CRYSTAL CLEAR SPECIAL UTILITY DISTRICT

CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM

I. INTRODUCTION

A. The purpose of the Cross-Connection Control and Backflow Prevention Program is to provide guidelines for the implementation of backflow prevention devices for the purpose of protecting the water supply of Crystal Clear Special Utility District (the "District") by isolating any contaminants from each customer's internal distribution system that could backflow into the public water supply system.

B. The Program also establishes guidelines for the maintenance of a continuing program of cross-connection control and backflow prevention. Failure, refusal or inability on the part of the customer to comply shall constitute grounds for refusing or discontinuing water service.

C. Any hazard must be isolated from the drinking water supply regardless of when the hazard was first created or when the site was built. Because the effects of a backflow event can be so significant, there are no grandfather clauses that apply to cross-connection control and backflow prevention in the TCEQ's regulations on backflow.

D. The Program is subject to change without notice to meet the requirements of the TCEQ and/or the needs of the District.

II. REGULATION

A. Under the provisions of the Safe Drinking Water Act of 1971, the Environmental Protection Agency (EPA) established national standards for safe drinking water. Each state is required to enforce the various regulations of the Safe Drinking Water Act and how it relates to its state laws.

B. In order to meet these provisions, the Texas Commission on Environmental Quality (TCEQ) on January 1, 1996, enacted a state law which requires the public water suppliers to implement and enforce the Cross Connection Control Program requirements located in the Texas Administrative Code (TAC), Title 30, Chapter 290 of the Rules and Regulations for Public Water Suppliers.

C. Final interpretations of these guidelines are left to the discretion of the District. While TCEQ rules state the minimum requirement, the District has the right to require additional measures and evaluate scenarios on a case-by-case basis to ensure the protection of the public water supply system.

III. CROSS CONNECTIONS AND BACKFLOW

A. A cross connection is a connection between a potable drinking water supply and a possible source of contamination or pollution.

B. Backflow is the undesirable reversal of flow in a potable water distribution system.

C. Cross connections and the possibility of backflow need to be recognized so they do not occur. A garden hose submerged in a hot tub, swimming pool, car radiator or attached to an insect/fertilizer sprayer could siphon the liquid back into the water main. Water from an irrigation system could also be siphoned back into the public water supply.

D. Backflow prevention assemblies are designed to protect the public water system from these types of concerns.

IV. BACKFLOW PREVENTION AND APPROVED PREVENTION ASSEMBLIES

A. Backflow prevention assemblies shall be designed and installed per the District's technical standards and backflow prevention details. Approved backflow prevention assemblies can be found in Appendix A (attached).

B. The customer service application must be accompanied by a water service layout plan showing all proposed structures to be connected to the water system and illustrating the proposed type and size of backflow prevention assemblies to be installed. The District and/or the District's engineer shall review and approve of the plans and backflow prevention assembly prior to installation.

C. All backflow prevention devices shall be located on private property within an easement and as close as possible to the public right-of-way. All backflow prevention devices shall be accessible to the District.

D. All types of establishments listed in 30 TAC 290.47(f) must provide for the separation of contamination within their premises, either by an air gap between the meter and the first tap or tee, or by having each of the internal plumbing facilities properly air gapped. If the containment air gap separation is impractical, and reliance is placed instead on individual internal air gaps or vacuum breakers in a customer's system, the District may require additional protection in the form of the other backflow prevention assemblies listed in Appendix A.

E. Single check valve. The single check valve is not considered to be an approved assembly and will be used only in limited instances such as for directional flow control.

V. TESTING AND REPORTING

A. In order to assure that backflow prevention assemblies continue to operate satisfactorily, each customer that is required to use an assembly is required to have periodic testing of the assembly performed in accordance with this section. All assemblies must be tested at the time of installation, and at the time of any repair or relocation. All tests and repairs must be performed by a certified tester. It will be the responsibility of the customer to initiate the testing and any maintenance determined by the test to be necessary, and to submit written results to the District.

B. Testing schedule. All assemblies must be tested in accordance with the following schedule*:

ASSEMBLIES	SCHEDULE*
Reduced Pressure Zone (RPZ) Assembly	Annually
Pressure Vacuum Breaker (PVB) Assembly	Annually
Double Check Valve Assembly (DCVA)	Annually
Double Check Detector Assembly (DCDA)	Annually

**The District may require devices to be tested at more frequent intervals based upon imminent public health and safety hazards presented.*

C. Backflow prevention assemblies must be tested per the table above. The assembly must be cleaned, and all rubber parts replaced when deemed necessary by the certified tester or the assembly manufacturer. If a backflow prevention assembly is found to be malfunctioning in an annual testing process, the assembly must be completely torn down and rebuilt at that time. The District will track individual assemblies to ensure compliance with these

requirements.

D. The District has chosen to partner with Vepo, LLC to allow for the online submission of Backflow Prevention Assembly Test and Maintenance Reports. All testing information will be entered directly by the tester into the online password protected system provided by Vepo, LLC. Testers will no longer be able to submit paper test reports directly to the District. Additional information and how to register your backflow prevention assembly is available at this weblink: https://www.crystalclearsud.org/backflow-prevention-assemblies.

E. The District may require field inspection of the customer's premises to determine the actual or potential hazards and the appropriate backflow prevention needed.

F. District personnel may perform periodic tests on assemblies at random locations to ensure that acceptable test standards are being followed by certified testers. District personnel may also randomly select and tag assemblies in a manner that will determine if the assemblies have been tested as required.

G. All new residential or commercial facilities are required to comply with these criteria. Compliance with these requirements will be verified in conjunction with the new customer's application for water service. All customer owned backflow prevention assemblies must be tested upon installation, repair or relocation. Because backflow prevention assemblies are mechanical devices that will degrade over time, all backflow assemblies should be tested regularly to ensure they are in working order. It shall be the responsibility of the property owner or the customer's representative of the property owner to provide verification of the required approvals upon request.

H. Private plumbing installations must adhere to state rules and regulations relating to backflow and cross connection control and shall be inspected in accordance with this program.

VI. BACKFLOW PREVENTION FOR FIRELINES

A. Backflow prevention is required on all fire line installations. All fire lines shall have an approved double check detector assembly (DCDA) installed per the District's technical specifications and standard water details. The DCDA detail can be found in Appendix B.

B. Installation and operation must comply with standards set forth by AWWA and all federal, state, and local laws, rules and regulation, codes and ordinances.

C. The DCDA shall be installed as close to the existing water line as practical. Assembly must be accessible for testing and maintenance. Location must be approved prior to installation.

D. Assemblies must be Underwriters Laboratory (UL) approved for fire protection purposes.

E. The type and extent of backflow prevention needed for a particular fire protection system is subject to approval by the District. Devices currently installed that are not the correct assembly as required by the District Rules and Regulations will be required to completely replace the device to meet the requirements of this program.

F. Pressure losses across backflow prevention assemblies must be accommodated in the design or redesign of a fire protection system. This factor is particularly important when redesigning existing fire protection systems. All backflow prevention assemblies for fire line installations must be UL listed.

G. Backflow prevention requirements for fire lines:

TYPE OF FIRELINE	DEVICE OR ASSEMBLY
Fire line with no chemical additive and no additional water supply	DCDA
Fire line utilizing a pressure pump system	AG or RPZ
Fire protection system utilizing chemical additives	RPZ
Fire protection system with access to an auxiliary water supply	AG or RPZ

APPENDIX A
BACKFLOW PREVENTION DEVICES AND DETAILS

Air Gap (AG)

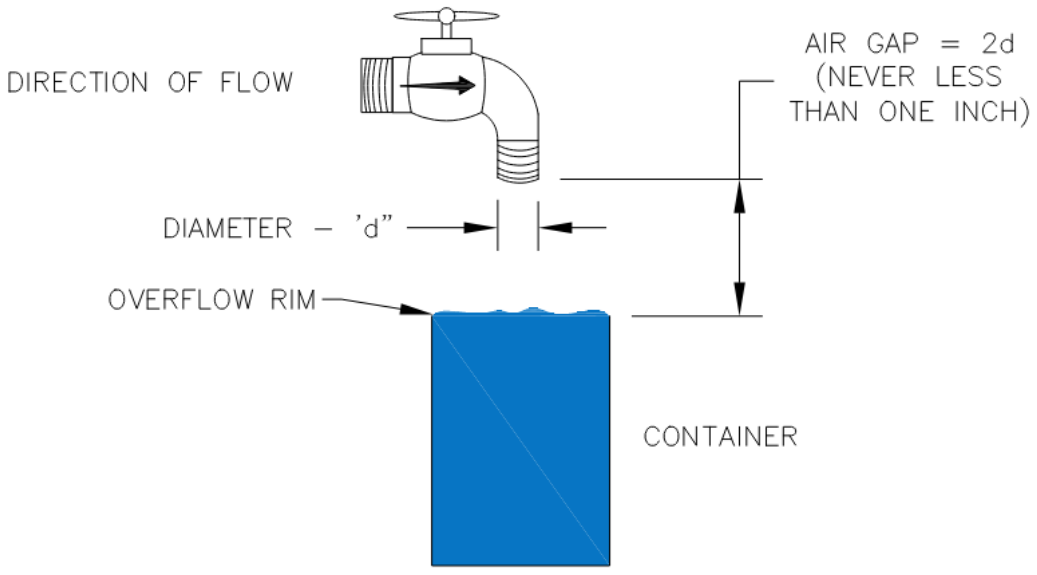
An air gap is a vertical, physical separation between the discharge end of a potable water supply pipeline and the flood-level rim of an open container being filled. This separation must be at least twice the diameter of the water supply outlet and never less than one inch. An air gap is considered the highest form of protection since the drinking water supply is physically separated from the container.

Common Applications:

- Lethal or high health hazard situations
- Raw sewage
- Recycled water
- Auxiliary water supply

Details about this system include:

- Use of an air gap often exposes water to dust, debris, airborne bacteria, and other contaminants and pollutants
- Should not be used in an area with dangerous atmosphere
- Vulnerable to bypass arrangements



Air Gap Detail

Double Check Valve Assembly (DCVA)

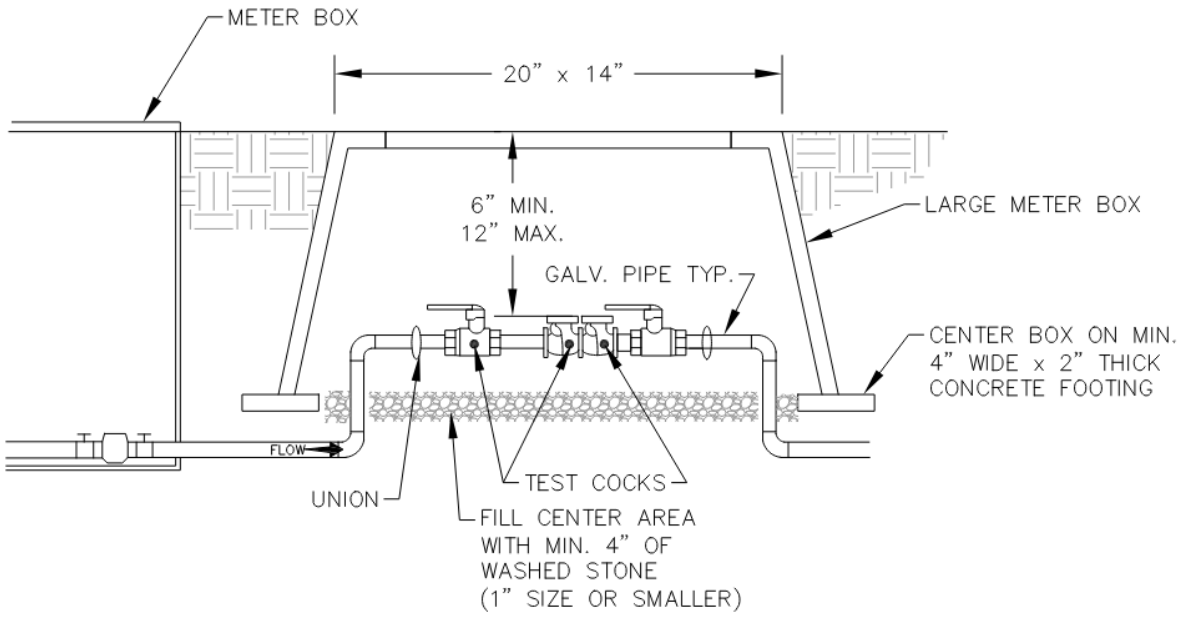
A DCVA is a mechanical valve assembly that consists of two independently acting, spring-loaded check valves. It includes tightly closing resilient seated shutoff valves at each end of the assembly and is equipped with test cocks. A DCVA is effective against backpressure backflow and back-siphonage.

Common Applications:

- Non-health hazards only
- Fire suppression systems
- Non-hazardous irrigation systems
- Combi-boilers

Details about this system include:

- Highly versatile
- Low-hazard sites such as apartment buildings
- Requires annual testing by State-certified tester
- Used for irrigation systems supplied by public water supply only



Double Check Valve Assembly Detail

Pressure Vacuum Breaker Assembly (PVB)

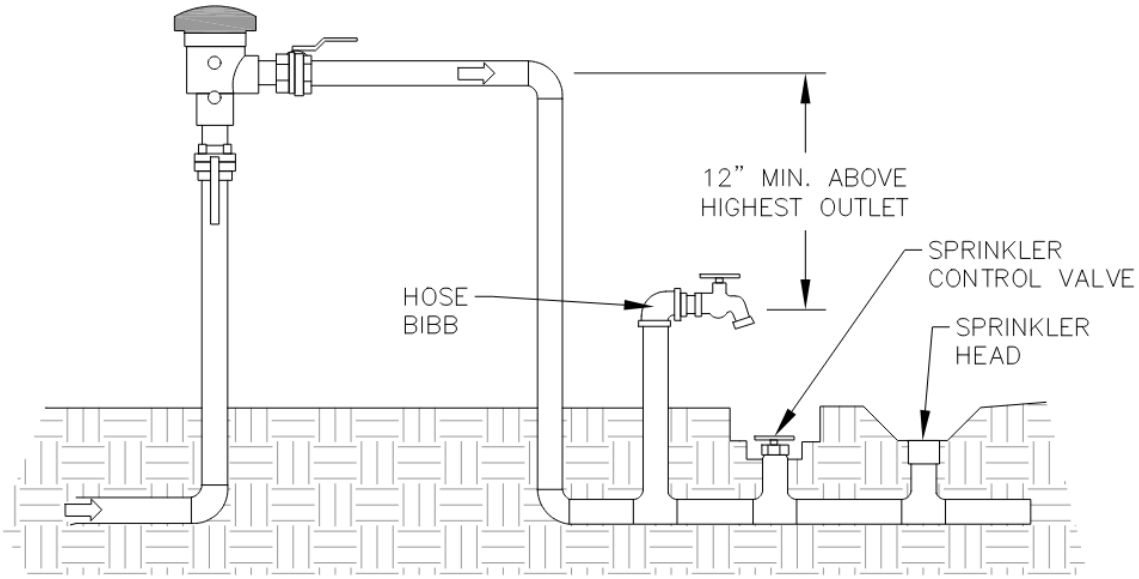
A PVB is a mechanical backflow preventer that consists of an independently operating, internally loaded check valve and an independently acting, spring-loaded air inlet valve located on the discharge side of the check valve. The air inlet valve opens when the internal pressure exceeds atmospheric pressure, preventing back-siphonage. Test cocks and shut off valves are attached at each end of the assembly. A PVB may be used to isolate hazards with no back pressure conditions. It is effective against back siphonage only.

Common Applications:

- Non-health or health hazard situations
- Irrigation systems

Details about this system include:

- Installed 12 inches above highest piping point
- Requires annual testing by State-certified tester
- Used for irrigation systems supplied by a public water supply only



Pressure Vacuum Breaker Assembly Detail

Reduced Pressure Zone Assembly (RPZ)

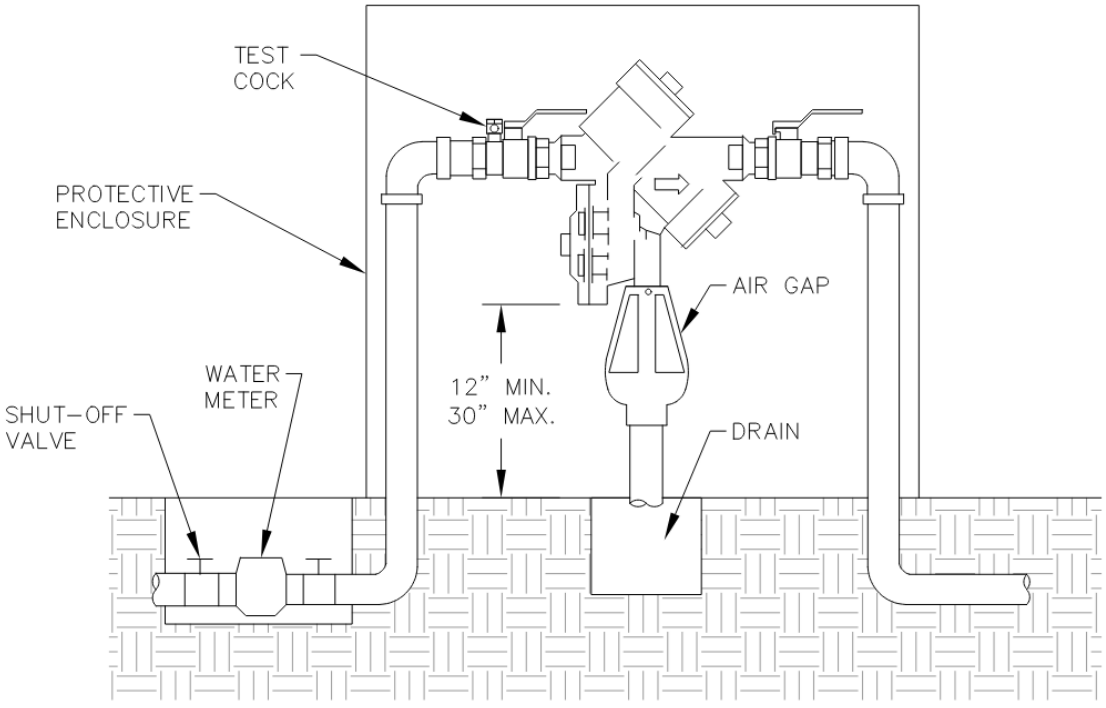
An RPZ is a mechanical valve assembly that consists of two independently operating, spring-loaded check valves with a mechanically independent, hydraulically operating pressure differential relief valve. The relief valve is located between the two check valves and below the first check valve. It includes shutoff valves at each end of the assembly and is equipped with test cocks. It is used for services having either health hazards or non-health hazards and under conditions of backpressure or back-siphonage and gives the highest level of protection among the mechanical backflow prevention assemblies.

Common Applications:

- Non-health and health hazards
- Domestic water protection
- Irrigation service protection

Details about this system include:

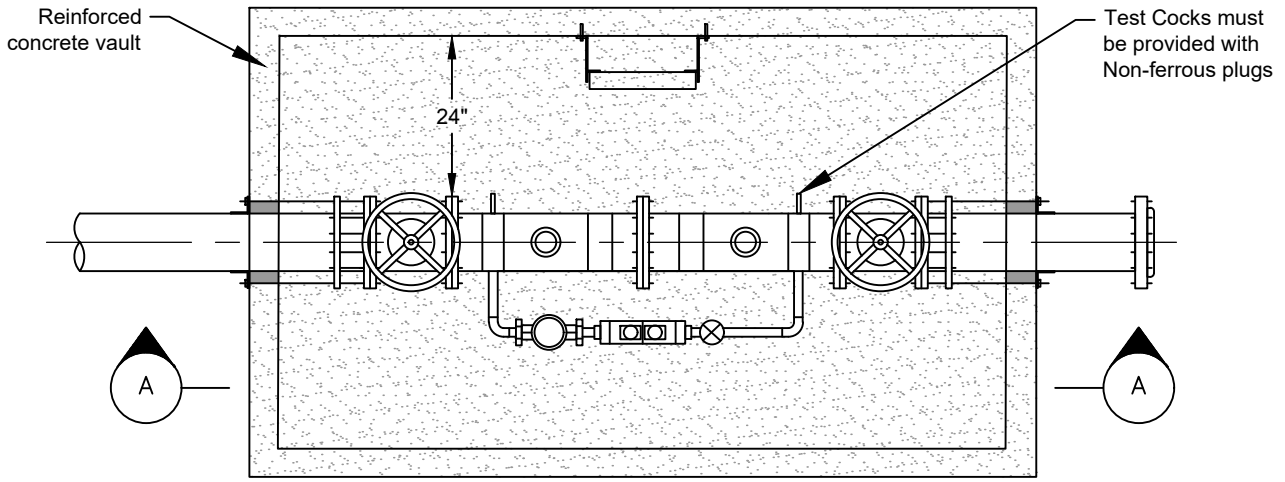
- Installed above ground
- Only device that allows for applying fertilizer or other chemicals into irrigation systems
- Requires annual testing by State-certified tester
- Used at high-hazard sites such as hospitals, chemical plants, mortuaries



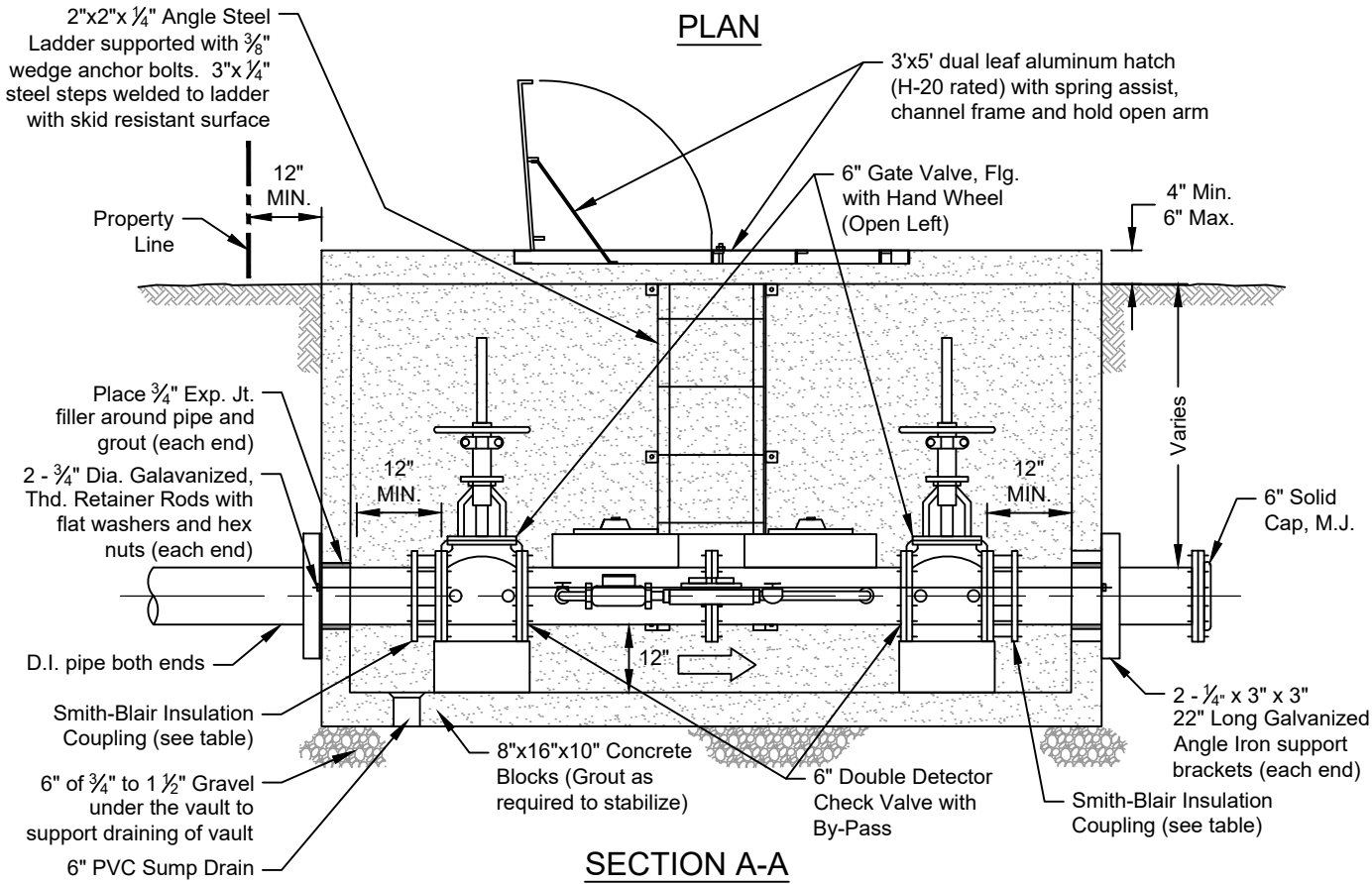
Reduced Pressure Zone Assembly Detail

APPENDIX B
DOUBLE CHECK DETECTOR ASSEMBLY DETAIL

PIPE DIAMETER	DOUBLE DETECTOR CHECK	BY-PASS METER	SMITH-BLAIR COUPLING
4"	4"	5/8" - 3/4"	932
6"	6"	5/8" - 3/4"	932
8"	8"	5/8" - 3/4"	932



PLAN



SECTION A-A
N.T.S.

NOTES:

1. APPROVED ASSEMBLIES ARE REQUIRED TO HAVE RESILIENT SEATED SHUT-OFF VALVES AND TEST COCKS AS INTEGRAL PARTS OF THE ASSEMBLIES, OTHERWISE APPROVAL IS VOIDED.
2. THE BYPASS METER WILL BE SUPPLIED BY CCSUD AND PAID FOR BY THE CUSTOMER.
3. NO CONNECTIONS OR TEES WILL BE ALLOWED BETWEEN SERVICE CONNECTION AND ASSEMBLY.
4. FOR ADDITIONAL INFORMATION, REFER TO CCSUD WATER DESIGN CRITERIA AND TECHNICAL SPECIFICATIONS.

PROPERTY OF
CRYSTAL CLEAR SPECIAL UTILITY DISTRICT

DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) DETAIL

M&S ENGINEERING
ELECTRICAL | CIVIL | MEP
TXENG FIRM # F-1394 | TBPELS FIRM #10169800
WWW.MSENGR.COM | (830) 228-5446

APPROVED	REVISION
DEC 2022	JUNE 2023

SHEET 1 OF 1