



## Cross-Connection Control Policy

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## INTRODUCTION

The South Carolina Department of Health and Environmental Control (SCDHEC or the Department) defines cross-connection as any actual or potential connection or structural arrangement between a public water supply and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas or substance other than the intended potable water which the system is supplied. Bypass arrangements, jumper connections, removable pipe sections, swivel or changeover devices and other temporary or permanent devices through which or because of which backflow can or may occur are considered to be cross-connections.

The State Primary Drinking Water Regulations promulgated pursuant to Section 44-55-10 through 44-55-120 South Carolina Code of Laws, R-61-58.7F. Cross-Connection Control section also mandates that:

- (1) All public water systems shall initiate and maintain a viable cross-connection control program. Such a program shall consist of:
  - (a) Locating and eliminating unprotected cross connections.
  - (b) Maintaining records pertaining to the location of existing backflow prevention assemblies, type and size of each assembly and annual test results.
- (2) No person shall install, permit to be installed or maintain any cross-connection between a public water system and any other non-public water system, sewer or a line from any container of liquids or other substances, unless an approved backflow prevention device is installed between the public water system and the source of contamination.
- (3) A connection between an approved public water system and a service or other water system not hazardous to health but not meeting the standards of the approved public water system and not cross-connected within its system with a potentially dangerous substance shall be considered a low hazard category cross-connection. An approved backflow prevention device must be installed for any identified low hazard cross-connection.
- (4) A connection between an approved public water system and a service or other water system which has or may have any material in the water dangerous to health, or connected to any material dangerous to health, that is or may be handled under pressure, or subject to negative pressure, shall be considered a high hazard category cross-connection. Protection shall be by air-gap separation or an approved reduced pressure principle backflow prevention assembly.
- (5) Reduced pressure principal backflow prevention assemblies shall not be installed in any location subject to possible flooding. This includes pits or vaults which are

not provided with a positive gravity drain to the ground's surface that is capable of exceeding the discharge rate of the relief valve.

- (6) Fire line sprinkler systems, except those in high hazard category shall be protected by an approved double detector check valve assembly that is equipped with a PW approved metering device on the bypass. High hazard category fire sprinkler systems shall include, but not be limited to: antifreeze systems, foam systems, systems charged from or tied into ponds, lakes, streams, or any water source other than the approved public water supply. High hazard category fire sprinkler systems shall comply with the requirements of Paragraphs (4) and (5) previously mentioned in this section. An approved backflow device will be allowed in a mechanical room if the riser is within 75 feet of the main connection. In the event the riser is greater than 75 feet from the main connection, the backflow device must be installed at the connection to the water main.
- (7) The Department shall prepare and publish a list of backflow prevention assemblies approved by the Department for use in South Carolina, and this list shall be updated at least once annually and available on the SCDHEC website.
- (8) When testable double check valve assemblies, pressure vacuum breakers, and/or reduced pressure principal backflow prevention assemblies are installed to protect a public water system against the possibility of backflow from a customer's water service, annual testing of the assemblies shall be performed by a certified tester.
  - (a) Each assembly shall be tested by a certified tester after installation and before use by the customer. Each assembly shall be tested at least once annually by a certified tester approved by SCDHEC. Each owner of these devices will be reminded annually to perform these tests in a timely manner. A list of certified testers is available on SCDHEC's website.
  - (b) The public water system is to receive a written report of the inspection and testing results for all assemblies tested within its distribution system. The report shall be submitted by the certified tester making the inspection and test on the SCDHEC approved forms.
  - (c) All backflow prevention assemblies shall be tested immediately after repairs of any kind are made to the assembly.
- (9) There are four (4) types of certified testers of backflow prevention assemblies; General Tester, Limited Tester, Inspector Tester and Manufacturer's Agent. The definition of each type of certified tester is specified in R.61-58(A).
  - (a) Each certified tester's license shall expire three (3) years from the date of issue. In order to renew this certification for three (3) more years, the tester shall come before a designated person approved by the Department and shall successfully complete a written examination with a passing score of 70% and

perform the prescribed test on an approved reduced pressure principal backflow prevention assembly, double check valve assembly, and a pressure vacuum breaker using the tester's own differential pressure gauge. The gauge must be accurate within 2% of full scale or  $\nabla$  0.3 pounds per square inch differential (PSID). Any gauge found to be inaccurate or malfunctioning will be required to be calibrated or repaired as needed to bring it into compliance before certification will be renewed.

- (b) Any applicant for certification who fails to properly perform the above prescribed tests will have his certification revoked immediately and will have to successfully complete the state sponsored backflow prevention training and certification course in order to become re-certified as a tester of backflow prevention assemblies in South Carolina.
- (c) A certified tester may have his tester's certification revoked due to incompetence or falsification of test results, as determined by the Department.
- (d) The Department shall reserve the right to charge or allow for the charge of a nominal fee for the administration of the recertification of testers.

In compliance with this State mandate, the following is Powdersville Water's (hereinafter referred to as PW) Cross-Connection Control Policy.

## OVERVIEW

Technology has made it possible to deliver safe drinking water of high quality to the distribution systems of public water supplies. However, to assure safe water at the customer's tap, it is essential that physical cross-connections, which create actual or potential backflow possibilities, are eliminated from both the distribution systems and the plumbing systems of customer taps. Where elimination is impractical, protection by installation of an approved backflow prevention assembly becomes necessary to protect PW's water distribution system.

The consumer's meter is actually the end of the water supply system and the beginning of the customer's responsibility. Backflow from secondary or unsafe water supplies into the public supply is recognized as a potential hazard wherever such supplies are interconnected.

Continued surveillance in a cross-connection control program is necessary because piping systems are constantly being installed, altered, or extended.

The objective of the cross-connection control policy is to protect PW's water distribution system from contamination and to provide safe drinking water to our customers.

Under certain circumstances, atmospheric vents and relief valves on backflow preventers could allow the entry of aerosols, toxic fumes, or airborne solid particles into the system. Wherever there is a physical connection between a potable water system and a non-potable environment, backflow may occur due to either back-siphonage or backpressure.

Back-siphonage is backflow caused by negative or reduced pressure in the supply piping. Examples of back-siphonage are:

- (1) Line repair of a broken main that is lower in elevation than its service point. This will allow negative pressures to be created by water trying to flow to a lower point in the system.
- (2) Undersized piping if water is withdrawn from a pipe at a very high velocity, the pressure in the pipe is reduced and the pressure difference creates a situation which causes the water to flow into the pipe from the contaminated source.
- (3) Lowered residual pressure in the water main due to a high water withdrawal such as fire fighting, water main flushing, or a broken water main.
- (4) Reduced supply main pressure on the suction side of a water main booster pump.

Backpressure may cause backflow to occur whenever a potable system is connected to a non-potable supply operating under a higher pressure by means of a pump, boiler, elevation difference, air or steam pressure, and so forth. There is a high risk that non-potable water may be forced into the potable water system whenever these inter-connections are not properly protected. Examples of cause of backpressure are:

- (1) Booster pump systems designed without backflow prevention devices.
- (2) Connections with another system, which may at times, have a higher system pressure. A simple private well pump may be an example.
- (3) Connections to boilers and other high pressure systems without backflow protection.
- (4) Water stored in tanks or a plumbing system which by virtue of their elevation difference would create sufficient pressure to cause backflow in the public system.

## **SECTION 1 – GENERAL POLICY**

### **1.1 The purpose of this policy is:**

- (1) To protect PW's potable water supply from the possibility of contamination or pollution by isolating within the customer's internal distribution system(s) or the customer's private water system(s) such contaminants or pollution that could backflow into PW's water distribution system; and,
- (2) To promote the elimination or control of existing cross-connections, actual or potential, between the customer's private potable water system(s) and other non-potable water systems, plumbing fixtures, and industrial piping systems; and,
- (3) To provide for the maintenance of a continuing program for cross-connection control that will systematically and effectively prevent the contamination or pollution of all potable water systems.

### **1.2 The responsibilities of PW's cross-connection program are as follows:**

- (1) To prevent contamination to the public water system due to backflow of contaminants or pollutants through any water service connection. This responsibility begins at the source and includes the entire water distribution system and ends at the user meter connections. If, in the judgment of PW, an approved backflow prevention assembly is required for the safety of the water system, PW shall give notice in writing to the customer to install such approved backflow prevention assembly(s) at specific location(s) on their premises. The customer shall immediately install such approved assembly(s) at their expense; and, failure, refusal, or inability on the part of the customer to install, have tested, and maintained said assembly(s) shall constitute grounds for discontinuing water service to the premises until such requirements have been satisfactorily met. Wholesale customers shall promulgate policies that meet or exceed those of PW's Policy or shall comply with these policies at the point of connection to PW's system.
- (2) To promulgate and enforce laws, rules, regulations, and policies necessary to carry out designated responsibilities.
- (3) To make inspections of private premises and determination of the degree of hazard customers present to PW's system.
- (4) To make and maintain all necessary records in accordance with this policy.
- (5) To maintain a list of approved cross-connection prevention assemblies for use in PW's system.

### **1.3 Customers**

The water user has the primary responsibility to keep contaminants out of the potable water system. This responsibility begins at the user's metered connection and includes any and all water distribution piping on the premises beyond this metered point. If a cross-connection or a potential for a cross-connection exists, the water user, at the water user's expense, must install, have tested and maintain approved backflow preventers as required by this policy.

In the event of accidental cross-connection to PW's water supply system, the user shall immediately notify PW and must confine further spread of pollution or contamination within the user's premises.

### **1.4 Backflow Prevention Assembly Installers**

It is the responsibility of the installer of backflow prevention assemblies to make sure that each assembly is working properly. The assembly shall be tested when installed prior to the system being placed into service and every year thereafter. All testing and repair reports (approved SCDHEC form) must be submitted to PW.

## **SECTION 2 – REQUIREMENTS**

### **2.1 Water System**

- (1) The water distribution system is considered to be made up of two parts: PW's distribution system and the customer's plumbing system.
- (2) PW's system shall consist of the distribution system and shall include all those facilities of the water system under the complete control of PW, up to the discharge side of the customer's meter.
- (3) The source shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system. In PW's case, the treatment facilities are owned and controlled by other entities. The water is master metered into the PW system.
- (4) The distribution system shall include the network of pipes used for the delivery of water from the source to the customer's system.
- (5) The customer's system shall include those parts of the facility beyond the meter that are utilized in conveying domestic water to the premises.

### **2.2 Policy**

- (1) No water service connection to any premises shall be installed or maintained by PW unless the water supply is protected as required by state law and regulations and this Cross-Connection Control Policy. Service of water to any premise shall be discontinued by PW if a backflow prevention assembly required by this Cross-Connection Control Policy is not installed, tested, and maintain, or if it is found that a backflow prevention assembly has been removed, by-passed, or if an unprotected cross-connection exists on the premises. Service will not be restored until such conditions or defects are corrected.
- (2) The customer's system should be available for inspection at all reasonable times to authorized representatives of the Department of Health and Environmental Control and PW to determine where cross-connection or other structural or sanitary hazards, including violations of the regulation may exist. When such a condition becomes known, PW may deny or immediately discontinue service to the premises by providing for a physical break in the service line until the customer has corrected the condition(s) in conformance with state, county, town, or city statutes relating to plumbing and water supplies and the regulations adopted pursuant hereto.

- (3) An approved backflow prevention assembly shall be installed on the service line to a customer's water system at or near the property line or immediately inside the building being served; but in all cases, before the first branch line leading off the service line.
- (a) In the case of premises having an auxiliary water supply that is not or may not be of safe bacteriological or chemical quality and that is not acceptable as alternate source by PW, the PW customer's system shall be protected against backflow by installing an approved backflow device in the service line, appropriate to the degree of hazard that is determined.
  - (b) In the case of premises on which any industrial fluids or any other objectionable substances are handled in such a fashion as to create an actual or potential hazard to PW's water system. PW's water system shall be protected from backflow from the premises by installing an approved backflow prevention assembly in the service line, appropriate to the degree of hazard. This shall include the handling of process waters and waters originating from PW's system that have been subject to deterioration in quality.
  - (c) In the case of premises having (1) internal cross-connections that cannot be permanently corrected and controlled, or (2) intricate plumbing and piping arrangements or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impractical or impossible to ascertain whether or not dangerous cross-connections exist, PW's water system shall be protected against backflow from the premises by installing and approved backflow prevention assembly at the meter location in the service line.
- (4) The type of protective assembly required under subsection 2.2 shall depend upon the degree of the hazard that exists. The requirement of specific devices outlined in this section shall be at PW's discretion based upon the degree of hazard and site-specific circumstances:
- (a) In the case of any premises where there is an auxiliary water supply, it will be considered a "High Hazard" and PW's water system shall be protected by an approved air-gap separation or an approved reduced-pressure principle backflow prevention assembly.
  - (b) In the case of any premises where there is water or a substance that would be objectionable but not hazardous to health if introduced into PW's water system, it will be considered a "Medium Hazard" and PW's water system shall be protected by an approved double-check valve assembly.
  - (c) In the case of any premises where there is any material dangerous to health that is handled in such fashion as to create an actual or potential hazard to PW's water system, it will be considered a "High Hazard" and PW's water system shall be protected by an approved air-gap separation or an approved reduced-pressure principle backflow prevention assembly. Examples of premises where these

conditions will exist include sewage treatment plants, chemical manufacturing and processing plants, medical facilities, mortuaries, and metal plating operations.

- (d) In the case of any premises where there are “uncontrolled” cross-connections, either actual or potential, it will be considered a “High Hazard and PW’s water system shall be protected by an approved air-gap separation or an approved reduced-pressure principle backflow prevention assembly at the service connection.
  - (e) In the case of any premises where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make a complete in-plant cross connection survey, it will be considered a “High Hazard” and PW’s water system shall be protected by an approved air-gap separation or an approved reduced- pressure principle backflow prevention assembly at each service to the premises.
  - (f) In the case of where, in the opinion of PW, an undue health threat is posed because of the presence of extremely toxic substances, PW may require an approved air-gap separation at the service connection to protect PW’s water system.
  - (g) In the case of any residential premises where a lawn irrigation system exists that are not equipped with any chemical injection or addition, it will be considered a “low hazard” and shall be protected by a dual check. If the customer elects to install an additional testable device the maintenance and testing responsibility of this device shall be borne by the customer. If chemical addition is used, it will be considered a “high hazard” and shall be protected by a reduced-pressure device. All non-testable dual checks shall be on a 10-year replacement cycle by PW for taps with residential lawn irrigation.
  - (h) In the case of any commercial (non-residential) premises where a lawn irrigation system exists, it will be considered a “medium hazard” and shall be protected by a minimum of a double check valve assembly.
- (5) Any testable backflow prevention assembly required herein shall be a model and size approved by SCDHEC and PW. The term approved backflow prevention assembly shall mean an assembly that has been manufactured in full conformance with the standards established by the American Water Works Association titled:

AWWA C510-89 – Standard for Double Check Valve Backflow  
Prevention Assembly, and  
AWWA C511-89 – Standard for Reduced-Pressure Assembly

- (6) It shall be the duty of the customer/user at the premises where backflow prevention assemblies are installed to have certified inspections and operational tests made at least once a year by a certified tester. In those instances where SCDHEC or PW deems the

hazard to be great enough, certified inspections may be required at more frequent intervals. These inspections shall be at the expense of the water user. A copy of all testing and repair reports shall be submitted to PW with the original to be retained on site.

- (7) All testers of backflow prevention devices located in PW's system shall be certified by SCDHEC and must be in good standing with SCDHEC. PW is authorized at any time to verify the validity of tests performed by certified testers in the distribution system. If PW determines that test records are falsified in any manner, the subject tester will be banned from performing work in PW's system and this information will be forwarded to SCDHEC's Cross Connection Control Department.

## **SECTION 3 – INSPECTIONS**

### **3.1 Proposed Construction**

All new construction plans and specifications for commercial and industrial facilities shall be reviewed by PW to determine the degree of possible cross-connections hazard. During this review, backflow prevention requirements in accordance with this policy will be determined.

### **3.2 New and Existing Facilities**

In order to determine the degree of hazard to PW's water system, a survey will be made of the customer's presently installed water system. This survey need not be a detailed inspection of the location of disposition of the water lines, but can be confined to establishing the water uses on the premises, the existence of cross-connections, the availability of auxiliary or used water supplies and the degree of hazard that the customer's system presents. On-site inspections are made of new or existing facilities and should any assemblies or plumbing changes be required, a follow up inspection will be made of the same facilities at a later date.

### **3.3 Right of entry**

Whenever it shall be necessary for the purpose of compliance or enforcement of this Policy, PW's representative, may enter upon any property or premises at reasonable times for the purpose of:

- (a) Inspection of any equipment, facilities or plumbing lines,
- (b) Sampling of any water suspected of any cross-connection,
- (c) Testing of any backflow prevention devices that are due to be tested.

PW and/or SCDHEC may enter upon the property at any hour under emergency circumstances to perform any investigation required to enforce this Policy.

### **3.4 Inspection and testing**

Annually, each testable device will be inspected, tested and repaired for compliance with this Policy. PW shall maintain accurate records of tests and repairs made to backflow prevention assemblies. The owner of the devices is responsible for making sure that periodic testing is performed of any device located on their property. All records shall be on forms approved by SCDHEC. Following any repair, overhaul, re-piping, or relocation of the assembly, the customer shall have the assembly tested to ensure that it is in good working condition and will prevent backflow. However, this testing may be more often in those instances where successive inspections indicate repeated failure to properly maintain such assembly or assemblies.

### **3.5 Fees**

All fees shall be set by PW on an annual basis for inspection, testing, and repairs. Fees are attached in Appendix “A” of this Policy and are subject to change from time to time. Fees for testing will only be charged by PW when the customer has failed to submit to PW a current successful test report after a second public notice. If PW determines a failure in the device, water service will be discontinued until the customer provides PW with a repair and test report from a certified tester.

## SECTION 4 – HAZARD DETERMINATION

In applying the policy outlined in this manual, two degrees of hazards are considered and defined as follows:

***Health (containment)***: A cross-connection or potential cross-connection involving any substance that could, if introduced into the potable water supply, cause death, illness, spread disease, or have a high probability for causing such effects.

***Non-health (pollutant)***: A cross-connection or potential cross-connection involving any substance that generally would not be a health hazard, but would constitute a nuisance, or be aesthetically objectionable, if introduced into the domestic potable water supply.

In assessing a potential cross-connection, the probability must be considered that piping may be changed, equipment may be used incorrectly, or negligence on the part of the customer may result in a backflow condition. Therefore, a potential cross-connection exists if one or more of the following elements are present: bypass arrangements, jumper connections, removable sections, swivel or changeover assemblies, hoses and hose bibs, or the presence of an abundance of piping that cannot be readily traced.

The degree of hazard increases as a function of both the probability that backflow will occur and the toxicity of the substance that may backflow. The risk associated with the substance's toxicity (or virulence) is always a greater concern.

## **SECTION 5 – TYPICAL CROSS-CONNECTION OCCURRENCES AND RECOMMENDED PROTECTION**

### **5.1 Protection recommended**

*Public potable water system.* Interconnection with an approved backflow prevention assembly shall be required on any direct interconnection (except as noted hereafter) between PW's approved public water supply and another approved public potable water supply over which PW does not have sanitary control. This may be accomplished in the following manner:

- (1) An air-gap separation or a reduced-pressure principle backflow prevention assembly is required at the service connection when the auxiliary water is or may be contaminated to a degree that would constitute a health hazard.
- (2) A double check valve assembly is required at the service connection when the auxiliary water supply is being operated under a public health permit but is not acceptable to PW as a source.
- (3) No backflow protection at the service is recommended if the auxiliary water system has a properly conducted cross-connection control program and sanitary control program in force, and the auxiliary water supply is acceptable to PW as a source.

*Private water supply.* A physical separation must be made between any private water supply, including a well, and the PW system.

## **SECTION 6 – METHODS OF BACKFLOW CONTROL**

The control of backflow, whether caused by backpressure or back-siphonage, requires the elimination of the cross-connection and the installation of an air-gap or a backflow prevention assembly.

Currently there are several general methods or types of assemblies that are used for the prevention of backflow, they include the following:

- (1) Air-Gap (AG) an approved air-gap is the unobstructed vertical distance through free atmosphere between the lowest point of a water supply outlet and the flood level rim of the fixture or assembly into which the outlet discharges. These vertical, physical separations must be at least twice the diameter of the water supply outlet, but never less than one inch (25mm).
- (2) Reduced-Pressure Principle Backflow Prevention Assembly (RPBA) The approved reduced-pressure principle backflow prevention assembly consists of two independently acting, approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and below two tightly closing resilient-seated shutoff valves, as an assembly, and are equipped with properly located resilient-seated test cocks.
- (3) Double Check Valve Assembly (DCVA) An approved double check valve assembly consists of two internally loaded check valves, either spring-loaded or internally weighted, installed as a unit between two tightly closing resilient-seated shutoff valves as an assembly, and fittings with properly located resilient-seated test cocks.
- (4) Pressure Vacuum Breaker (PVB) A pressure vacuum breaker assembly consists of an independently operating internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve, with properly located resilient-seated test cocks and tightly closing resilient-seated shutoff valves attached at each end of the assembly. Where provided, pressure vacuum breakers shall be installed a minimum of twelve (12) inches above the highest downstream piping and shall not be subject to backpressure.
- (5) Atmospheric Vacuum Breaker (AVB) The atmospheric vacuum breaker is an assembly that performs similarly to a pressure vacuum breaker. The AVB consists of a float check, a check seat, and an air inlet port. A shutoff valve immediately upstream may be an integral part of the assembly.

## SECTION 7 – GUIDE TO SELECTION OF ASSEMBLIES

The correct selection of a backflow assembly requires a thorough knowledge of the assembly’s operating function, the limitations of the assembly, the cause or potential cause of backflow, and the correct assessment of the degree of hazard. Because of the subjective nature in determining the proper backflow prevention assembly, this guide has been developed from past experience. However, when selecting the type of assembly, the health hazard should govern the final choice.

<b><u>Description of Cross-Connection</u></b>	<b><u>Minimum Type of Protection</u></b>
Aspirator (medical)	AVB, PVB
Aspirators	AVB
Autoclaves	RPBA
Autopsy Equipment	AVB, PVB
Bedpan washers	AVB, PVB
Clinics	RPBA
Commercial laundry	RPBA
Connection to sewer pipe	AG
Connection to plating tank	RPBA
Connection to salt water cooling system	RPBA
Connection to industrial fluid system	RPBA
Cooling towers with chemical additives	RPBA
Degreasing equipment	DCVA
Dock and dockside facilities	RPBA
Domestic space heating boiler	RPBA
Dye vats or machines	RPBA
Food & beverage processing plants	RPBA
Fire fighting system (toxic liquid foam)	RPBA
Heating equipment - commercial	RPBA
Fire Sprinkler Systems	DCVA
Irrigation systems with chemical additives	RPBA
Irrigations systems (non-residential))	DCVA
Kitchen equipment	AVB
Laboratories	RPBA
Lab bench equipment	AVB, PVB
Mortuary equipment	RPBA
Ornamental fountains	DCVA
Petroleum processing or storage facilities	RPBA
Plants using radioactive material	RPBA
Plating or chemical plants	RPBA
Pleasure boat marina	RPBA
Premises where inspection is restricted	RPBA

Reclaimed water systems	RPBA
Sewage treatment plants	RPBA
Sewage lift stations	DCVA
Steam generators	RPBA
Steam plants	RPBA
Sterilizers	RPBA
Specimen tanks	AVB, PVB
Swimming pools - public	DCVA
Tall buildings	DCVA
Tank vats or vessels containing toxic substances	RPBA
Vending machines	RPBA, PVB
Washing equipment	AVB

<b>Device Abbreviations Legend</b>
AG: Air-Gap
AVB: Atmospheric Vacuum Breaker
DCVA: Double Check Valve Assembly
PVB: Pressure Vacuum Breaker
RPBA: Reduced-Pressure Principle Backflow Assembly

## **SECTION 8 – INSTALLATIONS REQUIRING CONTINUOUS SERVICE: PARALLEL INSTALLATION**

All backflow prevention assemblies with test cocks are required to be tested once per year at a minimum. Testing requires a water shutdown usually lasting five (5) to twenty (20) minutes. For facilities that require an uninterrupted supply of water and when it is not possible to provide water service from a separate meter, provisions shall be made for a “parallel installation” of backflow prevention assemblies.

Multi-story buildings which have a number of flushometer toilets should be equipped with parallel assemblies. Experience has shown if the water supply is shut off to this type of building, flushometers may have to be manually reset.

During testing, one assembly is left on while the other is being tested. Usually, the two assemblies sized one assembly smaller than the service line, e.g. one 2-inch assembly or two 1-1/2-inch assemblies, one 8-inch assembly or two 6-inch assemblies.

PW will not accept an unprotected bypass around a backflow preventer when the assembly is in need of testing, repair, or replacement.

## **SECTION 9 – EXTERMINATING COMPANIES**

All tanks, tank trucks, and spraying apparatus used to convey or mix pesticides or herbicides in and exterminating process are required to use only overhead (air-gap) piping arrangements. All filling locations will consist of overhead piping arrangements with correctly installed pressure vacuum breakers. If for any reason an overhead piping arrangement cannot be used, a reduced pressure principle backflow assembly shall be installed on the service line at the meter.

**Never submerge a filling hose into any type of mixing tank.**

## **SECTION 10 – CROSS-CONNECTION REQUIREMENTS FOR FIRE PROTECTION SYSTEMS**

Fire protection systems consist of sprinklers, hose connections, piping and hydrants. Sprinkler systems may be wet or dry, open or closed. Systems of fixed spray nozzles may be used indoors or outdoors for protection of flammable liquids and other hazardous processes. It is required that these systems be protected based on the following classifications:

Class 1 – Direct connections from public water mains only; no pumps, tanks or reservoirs; no physical connection from other water supplies; no antifreeze or additives of any kind; all sprinkler drains discharging to atmosphere, dry wells, or other safe outlets.

Class 2 – Same as Class 1, except that booster pumps may be installed in the connection from PW's distribution system.

Class 3 – Direct connection to PW's distribution system, plus one or more of the following: elevated storage tanks, fire pumps taking suction from above-ground covered reservoirs or tanks and pressure tanks. All storage facilities shall be filled from the potable water supply and maintained in a potable condition.

Class 4 – Directly supplied from public mains similar to Classes 1 and 2, and with an auxiliary water supply dedicated to fire department use and available to the premises, such as an auxiliary supply located within approximately 1,700 feet of the pumper connection.

Class 5 – Directly supplied from public mains, and inter-connected with auxiliary supplies, such as: pumps taking suction from reservoirs exposed to contamination, or rivers and ponds; driven wells; mills or other industrial water system; or where antifreeze or other additives are used.

Class 6 – Combined industrial and fire protection system supplied from PW's distribution system only, with or without gravity storage or pump suction tanks.

Protection required:

Class 1 & 2	Double Detector Check Valve
Class 3	Double Detector Check Valve
Class 4 & 5	AG or RPBA
Class 6	Determined by inspection of system

## **10.1 Fire protection guidelines for the service area**

Prior to any connection of new or renovated fire sprinkler systems to PW's water distribution system, the following procedures are required:

- (1) Two sets of plans and hydraulic design data must be submitted for review to PW. All plans must be prepared or reviewed by a professional engineer and plans must be signed and embossed with the engineer's seal.
- (2) The plans will be reviewed and one set returned with any required changes. Changes will be noted on the plans. The plans will also be accompanied by a review letter. One set of plans will be retained for PW files.
- (3) Any booster pump installations will be designed to ensure that pressure in the distribution system does not fall below 25 psi residual. A minimum of 25 psi residual must be maintained in the distribution system at all times. Detail specifications on any fire pump are required for review for installation.
- (4) No anti-freeze or similar chemicals will be allowed in Fire Sprinkler Systems unless approved by PW.
- (5) An approved backflow device will be allowed in a mechanical room if the riser is within 75 feet of the main connection. In the event the riser is greater than 75 feet from the main connection, the backflow device must be installed at the connection to the water main.

## **10.2 Backflow Prevention Requirements**

All new, renovated or existing Fire Sprinkler Systems will be required to have an approved double detector check valve assembly with a PW approved by-pass meter. The by-pass line is also required to have a line size single check valve. The double detector check valve must meet all requirements of AWWA Standard C-506-79 or latest amendment.

## **10.3 Installation of Devices**

Installation of the double detector check valve and by-pass meter is the owner's responsibility. The double detector check valve and by-pass meter will in all cases be installed so that they are readily accessible for maintenance and inspection. Applications for the backflow assembly and fire meters must be made by a licensed fire suppression contractor or licensed plumber.

## **10.4 Maintenance Requirements**

It will be the responsibility of the owner to maintain the Fire Sprinkler System from the valve at PW's water distribution system to the inside of the building including the backflow assembly. PW will maintain from the tap to the main to the discharge side of the customer's water meter.

## **SECTION 11 – THERMAL PROTECTION – OWNER RESPONSIBILITY**

All customer water systems that have been closed or contained by the installation of a backflow assembly or similar checking device must make the necessary alterations to the plumbing system to protect against thermal expansion.

If water is heated and stored in a consumer's system, in which any branch or all of the system has been closed by the installation of a backflow preventer, a pressure reducing valve, or any other checking device, an approved auxiliary relief valve shall be installed at an accessible location between the checking device and the water heating equipment, to limit the thermal expansion of the water being heated to not more than 80 pounds per square inch no-flow pressure at any fixture on the system. A discharge line not less than ¼ inch inside diameter shall be piped to an approved location where no water damage would result from the discharge, and any water in the discharge pipe would drain by gravity, and be protected from freezing.

**The installation of a device to control thermal expansion will be the responsibility of the owner and plumbing officials having jurisdiction. All plumbing arrangements installed beyond PW's meter are the customer's sole responsibility.**

## **SECTION 12 – FREEZE PROTECTION – OWNER RESPONSIBILITY**

Customer owned water systems that have backflow assemblies shall be protected from freezing.

Installation of systems above ground may be subject to freezing. **The addition of freeze protection to protect the system will be the responsibility of the owner.** Freeze protection shall not interfere, with the inspection, operation or maintenance of the assembly.

## **SECTION 13 – PLAN REVIEW**

### **13.1 Drawing submittals**

Two (2) sets of plans and specifications for the backflow assembly installation must be submitted to PW for approval prior to installation of the device.

### **13.2 Design specifications**

Any backflow prevention assembly required shall be a model and size approved by PW. The term “approved Backflow Prevention Assembly” shall mean a device that has been manufactured in full conformance with the standards established by the American Water Works Association AWWA-0506-78 Standards for Reduced Pressure Principle Assembly and Double Check Valve Backflow Assembly and has completely complied with the laboratory and field performance specifications of the Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California.

## **SECTION 14 – NON-COMPLIANCE/ENFORCEMENT PROCEDURES**

### **14.1 Enforcement Procedure**

Non-compliance and enforcement procedures will fall into three categories:

- (1) Existing water customers who do not have a cross-connection control device in their system at present, but will be required to install such a device under this policy. Customers in this category where contaminants on their property have been determined by PW to represent a health hazard to the public water system will be required to take immediate corrective action upon notification. Customers will be required to install an approved backflow prevention assembly within 90 days of notification when PW has determined that a potential system hazard exists or within 150 days for a potential pollution hazard condition.
- (2) Any new water customer after the effective date of this Cross-Connection Control Policy will be required to install an approved backflow prevention device prior to connection to PW's distribution system whenever PW has determined that contaminants or pollution on the customer's property represents a hazard to the public water system.
- (3) Those existing water customers who have required backflow prevention devices in their system which do not meet PW's standards or have been found to be malfunctioning. These customers will be required to replace backflow prevention devices with assemblies that do meet PW standards. Malfunctioning backflow prevention devices for low hazard conditions must be repaired or replaced by the customers with an approved backflow prevention device within thirty days after notification by PW. For high hazard sources, the malfunctioning backflow prevention device must be replaced or repaired immediately.

### **14.2 Termination of water service**

- (1) Service of water to any premises will be discontinued by PW if a backflow prevention assembly required by law, rules, or regulations is not installed, tested, and maintained; or if it is found that a backflow prevention device has been removed or by-passed or if unprotected cross-connection exists on the premises and there is inadequate backflow protection at the service connections. Water service will not be restored until such conditions and defects are corrected.

- (2) Water services will be terminated for water customers who do not comply with PW's Cross-Connection Control Policy. A certified written notice shall be served to the offending party that water service will be terminated within ten days if the requirements of this policy are not met.
- (3) The water customer shall notify PW's Executive Director in writing within ten days to appeal termination action. The Executive Director shall convene a hearing within ten days of the receipt of the written notice (unless a later date is mutually agreed to) to hear the appeal of the water customer. Failure to appear by the customer will result in the termination of water service.

### **14.3 Legal Action**

After the evidence has been reviewed and a decision rendered with a copy to the customer, PW may terminate water service and/or pursue any available legal remedy.

### **14.4 Penalty: Cost**

The penalty for violating this policy shall not be more than one-thousand dollars for each violation. Each day on which a violation shall occur or continue shall be deemed a separate and distinct offense.

## **SECTION 15 – INSTALLATION REQUIREMENTS**

### **15.1 Installation within the building establishment**

Under special conditions, only backflow prevention assemblies will be allowed within the building establishments. These conditions include:

- (1) No connection between the tap at PW's water distribution system to the backflow prevention device.
- (2) Backflow assembly will not be installed in an area where discharge can cause damage. A small, occasional discharge from the vent in a RPBA is normal. Heavy discharge may occur if the device malfunctions. An approved drain must be installed to collect any water discharged from the reduced pressure backflow assembly.
- (3) Any approved drain must have free air space between the vent port and the drain conduit (air gap).
- (4) Backflow prevention assembly must be installed in an area which readily accessible for testing and maintenance. Installation in any confined area which is not conducive to normal maintenance activities is prohibited.

## **APPENDIX A**

### **FEES**

A. Annual Testing & Repairs (when customer fails to complete)

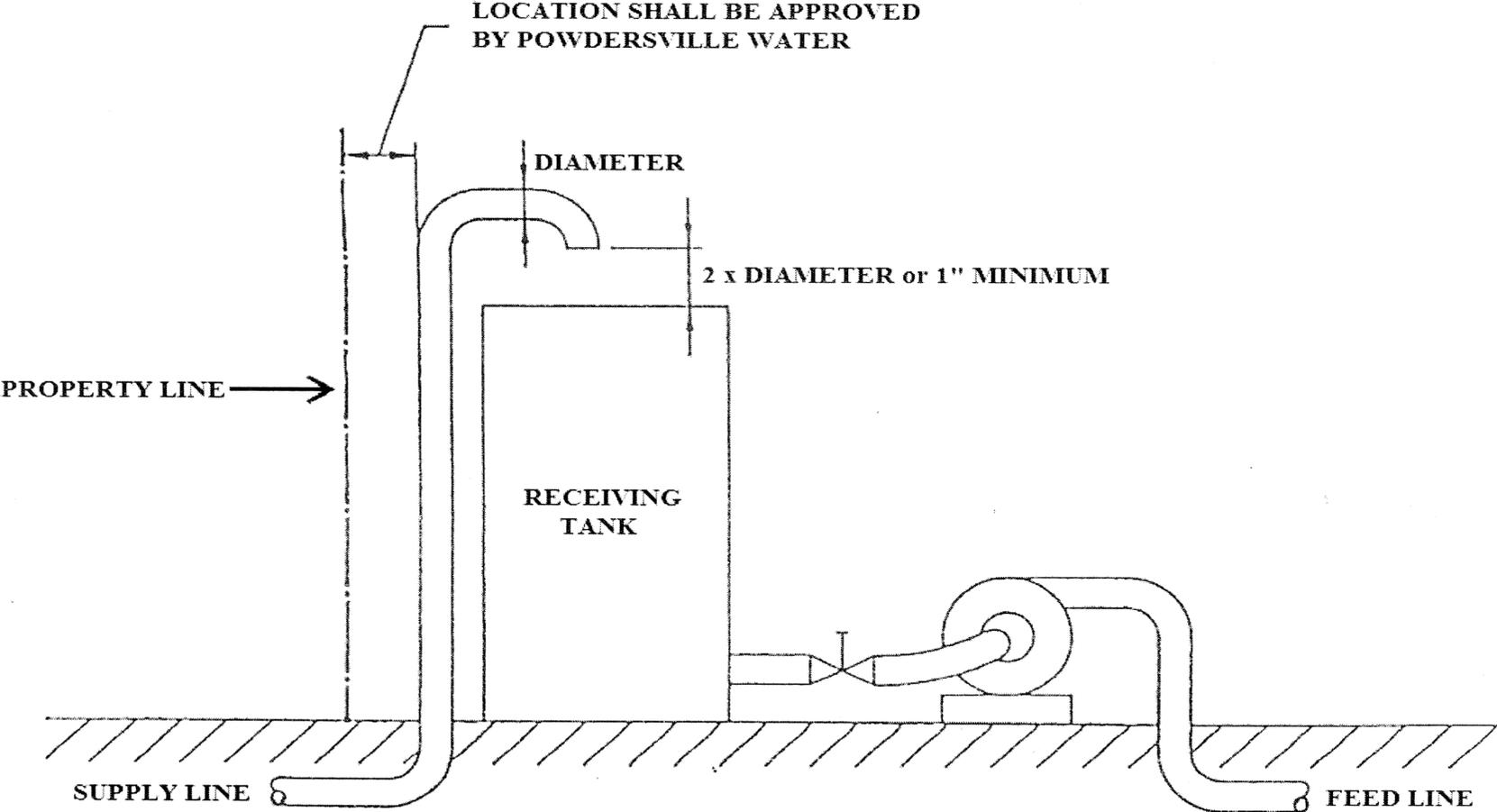
1. Test per Unit

- |    |                                   |          |
|----|-----------------------------------|----------|
| a. | DCVA or RP or PVB<br>less than 8" | \$250.00 |
| b. | DCVA or RP or PVB<br>8" or larger | \$350.00 |

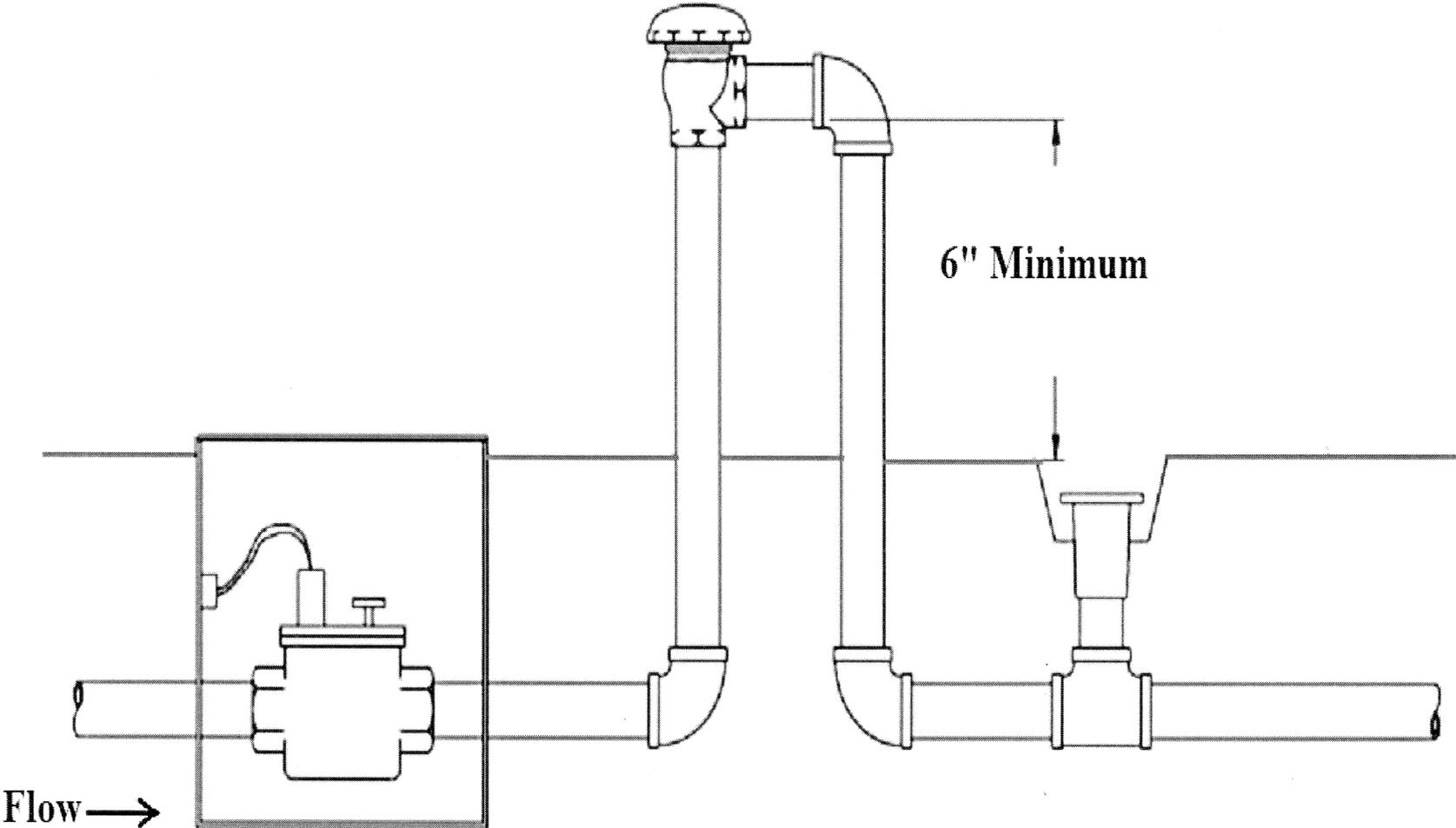
All fees subject to change without notice.

**APPENDIX B**  
**INSTALLATION DRAWINGS**

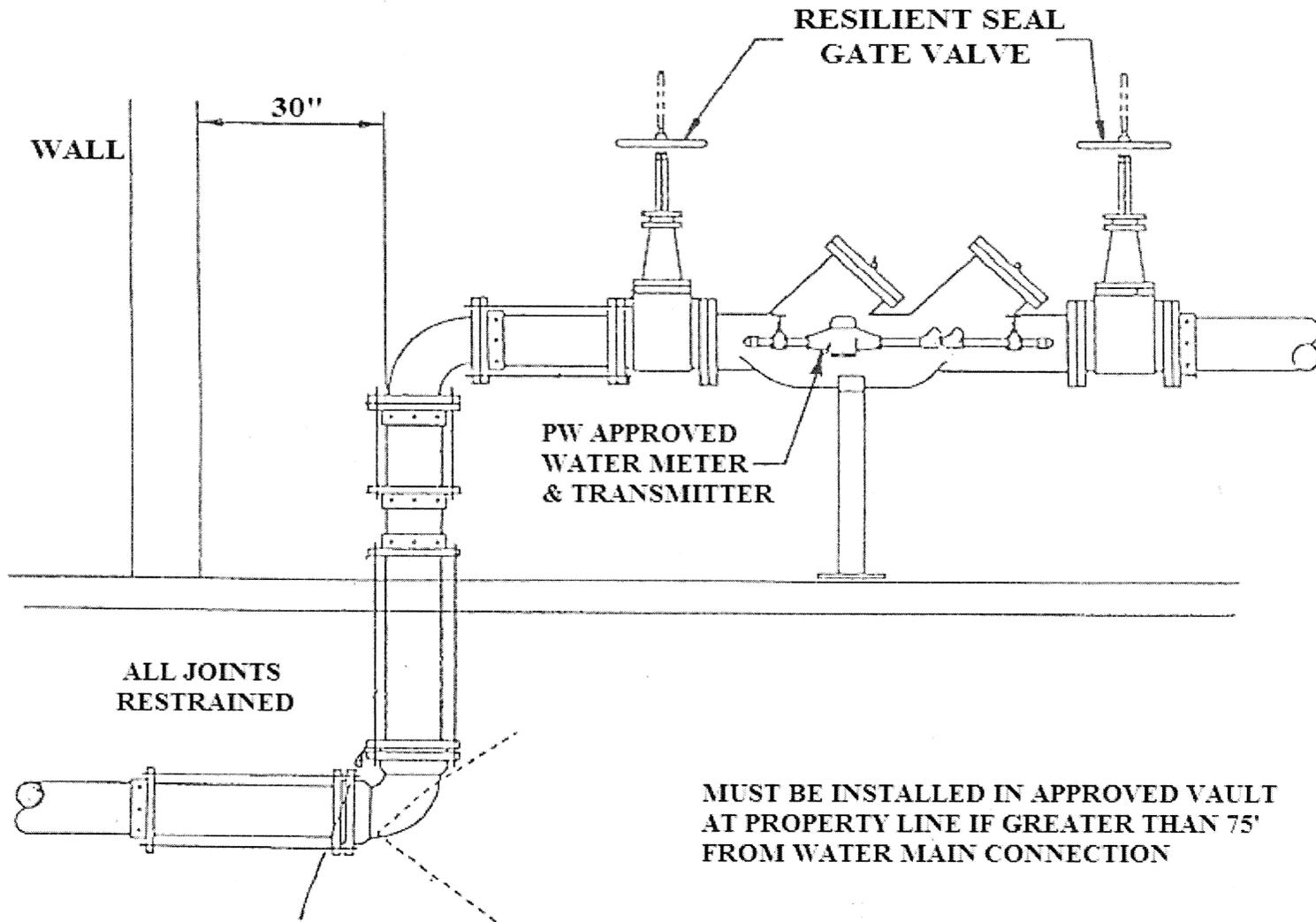
# AIR GAP SEPARATION



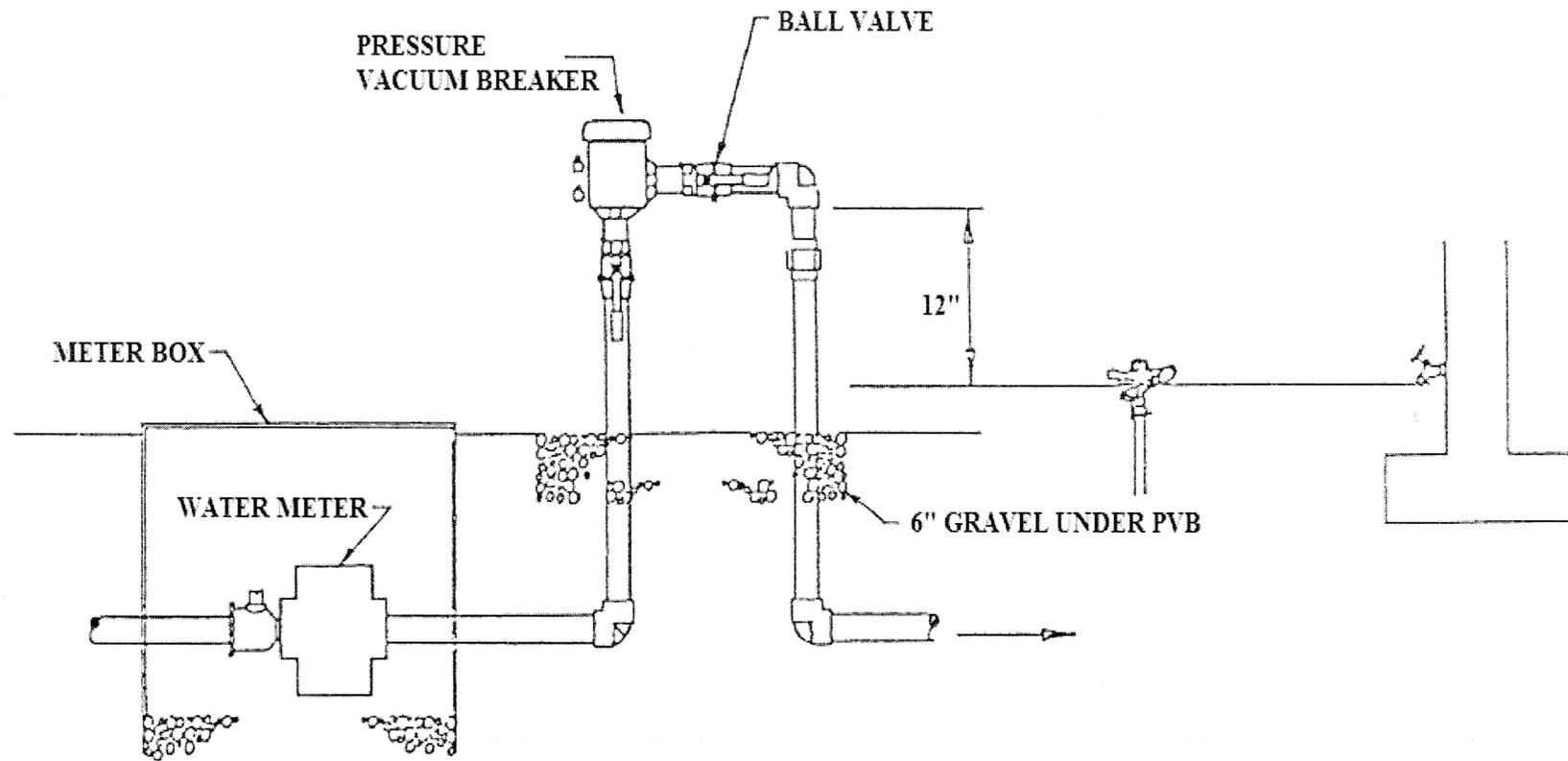
# ATMOSPHERIC VACUUM BREAKER



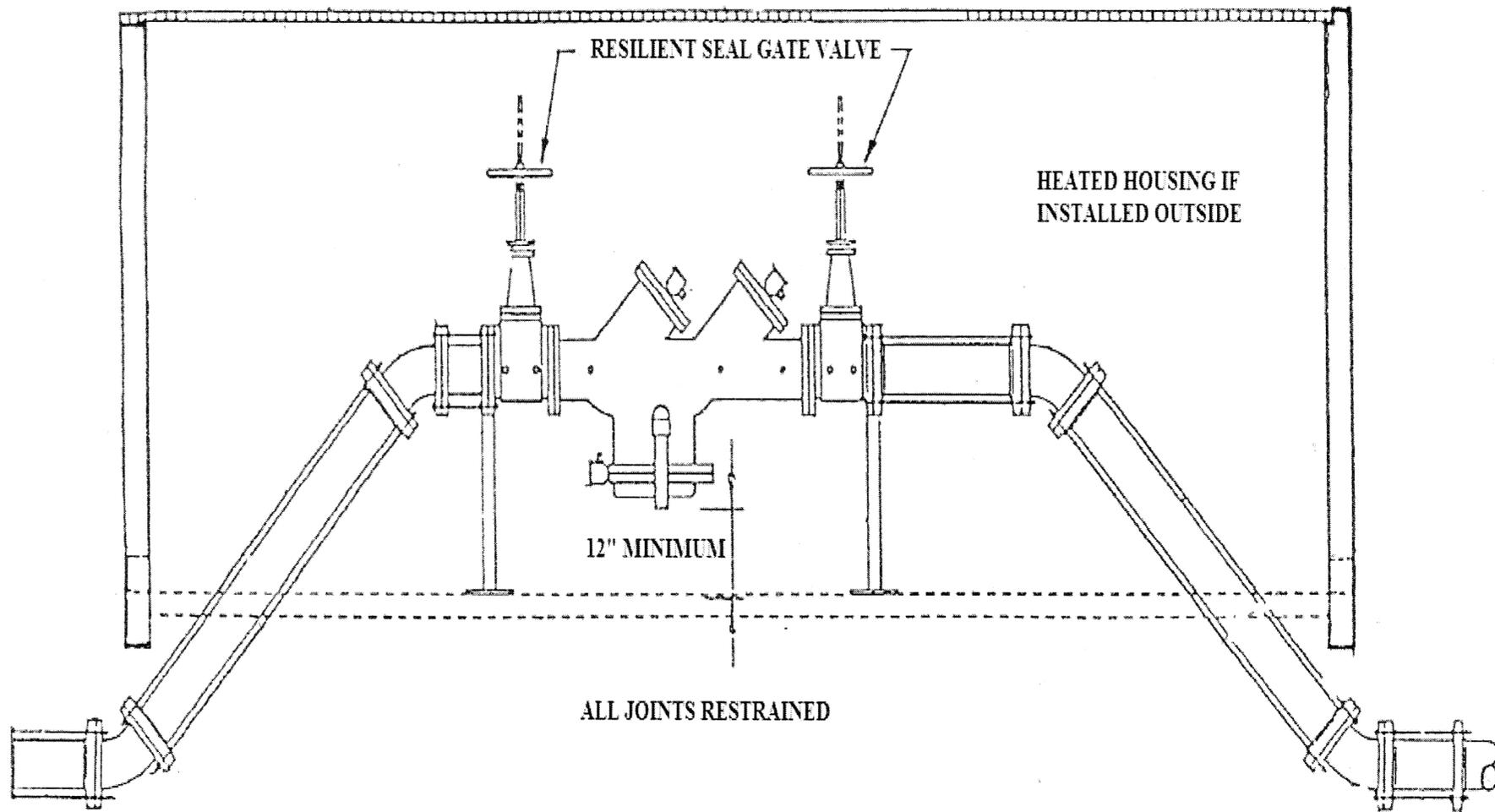
# DOUBLE DETECTOR CHECK VALVE



# PRESSURE VACUUM BREAKER

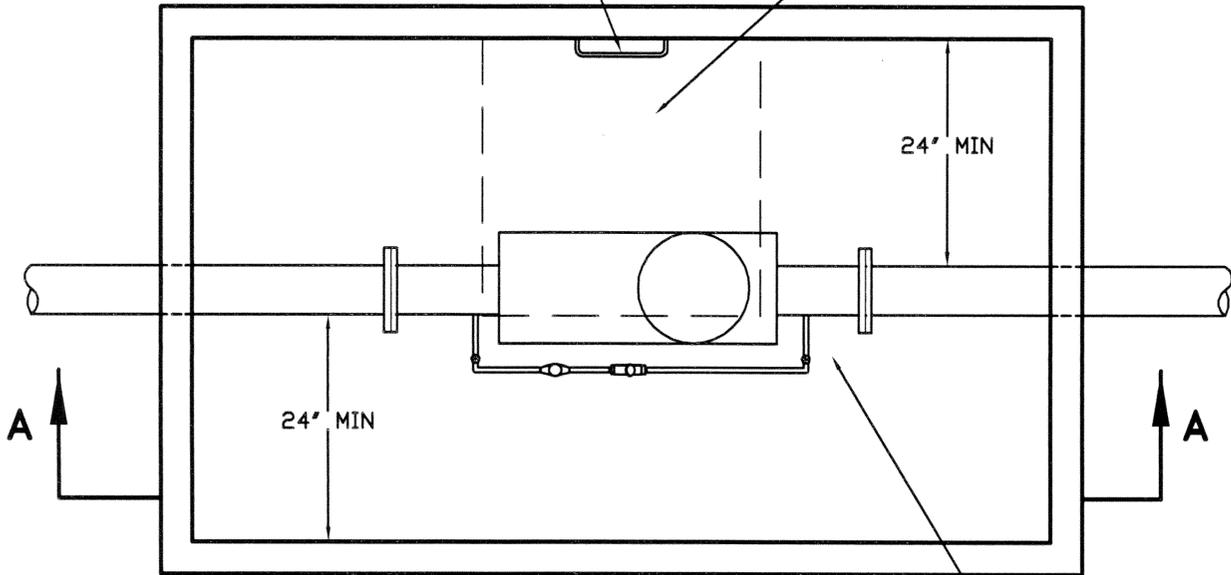


# REDUCED PRESSURE PRINCIPLE ASSEMBLY



MH STEPS  
(16" OC)

3' X 3' US FOUNDRY APS 300  
ALUMINUM HATCH COVER  
WITH LOCKING CAPABILITY  
OR EQUIVALENT

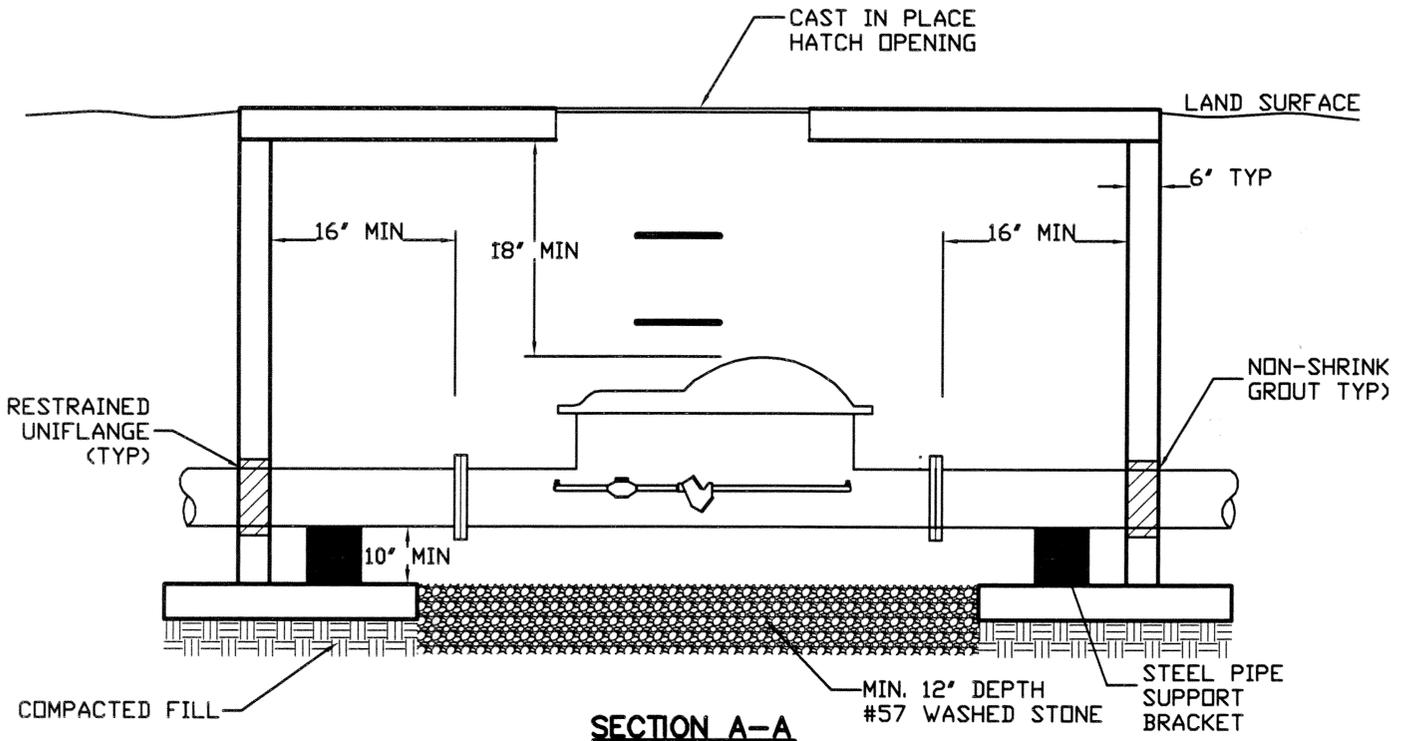


**PLAN VIEW**

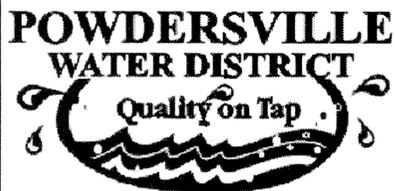
PRE-CAST CONCRETE  
VAULT WITH OPEN  
BOTTOM MST OR  
APPROVED EQUAL

SINGLE CHECK DETECTOR  
ASSEMBLY (HERSEY EDC  
OR APPROVED EQUAL)

CAST IN PLACE  
HATCH OPENING



**SECTION A-A**



**POWDERSVILLE WATER DISTRICT**

**SINGLE CHECK DETECTOR ASSEMBLY  
(TO SERVE PRIVATE FIRE HYDRANTS ONLY)**

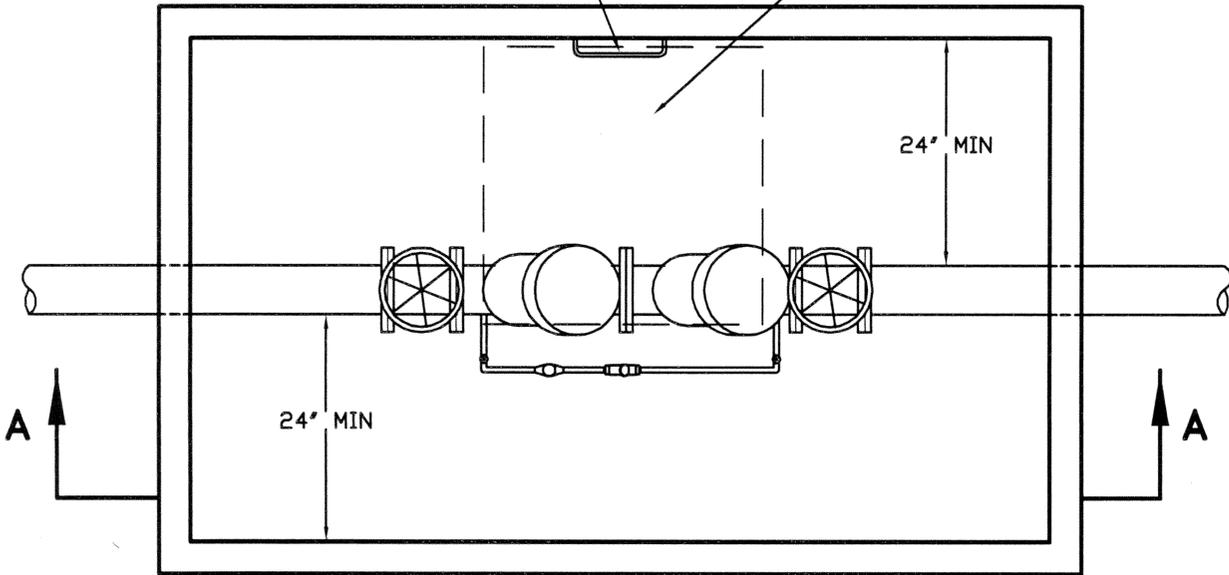
DATE: MAY 2013  
SCALE: NTS

JOB #: 02400-001

SHEET: STD-W-15

MH STEPS  
(16" OC)

3' X 3' US FOUNDRY APS 300  
ALUMINUM HATCH COVER  
WITH LOCKING CAPABILITY  
OR EQUIVALENT



**PLAN VIEW**

PRE-CAST CONCRETE  
VAULT WITH OPEN  
BOTTOM MST OR  
APPROVED EQUAL

90° BEND  
4" x 2.5" x 2.5" SIAMESE

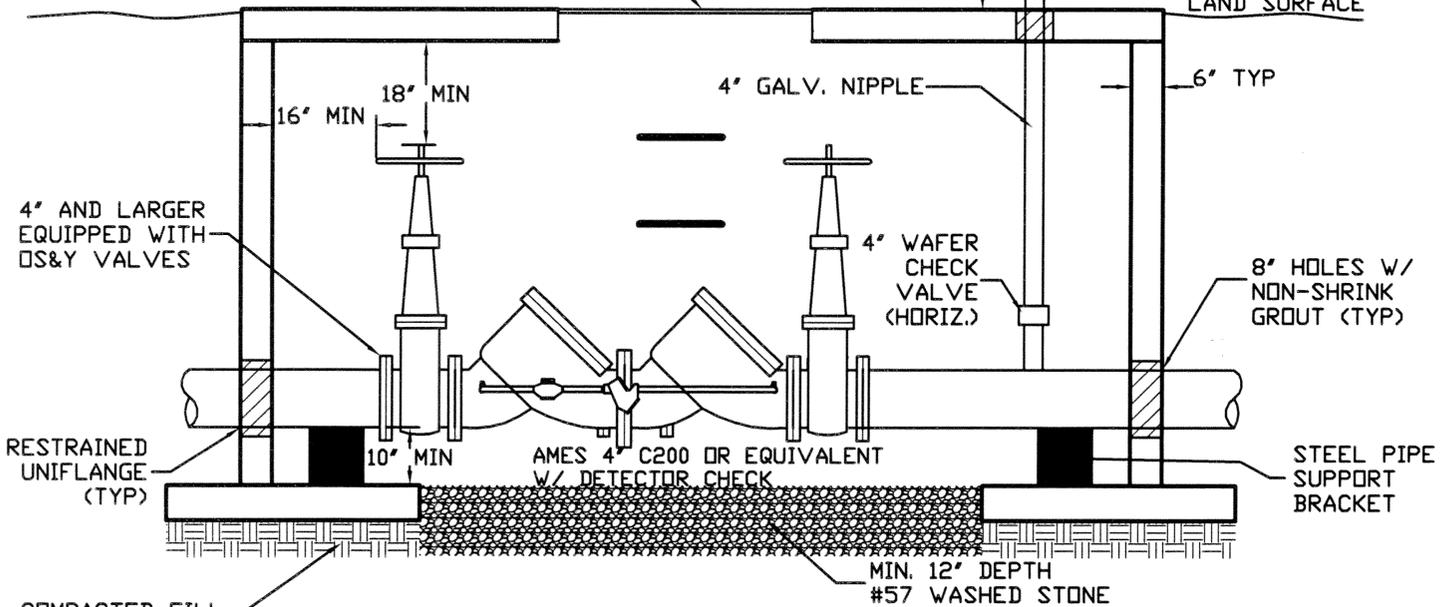
FDC SIGN: 12" x 18"  
RED W/ WHITE 8" LETTERING

**FDC**

CAST IN PLACE  
HATCH OPENING

3' MIN

LAND SURFACE



**SECTION A-A**

4" AND LARGER  
EQUIPPED WITH  
OS&Y VALVES

RESTRAINED  
UNIFLANGE  
(TYP)

COMPACTED FILL

16" MIN

18" MIN

4" GALV. NIPPLE

6" TYP

4" WAFER  
CHECK  
VALVE  
(HORIZ.)

8" HOLES W/  
NON-SHRINK  
GROUT (TYP)

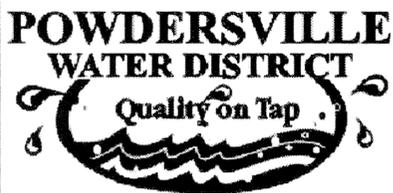
AMES 4" C200 OR EQUIVALENT  
W/ DETECTOR CHECK

STEEL PIPE  
SUPPORT  
BRACKET

MIN. 12" DEPTH  
#57 WASHED STONE

VAULT SIZE	MIN INSIDE DIMENSIONS
8"	8' x 6' x 6'
6"	8' x 6' x 6'
4"	6' x 6' x 6'

IF RP DEVICE IS REQUIRED CONTACT  
PWD ENGINEER FOR SPECIFICATION



**POWDERSVILLE WATER DISTRICT**

**FIRE PROTECTION VAULT WITH FDC  
(TO SERVE PRIVATE FIRE SPRINKLER SYSTEM)**

DATE: MAY 2013

SCALE: NTS

JOB #: 02400-001

SHEET: STD-W-16