

**CITY OF CARNATION**

**COMBINED WATER AND SANITARY SEWER  
UTILITY TECHNICAL STANDARDS**



**July 2010**

**Adopted by Resolution No. 358, 07/20/2010**

**City of Carnation  
4621 Tolt Avenue  
Carnation, WA 98014  
Telephone: (425) 333-4192  
Fax: (425) 333-4336**

**BURIED UTILITIES IN AREA  
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**EXISTING UTILITIES SHOWN ARE FROM  
THE BEST AVAILABLE INFORMATION AND  
NO GUARANTEE IS MADE AS TO THE  
EXACT SIZE, TYPE, LOCATION OR DEPTH.**

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## CITY OF CARNATION

### COMBINED WATER AND SANITARY SEWER UTILITY TECHNICAL STANDARDS

**The water and sanitary sewer system standards set forth in this document are minimum requirements intended to apply under usual and ordinary conditions. These requirements may be modified if the City finds it advisable.**

#### 1. DEFINITIONS

- A. "Council or City Council" is the City Council of the City of Carnation.
- B. "City" is the City of Carnation in King County, State of Washington.
- C. "City's Contractor" is the Contractor(s) under contract with the City.
- D. "City Engineer" or "Engineer" shall be a licensed civil engineer and as designated by the City.
- E. "Customer" or "Owner" is the property owner constructing the water or sewer system and its Contractor, and any representatives thereof, including builders or engineers acting on behalf of the Owner, who either will be or are currently connected to the City's water or sewer system.
- F. "Developer" is any party extending or connecting to the City's water or sewer system.
- G. "Fire Marshal" is the agent designated by the City Manager. The Fire Marshal for the City is the authorized representative of Eastside Fire and Rescue.
- H. "Fire Protection Service" is any part of the water system that connects to the customer's fire sprinkler system. This line is owned and maintained by the customer except where located within public right-of-way or easement to the City. The City also owns and maintains the meter in the fire service line. The customer shall provide unrestricted access for the City to the fire service line meter.
- I. "Inspector" is the City authorized representative assigned to make inspections for compliance with the City specifications and standards.
- J. "Licensed Side Sewer Contractor" is a contractor licensed by the State of Washington.
- K. "Manager" is the City Manager or their designee, of the City of Carnation.
- L. "Owner" or "Customer" is the property owner constructing the water or sewer system and its Contractor, and any representatives thereof, including builders or

engineers acting on behalf of the Owner, who either will be or are currently connected to the City's water or sewer system.

- M. "Owner's Contractor" is any Contractor or agent of the Owner authorized to act on behalf of the Owner
- N. "Premises" means a private home, building, apartment house, condominium, trailer court, mobile home park, farm, each residential or commercial unit, a group of adjacent buildings or properties utilized under one ownership and under a single control with respect to use of water and responsibility for payment therefore.
- O. "Property" is the parcel of land associated with any development or property being improved to these standards.
- P. "Residential Customer Equivalent" (RCE) means a single-family residence is equal to one RCE. Users other than single-family residential are based on an inventory of plumbing components (i.e., faucets, toilets) that are assigned a number of "fixture units" on estimated flows. These flows are then converted to RCEs using a conversion factor.
- Q. "Residential service" means a water or sewer service connection to a dwelling unit.
- R. "Retail Service Area" is the area designated by the municipal water supplier and ultimately approved by WSDOH as the area within which water is or will be sold directly to the ultimate consumers.
- S. "Service line" is any part of the water system that connects to the water main service line and the customer's building. The City owns, maintains and operates all service lines within the public right-of-way, including and through the water meter. The customer owns, maintains and operates all service lines on private property that are located downstream of the City's water meter.
- T. "Sewer or Sanitary Sewer System" is any lateral, trunk, or other sewer owned or constructed by and/or a part of the public sewerage facilities of the City.
- U. "Sewer Service Area" is that area consisting of the corporate limits of the City and those areas that have been or may be designated for sewer service by the City Council.
- V. "Side Sewer" is the line which connects at the property or easement line to the City's side sewer stub service and extends on private property to the connection at the building, and is owned and constructed by private parties and maintained by the property owner.

- W. “Side Sewer Stub” is the portion of the City owned system that extends from the valve pit to the property or easement line.
- X. “Water Meter” is the part of the water system that meters the water consumption of the customer. The water meter is owned, maintained and operated by the City.
- Y. “Water Service installation, service connection, or connection” means all piping and fittings from the main to the property owner’s side of the water meter assembly.
- Z. “Water Service Area” is that area consisting of the corporate limits of the City and those areas that have been or may be designated for water service by the City Council.  
“Water System” is any water main, service, or appurtenance owned or constructed by and/or a part of the public water system facilities of the City.

## **2. GENERAL POLICIES**

The City has adopted policies to guide in the administration of these standards. A summary of some of the policies are included in this chapter.

The intent of the policies is to establish general rules and regulations for the service and extension of service from the water and sewer system of the City; and to promote the public health, safety, and general welfare of the users of the water and sewer system, in accordance with standards established by the city, county, state and federal governments.

- A. Authorized employees of the city, properly identified, shall have access, upon the permission of the owner or his/her authorized agent, at reasonable hours of the day, to all parts of a premises or buildings to which water or sewer service is provided by the City for the purpose of assuring conformity to these standards.
- B. Whenever the owner of any premises supplied by the City restrains authorized city employees from making such necessary inspections, water or sewer service may be discontinued.
- C. Any person causing damage to any property belonging to the City shall be liable to the City for any and all damages resulting either directly or indirectly therefrom.
- D. It is unlawful for any person to store, maintain or keep any goods, merchandise, vegetation materials or rubbish within a distance of five feet of, or to interfere with the access or operation of any water meter, gate valve, fire hydrant, valve pit or other appurtenance in use on any water service, sewer service, connection, water main, or fire protection service.
- E. Authorization for Use of Hydrants Required

It is unlawful for any person, other than authorized employees of the Eastside Fire and Rescue or of the City, to operate fire hydrants and hose outlets.

F. Emergency Interruption of Service

- (1) In case of emergency, or whenever public health, safety, or the equitable distribution of water so demands, the City or his/her designee may authorize the City to change, reduce or limit the time for, or temporarily discontinue the use of water. Water service may be temporarily interrupted for purposes of making repairs, extension or doing other necessary work.
- (2) Before so changing, reducing, limiting or interrupting the use of water, the City shall notify, insofar as practicable, all water consumers affected.
- (3) The City shall not be responsible for any damage resulting from interruption, change or failure of the water supply system.

G. Permits Required

No person shall make any additions, betterments or extensions to the City's sewer or water system without first obtaining a permit to do so from the Public Works Director. Several different permits may apply. Contact City to confirm which permits are required. The fees for the various permits are listed in the City's current fee schedule.

H. Cross Connections Prohibited

- (1) The installation or maintenance of a cross connection is prohibited.
- (2) Any such cross connection now existing or hereafter installed is declared a nuisance and shall be abated immediately. The control or elimination of cross connections shall be in accordance with the State of Washington Administrative Code (WAC 284-54-820) as now enacted or hereafter amended, together with any future manuals of standard practice pertaining to cross connection control approved by the Director of the State of Washington Department of Health and the City's Cross Connection Control Plan attached as Appendix A to this document.
- (3) Water service will be discontinued to any premises for failure to comply with the provisions of this section.
- (4) Furnishing of water services shall be contingent upon the customer's providing cross connection control approved by the appropriate health authority and the Public Works Director or designee for protecting the city supply from backflow.

I. Nonliability of City for Damages

The City shall not be liable for damages nor will allowances be made for loss of production, sales or service, in case of water pressure variations, or in case the operation of the City's source of water supply or means of distribution fails or is curtailed, suspended, interrupted, or interfered with or for any cause reasonably beyond its control. Such pressure variations, failure, curtailment, suspension, interruption or interference shall not be held to constitute a breach of contract on the part of the City, or in any way affect any liability for payment for water made available or for money due on or before the date of such occurrence.

J. Discontinuance of Service

- (1) The City may discontinue service by reason of a failure to pay a bill for service or the failure to comply with the terms of this chapter, in accordance with the procedures established by state law, this chapter, and other city ordinances or procedures.
- (2) Service to any premises upon which a private water supply system or private sewage disposal system is used or operated contrary to the provisions of this chapter may be discontinued or refused.

K. Unauthorized Turn On Prohibited

- (1) It is unlawful for any person, except duly authorized employees of the City, to turn on the water supply to the premises after a turn off is made at the meter by the City.
- (2) A water service to any premises turned on by an unauthorized person, after such water supply had been turned off by the City, may upon discovery, be disconnected by the City from the water main in the street, and shall not be connected again until all fees due as a result of the disconnecting and reconnecting of such service are paid.

L. Nonliability of City

The City shall not be liable for any damage to persons or property resulting from a properly performed and authorized turn off or turn on of the water service, including, but not limited to, situations where water service is left on between change of customers occupying the premises, at the request of one of the customers, or the services disconnected for nonpayment or no contract.

M. Service Disconnection for Condemned Buildings

Whenever a premises supplied with water has been found by the proper authorities to be dangerous to human life and unfit for human habitation, and notice of such

finding has been received by the City from such authorities, the City shall cause the water service to such premises to be turned off or disconnected. Water service to such premises shall not be restored until the owner and/or his agent has secured a release or clearance from the City and Fire Marshal.

N. Administrative Authority

- (1) The City Manager or his/her designee may make such administrative determinations for the proper operation of this chapter as are not inconsistent with its provisions.
- (2) The City Manager or his/her designee shall promulgate and enforce such customer service policies and related additional rules as may be deemed necessary from time to time to encourage and facilitate the use of water, pursuant to city council resolution approving the same.

O. Violation Penalty

Any person willfully violating any of the provisions of this chapter shall be guilty of a misdemeanor, and shall be punished by a fine as described in the City's schedule of charges.

P. Service Connections, Charges and Application for Service

- (1) An application shall be made for all service connections, for the use of fire hydrants, and for water or sewer service work to be performed by the City. Such application shall be on forms provided by the City.
- (2) An application shall be accompanied by all fees or deposits required by the City's fee schedule.
- (3) The application shall provide all information required by this chapter, as well as all other information determined by the City to be necessary for consideration and action upon the application.
- (4) The application, when approved by the City, shall constitute an agreement whereby the applicant agrees to conform to the provisions of this section, as now enacted or hereafter amended.
- (5) A change of use of the served premises will require that a new application for service be made.

Q. Conditions Applicable To All Water Service Connections

- (1) All service connections shall be metered.

- (2) All meters installed by the City shall be and remain, the property of the city and shall be removed only by the City.
- (3) The owner, engineer, or architect shall provide the size of the meter for non-residential services. The City may require a change to the meter size if the City determines it not sufficient.
- (4) Whenever the owner of any premises desires to change the size of a meter, an application shall be made to the City, and, upon approval, the exchange will be made at the expense of the owner, less credit for the usable value of the meter removed including all related charges. Credit for the difference in fees and charges between the old and new sizes shall be made for all applicable fees and charges, including GFC, meter installation, etc.
- (5) Whenever demand periodically exceeds the rated capacity of a meter to the extent that the meter may be damaged, the City shall notify the owner of this fact. After evaluating the owner's requirements, the City shall advise what size meter is necessary to give proper service without damage to the meter. The estimate of cost covering such change shall be furnished by the City, upon request by the owner, without charge. If the owner does not make the required deposit for the installation of the larger meter within thirty days after the date of the notice, then the City shall install the proper size meter, charging the total cost to the owner, or the City may discontinue service.
- (6) Each served premises must have a separate connection to a main, unless otherwise approved by the City when impossible or impractical.
- (7) Water will not be provided to more than one new customer or dwelling through a single service connection, and separate service applications are required for each dwelling unless otherwise allowed in this section. When two customers or buildings are being served by a single service connection on the effective date of this chapter, the City may require the installation of a new service, when necessary, for efficient operation of the system, at the cost of the customer. Attached dwelling units may be served through a single water service and meter. Detached buildings will each have their own meters.
- (8) When the premises for which service is sought does not abut a main with sufficient pressure and capacity to provide the required flow at the property line, the application for service shall be rejected.
- (9) No application for water service shall be accepted or approved for locations outside of the City's water service area.
- (10) The furnishing of water by a customer to premises other than that served by the customer's service, is prohibited, except as may be approved by the City, and except during emergencies, provided that emergency service cannot continue

for more than thirty days and an application for emergency service shall be made to the City within forty-eight hours of the onset of the emergency.

- (11) A request for a change in the size of service connection shall be treated as a request for a new service installation.
- (12) A change of use of the served premises will require a new service connection, unless the existing service is adequate for the changed use, as determined by the City. Also, additional connection (GFC) charges may apply.
- (13) All water service connections to existing mains shall be made by the City or the City's contractor unless the development is more than one connection – in which case the developer's contractor shall install the services subject to City inspection
- (14) The cost of such connections shall be paid by the customer at the time of application.
- (15) The fees established by this chapter are for the water service connection only. Where special conditions exist, such as inability to bury service lines, the actual cost on installation shall be charged to the customer.
- (16) When buildings are replaced by new buildings, the existing water service connection shall not be used when the City determines that such connection is not acceptable. In such an instance, the customer shall be required to install a new water service connection, in accordance with the terms of this chapter.

R. Fee for New  $\frac{3}{4}$  and 1" Water Service Connection

- (1) The fee for new residential  $\frac{3}{4}$ " or 1" water service connections, including the meter, shall be as set forth in the City's current fee schedule, except as noted below - refer to the standard detail.
- (2) The water meter installation fee shall cover the cost of tapping the City's water main for the necessary size of service, installing service line necessary to reach to within two feet of the property line, to a maximum distance of sixty feet, and provide and install a meter, and meter box.

S. Conditions Applicable To All Sewer Service Connections

- (1) The actual or proposed finished floor elevations will be provided to the City by the property owner. The City shall determine the requirements for sewer service provision based upon the City's Sewer Comprehensive and Facilities Plans or engineering judgment. Final approval of the requirements shall be by the Public Works Director.

- (2) Whenever the owner of any premises desires to change the size of a sewer service, an application shall be made to the City, and, upon approval, the a permit will be issued for the new service
- (3) Each served premises must have a separate connection to a valve pit, unless otherwise approved by the City when impossible or impractical.
- (4) When the premises for which service is sought does not abut a main with capacity to provide the required flow at the property line, the application for service shall be rejected unless a main extension can provide the service.
- (5) No application for sewer service shall be accepted or approved for locations outside of the City limits.
- (6) A change of use of the served premises will require an evaluation of whether the sewer service is adequate for the changed use, as determined by the City. Also, additional connection (GFC) charges may apply.
- (7) All side sewer connections to existing mains shall be made by the City or the City's contractor unless the development has more than one connection – in which case the developer's contractor shall install and connect the side sewers at the City's discretion, subject to City inspection
- (8) The cost of such side sewer connections shall be paid by the customer at the time of application.
- (9) The fees for side sewer installation are listed in the City's current fee schedule.
- (10) When buildings are replaced by new buildings, the existing sewer service connection will be used unless the City determines that such connection is not acceptable based on capacity, materials or age. In such an instance, the customer shall be required to install a new side sewer in accordance with the terms of this document.

Additional requirements for side sewers and sewer service are described in Section 8 of this document.

#### T. Additional Fees

- (1) For any additional length of water service pipe beyond sixty feet, the customer shall be billed for the additional cost plus administrative overhead.
- (2) Water services for the sizes indicated in the Utility Service Fee Schedule irrespective of meter size, shall be based on the City's actual costs and administrative overhead which may include contractor fees.

- (3) For all commercial and/or industrial services, and for all residential services larger than two-inch diameter irrespective of meter size, the owner or applicant shall retain a qualified contractor to install the service and pay the contractor directly. The City will charge a meter drop fee in accordance with its Utility Service Fee Schedule.
- (4) In no event shall the installation charge be less than the charge for a one-inch diameter residential service with a five - eighths-inch meter.
- (5) Crossings of SR203, King County Roads or City streets that require trenchless methods will be paid for by the owner based on the City's or Contractor's costs.

#### U. Easements

- (1) All water and sewer mains not in the public right-of-way shall be in easements granted to the City of Carnation only by the form of easement provided by the City. Easements to the City may be shared with other utilities subject to approval by the City. General multiple utility easement references on Plan documents are not sufficient.
- (2) In general, all easements for water and sewer mains shall be a minimum of 15 feet wide. In special circumstances, the easement width may be reduced to 10 feet with the approval of the City. Additional facilities may require other easement limits.
- (3) No permanent structures are allowed to be constructed in the easement area. No additional building setback line from the edge of easements is required. Access to easements for maintenance and/or repair of the utility by the City shall not be restricted or prohibited by fences, rockeries, plantings and other improvements.
- (4) Easements within single lots are preferred rather than being split by a lot line. Easements may be located on two adjacent lots with the approval of the City.
- (5) The locations of water mains within easements shall be accurately surveyed and staked to guide the construction. All sewer mains or facilities shall be accurately staked by a licensed surveyor prior to installation. Any deviation from these requirements must be approved by the City.

#### V. Extension Policies

- (1) All properties are required to have water and sewer mains across their property frontage on at least one side of the property (water and sewer frontage may be different) as shown in the current Comprehensive Water or Sewer Plans or as

otherwise required by the City. It is further required that water and sewer mains continue to the next property for future service. There are instances where these main extension requirements may be modified by the City. Examples of possible exceptions to these requirements are listed below. For all instances where a modification or exemption to the requirement is requested by a property owner, this request must be made in writing to the City.

- (2) There is a geographic impediment for future main extension. If, in the City's sole judgment, a property proposed for a single family residence abuts a geographic feature where future extension is highly unlikely, the city may allow an extended water or sewer service line in lieu of requiring a main to be extended, subject to engineering review. Examples of these geographic features may be major water features, steep slopes, etc. The City may authorize a water or sewer service for these instances without a main extension.
- (3) If the single family structure to be served is more than 150 feet from a water main or 200 feet from a sewer main but construction of a main would not benefit the City, nor is necessary to provide service to the applicant. The City may authorize a water or sewer service for these instances without a main extension.
- (4) Temporary emergency service:

Water or sewer services may be extended on a temporary basis if there is a documented health hazard due to a failing well or other situation where construction to City Standards would not be feasible. These services may be extended on a temporary basis provided that the property owner, if eligible to be served by the City in the long term, signs an agreement to build a system that complies with City Standards as soon as is practicable and no longer than 2 years after temporary service is granted. This document shall be recorded.

#### W. Additions, Betterments, Extensions – Reimbursements Contracts

In the absolute discretion of the City Council on a recommendation from the City Manager, a developer who has installed a main improvement at his own expense, and who is qualified for reimbursement under the terms of the Municipal Water and Sewer Facilities Act, Chapter 35.91 RCW, as the same presently exists or may hereafter be amended, may be given a contract in accordance with the Act, but in no event shall its terms of reimbursement exceed 15 years. In the event the City agrees to enter into such contract, the contract shall provide for a set-aside of the estimated actual costs of the City's legal and administration expense incurred in administering the contract, to be approved by the City Council. The contract shall specify, by legal description and scaled drawings, attached to the contract, the area benefited by the utility addition, betterment or extension and cost identified with each benefited lot or parcel.

X. Additions, Betterments, Extensions – Over-sizing

Water and sewer mains to be installed by developers shall be oversized at the request of the City if the current Comprehensive Sewer Plan or Comprehensive Water Plan calls for a larger main than is needed for service to the property being developed – larger than 6” diameter for sewer and 8” for water. The City shall enter into a reimbursement agreement to pay for the over-sizing. The developer shall provide the City an itemized accounting of construction costs for the sewer main extension constructed, together with an estimated cost of pipe and other materials of the size which would serve the development. The developer shall also provide certification that all material and labor charges have been paid.

Y. Connection to City Water Main

The City has established a local facility charge or special connection charge whereby the property owner connecting to an existing water main will pay a charge not required to extend a main. This charge is based on calculation of the costs of facilities previously installed that provide service availability to their property.

Z. Disconnection of Water or Sewer Service

A property may be disconnected from water and sewer service, and monthly service charges abated, only when no habitable structures remain on the property. The owner shall provide notification to the City. Upon disconnection, the side sewer shall be securely capped off with an approved pipe terminating plug, and the installation shall be inspected by the City. The water service line shall be capped with approved fittings, the service meter removed and meter box left in place. Monthly service charges shall be prorated to the date the inspection requirement is satisfied. Re-connection of the property shall require new Side Sewer and Water Service Permits. Properties re-connected after two years shall be treated as new service, and shall pay then current connection charges, including the General Facilities Charge, with a credit for the connection charge amount that was in effect as of the date the side sewer was disconnected. In the alternative, the property may re-commence payment of monthly service charges within the two years, and upon actual connection the property will be treated as having been connected within two years, provided base charges for the time the property was not served are paid.

AA. Unauthorized Connections to the Water or Sanitary Sewer System

(1) Unauthorized Connections Prohibited

Connection to the water and sewer systems without City approval is prohibited. Infiltration and inflow are serious problems negatively impacting the efficient and economical operation of the City’s system of sewers, and prohibited by the City’s sewage treatment contract with the King County. Connection of cesspools, septic tanks, privy vaults or cisterns, gutter drains, sump pumps,

storm water collection systems, or any other such facilities to the public sanitary sewer or a side sewer, or allowing surface or storm water inflow into a grinder pump chamber, is strictly prohibited.

Unauthorized connections on those not conforming to these standards pose a serious threat to public health and safety. Any unauthorized or non-metered connection shall be prohibited. Any connections that do not conform to the Uniform Plumbing Code shall be prohibited.

## (2) Notice and Removal of Unauthorized Connections

Upon determination by the City that a property has an unauthorized connection, the property owner shall disconnect such unauthorized connection within fifteen (15) days from the date of notice by the City. Such notice will be by certified mail, and by regular mail with the City to maintain an affidavit of such mailing. The date that notice will be deemed to have been given for commencement of the fifteen (15) day removal period will be the third day following deposit of the notice in the U.S. Mail.

A property owner shall notify the City at least twenty four (24) hours in advance of the removal of an unauthorized connection to allow for inspection by the City.

## (3) Investigation, Testing and Inspection Charge

A charge established by the City will be billed against any property found to have an unauthorized connection. Such charge is for the City's investigation, testing and inspection of an unauthorized connection, and for the costs of the City's program of inspection, investigation, and monitoring of the sewer system made necessary by unauthorized connections.

In addition to the testing and inspection charge, the owner will reimburse the City for its actual reasonable costs, plus the City's normal overhead rate, for construction and/or repair by the City determined by the City to be necessary or proper to protect, correct or repair the City's facilities as a result of an unauthorized connection.

Failure to remove an unauthorized connection within the time allotted herein shall result in an additional monitoring and enforcement charges determined by the City. All charges in this Section shall be certified as liens against the property. Failure to remove an unauthorized connection within ninety (90) days from notice as provided herein may be grounds for termination of sewer service by the City upon its determination that such is reasonably necessary to correct an unauthorized connection, and after reasonable opportunity for hearing before the City Council. Notice of intent to terminate service shall be given to the Seattle/King county Health Department and King County.

Unauthorized water connections will be given 48 hours notice or immediately disconnected at the discretion of the City. An application for service, all applicable fees and charges for a new service will apply. Additionally, the City will estimate the cost of water and monthly fees that apply to the unauthorized connection – up to a maximum of 5 years.

(4) Contractor, Owner, Builder Suspension

In addition to the foregoing provisions, and supplemental thereto, if investigation by the City determines that an owner, contractor or builder has willfully made an unauthorized connection, or has directed that an unauthorized connection be made, all right under this policy shall be suspended. No permits of any type will be issued to or for such contractor, owner or builder until any unauthorized connection has been removed, and all charges required by this Section have been paid. Suspension shall be effective after fifteen (15) days notice to be given in the same manner as described hereinabove for notice to property owners; provided, however, that the commencement of such suspension shall be stayed pending a hearing thereon before the City Council at the next regularly scheduled Council Meeting, if requested by the contractor in writing within the fifteen (15) day period.

(5) Reduction or Waiver of Charges

The City Council hereby retains the right to reduce or waive a portion of the charges imposed herein upon compliance by property owners with the requirements of infiltration and inflow prevention programs that may be implemented from time to time by the City to encourage the voluntary disclosure and removal of unauthorized connections, or upon a determination of good faith compliance with the intent of the City's program to reduce infiltration and inflow.

BB. Compliance

Responsibility for the acts, omissions, compliance or lack of compliance by owners or their contractors performing water service or side sewer installation pursuant to this Policy shall be the owner's. The City's duties and responsibilities pursuant to this Policy shall be to the general public, and not to any specific individual or entity. The City's inspection is not an assurance and/or guarantee of the owner's or contractor's compliance. The City's failure to properly inspect and/or enforce these provisions shall in no way relieve the owner or contractor from his responsibility to strictly comply herewith.

A notice shall be sent to the owner of any side sewer that has been connected to the City's sewer system, but which does not strictly comply with the provisions and standards of this Policy. If such side sewer is not brought into compliance within

30 days of such notice, the City or authorized representative may enter the owner's property and make such corrections as are necessary to bring the side sewer into compliance. The cost of such corrections shall be charged against the property owner, and shall become a lien upon the property.

In the event correction cannot be made to a non-complying connection, and such connection could cause damage to the City's system, the City reserves the right to immediately disconnect such non-complying connection, without notice, as necessary to protect the City's system. Notice shall be given as soon as practicable.

If the City disconnects a side sewer service or water service it will notify the Seattle-King County Health Department.

### **3. GENERAL CONSIDERATIONS**

The City of Carnation has adopted these Standards for the purpose to standardize water and sewer system design and construction elements for consistency for development and/or improvements with the City which require City licenses or permits.

These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals and in construction methods.

These Standards are also not intended to limit unreasonably and innovative or creative effort which could result in better quality, cost savings, or both. Any proposed departure from these standards will be subject to review, approval and acceptance of the City. The City or his/her designee shall retain the sole authority to approve or disapprove proposed deviations from these Standards.

Materials shall be installed in compliance with the City's specifications and/or the manufacturer's specifications for installation. In case of dispute, the City will determine which specification shall be followed.

The City reserves the right to deny a connection to the City's water or sanitary sewer system if the work has not been completed in a satisfactory manner.

All work described in these Standards shall be performed to the City's reasonable satisfaction.

#### **A. Call Before You Dig**

The Owner and Contractor are advised that underground utilities such as but not limited to electrical power, natural gas, telephone, cable TV, sewer system mainlines, side sewers, water system main lines, water system service lines and storm sewer lines are buried within the City's Right-of-Way and on private

property. The presence or location of these utilities are not readily identifiable and can only be located by trained personnel.

Underground utilities may be shown graphically in these standards or other documents provided by the City. Any representation of underground utilities is for general informational purposes only. The owner or their agents may not rely upon any representatives of the location or absence of underground utilities in these standards or other documents provided by the City.

The Owner and Contractor must be aware that excavating or digging for any reason on any public properties, public Rights-of-Way, or private properties requires notification of the Utilities Underground Location Center at 1-800-424-5555 or 811 on local phone no less than 48 hours and two business days prior to excavation. Failure to properly follow the notification procedures to advise public and private utility companies of your plans to excavate may result in serious injuries or fatalities as well as damage to the utility that the Owner or Contractor are responsible for. As a reference only the Owner and contractor are advised of web information available at [www.callbeforeyoudig.com](http://www.callbeforeyoudig.com) or at the web search prompt for "Utilities Underground Location Center Washington State".

The Owner and Contractor are encouraged to familiarize themselves with the requirements of all State and Federal laws governing the requirements to notify all utility companies of the Owner's project and plans to excavate or dig. The City of Carnation provides the information about the requirement to notify the Utilities Underground Location Center to the Owners and Contractors operating under any Permit issued by the City as advisory only and assumes no responsibility or liability for the Owner's or Contractor's adherence to said requirements.

## **B. Cultural Resources**

The Owner and their Contractor are advised of the possibility of encountering buried artifacts or other cultural resources during the construction of any improvements that require excavation. In the event an artifact or other possible cultural resource is discovered during construction, the Owner is advised to contact City Hall immediately. The City will refer the Owner to the appropriate government agency for additional instructions.

## **C. Standard Specifications**

All work, materials and testing shall conform to the standards of City of Carnation and the "Standard Specifications for Road, Bridge, and Municipal Construction" current edition as prepared jointly by the Washington State Department of Transportation and the Washington State Chapter of the American Public Works Association, and herein after referred to as the "Standard Specifications," except as herein modified.

#### **D. Other Specifications**

Additions, betterments, and extensions to the City's water or sewer systems shall be made in accordance with the:

- (1) Carnation Municipal Code.
- (2) Applicable Washington Administrative Code Sections.
- (3) Washington State Department of Health (DOH) Water System Design Manual, current edition.
- (4) Washington State Department of Ecology (DOE) "Criteria for Sewage Works Design", current edition.
- (5) King County Department of Natural Resources Wastewater Division's Industrial Waste program.
- (6) Standards and Manuals of the American Water Works Association (AWWA), current editions.
- (7) East King County Coordinated Water System Plan, current edition.
- (8) Standards of the American Society for Testing and Materials (ASTM), current editions
- (9) City of Carnation Comprehensive Water System Plan, current edition.
- (10) City of Carnation Comprehensive Sewer System Plan, current edition.
- (11) Standards of the American National Standards Institute (ANSI), current editions
- (12) Manual of Uniform Traffic Control Devices (MUTCD) by the US Department of Transportation as amended and approved by the Washington State Department of Transportation, current editions
- (13) International Plumbing Code, latest edition
- (14) King County Road Standards, current edition.
- (15) City of Carnation Road and Street Standards, current edition.
- (16) International Building Code, latest edition

## **E. Legal Relations and Responsibilities**

### **(1) Laws to be Observed**

The Contractor at all times shall comply with all Federal and State laws, local laws and ordinances, and any regulations which in any manner affect the project.

Failure to comply with the laws and these Standards may result in denial of plan or development permit approval, revocation of prior approvals, legal action for forfeiture of bond, code enforcement, and/or other penalties as provided by law.

The Contractor shall release, indemnify and promise to defend and save harmless the City, its officer, employees and agents from and against any and all liability, loss, damage, expense, actions and claims, including cost and reasonable attorneys fees incurred by the City in defense thereof, asserting or arising directly or indirectly on regulations whether such violations are by the Contractor, his/her subcontractors, employees, or agents.

### **(2) Protection and Restoration of Property**

The Contractor shall protect and preserve from damage, interference and destruction all private and public property on or in the vicinity of the work. If such property is damaged or destroyed or its use interfered with by the Contractor or his agents, it shall be restored immediately to its former condition by the Contractor at his expense and such interference terminated.

Whenever construction work under this Policy is undertaken on easement, right-of-way or franchise, it shall be accomplished in such manner as to minimize disturbance and damage.

The owner shall not remove, even temporarily, any trees or shrubs which exist on easements or parking strips across other's private or public property without first obtaining approval from the affected property owner and the City.

The owner shall restore all easements and rights-of-way to a condition equal to their original condition before entry, or to a condition satisfactory to the property owner, and/or other authority, and the City.

### **(3) Utilities and Similar Facilities**

The Contractor shall protect from damage private and public utilities, including telephone lines, gas lines, power lines, storm drains, sewer and water lines, and appurtenances, highway lighting and signal systems, and similar facilities.

(4) Traffic Control

The Owner/Contractor shall be responsible for interim traffic control during construction on or along traveled roadways. Traffic control shall follow the guidelines of the Standard Specifications. All Barricades, signs and flagging shall conform to the requirements of the MUTCD manual. Signs must be legible and visible and should be removed at the end of each work day if not applicable after construction hours.

(5) Detours and Road Closures

When road closures cannot be avoided the Owner/Contractor shall post “to be closed” signs prior to the closing the road. The types and location of the signs shall be shown on a detour plan. A detour plan must be prepared and submitted to the City and approved prior to closing any City street. In addition, the Owner/Contractor must notify, in writing, local fire, school, law enforcement authorities, all Transit, Post Office and any other affected persons as directed by the City at least five days prior to closing unless the road closure is of an emergency nature.

(6) Work on State Highways, County Roads, City Streets, and Other Rights-of-Way (Right-of-Way Construction)

Work on Washington State Highway, King County Roads, City streets, Railroad right-of-way, or any other rights-of-way other than the City’s shall be in conformity with the requirements of the authority having jurisdiction.

It will be the owner’s responsibility to notify any authorities before beginning work on the right-of-way, and to obtain approval of the proposed schedule of operations.

**F. Developer Extension Agreement**

The City may require a developer extension agreement where the proposed development requires the extension of various services provided by the City, including extension of public utilities and/or streets. A copy of the developer extension agreement will be provided to applicants upon request. The City anticipates requiring Developer Extension Agreements for all utility extensions located outside of the City Limits and projects inside the City on a case by case basis.

#### **4. Main Extensions or New Facilities Required**

(1) When Required.

A main extension or other new system facilities shall be required whenever a property owner requires service and the property to be served does not abut a water and/ or sewer main, or the existing main is not adequate to provide the necessary water pressure or sewer capacity, or otherwise has deficient flow characteristics or if the main is identified in the City's current water or sewer comprehensive plan as a future improvement. In addition, a main extension or other water or sewer facilities may be required at the City's discretion to benefit the overall system.

(2) Application.

The person desiring a main extension shall apply to the City requesting permission to extend the City's water or sewer system.

The City shall review the application, and if the requested extension is determined to be a proper extension of the water or sewer system, shall provide the petitioner with the design requirements.

If the requested main extension is determined to be an improper extension of the water or sewer system, the application shall be denied.

(3) Preparation of Plans and Specifications.

Upon receipt of the design requirements from the City, the owner shall cause plans and specifications for the extension to be prepared. All design and construction plans and specifications shall be in accordance with standards adopted by the City. The completed plans and specifications, having a valid professional engineer's seal and endorsement, shall be submitted to the City for review and approval.

The owner may elect to hire the City to prepare the engineering plans for the water system extension or have them prepared by their engineer.

The City shall prepare the engineering drawings for the sanitary sewer. Due to the specific technical requirements of the City's vacuum sewer system, the design of additions or modifications thereof will be done only by the City Engineer.

(4) Inspection.

After approval of the plans and specifications, the City shall provide the petitioner with an estimate of the construction phase fees. A permit for construction will be issued after the fees and estimated connection charges have been deposited with the City Treasurer.

(5) Construction of Main Extensions.

Main extensions may be made by private contract or through local improvement district procedure. Any main extension shall be done by a licensed and bonded contractor of the State.

(6) City Participation in Main Construction.

The City will participate in construction of main extensions or other required facilities only where participation would provide direct benefit to the City, for example, adding another short section of pipe to get a valve or logical transition point.

(7) Acceptance of Main Extensions.

The City reserves the right to reject any installation not inspected and approved by the City.

Upon satisfactory completion of all required tests and acceptance of the main extension, the City shall cause the extension to be connected to the City system. All costs incurred in such connection(s) including overhead and administrative charges, shall be the responsibility of the developer. Any adjustment on the actual cost of installation because of variance between the estimate and actual cost shall be adjusted by refund upon completion of the job by the developer, or by payment by the developer to the City of any additional expense above the estimate C. No main extension shall be energized other than for test purposes by duly authorized personnel until the main extension has been accepted by the City and all fees and charges have been paid. If energizing a main is necessary to restore service to existing customers, fire hydrants will not be activated until acceptance of the main extension.

(8) Construction Record Drawings.

Upon Completion of Construction, the electronic file shall be edited to reflect actual construction conditions and as-built records by the design engineer. The electronic file shall then be submitted to the City and shall become the property of the City. The electronic file shall contain all data, including topography, lot line, other utilities and text. Title blocks may be removed. The electronic files shall be AutoCAD files in a .dwg format in the AutoCAD version requested by the City. In addition, a reproducible Mylar drawing that accurately indicates the main extension and appurtenances as actually installed in plan and profile if

necessary to convey the details of the extension is required. The as built drawing shall be plotted on a 22"x34" Mylar and wet stamped and signed by the design engineer.

No main extension will be accepted until satisfactory construction record drawings are provided to the City unless authorized by the City.

- (9) Deed of Main Extensions to City. The permit holder shall provide the City with a deed of conveyance for all main extensions as a condition of acceptance of the main extension by the City.

The transfer of any main to the City shall be on the condition that the owner, district, company, constructor or contributor shall transfer or provide for any necessary and proper franchise or franchise amendment. The Deed shall include an itemized Bill of Sale. All Deeds and Bill of Sale documents shall be on the form provided by the City. The applicant shall pay recording cost.

## **5. Drafting Standards**

Construction drawing shall be stamped and signed by professional civil engineer currently licensed in the State of Washington.

All drafting shall be completed in AutoCAD Current Version or LDD. Drafting symbols shall be per Joint APWA/WSDOT Drafting Symbols and Legends. File Medium shall be sufficiently layered so that topographic data, lot lines, text and design details may be easily turned on or off.

Scale: Plan view: 1"=20' and profile view: 1" = 5'. Profile view shall be provided where the utility requires special design around conflicts or on all sewer drawings. Other scales may be approved by the City on a case by case basis.

The following plans for Public Works improvements and utilities shall be prepared.

- (1) Erosion Control & Grading plan
- (2) Street Improvements
- (3) Storm Drain or Drainage Plan (Drainage & Street Plans may be combined together)
- (4) Sanitary Sewer Plan, if applicable
- (5) Water System Plan, if applicable
- (6) Landscaping Plan, if applicable

## **6. General Construction Standards for Water and Sanitary Sewer System**

### **(1) Trench Excavation**

Prior to any pavement cutting or removal, or excavation for pipe laying, the contractor shall verify, in the presence of the City's inspector, the location and depth of the existing water mains at the points where connections are to be made. The contractor shall verify the dimensions, type, and condition of the existing water main. If necessary, the grade shall be adjusted so neither a high spot nor a low spot is created adjacent to the connection to the existing water mains.

Water mains, parallel to a sewer, shall normally be above and separated by a distance of at least ten feet horizontally. Under unusual circumstances, the horizontal spacing may be adjusted, subject to the approval of the City. Water mains crossing sewers should be not less than three feet above the sewer. Where it is necessary for a sewer to cross within three feet, or over the water main, the sewer shall be constructed of ductile iron for a distance of ten feet on either side of the water main or encased in concrete or CDF for the same distance or constructed of other materials approved by the City.

Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits.

Trenches shall be excavated to the line and depth designated by the Plans to provide the cover on the water system or sanitary sewer system as specified by the City. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The owner shall maintain sufficient pumping equipment on the job to ensure that these provisions are carried out.

The Contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots, and other obstructions shall be entirely removed or cut out to the widths of the trench and to a depth 6 inches below water main grade. Where materials are removed from below water main grade, the trench shall be backfilled to grade with foundation gravel and thoroughly compacted.

Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration

(WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.

The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

Material excavated from trenches and piled adjacent to the trench, or in a roadway or public thoroughfare, shall be piled and maintained so that the toe of the slope of the material is at least 3 feet from the edge of the trench. It shall be piled in such a manner as will cause a minimum of inconvenience to public travel, and provisions shall be made for traffic control as necessary. Free access shall be provided to fire hydrants, water valves, and meters, and clearance shall be left to enable free flow of storm water in gutters, other conduits, and natural watercourses.

(2) Trenching Transverse to Existing Roadway

Open-cut transverse crossings of roadways after final paving are not to be permitted unless it can be shown that alternatives such as jacking, auguring or tunneling are not feasible or unless the utility can be installed just prior to reconstruction or an overlay of the road. Should an open cut be approved, all transverse trenches shall be backfilled with controlled density fill or crushed surfacing. Transverse crossings in roadway under construction with ATB applied may be backfilled with crushed rock.

(3) Trench Shoring and Dewatering

Where trench excavation equals or exceeds a depth of 4 feet, the developer/contractor shall provide, construct, maintain and remove, as required, safety systems that meet the requirements of the Washington Industrial Safety and Health Act, RCW 49.17, including WAC 296-155. The trench safety systems shall be designed by a qualified person, and meet accepted engineering requirements (see WAC 296-155-660).

The Contractor shall adequately shore trenches to protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions in the trench. The method of shoring shall be according to the contractor's design. The contractor may elect to use a combination of shoring or over break, tunneling, boring, sliding trench shields, or other methods of accomplishing the work, provided the method meets all applicable local, state, and federal safety codes. Damages resulting from improper shoring or from failure to shore shall be the sole responsibility of the contractor.

Where water is encountered in the trench, it shall be removed during pipe-laying operations and the trench so maintained until the ends of the pipe are sealed and provisions are made to prevent floating of the pipe. Trench water or other deleterious materials shall not be allowed to enter the pipe at any time.

The developer/contractor shall furnish, install, and operate all necessary equipment to keep the trench above the foundation level free from water during construction, and shall dewater and dispose of the water so as not to cause injury to public or private property or nuisance to the public. Sufficient pumping equipment in good working condition shall be available at all times for all emergencies, including power outage, and shall have available at all times competent workers for the operation of the pumping equipment.

#### (4) Trench Backfill

Suitable native material excavated during trenching may be used for trench backfill unless notified by the City that the native material is unsuitable. The City or representative will examine excavated native material at the time of excavation to determine its suitability for use as backfill. Native material will be considered suitable for trench backfill if it is:

- (a) Capable of attaining the degree of compaction specified within reasonable tolerance of optimum moisture content.
- (b) Reasonably free of organic material, clay, frozen lumps, rocks greater than 2 inches, or other deleterious matter.

Unsuitable backfill material shall be removed from the site and hauled to an approved disposal site. The City shall be provided with the location of all disposal sites to be used and also copies of the permits and approvals for such disposal sites.

Perpendicular open cut crossings of any public right of way shall require controlled density fill (CDF) or 100% import of Crushed surfacing base and top course unless waived by the City.

Imported material shall meet the requirements of Gravel Borrow or Crushed Surfacing Base Course as specified in the Standard Specifications. In backfilling the trench, the Contractor shall take all necessary precautions to protect the pipe from any damage or shifting. The contractor shall backfill from the side of the trench to a maximum uniform depth of 1 foot above the crown of the pipe before starting mechanical compaction.

During all phases of the backfilling operations and testing as outlined herein, the contractor shall protect the pipe installation, provide for the maintenance of traffic as may be necessary, and provide for the safety of property and persons.

Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. If suitable backfill material is not available from trenching operations or temporary traffic control and traffic safety issues exist, the City may order the placing of bedding around the water main and gravel base or controlled density fill for backfilling the trench.

(5) Controlled Density Fill

Controlled density fill (CDF, aka flowable fill) shall be a mixture of portland cement, flyash (optional), aggregates, and water. It shall be proportioned to provide a grouty, non-segregating, free flowing, self-consolidating and excavatable material that will result in a non-settling fill which has measurable unconfined compressive strength. Unless otherwise specified, unit weights shall range from 125 lbs. per cubic foot to 155 lbs. per cubic foot.

Materials testing shall be with unconfined compressive test cylinders. Test data may be either laboratory trial batch data or field test data.

Specific mix designs may be required at the Engineer's discretion.

The unconfined compressive strength at 28 days shall be a minimum of 50 psi and a maximum of 100 psi. Material shall be a sand/grout slurry proportioned to be hand-excavatable after long-term strength gain.

If CDF is used for trench backfill on ductile iron, steel, or copper utility mains or services, the mains and services shall be encased in polyethylene wrap.

(6) Compaction of Backfill

Trench backfill shall be spread in layers and be compacted by mechanical tampers of the impact type approved by the Engineer. Water settling will not be permitted. After the initial backfill is placed the remaining backfill material shall be placed in successive layers not exceeding 1 foot in loose thickness, and each layer shall be compacted to the density specified below:

Improved areas such as street and sidewalk areas shall be compacted to 95% of maximum dry density modified proctor.

Unimproved areas of landscape areas shall be compacted to 90% of maximum dry density modified proctor.

(7) Capping

Non-metallic mains shall be filled with CDF. Metallic mains shall be properly capped.

(8) Trenchless Construction Required

All new water and sewer connection or main line extensions planned to cross under SR 203 or a City street or King County Road that has been re-surfaced within the last 5 years shall be done by subsurface trenchless methods only, unless approved by the governing agency (WSDOT, King County or City).

(9) Asphalt Surface Restoration within Right-of-Way

When it is necessary for a contractor to break through a cement concrete pavement, or asphalted concrete pavement, the City shall issue a Right-of-Way permit or obtain the necessary permits from any authority having jurisdiction over such pavement prior to starting work. All costs to the City of acquiring such permits or other authorizations shall be paid by the owner. The owner shall ascertain precisely what such authorities may require or specify to adequately replace such paving, and shall conduct work and operations in compliance therewith, and shall assume and be responsible for all costs or damages attendant thereto. All work shall be conducted and completed in a manner satisfactory to the City.

The existing asphalt surface shall be cut on a neat line by saw cutting, jack-hammering or other approved method prior to excavation to provide a continuous line. Following proper backfill and compaction of the trench, the edges of the surfacing shall be retrimmed (saw cut) 12 inches wider than the excavation with straight vertical edges free from irregularities. A 1 ¼-inch minus crushed surfacing base course shall be placed to a compacted thickness of 3 ½-inches, followed by 5/8-inch minus crushed surfacing top course placed to a compacted thickness of 2 ½" inches.

(10) Temporary Street Patching

Temporary restoration of trenches shall be accomplished by using 2" Class B Asphalt Concrete Pavement when available or 2" medium-curing (MC-250) Liquid Asphalt (cold mix), 2" Asphalt Treated Base (ATB), or steel plates.

ATB used for temporary restoration may be dumped directly into the trench, bladed and rolled. After rolling, the trench must be filled flush with the existing asphalt concrete pavement to provide a smooth riding surface.

All temporary patches shall be maintained by the Contractor until such time as the permanent pavement patch is in place. If the Contractor is unable to maintain a patch for whatever reason, the City will patch it at actual cost plus overhead and materials.

(11) Trench Pavement Restoration

Trench restoration shall be either by a patch or patch plus overlay as required by the City.

All trench and pavement cuts shall be made by spade bladed jackhammer or saw cuts. All cuts shall be a minimum distance outside the trench width as prescribed by the City.

Replacement of the asphalt concrete or portland concrete cement shall be of existing depth plus 1 inch or 3 inches, whichever is greater.

Tack shall be applied to the existing pavement and edge of cut and shall be emulsified asphalt grade CSS-1 as specified in the Standard Specifications. Tack coat shall be applied as specified in the Standard Specifications.

Asphalt concrete Class B shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the applicable requirements of the Standard Specifications, except that longitudinal joints between successive layers of asphalt concrete shall be displaced laterally a minimum of 12 inches unless otherwise approved by the City. Fine and coarse aggregate shall be in accordance with the Standard Specifications. Asphalt concrete over 2 inches thick shall be placed in equal lifts not to exceed 2 inches each.

All street surfaces, walks or driveways within the street trenching areas affected by the trenching shall be feathered and leveled to an extent that provides a smooth-riding connection and expedites drainage flow for the newly paved surface. Leveling and feathering as required by the City shall be accomplished by raking out the oversized aggregates from the Class B mix as appropriate.

Surface smoothness shall be per the Standard Specifications.

- (a) All joints shall be sealed using paving asphalt AR4000W.
- (b) When trenching within the roadway shoulder(s), the shoulder shall be restored to its original or better condition.
- (c) The final patch shall be completed as soon as possible and shall be completed within 30 days after first opening the trench. This time frame may be adjusted if delays are due to inclement paving weather, or other adverse conditions that may exist. However, delaying of final patch or overlay work is allowable only subject to the City's approval.

(12) Tunneling and Jacking (Right-of-Way Construction)

Whenever it is necessary to tunnel or jack a stub service under any public street or public right-of-way, the City will obtain the necessary permits or authorizations from those agencies having jurisdiction, and all costs thereof shall be paid by the owner.

When it is necessary to tunnel or jack a stub service under any private right-of-way or private property, it will be the owner's responsibility to procure temporary and/or permanent easements from the property owner or owners, and permits from the appropriate authorities prior to starting work. The owner shall also ascertain precisely what the requirements and specifications of the said authorities or property owners may be with regard to the proposed work, and shall conduct all work and operations in compliance therewith. The owner shall assume and be responsible for all costs or damages attendant thereto. All work shall be conducted and completed in a manner satisfactory to the City.

(13) Maintenance of Traffic (Right-of-Way Construction)

The owner shall conduct all work so as to interfere as little as possible with public travel. The owner shall provide and maintain suitable bridges, detours, or other temporary facilities for the accommodation of public or private travel, and shall give reasonable notice to the owners of private drives before interfering with them; provided, however, that such maintenance of traffic will not be required where the owner has obtained permission from the owners or tenants of private property, or the proper public authority, or both, to obstruct public or private rights-of-way. Access for emergency vehicles shall be maintained at all times, and the owner shall keep the local fire protection authorities informed of the location of construction operations and fire lanes. Street or highway crossings shall be made in accordance with the requirements of the permit of the governing agency or agencies.

## **7. DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS – WATER SYSTEM**

### **A. General**

All materials shall be new and undamaged. The same manufacturer of each item shall be used throughout the work.

Where reference is made to other specifications, it shall be the latest revision at the time of construction, except as noted on the plans or herein.

All materials not specifically referenced shall comply with applicable sections of ANSI, ASTM, AWWA, and the Standard Specifications.

Approved manufacturers and model numbers of various materials are listed in Approved Materials List included with these Standards. When specific manufacturers or models are listed, no substitutions will be allowed without prior approval by the City.

### **B. Main Line**

Water mains shall be sized to provide adequate domestic and fire flow demands at the required residual pressure per WSDOH regulations and fire flow requirements. Fire flow requirements will be determined by the Fire Marshal; however, the quantity of water required will in no case be less than 1000 gpm at 20 psi residual pressure for single family residential areas where fire flow is provided.

The minimum water main size shall be 8 inches diameter as long as fire flow requirements can be met. Larger size mains are required in specific areas outlined in the Comprehensive Water System Plan. The City may require the installation of a larger sized main in areas not addressed in the Comprehensive Water System Plan if the City determines a larger size is needed to meet fire protection requirements for future service. If a proposed project requires a water main larger than 8-inch diameter for fire flow, no oversize reimbursement will be paid for by the City. If the City opts to require a water main larger than 8-inch diameter, the City will reimburse the developer for the cost of the incremental oversize. The cost of the incremental oversize will be calculated in material costs only.

### **C. Dead End Lines**

No dead end line less than 8 inch in diameter shall be longer than 200 lineal feet. Fire protection must be attainable for all lots from main line hydrants and it is apparent that the main will not be extended at any time in the future.

#### **D. Ductile Iron Pipe**

Ductile iron pipe shall conform to ANSI Specification A21.51, 1976, AWWA C151-76, or the latest revision thereof and shall be of the thickness Class 52 for pipe unless otherwise specified by the City. The pipe shall be furnished with rubber gasketed push-on type joints except where flanged or mechanical joints are specifically required by the City. Joint details shall be as specified in ANSI A21.11. Pipe with push-on fitting joints shall be suitable for use with mechanical joint fittings. The pipes shall be coated as specified in ANSI A21.51 and be furnished with cement mortar lining as specified in ANSI A21.4.

The Contractor shall furnish certification from the manufacturer of the pipe and gasket being supplied that the inspection of all the specified tests have been made and the results thereof comply with the requirements of the above-referenced standards.

#### **E. Fittings**

All fittings for ductile iron pipe shall be ductile iron compact (short body) fittings conforming to AWWA C153 or Class 250 gray iron conforming to AWWA C110 and C111. All fittings shall be cement mortar lined conforming to AWWAC 104. Plain end fittings shall be ductile iron if mechanical joint retainer glands are installed on the plain ends. All fittings shall be connected by flanges or mechanical joints.

Flanges shall be Class 125, drilled in accordance with ANSI A21.10.

Gasket for flanged fittings shall be 1/16-inch thick "Cranite" or approved equal. Gaskets for push-on type and mechanical joints shall conform to ANSI A21.11.

Rubber gaskets for push-on joints or mechanical joint (M.J.) shall be in accordance with ANSI A21.11, AWWA C111.

Gasket material for flanges shall be neoprene, Buna N, chlorinated butyl, or cloth-inserted rubber.

The type of connections shall be specified on the plans as push-on joint, mechanical joint (M.J.), plain end (P.E.), flanged (FL), or threaded.

#### **F. Polyethylene Encasement**

Polyethylene encasement shall be eight mil. tube or sheet stock and shall be furnished where the trench is backfilled with CDF, where soils testing indicates this is of value or as directed by the City. Materials shall comply with AWWA C105.

## **G. Minimum Cover**

Minimum cover for all water mains from top of pipe to finish grade shall be 36 inches for all pipes 8 inches diameter and smaller, and 48 inches for all pipes greater than 8 inches diameter, and maximum depth of 60 inches, unless otherwise approved by the Public Works Director.

## **H. Couplings**

Flexible couplings and transition coupling cast components shall be ductile iron. Center rings and end rings shall be ductile iron in accordance with ASTM 536-80, Grade 65-45-12.

Gasket material shall be virgin SBR in accordance with ASTM D2000 3 BA715.

Bolts shall be high strength, low alloy steel trackhead bolts with national course rolled thread and heavy hex nuts. Steel shall meet AWWA/ANSI C11/A21.11 composition specifications.

## **I. Adapters**

Adapters shall be Romac flange coupling adapters.

## **J. Bolts In Piping**

Bolts shall be malleable iron Cor-ten, or stainless steel.

T-bolts shall be malleable iron Cor-ten in accordance with AWWA/ANSI C111/A21.11. Stainless steel bolts shall meet the requirements of ASTM A-307, Grade A. Shackle rods, nuts, and washers shall be hot-dipped galvanized in accordance with AASHTO M232 and/or coated thoroughly with coal-tar/asphaltic material.

Stainless steel nuts, bolts, and washers shall be type 304.

## **K. Hydrants**

All buildings constructed in the north pressure zone of the City's water system shall be served by fire hydrants. Such fire hydrants shall be serviced by the City or by other adequate means as approved by the City and Eastside Fire and Rescue.

The lead from the service main to the fire hydrant shall be ductile iron cement mortar lined Class 52 no less than 6 inches in diameter, with a maximum length of

50 feet. Where leads require more than one length of pipe, Field Lok gaskets are required.

Fire hydrants shall be installed in accordance with Standard Details, at locations as shown on the approved plans. They shall be painted with 2 coats of high gloss Caterpillar Yellow Preservative 43-616 type paint.

Hydrants shall be the "Traffic Model" type with approved breakaway features. All hydrants shall be brass to brass subseat, minimum valve opening of 5-1/4 inches "O" ring stem seal, 6 inch mechanical shoe connection, 1-1/4 inch pentagonal operating nut.

Fire hydrants shall have two, 2-1/2 inch outlets and one 4-1/2-inch pumper port outlet. All outlet threads shall be National Standard thread. The valve opening shall be 5-1/4 inch diameter. The hydrant shall have a positive and automatic barrel drain.

Hydrant shall be M & H 929 or approved equal. All hydrants shall be bagged until system is approved.

All hook-ups to fire hydrants for temporary water for whatever purpose shall be approved by the City.

Hydrant valves installed in unpaved areas shall have a 4-inch thick, 2-foot square asphalt cement pad placed around them.

The City and Eastside Fire and Rescue shall work together to ensure that adequate hydrant spacing and installation are achieved.

Unless otherwise required by the governing authority, the following guidelines shall apply for hydrant number and location:

- (1) At least one hydrant shall be installed at all intersections.
- (2) All hydrants newly installed in a single family residential area shall be supplied by not less than eight (8) inch circulating mains. Dead end mains supplying fire hydrants must be at least eight (8) inches in diameter, except hydrant leads up to fifty (50) feet long may be six (6) inches in diameter.
- (3) Hydrant spacing of 600 feet maximum or as required by the Fire Marshal shall be required for single family residential areas.
- (4) Fire hydrants shall be installed at the ends of dead end lines which are more than three hundred (300) feet in length. Said hydrants may later be moved to conform to standard spacing requirements when the main is again extended, under supervision of the City.

- (5) No one shall plant any vegetation, erect any structure, or perform any action which results in obstructing the view of a fire hydrant for a distance of 50 feet. The Owner and/or occupant of any area in which a hydrant is located shall be responsible for removing weed and tree growth from around the hydrant for a distance of not less than 5 feet. The purpose of this part is to maintain a clear visual area around the hydrant.
- (6) All fire hydrants installed as required by these standards shall be maintained by the City unless conditions warrant a waiver of this provision.
- (7) Fire hydrants shall be set as shown in the Standard Detail.
- (8) The City and Eastside Fire and Rescue may require hydrants to be protected by two or more guard posts. If guard posts are required, they shall be made of either reinforced concrete or steel pipe filled with concrete, 8 inches in diameter, 6 feet long and buried to a minimum depth of 3 feet. Guard posts shall be set with their tops at the same elevation as as the bonnet flange of the hydrant. The exposed portion of the guard posts shall be painted with 2 coats of caterpillar yellow paint.
- (9) Fire hydrants must be installed, tested, and accepted prior to final plat acceptance or the issuance of an occupancy permit.
- (10) Fire hydrants shall be installed with a tee and an auxiliary gate valve between the service main and the hydrant sufficient to permit repair and replacement of the hydrant without disruption of water service. The location of all valves and fire hydrants installed shall be properly and accurately marked on identifiable plans or drawings.
- (11) Hydrants shall stand plumb, be set to the finished grade per the standard detail with the lowest outlet of the hydrant no less than 18 inches above grade and no less than 36 inches of clear area about the hydrant for clearance of a hydrant wrench on all outlets and on the control valve. The pumper port shall face the street. Where the street cannot be clearly defined or recognized, the port shall face the most likely route of approach and location of the fire truck while pumping as determined by the City.
- (12) When any portion of a proposed commercial or residential building is in excess of 200 feet from a public street right-of-way, on-site hydrants or a building sprinkler system shall be required. Such hydrants shall be located per Eastside Fire and Rescue and easements for such hydrants, leads, and water mains, shall be granted to the City.

(13) The installation of fire hydrants shall be required of the owner and/or developer of any future business, commercial, institutional, or industrial facility as follows:

Fire systems shall comply with the IFC, current edition.

All hydrants are to be accessible to fire department pumpers over roads capable of supporting such fire apparatus. The Fire Marshal shall determine the location of the fire hydrants depending on utility, topography, and building location. Hydrants shall be a minimum of fifty (50) feet out from the building, minor deviations may be granted.

The lead from the service main to the hydrant shall be no less than 6 inches in diameter. Any hydrant leads over 50 feet in length from service to the hydrant shall be no less than 8 inches in diameter. The provisions of this part shall apply without exception and regardless of the size of the service main.

Fire hydrants shall be set as shown in Standard Detail.

For requirements regarding use, size, and location of a fire department connection (FDC) and/or post indicator valve, contact Eastside Fire and Rescue. Location of FDC shall be shown on water plans.

Fire hydrants must be installed, tested, and accepted prior to the issuance of an occupancy permit.

All fire hydrants installed as required by these Standards shall be owned and maintained by the City unless conditions warrant a waiver of this provision.

The installation of private hydrants as defined herein shall be limited to those cases when the number of public hydrants installed under the distance provision of this section shall be insufficient in number. Private hydrants shall meet City requirements for public hydrants and shall be located as designated by the approving authority. The City shall have the right to go upon the premises and to use the private hydrant for public purposes, including testing, flushing, and emergency uses.

Installation shall further conform to the provisions listed previously regarding dead end lines exceeding 300 feet in length; obstructing the hydrant with vegetation or structures; guard posts; testing and acceptance; and installing plumb with the lowest outlet 18 inches above grade, etc.

## **L. Valves**

All valves and fittings shall be ductile iron with ANSI flanges or mechanical joint ends. All existing valves shall be operated by City employees only.

All valves shall be inspected upon delivery in the field to ensure proper working order and damage to protective coatings before installation and shall be free of all rust and dirt. They shall be set and jointed to the pipe in the manner as set forth in the AWWA Standards for the type of connecting ends furnished. No valves shall be located in such position as to place the valve chamber or box in any roadside ditch, drainage ditch, or channel.

Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance but in no case shall be less than one valve every 600 feet. Generally, valving shall be installed at all intersections and on each end of easements. Specific requirements for valve spacing will be made at the plan review stage.

- (1) Gate valves shall be used on all 4-inch to 12-inch lines. The design, materials, and workmanship of all gate valves shall conform to either AWWA C509-01 (or latest revision) or AWWA C515-01 (or latest revision). Gate valves shall be resilient wedge non-rising stem (NRS) with two internal O-ring stem seals.
- (2) Butterfly valves shall conform to ANSI/AWWA C504, Class 150, with cast iron short body and “O” ring stem seal. Valves in chambers shall have a manual crank operation. Buried valves shall have a stem extension with AWWA 2-inch operating nut and suitable valve box.
- (3) Butterfly valves shall be used on all lines 14 inches and larger unless designated by the City.
- (4) Valve Box. All valves shall have a standard APWA cast iron water valve box set to grade with two-piece, extension type cast iron riser from valve. Valve box shall have a lug type cover, 18” or 8” top and 24” bottom per the standard detail. Valve box lids shall have the word “WATER” cast in the upper surface and the valve box ears shall be set in direction of flow.
- (5) If valves are not set in paved area, a 2-foot by 2-foot by 4-inch asphalt concrete pad shall be set around each valve box at finished grade. In areas where valve box falls in road shoulder, the ditch and shoulder shall be graded before placing asphalt or concrete pad. The valve and valve box shall be set plumb with the valve box centered on the operator nut. Valve boxes shall be set flush in pavement or road shoulder. See Standard Details.
- (6) Operating Valve Nut Extension. A valve stem extension shall be installed whenever the valve operating nut is more than 3 feet below finished grade. Extensions are to be a minimum of 1 foot with only one extension per valve. The operator nut extension shall extend into the top section of the valve box and shall clear the bottom of the lid by a minimum of 10 inches. See Standard Details.

- (7) Valve Marker Post. Marker posts shall be of reinforced concrete, 42 inches in length, and tapered in cross-section from 6-inches by 6-inches to 4-inches by 4-inches. The posts shall be painted with 2 coats of caterpillar yellow paint. The horizontal distance from the valve to the post, to the nearest one-tenth foot, shall be stenciled in 2" black numerals on the face of the post per the Standard Detail.
- (8) Check Valve. Check valves for permanent installations other than cross connection control shall be rated for 150 psi working pressure, unless otherwise specified, and shall have adjustable tension lever and spring to provide non-slamming action under all conditions unless otherwise specified.
- (9) Air and Vacuum Release Valve. Air and vacuum release valves (ARV) shall be APCO 145C combination air release valve. Installation shall be as shown on standard drawings. The installation shall be set at the high point of the line when required. Where possible pipes are to be graded to limit the number of ARV's needed.

#### **M. Pressure Reducing Stations and Pressure Reducing Valves**

##### **(1) Pressure Reducing Valve Stations**

Unless otherwise noted in the Comprehensive Water System Plan or approved plans, a standard pressure reducing station shall have a Cla-Val model 90G-01 BCSY pressure reducing main valve of approved size with flanged ends. Pressure reducing valves shall have flow opening/closing speed controls, epoxy coated body, and valve position indicator. A 2" Cla-Val model 90G-01ABCS pressure reducing valve with threaded ends shall be installed on the bypass side of the larger pressure reducing valve line. Pressure reducing valves, 2" and smaller, shall be equipped with stainless steel trim (seal, stem, and cover bearing). Pilot controls shall be on the side of PRV facing the vault center See Standard Details.

Strainers shall be installed on the inlet side of each pressure reducing valve. The bypass shall be fitted with bronze ball valves sized to correspond with the bypass inlet and outlet size.

Strainers shall be iron bodied "Y" type equal in size to corresponding pressure reducing valve. Strainer shall feature bolted cover machined to hold screen securely in place and tapped with iron pipe threads for corporation stop. Screen shall be constructed from perforated stainless steel. Main-line strainer shall have flanged-ends and bypass strainer shall have threaded ends.

The vault shall be equal to Utility Vault Co. model 687-LA and cover 687-TL with frame and hatch HD-1 as manufactured by LW Proucts Co., per the standard detail. Vault exterior shall be coated with coal tar epoxy, or equal.

When pressure reducing stations are required, all pipe, fittings, and equipment shall be supported and blocked against static and dynamic loading in accordance with the equipment manufacturers' recommendations and as approved by the City. Drain lines from pumps or other equipment shall be piped to a below grade drainage system connected to the station sump or drain.

(2) Individual Pressure Reducing Valve (Residential).

When individual lot pressure exceeds 80 psi, an individual pressure reducing valve shall be installed by the property owner and shall be direct-action piston type with integral strainer and bypass. Valve body shall be bronze with threaded outlet end and integral union on inlet end. Valve shall be line-sized with spring range from 25 to 75 psi. The reducing valve shall be the property of the home owner. All ownership maintenance and operation of the individual Pressure Reducing Valve shall be the Owner.

All other appurtenances shall be as shown in the Standard Details.

(3) Individual Pressure Reducing Valve (Multifamily or Commercial).

An individual PRV shall be preceded by a strainer. PRV's shall be direct-acting and diaphragm actuated with a spring mechanism for a range of 25-85 psi. Valve shall be line sized. Valve body shall be cast bronze with inside iron pipe threads on both ends. All other appurtenances shall be as shown in Standard Details. These appurtenances shall be the property of the Owner. All ownership maintenance and operation of the individual Pressure Reducing Valves shall be by the Owner.

**N. City's Service Connections**

- (1) All service connections relating to new development shall be installed by the developer at the time of mainline construction. After the lines have been constructed, tested, approved, and a letter of acceptance has been issued, the Owner may apply for a water meter. The City will install a water meter after the application has been made and all applicable fees have been paid. Water meters will be set only after the system is inspected and approved.
- (2) When water is desired to a parcel fronting an existing main but not served by an existing meter, an application must be made to the City. Upon approval of the application and payment of all applicable fees, the City will allow tapping of the main, and installation of the meter, box, and setter.
- (3) Corporation stop shall be all bronze alloy and shall be Ford, Mueller, or approved equal in accordance with AWWA Standard C800 with iron pipe

thread (IP) thread inlet by compression fitting outlet for hi-mol plastic, cl 200 (IPS) .

Corporation stops for 1-inch taps shall be ball valve type with I.P. inlet and compression outlet. Corporation stops for 1-1/2-inch and 2-inch taps shall be the ball valve type with I.P. thread inlet and outlet.

All joints with plastic pipe shall be made utilizing stainless steel inserts with couplings or adapters.

- (4) Service connections for any service shall be installed with Romac or approval equal pipe saddles. The minimum acceptable tap size shall be 1 inch.

Service saddle shall be Romac 202BS, all bronze with stainless straps and (IP) thread or approved equal. All clamps shall have rubber gasket and iron pipe threaded outlets.

- (5) Service lines shall be polyethylene meeting the requirements of AWWA C901, with high molecular mass with at least 200 psi rating, and have a 16gauge copper tracer wire wrapped along its entire length (one wrap per foot).

¾" and 1" polyethylene tubing shall be iron pipe size (IPS) – ID ASTM D2239 – SDR 7 (PE 3408).

1 ½" and 2" polyethylene tubing shall be iron tube size (IPS) – ID ASTM D2239 – SDR 7 (PE 3408).

- (6) Meter Setter. Meter setters (1 inch and smaller) shall be 12 inches in height with horizontal inlet and outlet, double purpose couplings, unless otherwise specified, angle ball valve with drilled wings for padlock, and angle check valve for the size meter to be installed, per the Standard Detail.

1-1/2-inch and 2-inch meter setters shall have vertical inlet and outlet tees with 1-inch lateral bypass, flanged ball meter valve on inlet and angle check valve outlet, ball valve on bypass, and padlock wings on all valves per the Standard Details.

- (7) Meter Box. Mid-States HDPE meter box shall be complete with lid as specified in the Standard Details.

- (8) Any plumbing in a residential or nonresidential facility providing water for human consumption which is connected to a public water system shall be lead free. With respect to solders and flux, lead free shall mean no more than 0.2% lead, and with respect to pipes and pipe fittings no more than 8% lead.

## **O. Turn On – New Installation For Owner**

When new water service connections are installed by the City or Developer's contractor for any premises the valve at the meter shall be turned to the "off" position and remain off until a turn-on is applied for and an order shall be issued by the City upon written application therefore by the owner of the premises to be supplied after inspection and approval by the City, and after the City plumbing inspector has issued a certificate that all provisions of the applicable plumbing code have been complied with.

**P. Owner's Service Pipe Specifications**

- (1) All water service line piping leading from the meter to the premises, shall be laid not less than 18 inches below the surface of the ground.
- (2) Water service line pipes or any underground water pipes shall not be laid in the same trench with building sewer or drainage piping.
- (3) Water service line pipes, parallel to building sewers or drainage piping, shall normally be above and separated by a distance of at least ten feet horizontally, unless otherwise approved by the City.
- (4) Shutoff valves of approved full-flow pattern with key or hand wheel shall be installed in the water service pipe leading from the City meter to the building, within the premises served, in accordance with the applicable plumbing code. Shutoff valves where buried shall be properly enclosed in a minimum six-inch diameter pipe, or box, of concrete, plastic, or iron with an approved cover, protected from freezing and readily accessible. Valves internal to the structure are recommended.
- (5) Customer-owned valves or equipment are not permitted to be installed within the City's meter box.
- (6) Service connections and extension pipes laid underground shall be sized in conformance with the applicable provisions of the IBC as adopted by the City.

**Q. Owner's Plumbing Specifications**

- (1) All persons installing fixtures or appliances to be supplied with water from the City system shall be subject to the requirements of the applicable plumbing code of the City. Persons installing plumbing in new buildings shall leave the valve at the meter in the off position upon completion of their work.
- (2) The City Public Works Director shall have the right to refuse water service or discontinue water service in any situation where it is discovered that applicable City standards and codes have not been complied with in making the installation.

## **R. Irrigation System Specifications**

- (1) An irrigation system connected to a domestic, or commercial connection shall be equipped with an approved backflow device per Appendix A and the WSDOH list of approved Cross Connection Control devices. The approved device shall be placed at a height as provided in the applicable plumbing code

## **S. Fire Protection Service**

- (1) A water service connection to be used solely for fire protection purposes may be installed, servicing any premises, subject to the provisions of this section.
- (2) A plan of the proposed required fire protection system showing the general installation detail shall be required and shall be approved by the City and the Chief of Eastside Fire and Rescue, prior to construction.
- (3) Service of more than one premise by a fire service shall not be permitted.
- (4) Fire protection systems shall be installed and maintained by the customer in a manner approved by Fire and Rescue and the system shall contain an approved, tested backflow prevention device.
- (5) Fire protection systems shall be installed with a double check detector assembly (DCDA) of a size and type approved by the City, for un-metered service.
- (6) Indication of unauthorized use of water through a DCDA meter more than once per calendar year shall be cause for installation of a fire line meter at the expense of the customer.
- (7) Delinquency in payment of expense for fire protection service or failure of the customer to make changes in meter installation as provided in this chapter, after reasonable notice from the City, shall be sufficient cause for filing a lien on the property and/or discontinuance of the service.

## **T. Steel Casing**

- (1) Steel casing shall be black steel pipe conforming to ASTM A53.
- (2) Casing wall minimum thickness shall be 0.250 inch for casings 24 inches or less in diameter and 0.375 inch for casings over 24 inches in diameter.
- (3) Carrier pipe for water shall be Ductile Iron, Class 52.

- (4) Pipe spacers shall be Cascade style CC5 with 8-inch runners as available from Cascade Waterworks or other type as approved by the City. Casing pipe and spacers shall be sized for pipe being installed. Install minimum of three spacers per section of pipe. See Standard Details.

#### **U. Galvanized Iron Pipe**

Where galvanized iron pipe is specified, the pipe shall be standard weight, Schedule 40, steel pipe per Standard Specification for black and hot-dipped, zinc-coated (galvanized) welded and seamless steel pipe for ordinary uses (ASTM A-120). Fittings shall be screwed malleable iron galvanized per ANSI B16.3. Galvanized pipe shall be used only for PRV's and dry pipe in pressure relief and vacuum breaker assemblies.

#### **V. Blowoff Assembly**

If a fire hydrant is not located at the end of a dead end main, a blowoff assembly shall be required. On water mains which will be extended in the future, provide tee and blocking as shown on Standard Details.

#### **W. Concrete Bedding and Blocking**

Bedding, blocking, encasement, or slope anchor concrete shall be premixed bags of concrete or concrete mixed from materials acceptable to the Engineer and shall have a 30-day compressive strength of not less than 2,500 psi. The mix shall contain five sacks of cement per cubic yard and shall be of such consistency that the slump is between 1 inch and 5 inches. All concrete shall be mixed prior to installation.

Concrete thrust blocking, as indicated on the Standard Details, shall be placed at bends, tees, dead ends, crosses, and as designated by the Engineer.

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings. See Standard Details for thrust block locations and calculations. All blocking as shown on the Standard Details are considered as minimums, and consideration should be given to unusual circumstances such as unstable soil, adjacent pipe lines, and topography.

#### **X. Joint Restraint**

Joint restraint methods shall be as per the approved materials list and/or the Standard Details.

#### **Y. Backflow Prevention**

All water system connections to serve buildings or properties with domestic potable water, fire sprinkler systems, or irrigation systems shall comply with the minimum backflow requirements as established by the Department of Health (DOH) and the City.

The installation of all backflow devices is required to protect the existing water system and users from possible contamination. To prevent contaminated water from the new main from entering the existing distribution system, a backflow prevention device shall be used on the line supplying the water. A double check valve assembly is sufficient backflow protection only for filling and flushing of the new main. Final connection to the existing system is shown on Drawing W-35. For fire and irrigation, the minimum current level of backflow prevention required is a double check valve assembly. Fire services shall have a double detector check valve assembly. Air gap and reduced pressure backflow assemblies are required whenever a potential health hazard exists.

All approved backflow prevention devices are listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by Washington State Department of Health. The required types of protection for specified applications are subject to change. Consult the document referenced above for any proposed application.

The City shall get the certificate of testing of any backflow prevention device before releasing the certificate of occupancy on any building or acceptance of water system. A list of approved testers may be obtained from Washington Environmental Training Resource Center (WETRC) located in Auburn, Washington.

(1) Reduced Pressure Backflow Assembly with Detector

This assembly shall include a line-sized D.O.H. approved (listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by Washington State Department of Health) Reduced Pressure Backflow Assembly with a parallel 3/4-inch meter and 3/4-inch D.O.H. approved Reduced Pressure Backflow Assembly. Each assembly shall be housed in a hot box or approved equivalent and include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks.

All other appurtenances shall be as shown in Standard Details.

(2) Double Check Valve Assembly

All Double Check Valve Assemblies shall be the one listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by

Washington DOH. The assembly shall include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks.

(3) Double Check Valve Assembly with Detector

This assembly shall include a line sized DOH approved (listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by the Washington DOH) Double Check Valve Assembly with a parallel 3/4-inch meter and 3/4-inch approved double check valve assembly. Each assembly shall include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks.

All other appurtenances shall be as shown in the Standard Details.

(4) Backflow Device Resilient Seated Shut-off Valves

Each valve shall be marked with model number with designation of resilient seat; such as "RS" or "R", which must be cast, molded, or affixed onto the body or bonnet of the valve. All ferrous bodied valves shall be coated with a minimum of 4 mils. of epoxy or equivalent polymerized coating. 2 inches and smaller R.P.B.A.s and D.C.V.A.s shall use ball valves, and all 2-1/2 inches and larger R.P.B.A.s and D.C.V.A.s shall use resilient seated gate valves for domestic supply and resilient seated O.S. and Y. valves for fire lines.

The minimum requirements for all resilient seated gate valves shall, in design, material, and workmanship, conform to the standards of AWWA C509 or C515

## **Z. Existing Utilities**

When utility services occupy the same space as the new water main, the contractor shall do all necessary excavation to fully expose such services. The contractor shall protect said services and work around them during excavating and pipe laying operations. The contractor shall be responsible for all damages to the services due to his operation and shall immediately notify the Public Works Director and other utility and arrange for replacement of all damaged services.

In the event of conflict, the contractor shall remove and restore existing catch basin connections, inlet connections, drains, side sewers, inlets, and other sewerage and drainage facilities. All restoration shall be constructed to City standards. Water main pipe shall be installed to clear mainline sewers and storm drains.

It is anticipated that the contractor will encounter private water services during work operations. Records of these utilities often are not maintained by the City and

will not be field located by the City. It shall be the contractor's responsibility to ascertain the location of and protect these private utilities from damage.

**AA. Water Main/Sanitary Sewer Crossings**

The Contractor shall maintain a minimum of 18 inches of vertical separation and 10 feet of horizontal separation between sanitary sewers and water mains. The minimum cover for water main of 42 inches may be reduced to 30 inches upon approval by the City to provide for as much vertical separation as possible.

The longest standard length of water pipe shall be installed so that the joints will fall equidistant from any sewer crossing. In some cases where minimum separation cannot be maintained, it may be necessary to encase the water pipe and/or sewer service in a carrier pipe or control density fill. No concrete shall be installed unless specifically directed by the City.

**BB. Staking**

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a Professional Engineer or Professional Land Surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of waterlines shall be as directed by the City or as follows:

- (1) Stake centerline alignment every 50 feet with cut or fill to invert of pipe maintaining 42 inches of cover over pipe. Cuts are normally not required when road grade has been built to subgrade elevation.
- (2) Stake alignment of all fire hydrants, tees, water meters, setters and other fixtures and mark cut or fill to hydrant flange finished grade.

**CC. Installation**

The installation of all water mains and appurtenances shall be in accordance with the construction plans as approved by the City for the project. Any deviation or changes are to be approved by the City before the changes are incorporated into the work.

Unsuitable Material - Whenever excavating the trench for water mains and the bottom of the trench exposes peat, soft clay, quicksand, or other unsuitable material,

such material shall be removed from the trench and replaced by Foundation Material "Ballast" as specified in the Standard Specifications.

Handling of Pipe - Pipe shall be handled in a manner that will prevent damage to the pipe, pipe lining, or coating. Pipe and fittings shall be loaded and unloaded using hoists and slings in a manner to avoid shock or damage, and under no circumstances shall they be dropped, skidded, or rolled against other pipe. Damaged pipe will be rejected, and the contractor shall immediately place all damaged pipe apart from the undamaged and shall remove the damaged pipe from the site within 24 hours.

Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and re-laid. When pipe laying is not in progress, the open ends of the pipe shall be closed by watertight plugs or by other means approved by the City.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, or other similar supports.

Cutting Pipe - Whenever it becomes necessary to cut a length of pipe, the cut shall be made by abrasive saw or by pipe cutter. All pipe ends shall be square with the longitudinal axis of the pipe and the outside shall be beveled and otherwise smoothed so that good connections can be made without damage to the gasket. Threads shall be cleanly cut. Oxyacetylene torch cutting of ductile iron will not be allowed.

Bedding the Pipe - Bedding material, when specified or required by the Engineer shall be as specified in the Standard Specifications. For the type of pipe (rigid or flexible) being bedded, bedding is defined as 6 inches below the pipe, around the pipe, and 12 inches above the pipe. Native material will normally be used for bedding for ductile iron pipe unless judged unsuitable by the Engineer.

#### **DD. Laying Pipe on Curves**

Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflecting the joints. If the pipe is shown curved in the drawings and no special fittings are shown, the contractor can assume that the curves can be made by deflecting the joints with standard lengths of pipe. If shorter lengths are required, the drawings will indicate maximum lengths that can be used. The amount of deflection at each pipe joint when pipe is laid on a horizontal or vertical curve shall not exceed the manufacturer's printed recommended deflections.

Where field conditions require deflection or curves not anticipated in the drawings, the Engineer will determine the methods to be used.

When rubber gasketed pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment. Trenches shall be made wider on curves for this purpose.

Maximum deflections at point joints and laying radius for various pipe lengths are specified in the following table, or if not, shall conform to the manufacturers and AWWA for the given type of pipe:  
 Maximum Permissible Deflection in Laying Mechanical-Joint Pipe

Size of Pipe Inches	Max. Permissible Deflections Per Length - In Inches				Approx. Radius of Curve Produced by Succession of Deflections			
	12-ft Length	16-ft. Length	18-ft. Length	20-ft. Length	12-ft. Length	16-ft. Length	18-ft. Length	20-ft. Length
3	16	23	25	27	105	130	155	180
4	16	23	25	27	105	130	155	180
6	14	19	22	24	120	160	175	200
8	11	14	16	18	160	220	240	265
10	11	14	16	18	160	220	240	265
12	11	14	16	18	160	220	240	265
14	7	10	11	12	250	310	350	400
16	7	10	11	12	250	310	350	400
18	6	8	9	10	290	380	430	480
20	6	8	9	10	290	380	430	480
24	5	7	7	8	350	440	555	600
30	5	7	7	8	350	440	555	600
36	4	6	6	7	430	510	650	690

Maximum Permissible Deflection in Laying Push-In Joint Pipe

Size of Pipe Inches	Max. Permissible Deflections Per Length - In Inches				Approx. Radius of Curve Produced by Succession of Deflections			
	12-ft Length	16-ft. Length	18-ft. Length	20-ft. Length	12-ft. Length	16-ft. Length	18-ft. Length	20-ft. Length
3	10	14	15	17	175	220	260	280
4	10	14	15	17	175	220	260	280
6	10	14	15	17	175	220	260	280
8	10	14	15	17	175	220	260	280
10	10	14	15	17	175	220	260	280
12	10	14	15	17	175	220	260	280
14	6	8	9	10	290	380	430	480
16	6	8	9	10	290	380	430	480
18	6	8	9	10	290	380	430	480
20	6	8	9	10	290	380	430	480
24	6	8	9	10	290	380	430	480
30	4	5	6	7	430	615	650	690
36	4	5	6	7	430	615	650	690

**EE. Hydrostatic Pressure Tests**

The City or its representative will inspect and observe the hydrostatic test of the pipe within 24 hours after notification by the Contractor that a section is ready for inspection and test. The Contractor shall contact the City at least 24 hours in advance of the completion of sterilization and flushing and the City will take the required water samples. The contractor shall pay for the cost of the water quality tests.

Prior to the acceptance of the work, the installation shall be subjected to a hydrostatic pressure test and any leaks or imperfections developing under said pressure shall be remedied by the Contractor before final acceptance of the work. The Contractor shall perform a preliminary test to assure that the equipment to be used for the test is adequate and in good operating condition and the air in the lines has been released before requesting the City witness the test. The City or his representative shall witness the test; if the test does not pass inspection for any reason, additional trips required to witness the test shall be done at the Contractor's expense.

No air will be allowed in the lines. The mains shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. Test pressure shall be maintained while the entire installation being tested is inspected. The Contractor shall provide all necessary equipment and shall perform all work connected with the test. Tests shall be made before all valved connections have been made. At unvalved connection points, a temporary plug (or 2" blow-off assembly on lines without hydrants) shall be installed at the end of the new main. This shall include concrete blocking and/or restrained joints necessary to withstand pressures encountered during the hydrostatic test.

Once the new line is successfully tested and disinfected, the plug (blow-off) shall be removed and the connection to the existing main completed. The Contractor shall provide special plugs and blocking necessary in those locations where it would be necessary to test against butterfly valves to ensure that the pressure rating of these valves is not exceeded during testing.

All water mains and appurtenances shall be hydrostatically tested as specified in the Standard Specifications.

#### **FF. Sterilization and Flushing of Water Mains**

Sterilization of water mains shall be accomplished by the Contractor in accordance with the requirements of the State Health Department and in a manner satisfactory to the City. The section to be sterilized shall be thoroughly flushed at maximum flow established by the City prior to chlorination, no less than 2.5 ft/s. Flushing period must be approved by the City. Sections will ordinarily be sterilized between adjacent valves unless, in the opinion of the City, a longer section may be satisfactorily handled. Chlorine shall be applied by solution feed at one end of the

section with a valve or hydrant at the opposite end open sufficiently to permit a flow through during chlorine application. The chlorine solution shall be fed into the pipeline already mixed by an automatically proportioning applicator so as to provide a steady application rate of not less than 50 ppm chlorine. Hydrants along the chlorinated section shall be open during application until the presence of chlorine has definitely been detected in each hydrant run. When a chlorine concentration of not less than 50 ppm has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours minimum contact time.

As an alternative, the Contractor may use granulated chlorine. Granulated chlorine (dry calcium hypochlorite at 65% - 70% chlorine) shall be placed in the pipe to yield a dosage of not less than 50 ppm. The number of ounces of 65% test calcium hypochlorite required for a 20-foot length of pipe equals  $.00843ld$ , in which "d" is the diameter in inches. The line shall then be thoroughly flushed and water samples taken for approval by the local health agency. Flushing period must be approved by the City. The Contractor shall exercise special care in flushing to avoid damage to surrounding property.

Should the initial treatment result in an unsatisfactory bacteriological test, additional chlorine using the first procedure shall be repeated by the Contractor until satisfactory results are obtained. The Contractor shall be responsible for disposal of treated water flushed from mains and at no time shall chlorinated water from a new main be flushed into a body of fresh water. This is to include lakes, rivers, streams, storm drainage systems and any and all other waters where fish or other natural water life can be expected.

Dechlorination of the treated water that is flushed from the main is required. Allowable chemicals are ascorbic acid or other chemical if approved by the Public Works Director.

Main extensions shall not be connected to the City water system until pressure and bacteriological tests have passed all required standards.

## GG. Chlorine Dosage

References in Section 7-09.3(24) of the Standard Specifications to an initial chlorine content of the water of not less than 50 mg/l is as follows.

The amounts of chlorine (Cl<sub>2</sub>) required to provide 50 mg/l for 100-foot lengths of various diameter of pipe are:

### AMOUNTS OF CHLORINE REQUIRED FOR 50 MG/L DOSAGE

Pipe Size (Inches)	Volume of Water Per 100 ft. Length (gallons)	Household Bleach 5-1/4% (gallons)	Commercial Bleach 12-1/2% (gallons)
4	65.3	0.06	0.03
6	146.5	0.14	0.06
8	261.0	0.26	0.11
10	408.0	0.40	0.16
12	588.7	0.60	0.24
14	799.6	0.80	0.32
16	1044.4	1.0	0.42
20	1631.9	1.6	0.66
24	2349.9	2.2	0.94
30	3671.7	3.6	1.50
36	5287.3	5.0	2.20
42	7196.6	7.0	2.90
48	9399.6	9.2	3.20

## **8. DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS – SANITARY SEWER SYSTEM**

### **A. General**

The City has a vacuum sewer system that operates differently than standard gravity sewer. All materials shall be new and undamaged. The installation of all sanitary sewer facilities shall be done per plans which have been approved by the City shall be used throughout the work.

Where reference is made to other specifications, it shall be the latest revision at the time of construction, except as noted on the plans or herein.

All materials not specifically referenced shall comply with applicable sections of ANSI, ASTM, AWWA, and the Standard Specifications.

Approved manufacturers and model numbers of various materials are listed in Approved Materials List included with these Standards. When specific manufacturers or models are listed, no substitutions will be allowed without prior approval by the City.

### **B. Materials**

(1) Sewer main pipes shall be 6-inch minimum or as directed by the City.

Side sewers may be either 4" or 6" for single family residences. All multi-family and commercial side sewers shall be 6" minimum. Sewer main shall be constructed of ASTM 2241 SDR21 unless otherwise approved by City.

Gravity or grinder pump main line sewer will only be allowed if vacuum sewer is not technically feasible to use. Sizing will be determined by the City.

Gravity sewers and services shall be constructed of ASTM 2241 SDR 21 PVC, ASTM 3034 SDR 35 PVC, or Class 50 ductile iron pipe conforming to Section 9-05.12 of the Standard Specifications unless shown otherwise on drawings. PVC gravity sewer service pipe shall be considered flexible conduit. PVC compound shall meet the requirements of ASTM D 1784 for Class 12454-B PVC. Vent pipes shall be PVC SDR 21 or Schedule 40 PVC with solvent weld joints as shown on the standard detail. Installation of tracer tape or wire over the side sewer is recommended.

Ductile iron pipe (Class 50) may be used in lieu of PVC pipe provided the ductile iron pipe is lined with epoxy, polyurethane, or SewperCoat as manufactured by Lafarge Calcium Aluminates or approved equal. All linings shall be applied per the manufacturer's recommendations.

The interior of the pipe shall be kept clean and free from dirt, cement, or any other superfluous, and each joint left entirely free from any protruding material on the inside of the pipe joint or pipe barrel.

(2) Couplings

Only ROMAC, Fernco couplings or Ford flexible couplings may be used. Fernco couplings are only allowed at the building connection to the side sewer, not at the connection to the City side sewer. They shall be installed as prescribed by the manufacturer of the coupling, and in a manner satisfactory to the City.

(3) Wyes, Tees and Cleanouts

Cleanouts shall be required for all side sewers longer than 100 feet as measured from the owner's property or easement line and the building foundation. Cleanouts shall be provided at intervals not to exceed 100 feet and are encouraged at changes of pipe alignment.

Wyes and cleanouts shall be placed shall be placed at any location or locations which in the City's opinion are reasonably necessary to assure a proper installation.

All wyes to be installed for use as a permanent cleanout, and all temporary or future ends of runs shall be plugged with a plug of a type satisfactory to the City and shall be made completely watertight. It is the installer's responsibility to assure that such plug will not be blown out or moved by the testing pressure in the sewer system. Any such means of prevention shall be easily removable without damage to the fitting or the plug.

No side sewer shall be covered or backfilled prior to the field inspection by the City. Any person performing work subject to the provisions of this Policy shall notify the City as least forty eight (48) hours in advance of when the work will be ready for inspection and testing, and an appointment will be arranged for the inspection. The owner or contractor must be present during the inspection. If an appointment has been scheduled and the inspector arrives and finds that, in fact, the side sewer is not ready for testing and inspection, a new appointment must be made and a charge made for the second visit as established by this City.

(4) Pipe Bedding

Native material may be used for pipe bedding if it is sand or small gravel material with stones no larger than 1 ½-inch diameter.

Hand selected and placed native material may be used only if it is free of stones larger than 1 ½ inches in diameter and is hand placed around the pipe to at least 6 inches over the top of the pipe.

If the native material is not suitable for pipe bedding, the imported pipe bedding shall only be either pea gravel or 5/8-inch crushed rock. Backfill with such material shall be continued until embedding is completed to the top of the pipe. The top of the pipe and all fittings shall remain exposed for inspection. The bedding shall be completed before inspection or testing of the side sewer.

Ledge rock, boulders or stones shall be removed to provide a minimum clearance of 4 inches from the pipe. All materials removed shall be replaced with bedding material satisfactory to the City.

Where trench bottom is in quicksand, mulch, peat or other unstable material, a stable foundation of gravel shall be provided. The responsibility for adequate pipe bedding will rest entirely with the owner. Bedding material shall be satisfactory to the City and so placed as to preclude the possibility of large rocks or boulders bearing directly against the sewer pipe.

(5) Grade and Alignment (minimum and maximum)

All side sewers shall be laid to a minimum grade of one and one-half (1.5)% and a maximum grade of 2 feet vertical to 1 foot horizontal (200%), unless otherwise explicitly authorized in writing by the City. Side sewer grades of 2% minimum are recommended. Side sewers shall be constructed with a maximum pipe deflection of not more than 2 inches per foot.

The maximum deflection permissible at any one fitting shall not exceed 45 degrees with minimum of 24 inches separation between bends.

(6) HDPE Pipe and Fittings

HDPE piping components shall be manufactured from materials that meet or exceed the requirements of the Plastic Piping Institute designation PE3408 and that conform to the requirements of ASTM D3350 for a cell classification of PE 345434C.

Bolts and nuts for buried mechanical joining components such as flanges shall be made of noncorrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21, regardless of any protective coating.

Pipe shall have the nominal dimensions shown with an IPS outside diameter basis and the dimensions and tolerances specified in AWWA C906. DR rating shall be 26 and pressure class shall be 64 psi.

Fittings shall conform to the applicable requirements of AWWA C906 for the joining methods specified in this Special Provision.

For pipe bends 14 inches and smaller and where long radius bends are specified for the piping system, provide Arc<sup>TM</sup> sweep bends manufactured by Pipestar International, or equal. Bend radius shall be three times the pipe diameter, measured to the center line of the bend for long-radius bends.

Flange fittings shall be Flange Type VR 955.

Pipe marking shall conform to the requirements of AWWA C906.

### **C. Shoring**

It is the owner's responsibility to provide whatever shoring may be required to protect the work and property, utilities, pavement, to provide lateral support of existing property, and also to provide safe working conditions in the trench. Such shoring shall be in accordance with Washington Industrial Safety and Health Administration and Office of Safety and Health Administration standards and shall be at the owner's expense.

Removal of any shoring from the trench shall be accomplished in such a manner as to assure that no damage is done to the pipe or work.

It is the owner's sole responsibility to restore all properties, public or private, which may be disturbed or damaged by the owner's construction. The owner shall maintain an absolute minimum width of trench at both the top of the pipe and the top of the ditch.

Temporary shoring shall be removed unless specific permission is granted by the City to leave it in place, and in no event will shoring be permitted to remain in the top 18 inches of the trench.

### **D. Trenching Transverse to Existing Roadway**

Open-cut transverse crossings of roadways after final paving are not to be permitted unless it can be shown that alternatives such as jacking, auguring or tunneling are not feasible or unless the utility can be installed just prior to reconstruction or an overlay of the road. Should an open cut be approved, all transverse trenches shall be backfilled with controlled density fill or crushed surfacing. Transverse crossings in roadway under construction with ATB applied may be backfilled with crushed rock.

## **E. Trench Excavation, Bedding and Backfill**

Any trench exceeding four feet in depth shall be provided with adequate safety systems meeting the requirements of the Washington State Industrial Safety and Health Act (WISHA), Chapter 49.17 RCW, and all regulations adopted pursuant thereto. Contractor shall have a structural engineer review and stamp any and all shoring plans and calculations. The Contractor alone shall be responsible for worker safety and the City and the Engineer assume no responsibility.

When native material at the trench bottom is suitable for pipe bedding, the bottom shall be hand finished to grade so that the pipe will have uniform support along the barrel and bell. After the pipe is in place additional hand selected native material meeting the requirements for bedding material shall be placed and tamped around the pipe for a minimum of 6 inches above the crown of the pipe.

When native material at the trench bottom is stony or otherwise non-uniform, the trench shall be over-excavated a minimum of 6 inches below the specified grade and a layer of pipe bedding material shall be furnished and placed by the Contractor to the specified grade. After the pipe is in place additional hand selected native material meeting the requirements for bedding material shall be placed and tamped around the pipe for a minimum of 6 inches above the crown of the pipe.

If the native material at the trench bottom is unsuitable for foundation purposes or will have difficulty providing uniform bearing for the pipe, such material shall be removed and replaced with a minimum of 6 inches of compacted foundation material.

The bedding material shall be carried up evenly on both sides of the pipe simultaneously in approximately 6-inch layers and each layer thoroughly compacted with appropriate tools in such manner as to avoid injuring or disturbing the completed pipeline. All bedding and native material shall be stored away from the edges of excavation and off the paved roadway and shoulder.

All trench backfill shall be mechanically compacted to 95% of maximum density (Modified Proctor Test) within the Right-of-Way and in all areas (paved and unpaved) where streets, roadway shoulders, driveways, sidewalks, or parking lots will be constructed or reconstructed over the trench except for trenches over 8 feet in depth. When the trench depth exceeds 8 feet, trench backfill up to 4 feet from the top of the trench may be water settled or mechanically compacted to 90% of the maximum density. The upper 4 feet shall be compacted to 95% of the maximum density.

If Side Sewer is constructed outside of the Right-of-Way, trench backfill may be compacted to 90% max density.

Backfill shall begin immediately after inspection and approval of the installation by the City. Backfill compaction on private property is the owner's responsibility.

#### **F. Side Sewer Stub Service (Right-of-Way Construction)**

Note: The following specifications are in addition to the requirement of any stub service road cut permit.

Larger changes in direction shall be made by use of standard 11-1/4 degree or 22-1/2 degree bends. No more than one bend per stub service will be allowed.

Grade and Alignment shall be per other section of these standards. Each side sewer stub shall terminate with a 6 inch cap within 1 foot of the property or permanent easement line.

The owner may elect to extend the side sewer stub by one length of side sewer pipe. Any such extension shall not exceed 12 feet in length from a Tee installed at the property line. The Tee, with a push-in plug, shall be laid in such a fashion that the branch is vertical. Such length of side sewer shall terminate with a cap, and shall be tested along with the stub service.

All side sewer stubs shall be 6-inch minimum. Commercial or multifamily units may require larger side sewer stubs and will be reviewed by the City.

#### **G. Protection and Maintenance of Public and Private Right-of-Way**

The owner shall protect and maintain all underground or above-ground utilities, and all public facilities, including but not limited to streets, roads, highways, sewer mains, sewer stub services, water mains, water services, culverts, drains, ditches, curbs, sidewalks, landscaping.

The owner is responsible for all damages to streets, roads, highways, ditches, walls, culverts, utilities, barricades, lights, or any other property caused by the Owner or Owner's Contractor's work, whether such damage be at the site of the work or caused by transporting or hauling to or from the work, and shall repair or replace, or arrange for the repair of all such damages to the satisfaction of the City and of any other authority or person having ownership or jurisdiction over the place of work and/or damage.

#### **H. Testing Specifications**

##### **Vacuum Sewer Mains and Fittings**

Testing of all sewer mains and lateral connections shall be performed daily in accordance to the following procedure:

Plug all open connections with rubber stoppers or temporary caps, fitted to the pipe by "no-hub" couplings. Apply a vacuum to 22 inches Hg to the pipes and allow the pressure to stabilize for 15 minutes. There shall be no loss of vacuum in excess of 1% per hour for a two-hour test period. There shall be absolutely no water allowed to be admitted into the piping network during this test. As pipe is laid the new section shall be tested in addition to the previously laid pipe on that main.

The Contractor should leave the sewer main pipe joints uncovered until after the daily vacuum test is complete so that any leaks can be easily located and repaired.

#### Two (2) Hour Vacuum Line Test Modification Provision:

If the Contractor succeeds in meeting the daily 2-hour test for seven (7) consecutive working days or two thousand feet of pipe, he may alter the procedure to allow the trench to be covered as work progresses rather than the trench being kept open all day as is the norm with the daily 2-hour test. Should a line fail the vacuum test while utilizing this test modification, the Contractor shall take whatever action necessary at his cost to pass the test including the re-excavation of the trench, leak detection and line repair, and additional cleanup as required by the Engineer. After the failure, the contractor must "re-qualify" as specified above. Note that this test modification is optional, and as such, the Contractor assumes all liability in its use.

#### **Vacuum Pipe Flushing**

After acceptance of vacuum testing, flush lines to remove debris and foreign materials that accumulated in the lines during construction.

Suggested procedure (In the absence of special test apparatus, this procedure will require the use of vacuum valves, which must be installed by the Owner. Coordination is therefore required.):

Place system under vacuum.

- (1) Add water and air in controlled amounts to valve pits at extreme ends of system.
- (2) Utilize system vacuum to transport water and debris to collection point.
- (3) Continue procedure until water entering at collection point is free of contamination or debris. If vacuum collection tank is used as collection point, monitor volume of liquid in tank and pump out as necessary. Use system sewage pumps only after verifying that no debris is present in collection tank. If debris is present, use other methods to empty collection tank. At completion of flushing, clean collection tank of all collected debris.
- (4) Seal system and make ready to place into operation.

Alternate flushing procedures are subject to ENGINEER's review.

Side Sewer Testing

Prior to being connected to the premises all side sewers shall be tested by one of the two following methods:

(1) Exfiltration

The side sewer shall be filled with water through a riser that extends a minimum of 5 feet above finished grade at the installation. The riser shall be filled with water and no noticeable drop in the water level shall be accepted for a period of not less than 10 minutes of observation. The riser may double as the side sewer vent pipe. The riser shall be cut to the required length for the vent pipe after the side sewer passes the ex-filtration test.

(2) Air test

All equipment required to make such tests, including plugs, hoses, blocking, air pumps, water and other equipment shall be furnished by the owner.

Air testing shall meet the following requirements:

<u>PIPE SIZE</u>	<u>SECONDS PER LINEAL FOOT OF PIPE</u>
4"	1.0
6"	1.5

Decompression is from 3.5 psi to 3.0 psi. For high groundwater table conditions, add 0.5 psi per foot of ground water above the pipe.

HDPE force main testing

HDPE force main shall be tested at 60 psi hydrostatic for 3 minutes.

**I. Inspections**

By applying for a side sewer permit the owner expressly grants personnel of the City the right of entry upon its property during reasonable hours for the purpose of inspecting the construction.

If City personnel find that the construction of the side sewer does not comply with the provisions of this Policy, they shall post a notice at a conspicuous place upon the premises, advising the owner of the defects, and shall file a copy of the notice at the City's office. The City shall mail to the permit applicant a copy of the inspection notice of deficiency within five (5) days; provided that if a permit applicant is present at the

time of the inspection, the City personnel may procure a signature upon the notice of deficiency in lieu of mailing.

When the construction provided for in the original permit has been completed and approved, any subsequent additions and/or changes to the side sewer and/or property use will require a new permit application and payment of fees at the then current rate. A change of type of use (e.g., change from single family to multi-family use) for the property will also require payment of other fees and charges of the City at the then current rate attributable to the new use, with a credit for amounts paid for the prior use.

## **J. Side Sewer Connections**

No more than one building may be connected with the side sewer unless the City issues an exemption for multiple connections. An exemption will be issued only upon the condition that the permittee has no other feasible option based on utility conflicts or space considerations or other technical issue that prevents installation of separate side sewers. The permittee shall hold the City harmless from any damages by reason of such installation and subject to the following regulations:

### **Common Side Sewers**

Two houses may be connected to a common side sewer when the following conditions are met:

- (1) At the end of the common portion of the joint side sewer a cleanout shall be installed per detail for joint side sewer cleanout.
- (2) A backwater valve shall be installed on both houses.
- (3) An easement on a form acceptable to the City shall be provided for the installation and maintenance of the common side sewer by all properties connected to the common side sewer. It is the property owners' responsibility to record the easement with King County.
- (4) The exemption will be prepared by the City in a form of an agreement of their choice and will include a hold harmless and indemnification provision satisfactory to the City. All participants of the joint side sewer shall execute the agreement and reimburse the City for all cost of reviewing the request and preparing agreements and necessary documentation.

### **Backwater Valves**

Backwater valves shall be installed on all structures except when waived by the City.

Backflow valves may be used as the cleanout between the house plumbing and side sewer as otherwise required by these standards.

Backflow valves may be either Alternate No. 1 or No 2 as shown on the Standard Details.

### **Required Size**

- (1) For single family residences a four inch minimum side sewer is required. For single family residences utilizing a joint side sewer, each residence may use a four inch side sewer from the residence to the wye connection; a six inch side sewer stub service shall be required from the wye to the connection to the valve pit.
- (2) For projects with more than 2 units, the City shall determine the required side sewer size and any buffer tanks or appurtenances to connect to the system.

### **Maximum Length – Four and 6-Inch Side Sewers**

Four-inch side sewers may be used for connections to single-family, residential buildings that are no more than 150 feet from the public right-of-way or easement in which the main line is located. Six-inch side sewer may be used for connections to buildings that are more than 200 feet from the right-of-way or easement in which the main line is located. Longer side sewers will only be allowed in such special cases as may be approved by the City and any such side sewer is subject to the City's establishing the conditions and regulations for extended side sewers.

## **K. Commercial Buildings**

Due to the unique nature of each commercial building, standardized procedures will satisfy neither the necessities of the owner nor in many cases governmental regulations. Therefore, a special study of each case will be made and requirements determined based upon such analysis. The owner will be responsible for gathering this information for review and approval by the City.

All non-residential customers are advised to contact King County Department of Natural Resources Wastewater Division for more information pertaining to their connection and potential sewage pre-treatment requirements.

## **L. Swimming Pools**

It is unlawful to drain large volumes of water directly into the sewer and thereby cause surcharging of sewer lines. Swimming pools, public or private, shall not be connected to the sewer. Discharge of swimming pools into the sewer shall be allowed; provided, that the City is authorized to enter into agreement with owners of private and public

swimming pools to provide for off-hour discharge of pool waters into City lines, where this is done under the supervision of the Public Works Director and at such hours as he may direct. Any such connection shall include a keyed valve to be opened only by the Public Works Director or his authorized representative.

#### **M. Industrial Waste Program**

All commercial sewer customers of the City shall be required to meet the policy requirements and specifications of the King County Department of Natural Resources Wastewater Division's Industrial Waste Program which administers regulations affecting businesses that discharge wastewater. A program built in 1969 as part of King County's sewer system that regulates the discharging of substances that can degrade the wastewater treatment process, harm workers or facilities, or impact surface water quality.

It will be the sole responsibility of the owner to operate within the guidelines of all regulations, discharge limits, and pretreatment limits set forth by King County Department of Natural Resources Wastewater Treatment Division, King County Industrial Waste Program, and the Federal Government for the disposal of materials including but not limited to Metals and cyanide, Fats, oils, and grease (FOG), Corrosive substances (pH), Flammable or explosive materials, Organic compounds, Hydrogen sulfide, High temperature, Solids and food waste.

Prohibited discharges include all items set forth in the King County industrial waste program in addition to all items that can mechanically impair the sewer system. For example no rags, towels, rubber gloves or water from construction sites shall enter the public sewer system. Individuals introducing prohibited items into the system are subject to fines and prosecution described in the CMC.

A FOG "Fats, oils, and grease" control plan is required by the Owner to be implemented and maintained with the standards set forth by King County Industrial Waste Program.

FOG is of two types: (1) of petroleum or mineral origin; (2) of animal or vegetable origin.

FOG of petroleum or mineral origin, called nonpolar FOG, can harm the biological phase of sewage treatment where microbes are used to break down wastes. The King County limit for nonpolar FOG is 100 milligrams per liter of discharged wastewater.

FOG of animal or vegetable origin, called polar FOG, can block sewer lines. King County rules require dischargers to minimize free-floating FOG. Wastewater must not be discharged if someone can see FOG floating on the surface or adhering to sides of storage containers. Dischargers may not add agents to emulsify free-floating polar FOG.

FOG Control Plans: The goal of the FOG control plan is to implement reasonable and technically feasible controls of free floating FOG. The basic components of the FOG control plan should include:

- (1) A written policy articulating management and corporate support for the plan and a commitment to implement planned activities and achieve established goals.
- (2) A description of the facility type and a summary of the products made and/or service provided.
- (3) Quantities of FOG brought into the facility as raw product, amounts contained in products, and quantities discharged to the sewer.
- (4) Schematics of process areas illustrating drains and discharge points connected to the sewer.
- (5) A description of current reduction, recycling, and treatment activities.
- (6) Identification of a full range of potentially feasible reduction opportunities.
- (7) A description of the reduction or control opportunities selected for implementation, process(es) affected, and estimated reductions to be achieved.
- (8) Specific performance goals and implementation schedule.

Flammables and Explosives: These include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and sulfides. The pollutant may be anything that King County, the fire department, EPA, and Washington State recognize as a hazard.

High temperature can cause materials in wastewater to release gases in sewers or can disrupt operations in sewage treatment plants. Industrial wastewater must not exceed 65°C (150°F) at the point where it enters the public sewer system.

Solids capable of settling can restrict or block flow in sewer lines. A company that discharges solids which cause a sewage backup is liable for any damages.

King County prohibits discharge to the sewer of materials such as ashes, sand, grass, and gravel. Industrial wastewater must contain less than 7 milliliters per liter of solids capable of settling. Food waste, including food-grinder waste, must be capable of passing through a 1/4-inch sieve.

Hazardous waste is a federal and state designation for waste material that is toxic, flammable, corrosive, or reactive; this kind of waste requires special handling and treatment at a licensed treatment, storage, disposal facility (TSDF). Hazardous waste can

be discharged to the sewer system only with verbal or written authorization from the Industrial Waste Program. More information can be obtained at King County Department of Natural Resources Wastewater Treatment Division at <http://dnr.metrokc.gov/wlr/indwaste/index.htm> or contact King County Industrial Waste Program at 130 Nickerson Street #200, Seattle WA 98109. Phone: (206) 263-3000.

Businesses or individuals who illegally discharge substances to the sanitary sewer system must pay for any damages and may be fined up to \$10,000 per day per violation as determined by King County Industrial Waste Program rules and regulations. Prior to discharging industrial waste to the sewer, all dischargers who generate and dispose of industrial wastewater (not including toilets) should contact King County Industrial Waste Program.

Grease traps are required for all restaurants and food service establishments as specified in the King County Department of Natural Resources Wastewater Treatment Division's currently adopted pre-treatment specifications.

Oil separators with grease traps are required on all automotive service stations, automotive garages, and car washes as specified in King County Department of Natural Resources Wastewater Treatment Division's currently adopted pre-treatment specifications.

All commercial sewer customers of the City shall be required to meet the policy requirements and specifications of the King County Department of Natural Resources Wastewater Division's Industrial Waste Program which administers regulations affecting businesses that discharge wastewater.

## **N. Alternative Installations**

### **(1) Where Permitted**

It is the City's policy that transporting sewage to the side sewer stub by gravity is the best system. Alternative pressure systems will be permitted only in those circumstances when a gravity system would be impractical, unreasonably expensive, or otherwise unfeasible. Approval of an alternative installation will be by the City.

The City will conduct a study for each project that exceeds 3 RCE's and determine the specific requirements for each applicant. The study will be paid for by the applicant.

In the case where a property owner has an existing gravity side sewer service and plans to add new plumbing facilities that cannot be served by gravity, the property owner shall contact the City for requirements.

If a gravity system is proposed instead of a vacuum system for mainline construction, this will have to be approved by the City, and requirements will be provided to developer.

(2) Type

After review and study, the City has selected the grinder pump pressure system as the alternative most suitable for the City. The City has standardized on the “Environment One” grinder pump. The Environmental One grinder pump requires a single-phase, 240 volt power connection. See Standard Details.

(3) Permit

A Side Sewer Permit for an Alternative Installation shall be subject to all of the requirements for a Standard Installation, and the following additional requirements:

- (a) The plot plan required for a Side Sewer Permit Application shall include the data required for a Standard Installation, plus the location of the electrical panel in the building to be served, the plumbing outlet location, and the proposed location of the grinder pump station and force main.
- (b) The applicant shall execute the City’s Grinder Pump Agreement, which the City will record with the King County Recorder’s Office. The City’s Power Outage Policy is incorporated into the Agreement.
- (c) The City or its agent must be present during the initial activation of the system.

**O. Installation**

Upon issuance of a Side Sewer Permit and execution of the Grinder Pump Agreement, the system will be installed on the property by the owner’s contractor shall install the system. One single family residence will be allowed per pump. Multi-unit residences will be evaluated for requirements on a case-by-case basis.

The installation of a grinder system may require upgrades to the owner’s electrical service. Additional installation requirements are shown on the Standard Details.

## **9. APPROVED MATERIALS LIST – WATER AND SEWER SYSTEMS**

The following manufacturers have been approved for use for water and sewer. Where specific manufacturers are listed no other manufacturer may be used without prior approval by the City.

### **A. Ductile Iron Pipe**

All manufacturers that meet the performance requirements specified under the material section of these standards.

### **B. Ductile Iron Fittings**

All manufacturers that meet the performance requirements specified under the material section of these standards.

### **C. Galvanized Iron Pipe**

All manufacturers that meet the performance requirements specified under the material section of the standards.

### **D. Joint Restraint Systems**

EBAA Iron (Megalug 1100)  
Griffin Pipe Products Company (Snap-Lok)  
Romac (Grip Ring)  
Pacific States Restrained Joint  
US Pipe (TR Flex)  
Mueller (Aqua Grip)  
One Bolt  
Field Lok Gaskets

### **E. Couplings**

Romac, Dresser

### **F. Stainless Steel Repair Bands**

Romac, Ford

### **G. Casing Insulators**

Pipeline Seal and Insulator Co.

8-inch band Model C8G  
12-inch band Model C12G

Cascade Waterworks Mfg. Co.

Stainless Steel Casing Spacers (catalog number depends on size)

**H. Casing End Seals**

Pipeline Seal and Insulator Co.,  
Standard Pull-on (Model S)  
Custom Pull-on (Model G)

**I. Gate Valves (3 inches to 12 inches)**

Manufacturers that meet the performance requirements specified in the Standards.

**J. PRV Station**

(1) Pressure Reducing Valves

CLA-VAL 90G-01 ABCSY } Approved Size for Main Valve

CLA-VAL 90G-01 ABCS } 2-inch Bypass Valve

(2) Strainers

Mueller 758 6-inch

Mueller 11M 2-inch

(With brass or stainless steel perforated screen, 1/16" diameter, 144 holes per square inch)

(3) Pressure Relief Valves

CLA-VAL 50G-01KO 2-inch or as required

**K. Individual Pressure Reducing Valves (Residential)**

Wilkins 600 with built-in bypass.

**L. Individual Pressure Reducing Valves (Commercial)**

(1) Pressure Reducing Valves

Mueller H-9300, No. 2 setting, Watts Series N45B or U5-Z3 or equivalent

(2) Pressure Relief Valves

CLA-VAL 55F

**M. Service Saddles**

Per the Standards and Standard Details.

**N. Corporation Stops**

Per the Standards and Standard Details.

**O. Angle Meter Valves**

Per the Standards and Standard Details.

**P. Valve Boxes**

Seattle style #940B with deep skirt lid

**Q. Butterfly Valves**

All manufacturers that meet the performance requirements specified in the Standards.

**R. Check Valves**

Rennselaer List 340

**S. Air and Vacuum Release Valves**

APCO No. 143-C, Val-Matic No. 201C, Crispin UL20

**T. Fire Hydrants**

M&H 929, AVK Nostalgia 2780, and Clow Medallion

**U. Meter Setters**

Per the Standards and Standard Details.

**V. Meter Boxes**

Per the Standards and Standard Details.

**W. Reduced Pressure Backflow Assemblies**

As approved on the most current Department of Health Services list for cross connection devices.

**X. Double Check Valve Assemblies**

As approved on the most current Department of Health list for cross connection devices.

**Y. Resilient Seated Shut-Off Valves**

All manufacturers that meet the performance requirements specified under the material section of the standards.

**Z. PVC Pipe (ASTM D3034) 4-inches – 15-inches**

All manufacturers that meet the performance requirements specified under the material section of the standards.

**AA. PVC Pipe (ASTM F679) 18 inches – 27 inches**

All manufacturers that meet the performance requirements specified under the material section of the standards.

**BB. PVC Pipe (AWWA C900) 4 inches – 12 inches, (AWWA C905) 14” or larger**

All manufacturers that meet the performance requirements specified under the material section of the standards.

**CC. HDPE Pipe and Fittings (Force Mains)**

HDPE piping components shall be manufactured from materials that meet or exceed the requirements of the Plastic Piping Institute designation PE3408 and that conform to the requirements of ASTM D3350 for a cell classification of PE 345434C.

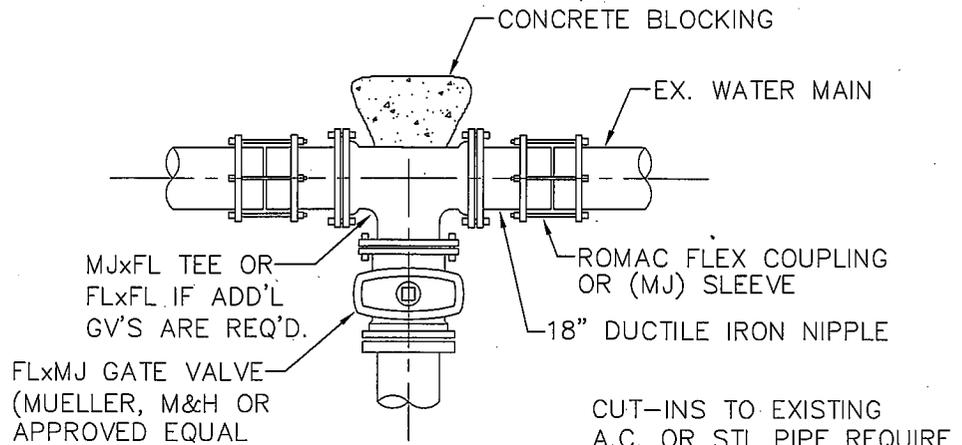
**DD. Controlled Density (Flowable) Fill**

Approved Sources are:  
Stoneway, CADMAN, Earth to Earth if available

**EE. Recycled Concrete (For Use as Crushed Surfacing Base Course Material)**

Stoneway Recycling,  
Renton Recycling (with certification that the material is free of contaminants)

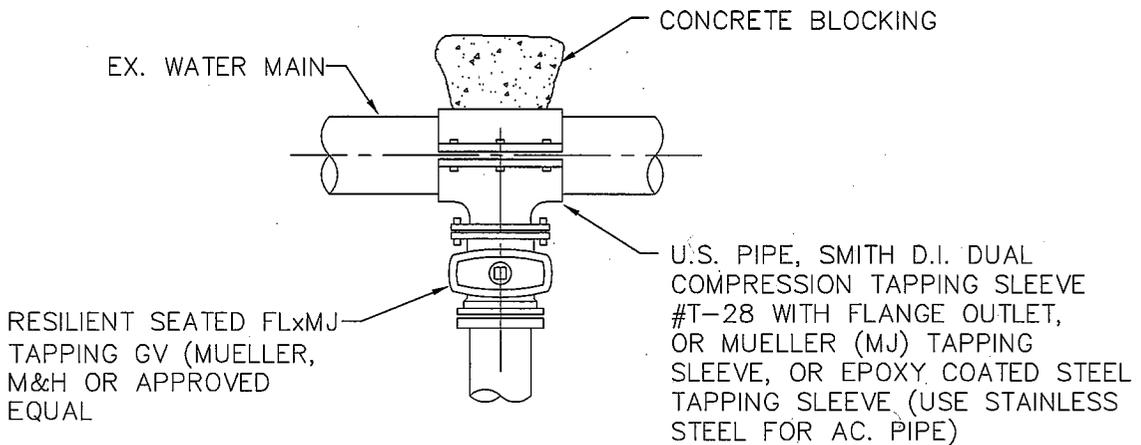




CUT-INS TO EXISTING C900 OR C905 PVC,  
C.I., OR D.I. PIPE REQUIRE  
2-18" D.I. NIPPLES  
2-(MJ) SLEEVES (LONG)

CUT-INS TO EXISTING  
A.C. OR STL PIPE REQUIRE  
2-18" D.I. NIPPLES  
2-ROMAC FLEX COUPLINGS

CUT-IN TO EXISTING WATER MAINS (TYP)



WET TAP EXISTING WATER MAINS (TYP)

NOTE:

ALL CONNECTIONS TO EXISTING MAINS WILL BE MADE WITH CITY OF CARNATION PERSONNEL PRESENT.

ALL FITTINGS TO BE SWABBED W/CL2 SOLUTION (50 PPM)

STEEL PIPES SHALL BE RECOATED WHERE WRAPPING HAS BEEN DISTURBED.

SIZE ON SIZE TAPS REQUIRE CAST IRON MJ SLEEVE (8" MIN. DIA.)

**ROTHHILL**

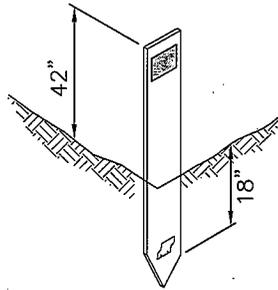
**Roth Hill, LLC**  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**CUT-INS & LIVE TAPS**

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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-1	DATE APPROVED		



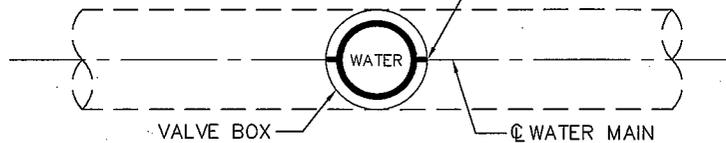
DWG. NO. **W-1**



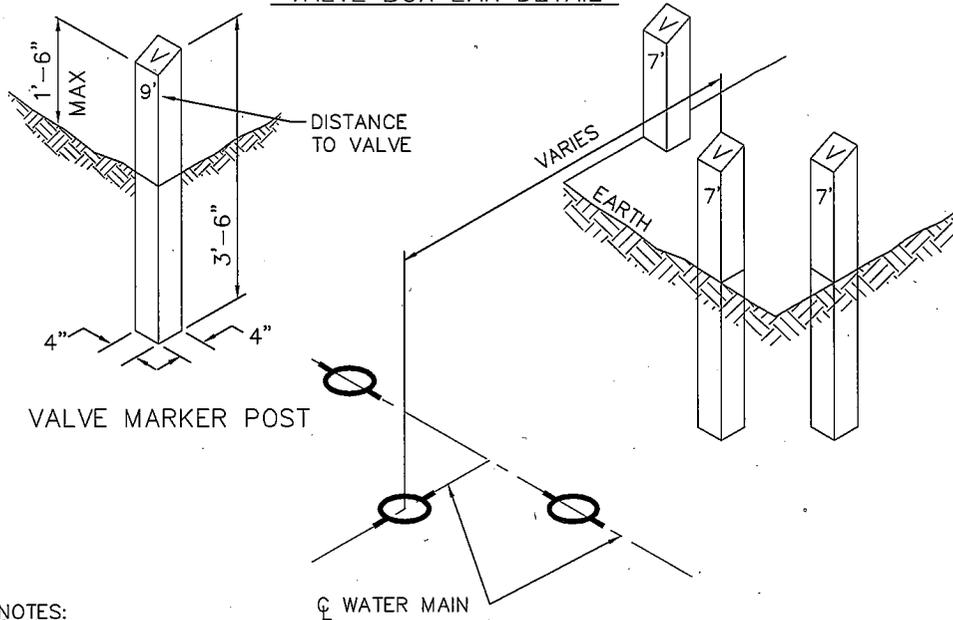
PROVIDE A VALVE MARKER POST FOR EACH VALVE OUTSIDE OF THE PAVEMENT. THE FIBERGLASS VALVE MARKER POST SHALL BE YELLOW IN COLOR, 3 3/4" WIDE (FLAT), 60" LONG, & FURNISHED WITH A 2" x 2", HIGH DENSITY WHITE REFLECTOR (250 CANDLE POWER) & A FLEXIBLE ANCHOR BARB. VALVE MARKER SHALL BE CARSONITE UTILITY MARKER CUM 375 OR APPROVED EQUAL.

OPTIONAL VALVE MARKER POST WHERE REQUIRED

ALIGN VALVE BOX EARS IN THE DIRECTION OF THE WATER MAIN (AS SHOWN)



VALVE BOX EAR DETAIL



NOTES:

1 VALVE MARKER POST PER VALVE UNLESS TWO VALVES CAN BE ALIGNED w/ ONE VALVE MARKER w/ BOTH DISTANCES STENCILLED ON THE FRONT OF THE VALVE MARKER.

VALVE MARKER POST SHALL BE A FOGTITE VALVE MARKER OR APPROVED EQUAL.

THE POST SHALL BE SET AT RIGHT ANGLES TO THE ROADWAY FROM THE VALVE AND SHALL BE SITUATED IN A SAFE AND REASONABLY CONSPICUOUS LOCATION.

PAINT VALVE MARKER WITH 2 COATS CATERPILLAR YELLOW. STENCIL DISTANCE (TO THE NEAREST FOOT) TO THE LINE VALVE IN 2" BLACK NUMERALS.

VALVE MARKER POST REQUIREMENT & LOCATION SHALL BE AT THE DISCRETION OF THE PUBLIC WORKS DIRECTOR.

VALVE MARKERS NOT REQUIRED FOR VALVES LOCATED IN PAVED AREAS.

**ROTH HILL**

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11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

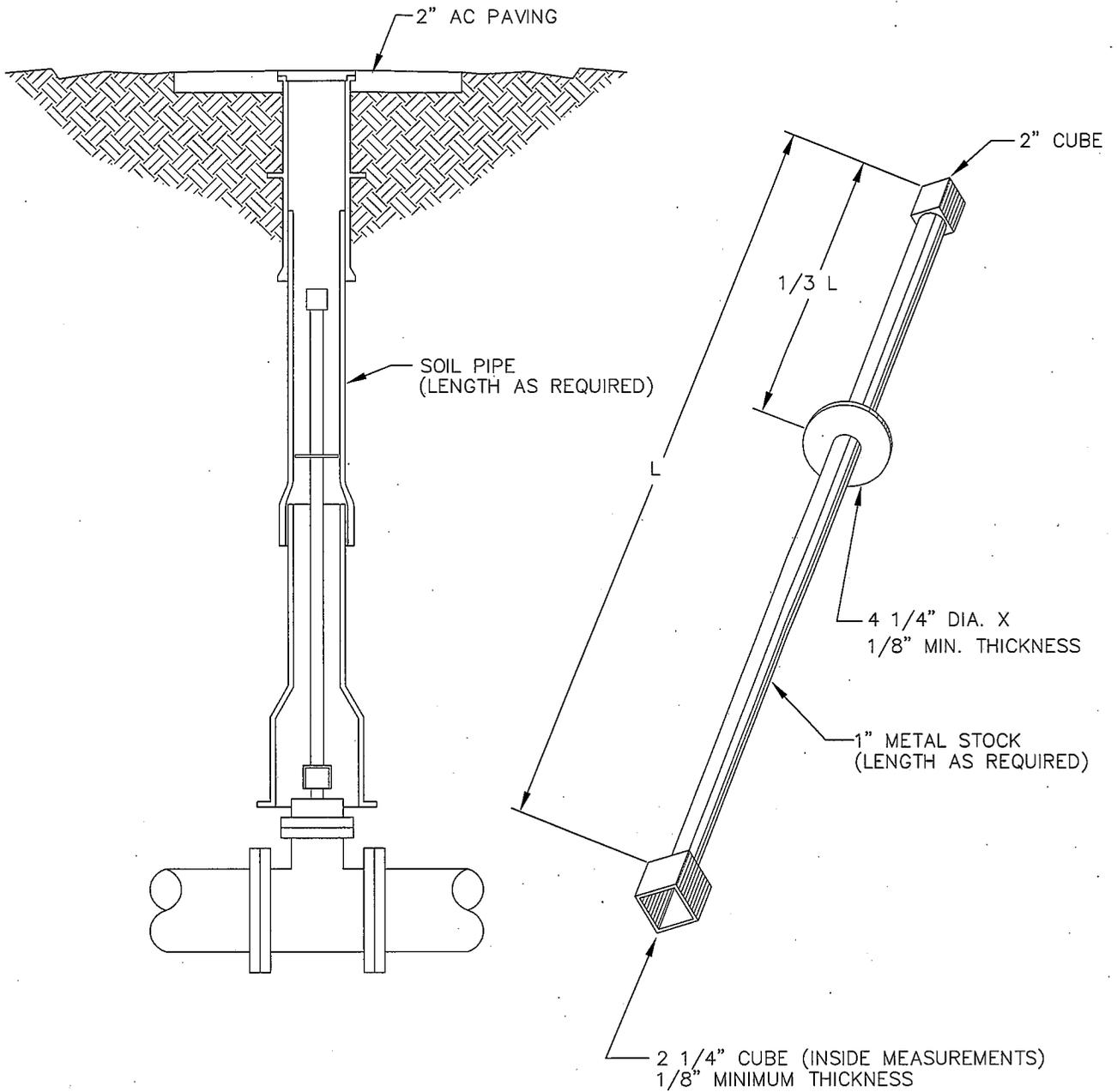
**VALVE MARKER POST DETAIL**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-2	DATE APPROVED		

DWG. NO.

W-2



NOTES:

LENGTH AS REQUIRED TO PUT OPERATING NUT, TWO (2) FEET FROM SURFACE. EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN FOUR (4) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF TWO (2) FEET LONG. ONE EXTENSION IS TO BE USED PER VALVE.

ALL EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.

**ROTH HILL**

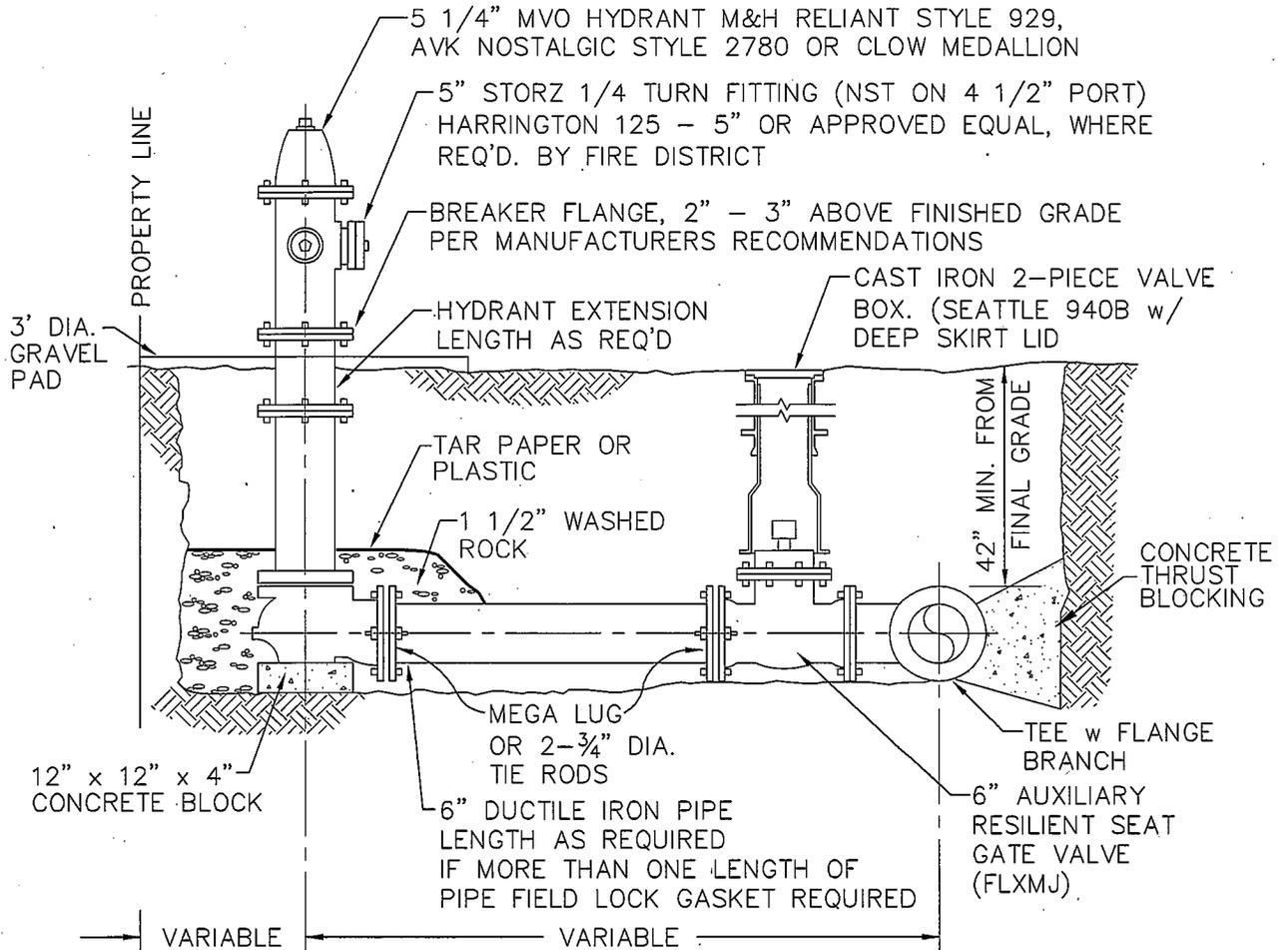
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 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**VALVE OPERATING NUT  
 EXTENSION DETAIL**



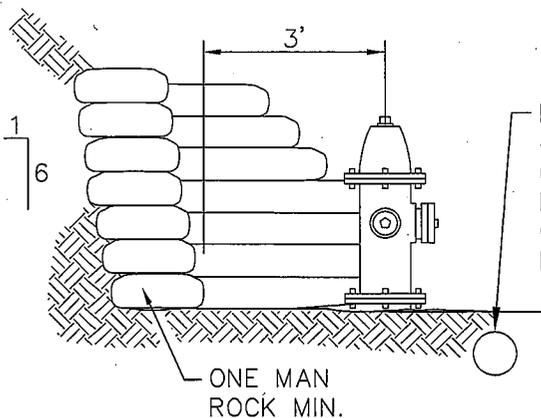
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DWG. NO. W-3



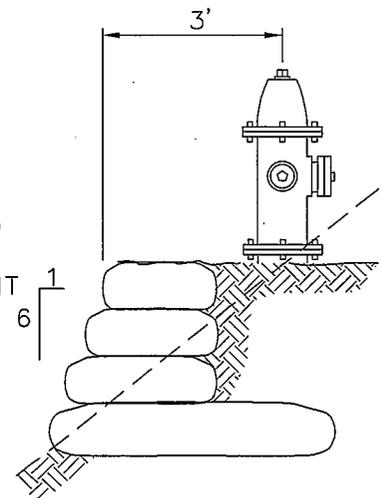
NOTE: PAINT HYDRANT WITH CATERPILLAR YELLOW. BAG HYDRANT UNTIL SYSTEM IS APPROVED.

3' MINIMUM CLEARANCE AROUND FIRE HYDRANT



CUT

INSTALL CULVERT W/ 4 TO 1 TAPERED ENDS (SIZE & TYPE EQUAL TO NEAREST DOWNSTREAM CULVERT) WHEN HYDRANT IS BEHIND DITCH.



FILL

**ROTH HILL**

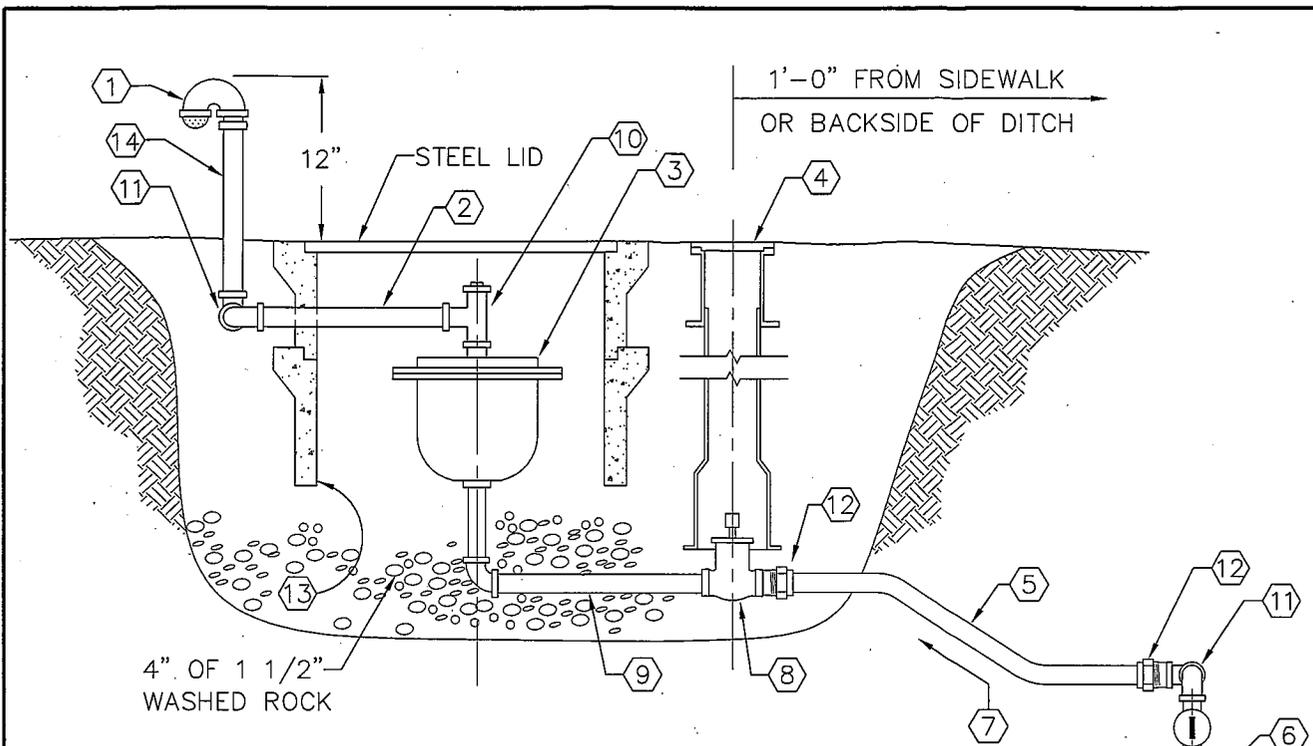
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Bellevue, WA 98004  
Tel. 425.869.9448

**FIRE HYDRANT ASSEMBLY  
INSTALLATION**

PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-4	DATE APPROVED		



DWG. NO. W-4



**GENERAL NOTES**

ALL PIPE AND FITTINGS FROM THE MAIN TO THE SCREWED GATE VALVE (8) SHALL BE 2" HI-MOL CL 200 PLASTIC PIPE.

AIR AND VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT IN LINE. IF HIGH POINT FALLS IN LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF LINE TO CREATE HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED.

INSTALL VALVE BOX PERPENDICULAR TO PAVING. INSULATE W/ FIBERGLASS INSULATION TO TOP OF AIR/VACUUM VALVE.

**KEYED NOTES**

- (1) 2" BRONZE BEEHIVE STRAINER, 2" RETURN BEND, PAINTED CATERPILLAR YELLOW
- (2) EXTEND 2" GALV. PIPE HORIZONTALLY THROUGH NOTCHED OPENING IN BACK OF BOX
- (3) 2" AIR RELEASE OR COMBINATION AIR/VACUUM VALVE, APCO 145C OR EQUAL.
- (4) CAST IRON 2 PIECE VALVE BOX w/ LID, SEATTLE STYLE 940A
- (5) 2" HI-MOL CL 200 PLASTIC PIPE
- (6) 2" DOUBLE STRAP SADDLE WITH IP BALL CORP STOP
- (7) MAINTAIN POSITIVE SLOPE FROM MAIN TO AIR RELEASE VALVE
- (8) 2" R/S GATE VALVE (IP), CAST IRON BODY, SCREWED, NON-RISING STEM, 2" SQUARE OPERATING NUT
- (9) 2" GALV. PIPE WITH 90° ELBOW AND SHORT NIPPLE
- (10) 2" TEE w/ 2" CLOSE NIPPLE & PLUG
- (11) 2" 90° BEND & 2" 90° STREET ELL
- (12) 2" ADAPTER (MIPxCOMP)
- (13) 2-#2 FOGTITE CONCRETE METER BOXES w/ ONE STEEL TRAFFIC BEARING LID
- (14) 2" GALV. PIPE

**ROTH HILL**

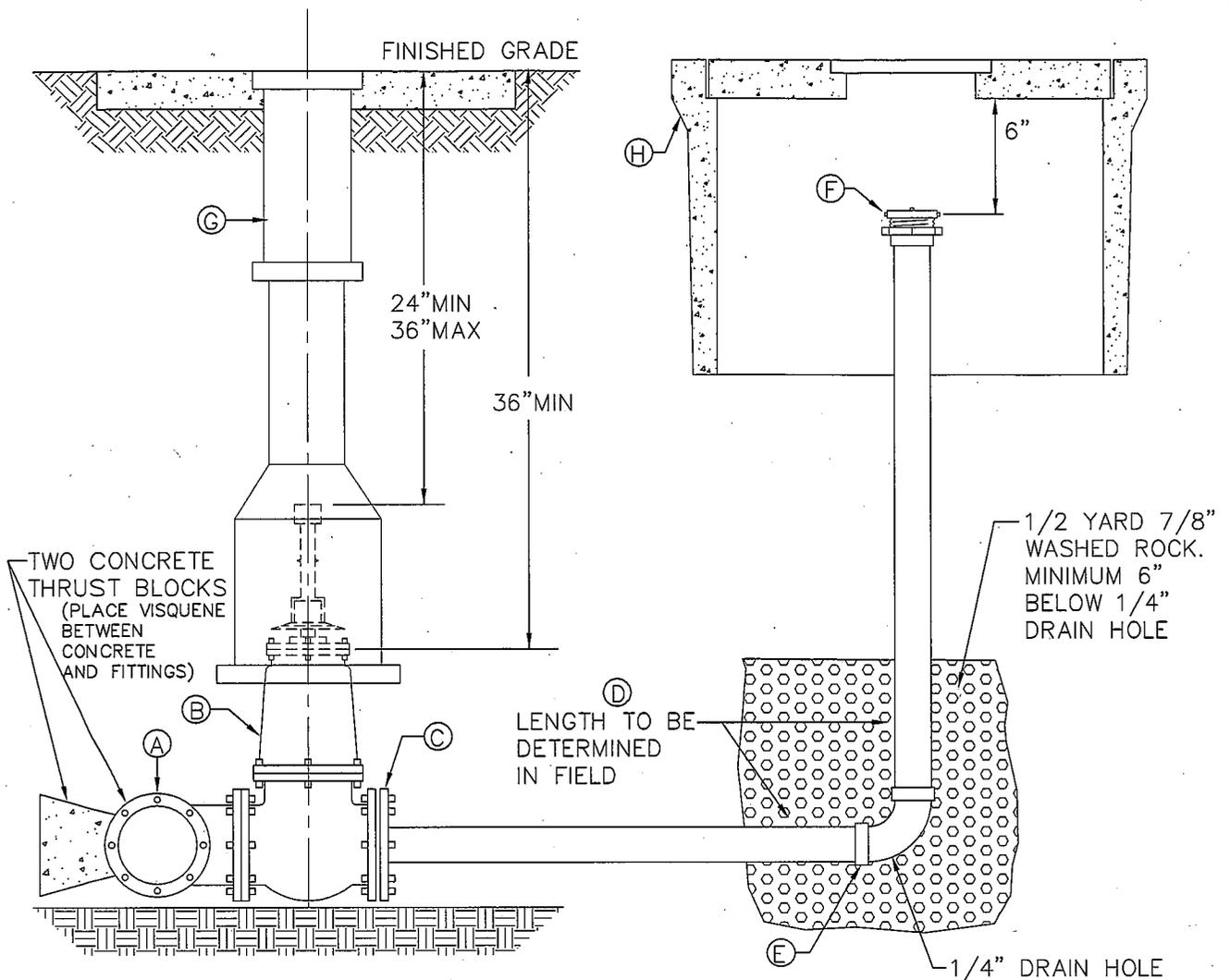
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 11130 NE 33rd Place,  
 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**2" AIR RELEASE OR COMBINATION  
 AIR/VACUUM VALVE**

PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-5	DATE APPROVED		



DWG. NO. **W-5**



- A. DUCTILE IRON TEE (MJxFL) WITH 4" BRANCH & MJ SOLID PLUG.
- B. 4" GATE VALVE, (FLxMJ) TO BE LOCATED IN ASPHALT.
- C. 4" PLUG (MJ) w/ 2" IP TAP.
- D. 2" SCHED 40 GALVANIZED PIPE
- E. 2" 90 DEG BEND, GALV.
- F. 2" FIPx 2 1/2" NST HOSE ADAPTER & CAP w/ CHAIN.
- G. SEATTLE #940B (18"x 24") VALVE BOX ASS'Y. w/ DEEP SKIRT LID.
- H. FOGTITE B-9 1/2T BOX WITH STEEL LID LOCATED BEHIND SIDEWALK.

**ROTH HILL**

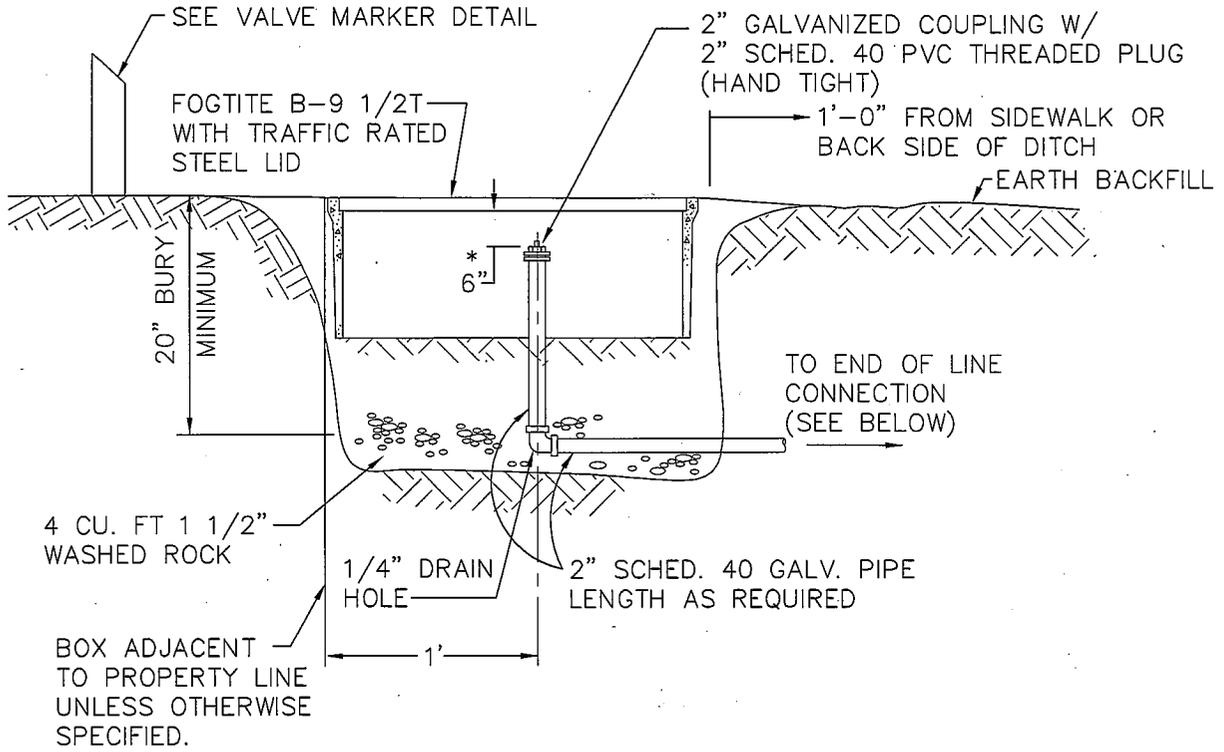
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 Bellevue, WA 98004  
 Tel. 425.869.9448

**2" PERMANENT BLOW OFF  
 ASSEMBLY FOR 6" & SMALLER MAINS**



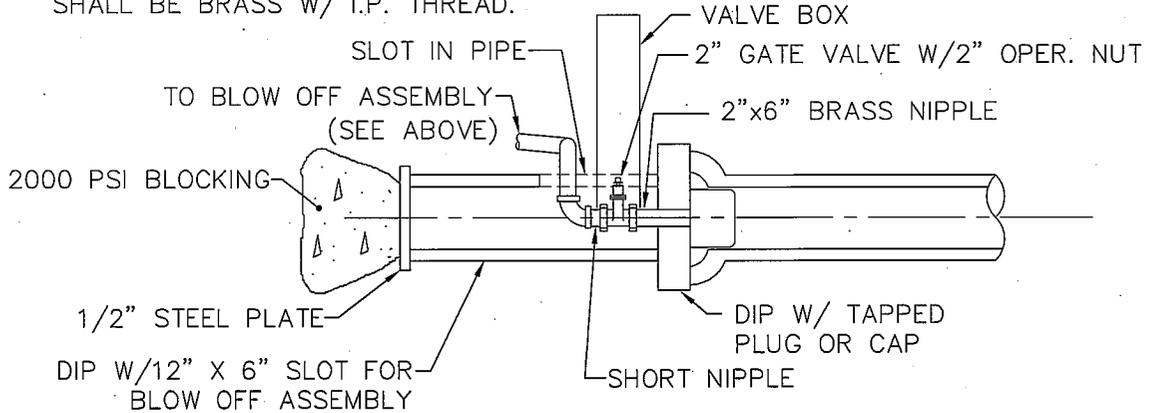
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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-6	DATE APPROVED		

DWG. NO. **W-6**



**NOTES:**

ALL PIPE AND FITTINGS FROM THE MAIN TO THE GATE VALVE SHALL BE BRASS W/ I.P. THREAD.



**END OF LINE CONNECTION**

**ROTH HILL**

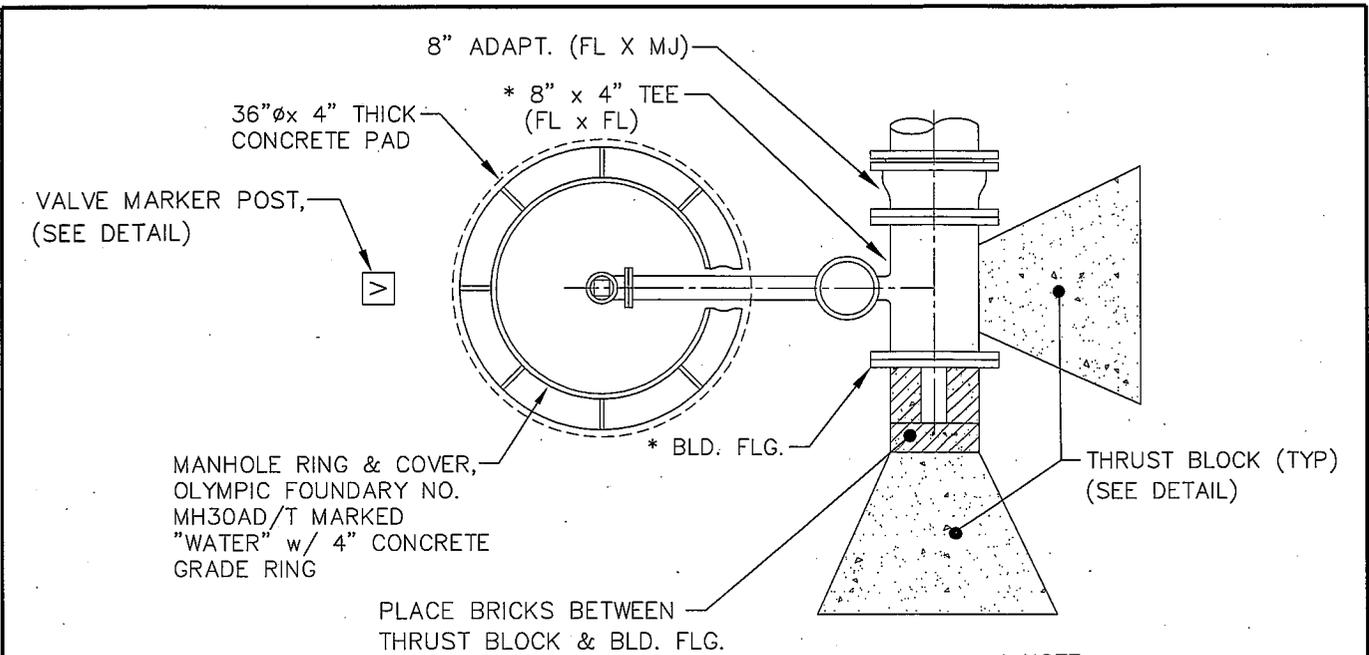
Roth Hill, LLC  
 11130 NE 33rd Place,  
 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**2" TEMPORARY BLOW OFF  
 ASSEMBLY FOR TESTING**

PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-7	DATE APPROVED		

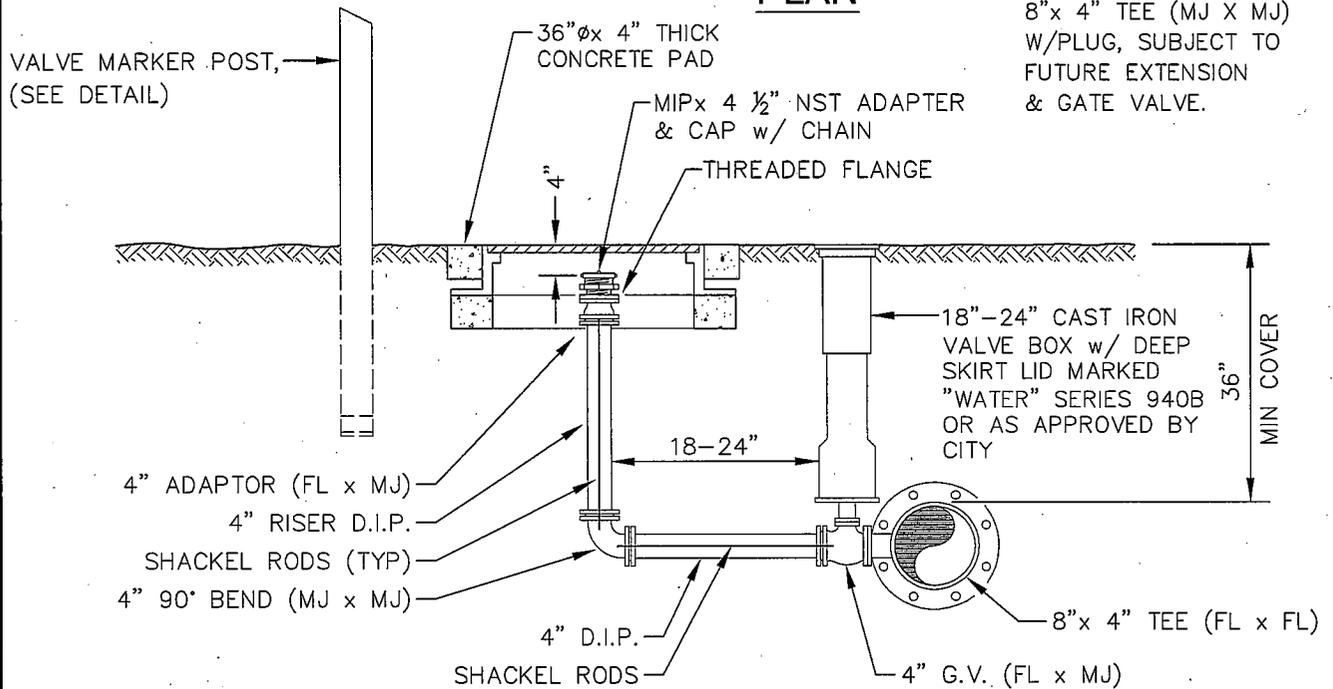


DWG. NO. W-7



**PLAN**

\* NOTE:  
 ALTERNATIVE 8" x 4" TEE (MJ X MJ) W/PLUG, SUBJECT TO FUTURE EXTENSION & GATE VALVE.



**ELEVATION**

**NOTES:**

1. LOCATE BLOW-OFF AS CLOSE AS POSSIBLE TO MAIN, OR AS DIRECTED BY CITY.
2. THE GROUND WITHIN 3' RADIUS OF BLOWOFF SHALL BE GRADED UNIFORMLY.
3. SHACKEL RODS TWO EA. 3/4" GALV. STEEL TIE RODS WITH ONE HEAVY COAT OF COAL TAR PRESERVATIVE ON TIE RODS, NUTS AND BOLTS AFTER INSTALLATION.

**ROTH HILL**

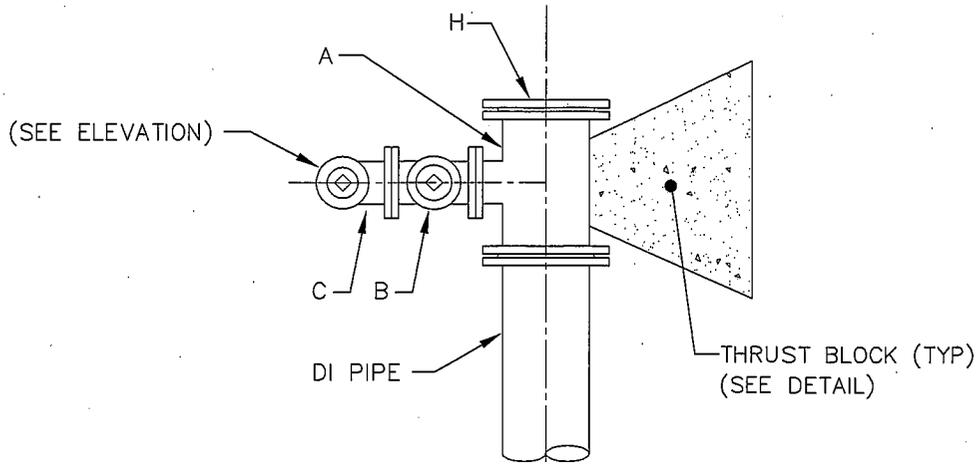
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 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**OFF PAVING 4" BLOWOFF ASSY.  
 FOR 8" & LARGER MAINS**

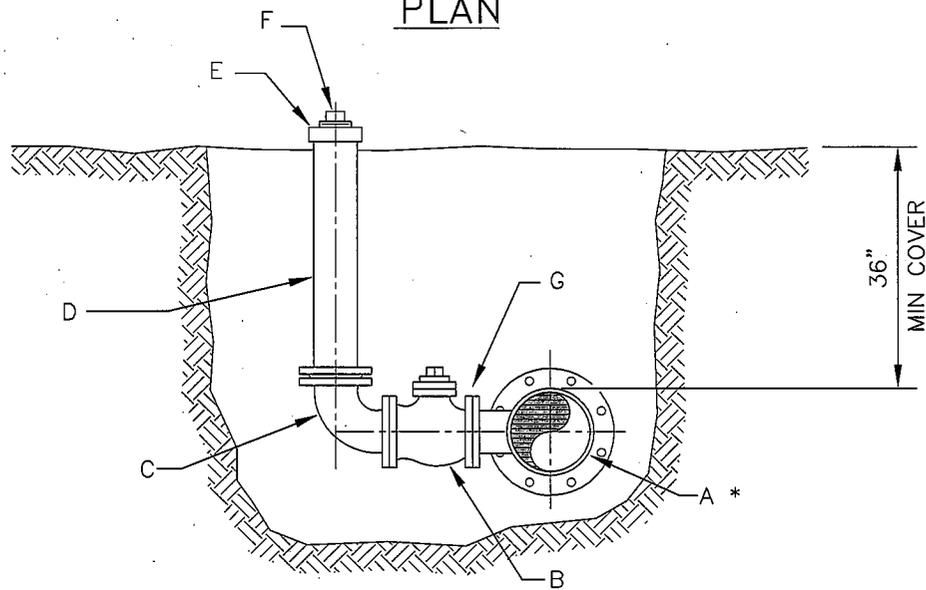


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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-8	DATE APPROVED		

DWG. NO. W-8



**PLAN**



**ELEVATION**

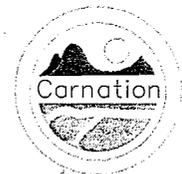
PART NO.	PART DESCRIPTION	BLOW OFF SIZE		
		4"	6"	8"
A	D.I. TEE (FL x MJ) BRANCH SIZE *	4"	6"	8"
B	G.V. (FL x FL)	4"	6"	8"
C	90° BEND (FL x MJ)	4"	6"	8"
D	RISER D.I.P. x LENGTH AS REQ'D	4"	6"	8"
E	MJ CAP W/ MEGALUGS TAPPED FOR 4" IPT (3" IPT FOR 4" BLOW OFF)	4"	6"	8"
F	PLASTIC PLUG	3"	4"	4"
G	BLIND FLANGE (AFTER FLUSHING, REMOVE)	4"	6"	8"
H	GATE VALVE & RISER BLIND FLANGE	MAIN SIZE		

\* TEE SIZE SAME AS WATER MAIN UNLESS OTHERWISE INDICATED.  
ALTERNATIVELY D.I. TEE (MJ x MJ) WITH PLUG, SUBJECT TO FUTURE  
EXTENSION & GATE VALVE.

**ROTH HILL**

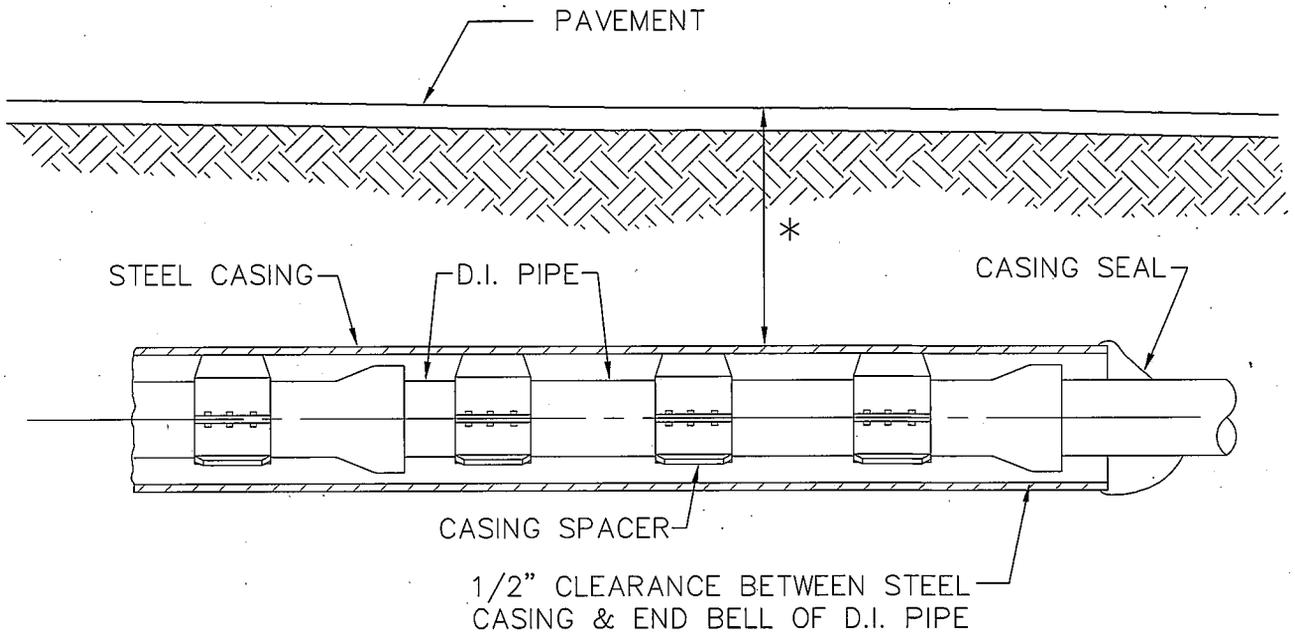
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**4", 6" OR 8" TEMPORARY BLOW OFF  
ASSEMBLY FOR TESTING**

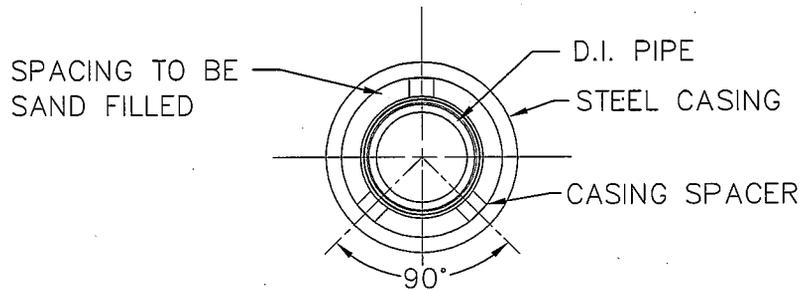


PLOTTING DATE 1/2/08	DRAWN DSH.	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-9	DATE APPROVED		

DWG. NO. **W-9**



\* DEPTH PER APPLICABLE COUNTY/STATE REQUIREMENTS



NOTES:

CASING

SIZE AND MINIMUM THICKNESS OF CASING SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING THE THICKNESS CONSISTENT WITH HIS OPERATION.

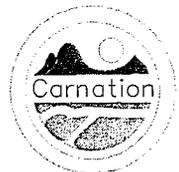
CASING SEAL

MINIMUM 3/16" THICK, SHEET TYPE SYNTHETIC RUBBER WITH STAINLESS STEEL BANDS.

**ROTHHILL**

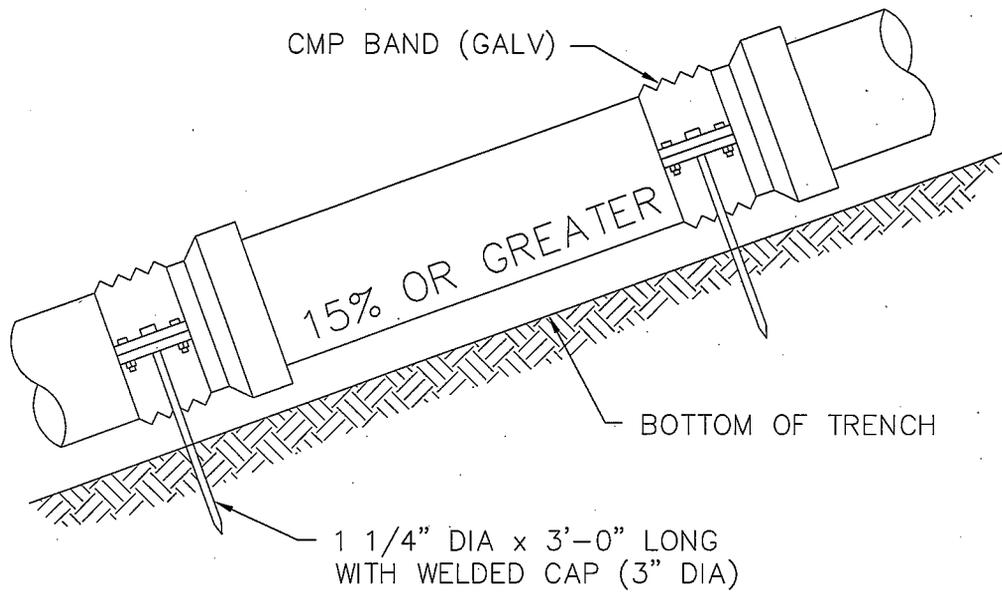
**Roth Hill, LLC**  
 11130 NE 33rd Place,  
 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**PIPE CASING**

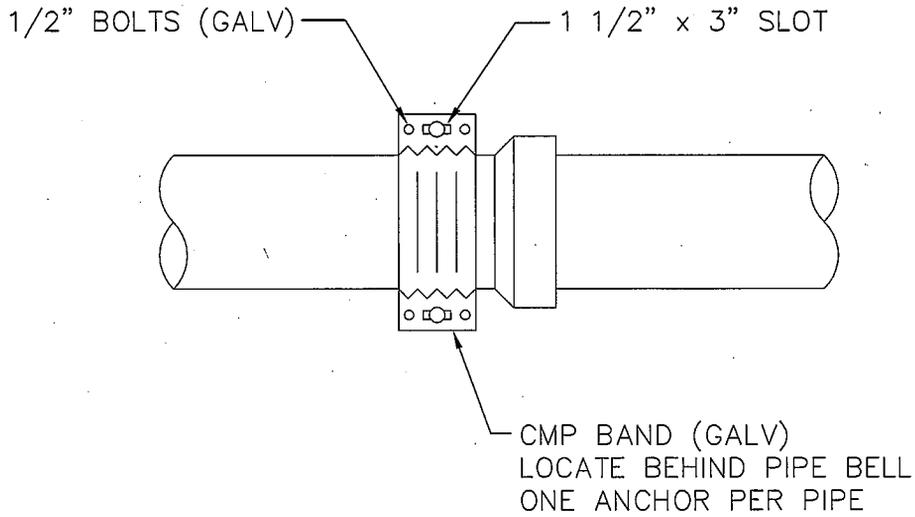


PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-10	DATE APPROVED		

DWG. NO. | **W-10**



PROFILE/ELEVATION



PLAN VIEW

**ROTH HILL**

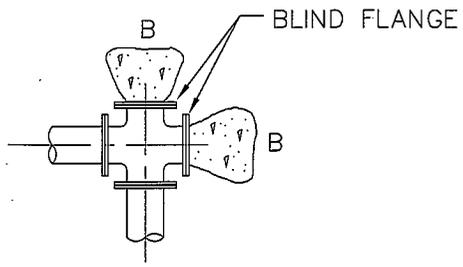
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**PIPE ANCHOR DETAIL  
FOR SLOPES**

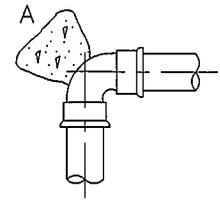
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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-11	DATE APPROVED		



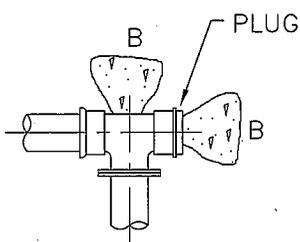
DWG. NO. W-11



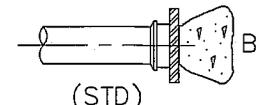
CAPPED CROSS



90° BEND

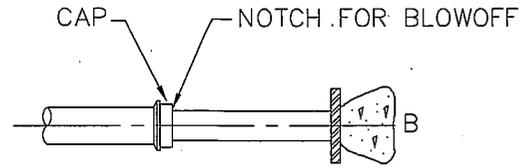


TEE

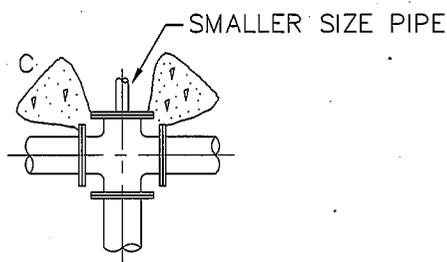


(STD)

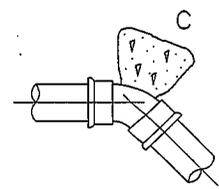
OR



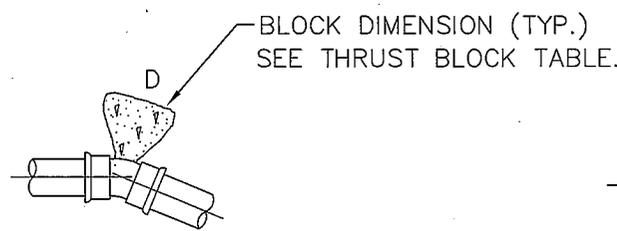
ONE PIPE SIZE SMALLER THAN DEAD ENDING PIPE



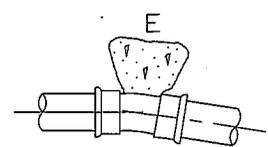
CROSS



45° BEND



22 1/2° BEND



11 1/4° BEND

**NOTES:**

SEE THRUST BLOCK TABLE FOR ALL NOTES.  
 PROVIDE POLYETHYLENE SHEETING TO COVER BOLTS AND JOINTS FOR DISMANTLING.

**ROTH HILL**

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 11130 NE 33rd Place,  
 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**CONCRETE BLOCKING DETAIL**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-12	DATE APPROVED		

DWG. NO. W-12

THRUST BLOCK – TABLE  
MIN. BEARING AREA AGAINST UNDISTURBED SOIL  
SQUARE FEET

PIPE SIZE	A (FT.2)	B (FT.2)	C (FT.2)	D (FT.2)	E (FT.2)
3"	3	2	2	2	2
6"	4	4	2	2	2
8"	7	6	4	2	2
10"	11	10	6	3	2
12"	16	14	9	5	3
14"	22	19	12	6	3
16"	29	25	16	8	4
18"	36	31	20	10	5
20"	45	39	24	13	6
22"	54	47	29	15	8
24"	64	56	35	18	9
28"	87	76	48	24	12
30"	101	87	55	28	14
36"	145	125	78	40	20
42"	197	171	107	55	27
48"	257	223	140	71	36

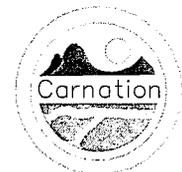
NOTES:

1. BEARING AREA OF CONC. THRUST BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2,000 POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM BEARING SURFACE OF 6" X 6" SQUARE AGAINST THE FITTING.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATION PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. ALL BOLTS AND NUTS SHALL BE POLYWRAPPED PRIOR TO POURING CONCRETE.

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**THRUST BLOCK TABLE**



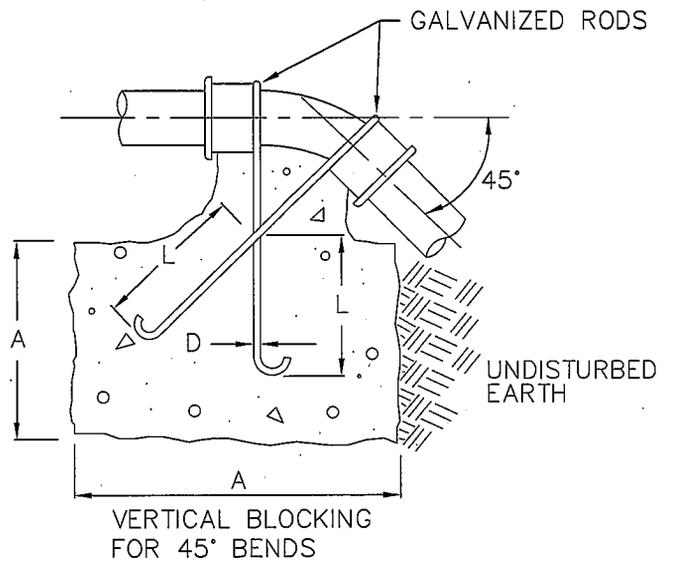
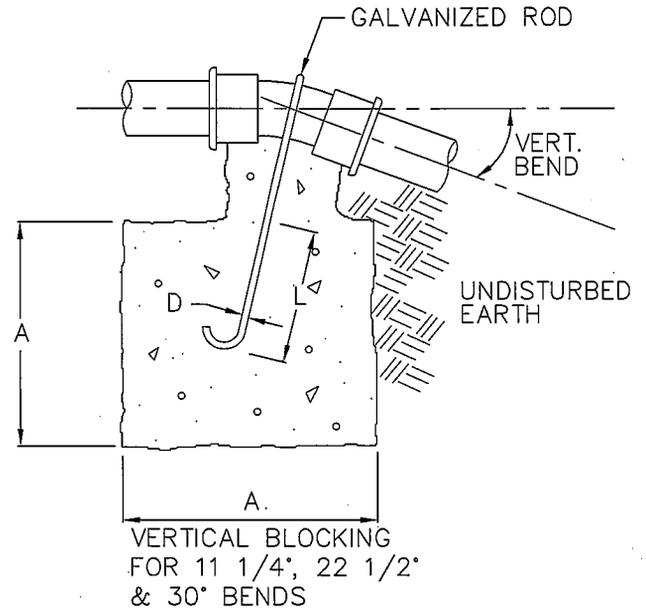
PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-13	DATE APPROVED		

DWG. NO. **W-13**

VERTICAL BLOCKING FOR 11 1/4° & 22 1/2° BENDS					
PIPE SIZE	V B	CU FT	A	D	L
4"	11 1/4°	8	2.0'	3/4"	1.5'
	22 1/2°	11	2.2'		2.0'
6"	11 1/4°	11	2.2'	3/4"	2.0'
	22 1/2°	25	2.9'		
8"	11 1/4°	16	2.5'	3/4"	2.0'
	22 1/2°	47	3.6'		
12"	11 1/4°	32	3.2'	3/4"	2.0'
	22 1/2°	88	4.5'	7/8"	3.0'
16"	11 1/4°	70	4.1'	7/8"	3.0'
	22 1/2°	184	5.7'	1 1/8"	4.0'
20"	11 1/4°	91	4.5'	7/8"	3.0'
	22 1/2°	225	6.1'	1 1/4"	4.0'
24"	11 1/4°	128	5.0'	1"	3.5'
	22 1/2°	320	6.8'	1 3/8"	4.5'

VERTICAL BLOCKING FOR 45° BENDS					
4"	45°	30	3.1'	3/4"	2.0'
6"		68	4.1'		
8"		123	5.0'		
12"		232	6.1'	3/4"	2.5'
16"		478	7.8'	1 1/8"	4.0'
20"		560	8.2'	1 1/4"	
24"		820	9.4'	1 3/8"	4.5'

NOTE: CONCRETE BLOCKING BASED  
ON 200 PSI PRESSURE AND  
2500 PSI CONCRETE



**ROTHHILL**

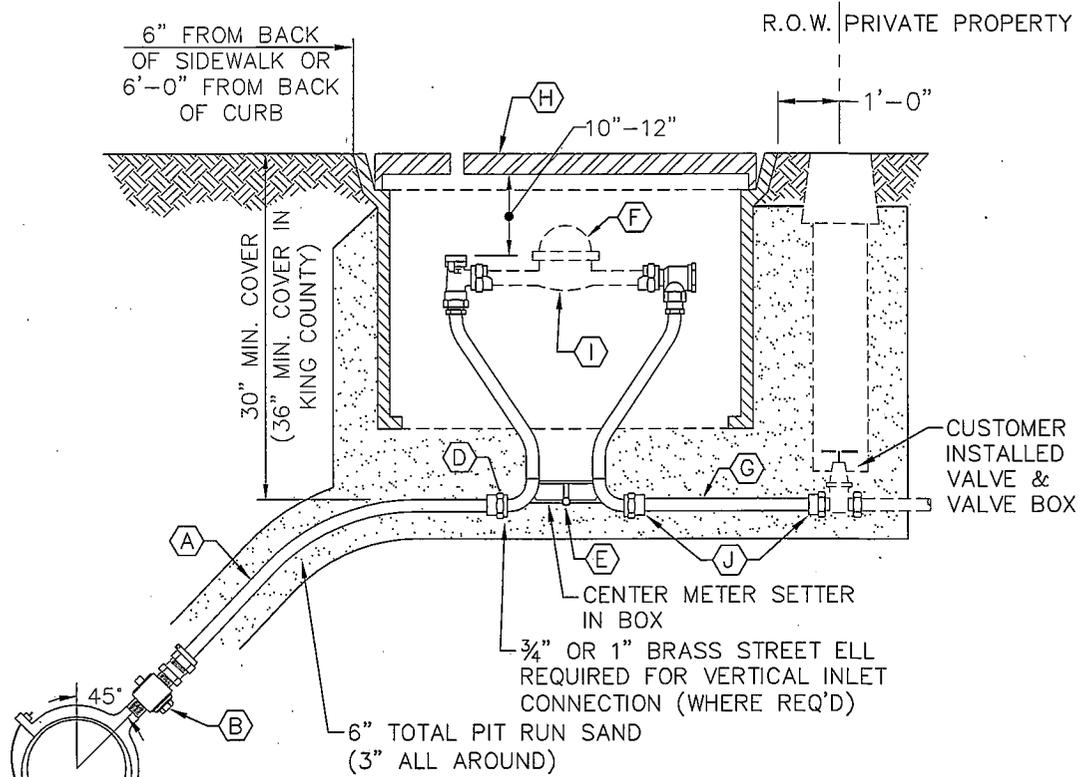
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**VERTICAL THRUST  
BLOCKING DETAIL**

PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-14	DATE APPROVED		



DWG. NO. W-14



**METER BOX LOCATION**

1. SIDEWALKS - METER BOX 6" BEHIND SIDEWALK.
2. THICKENED EDGE - SET METER BOX 3' OFF PROPERTY LINE (WITHIN R/W).
3. SHOULDER ROADS - SET METER ON BACKSIDE OF DITCH (WITHIN R/W)
4. SPECIAL CIRCUMSTANCES - CONSULT CITY ENGINEER NO BOXES IN DRIVEWAYS OR TRAVELED WAYS UNLESS APPROVED BY CITY ENGINEER.
5. CURB NO SIDEWALK - 6' BEHIND BACK OF CURB (WITHIN R/W).
6. SET METER PERPENDICULAR TO PAVING.

NOTE: SERVICE LOCATION SHALL BE DETERMINED SIMULTANEOUSLY W/ OTHER UTILITIES SO THAT CONFLICTS ARE NOT ENCOUNTERED.

**KEYED NOTES**

- A 1" HI-MOL PLASTIC PIPE CL200 (IPS) w/ 16 GAUGE TRACER WIRE & STAINLESS STEEL INSERTS TO REINFORCE PLASTIC PIPE ENDS.
- B 1" BALL CORP. STOP (IPxCOMP)
- C 1" SERVICE SADDLE WITH DOUBLE STAINLESS STEEL STRAPS EQUAL TO ROMAC.
- D 1"x 3/4" REDUCER (COMPxMIP) REQ'D. FOR 3/4" METER SETTERS OR 1" (COMPxMIP). ADAPTOR FOR 1" METER SETTERS.
- E 3/4" OR 1"x 12" METER SETTER EQUIPED w/ LOCK WING ANGLE STOP, ANGLE BALL CHECK & MULTI PURPOSE FITTINGS.
- F METER TO BE INSTALLED BY CITY.
- G 3/4" OR 1" DIA. (LENGTH AS REQ'D) HI-MOL PLASTIC PIPE, CL 200 w/ TEMPORARY PLUG.

- H MID-STATES HDPE METER BOX #BCF111812BXL FOR 3/4" METER & #BCF132412B FOR 1" METER DI METER LID w/ TOUCH READ BCF1118AMR/TR OR BCF1324AMR/TR.
- I TEMPORARY PVC SPACER OF CORRECT LENGTH FOR SETTER.
- J 3/4" OR 1" ADAPTOR (MIPxCOMP)

NOTE: BRASS FITTINGS SHALL BE MUELLER, FORD OR APPROVED EQUAL.

**ROTHHILL**

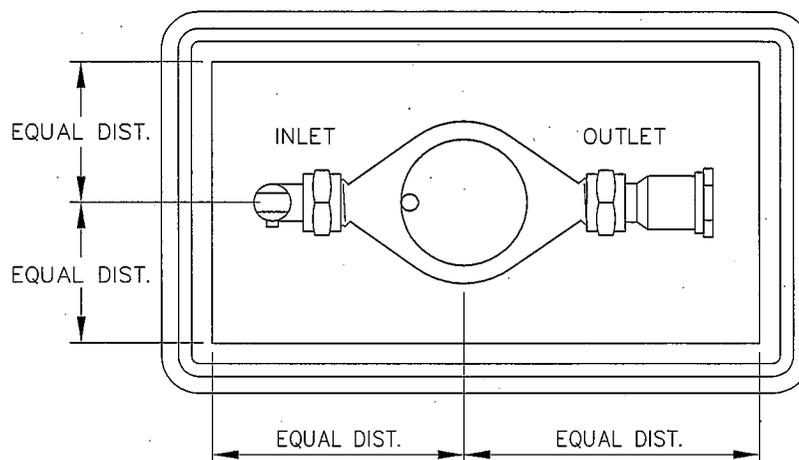
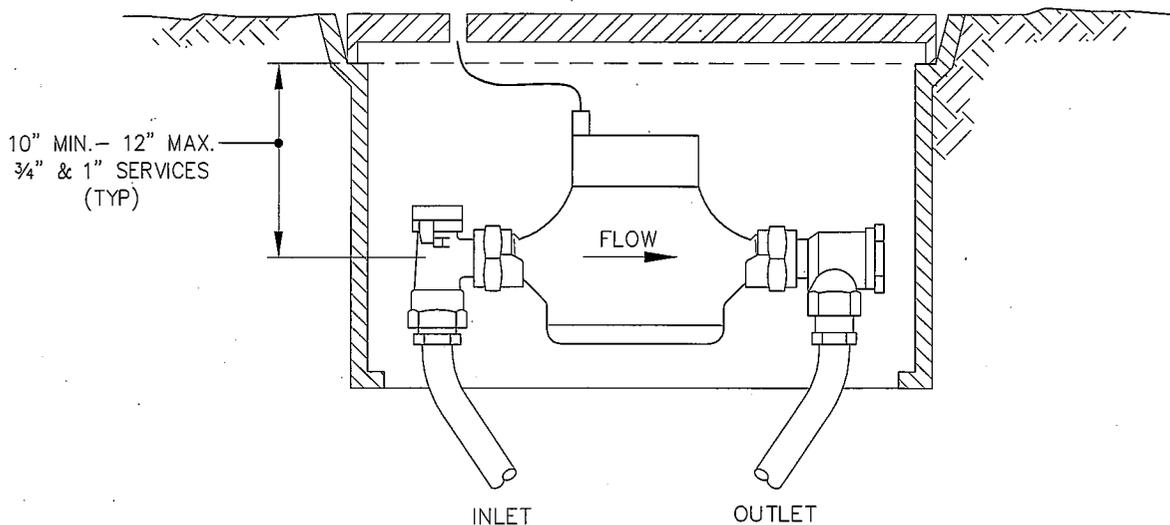
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**3/4" OR 1" SINGLE  
METER SERVICE**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-15	DATE APPROVED		

DWG. NO. W-15



**NOTES:**

1. THE METERSSETTER MUST BE CENTERED IN THE METER BOX. THE OUTLET OF THE ANGLESTOP MUST BE BETWEEN 10" - 12" BELOW THE BOTTOM OF THE METER BOX LID.
2. THE METER BOX MUST REMAIN FREE OF FOREIGN MATERIAL SUCH AS CONCRETE & ITS BY-PRODUCTS.
3. METER BOX SUPPLIED BY OWNER/CONTRACTOR. METER BOX SHALL BE MID-STATES PLASTIC HDPE METER BOX NO. BCF111812BXL WITH D.I. TOUCHREAD LID FOR 5/8"x 3/4" METERS OR MID-STATES PLASTIC HDPE METER BOX NO. BCF132412B WITH D.I. TOUCHREAD LID FOR 1" METERS OR AS APPROVED BY DISTRICT.

**ROTH HILL**

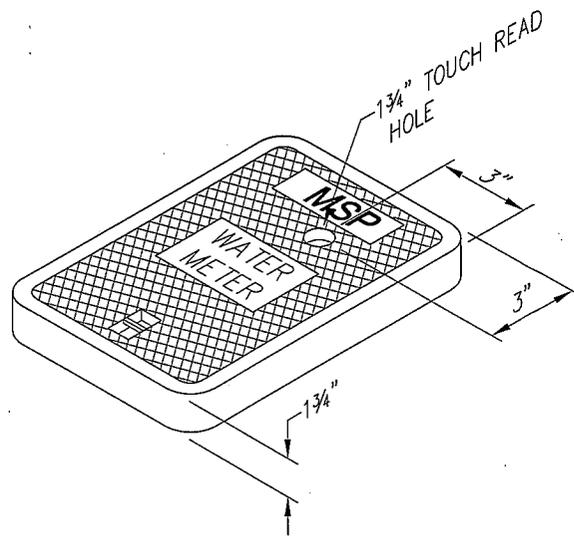
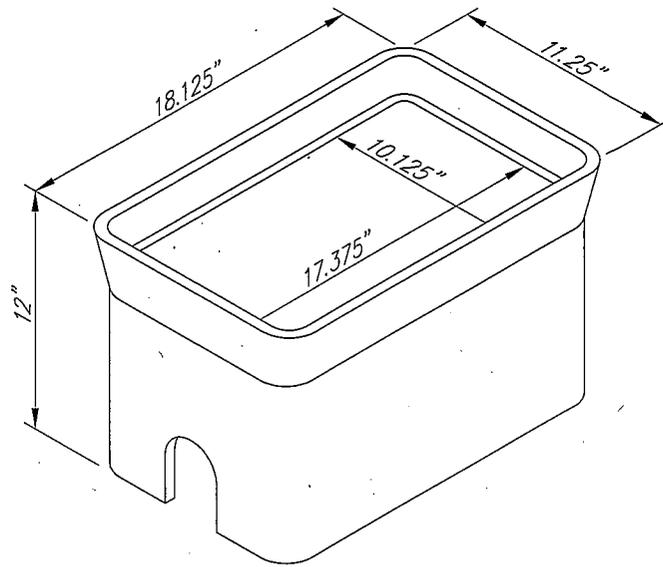
Roth Hill, LLC  
 11130 NE 33rd Place,  
 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**3/4" & 1" METER  
 INSTALLATION**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-16	DATE APPROVED		

DWG. NO. W-16

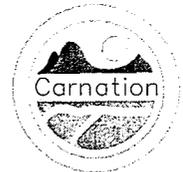


**DI METER LID w/TOUCH  
READ NO. BCF1118AMR/TR**

**ROTH HILL**

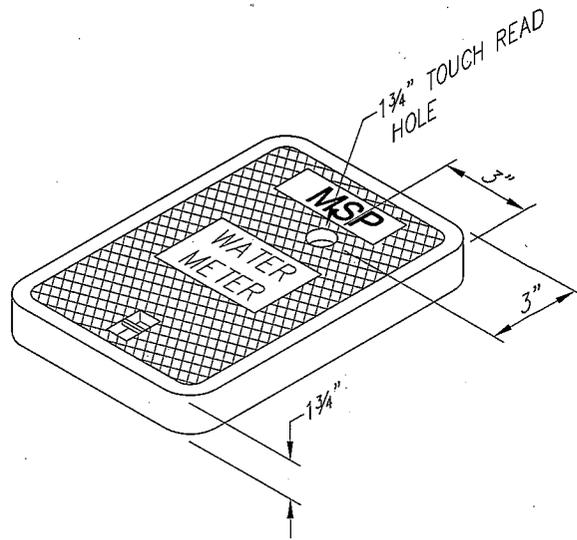
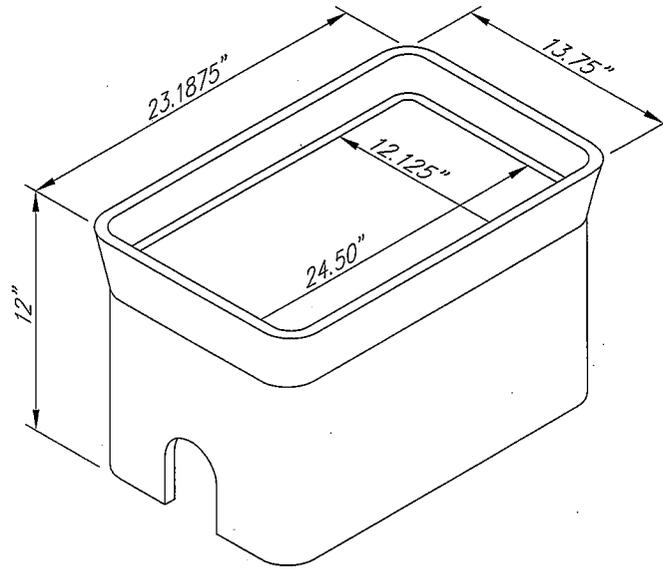
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**HDPE METER BOX NO. BCF111812BXL  
FOR 3/4" METER**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS 1=1F	FILE NAME \\DETAILS\CARNATION\WATER\W-17			DATE APPROVED

DWG. NO. **W-17**



**DI METER LID w/ TOUCH  
READ NO. BCF1324AMR/TR**

**ROTH HILL**

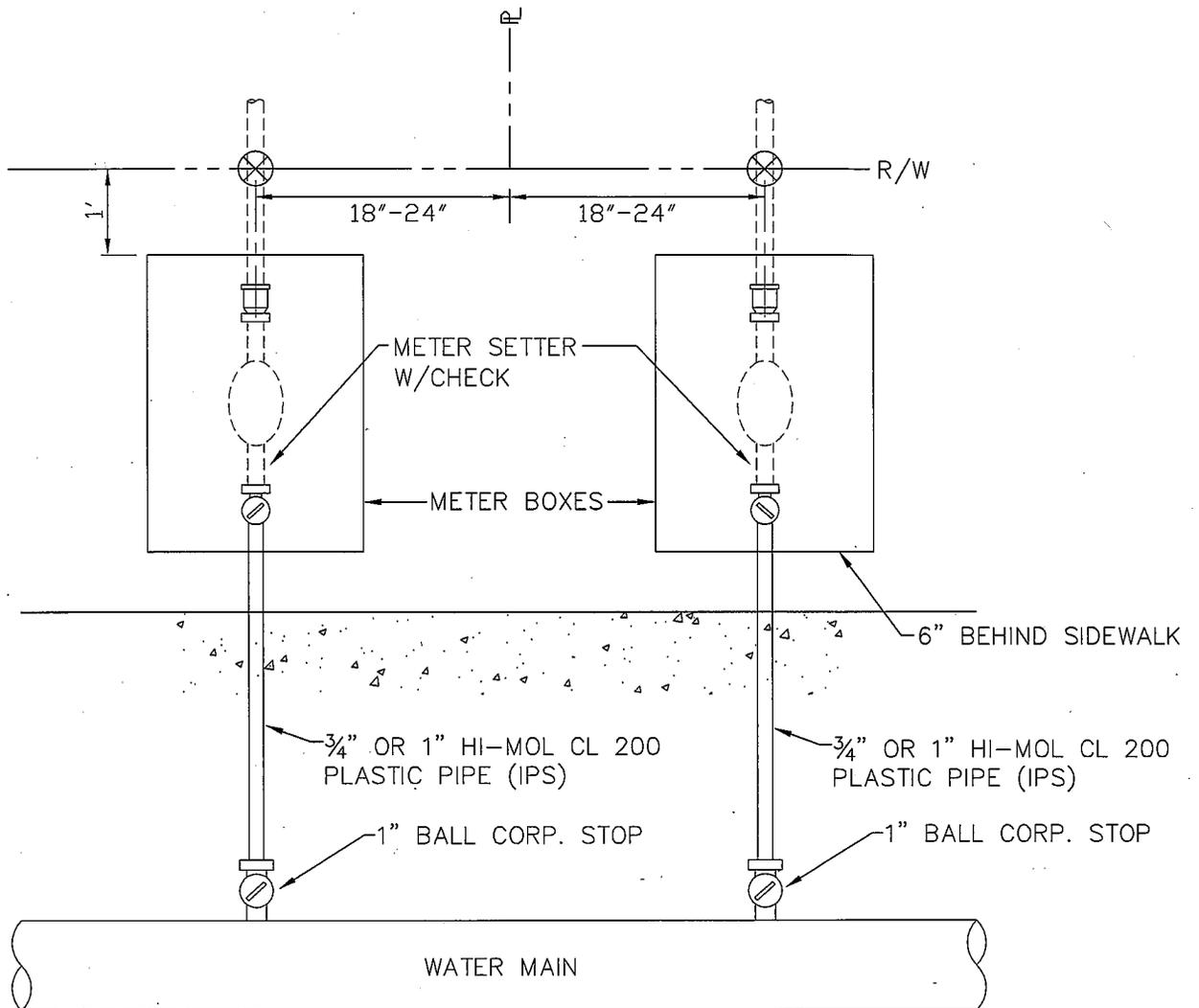
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**HDPE METER BOX NO. BCF132412B  
FOR 1" METER**

PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS 1=1F	FILE NAME F:\DETAILS\CARNATION\WATER\W-18			DATE APPROVED



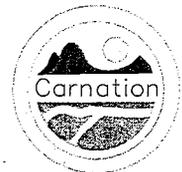
DWG. NO. W-18



**ROTH HILL**

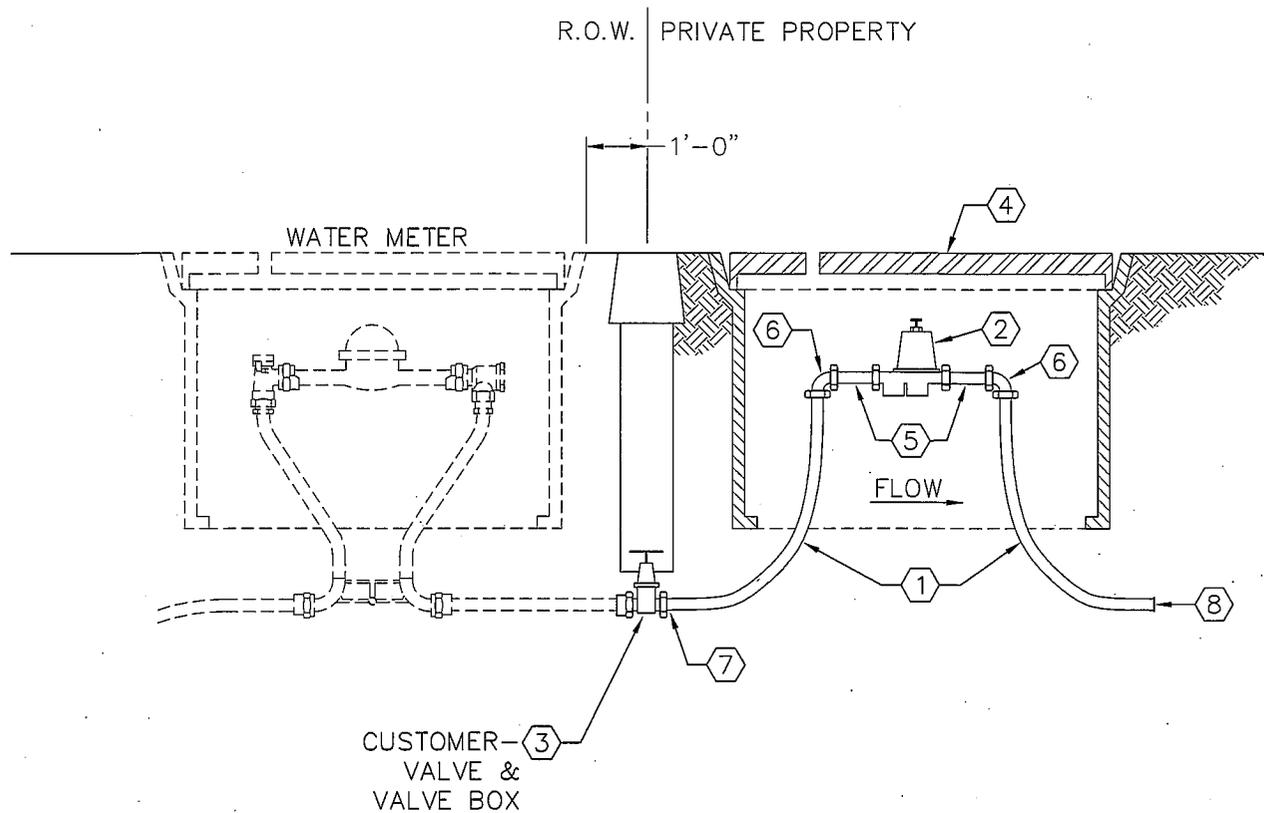
Roth Hill, LLC  
 11130 NE 33rd Place,  
 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**PAIRED WATER SERVICE  
 LOCATION DIAGRAM**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-19	DATE APPROVED		

DWG. NO. | W-19



KEYED NOTES FOR PRV

- ① 3/4" OR 1" HI-MOL CL200 PLASTIC PIPE (IPS).
- ② PRESSURE REDUCING VALVE W/ STRAINER - 3/4" WITH UNION COUPLING ON THE INLET; EQUAL TO: WILKINS #600, WATTS #U5B, OR SEARS #42A1789. INSTALL SIDEWAYS TO ALLOW ACCESS TO STRAINER AND ADJUSTING SCREW.
- ③ 3/4" OR 1" BRASS GATE VALVE & PLASTIC IRRIGATION VALVE BOX.
- ④ MID-STATES HDPE METER BOX #BCF111812BXL w/ FULL PLASTIC LID.
- ⑤ 3/4" OR 1" BRASS NIPPLE LENGTH AS REQ'D.
- ⑥ 3/4" OR 1" 90° BEND (FIP) BRASS w/ MIPx PLASTIC ADAPTER & HOSE CLAMPS.
- ⑦ 3/4" OR 1" MIPx PLASTIC ADAPTER w/ HOSE CLAMPS.
- ⑧ 3/4" OR 1" TEMPORARY PLUG (IF NEEDED).

INSTALLATION

THE PRESSURE REDUCING VALVE SHALL BE LOCATED "DOWNSTREAM" OF THE METER. RESPONSIBILITY FOR PROPER INSTALLATION, AND OPERATION OF THE VALVE SHALL BE THAT OF THE CONTRACTOR.

**ROTH HILL**

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 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

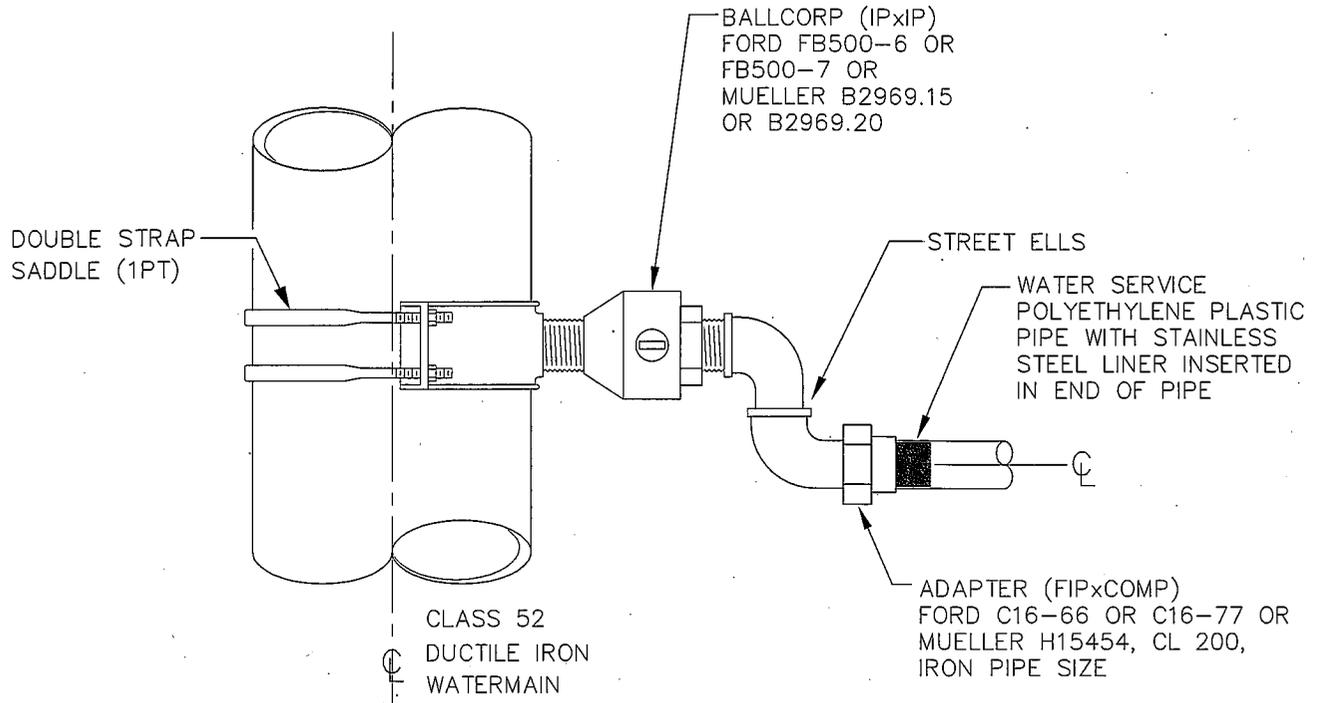
**PRESSURE REDUCING VALVE**

PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-20	DATE APPROVED		

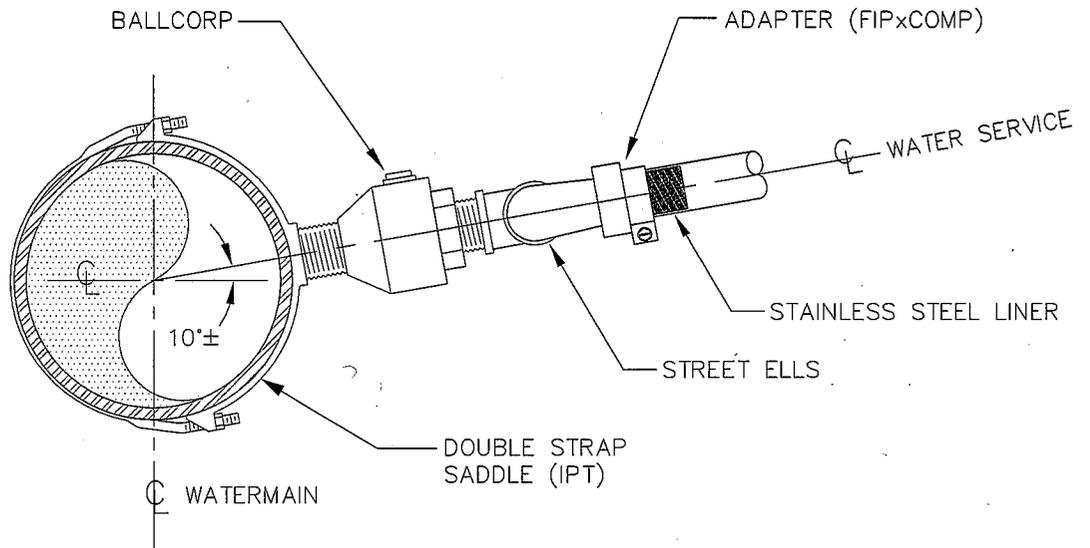


DWG. NO. | W-20





**PLAN**



**ELEVATION**

**NOTES:**

1. SERVICE LINE FITTINGS: ALL FITTINGS SHALL BE CAST FROM WATER WORKS BRASS CONFORMING TO C800-89.
2. MUNICIPAL SERVICE PIPE: IRON PIPE SIZE ID ASTM D-2239 -SIDR 7(PE 3408) (HI-MOL PLASTIC) TRACER WIRE 16 GAUGE.
3. BALLCORP VALVE INSTALLED PARALLEL TO WATERMAIN.

**ROTH HILL**

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**WATER SERVICE CONNECTION  
 1 1/2 INCH AND 2 INCH**

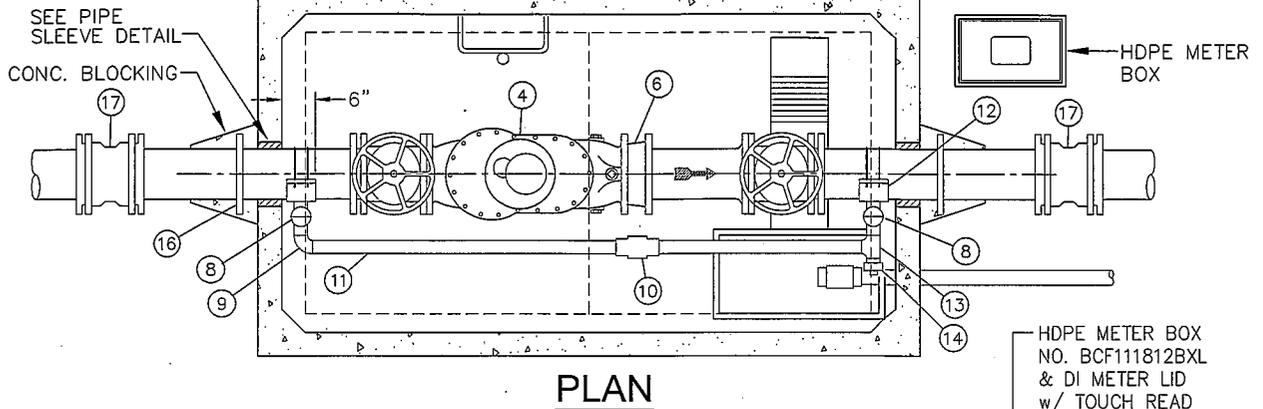


PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS 1=1 F:	FILE NAME \\DETAILS\CARNATION\WATER\W-21A	DATE APPROVED		

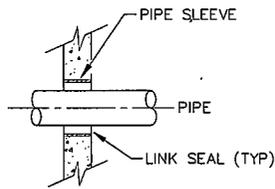
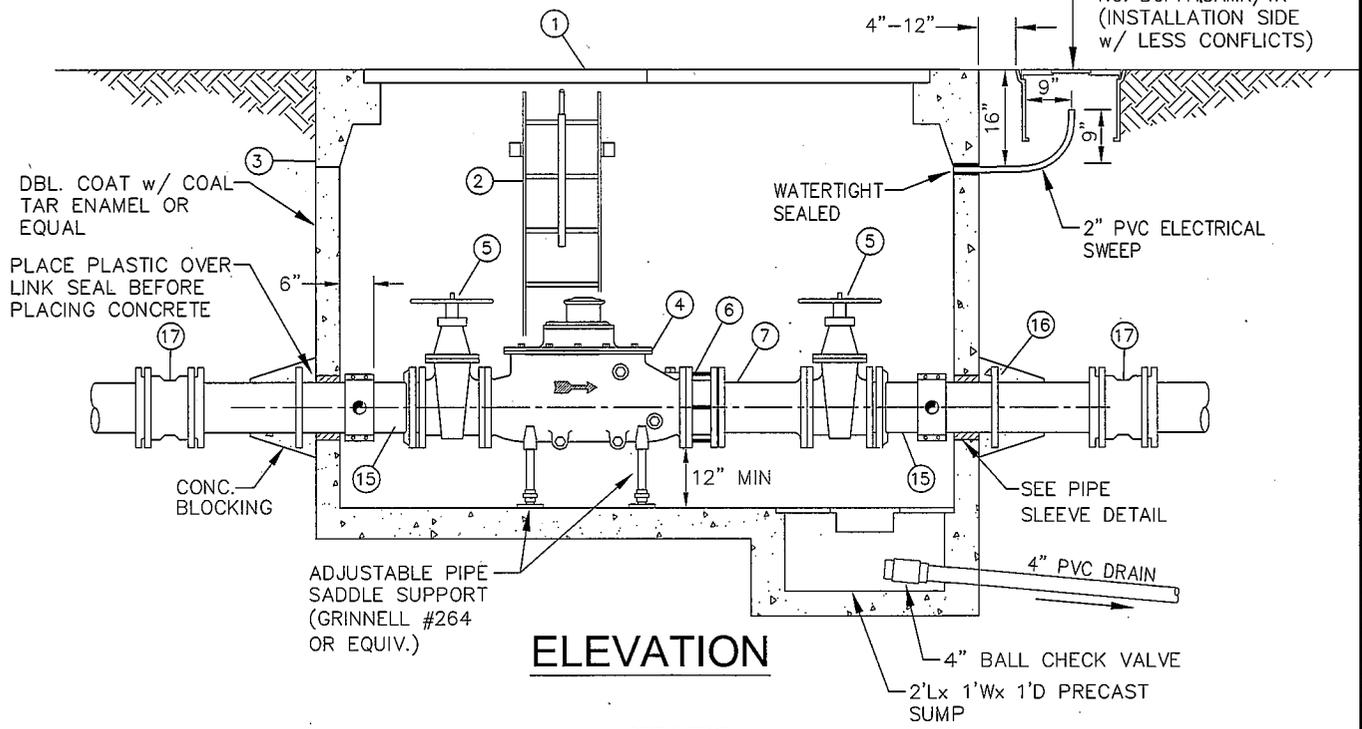
DWG. NO. **W-21A**

NOTE: ALIGN EDGE OF HATCH OPENING WITH ACCESS LADDER.

STAINLESS STEEL BASE & CAP FOR UCL SAFETY SYSTEM MOUNTED IN 12"Øx 36" CONC. COLUMN



HDPE METER BOX NO. BCF111812BXL & DI METER LID w/ TOUCH READ NO. BCF1118AMR/TR (INSTALLATION SIDE w/ LESS CONFLICTS)



PIPE SLEEVE DETAIL

\* SEE SHEET 2 FOR ADDITIONAL NOTES & MATERIALS

SHEET 1 OF 2

**ROTH HILL**

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Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**3", 4" AND 6"  
METERS**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS 1=1	FILE NAME F:\DTL'S\CARNATION\WATER\W-22	DATE APPROVED		

DWG. NO. W-22

PIPE SIZE	VAULT SIZES			
	CATALOG #	VAULT #	COVER #/ LW PRODUCTS CO HATCH #	BASE #
3"	575-LA	575-BL	57TL-HD-1	575-BL
4"	575-LA	575-BL	57TL-HD-1	575-BL
6"	675-LA	675-ML	675-TL-HD-1	675-BL

**GENERAL NOTES:**

1. PAINT ALL INTERIOR METAL INCLUDING PIPE, VALVES, AND FITTINGS WITH TWO COATS OF EPOXY AS APPROVED BY THE ENGINEER. USE TNEPEC SERIES 135 CHEMBUILD MODIFIED POLYAMIDOAMINE EPOXY. APPLY PER MANUFACTURERS INSTRUCTIONS.
2. THE ABOVE VAULT SIZES WERE SUPPLIED BY UTILITY VAULT CO. AS A REFERENCE FOR REQUIRED VAULT DIMENSIONS. SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL.
3. ALL ACCESS COVERS MUST BE MARKED "WATER".
4. CLASS 52 D.I. PIPE IS REQUIRED.
5. ALTERNATE METHODS OF RESTRAINT SHALL BE APPROVED BY THE DISTRICT.
6. THE ENDS OF THE VAULT SHALL BE SOLID WALL & CORE DRILLED TO SIZE FOR REQUIRED PIPE DIAMETER & LINK SEAL.
7. COVER SHALL EXTEND 6" ABOVE GRADE WHEN VAULT IS NOT IN TRAFFIC AREA & SHALL BE FLUSH IN TRAFFIC AREA.
8. SLOPE PAVEMENT AWAY FROM COVER WHEN VAULT IS IN TRAFFIC AREA.

**MATERIAL LIST**

- ① HATCH ————— ALUMINUM DOUBLE DOORS w/ GUTTER DRAIN H-20 VEHICLE RATING & LOCKING HASP (LW PRODUCTS OR APPROVED EQUAL).
- ② LADDER RUNGS ——— CAST IN PLACE 3/4" GALV. BAR AT .12" O.C. OR FABRICATED ALUMINUM LADDER SECURED AT TOP AND BOTTOM w/ "BILCO LADDERUP" SAFETY POST ON LADDER.
- ③ CONCRETE VAULT ——— SUBMIT DETAILS FOR APPROVAL. (SEE TABLE ABOVE)
- ④ METER ————— COMPOUND WATER METER FLG. x FLG. SUPPLIED BY DISTRICT.
- ⑤ MAIN VALVE ——— TWO EACH, AWWA, FL x MJ W/RESTRAINTS GATE VALVES WITH HANDWHEEL. MUST BE LOCATED INSIDE OF VAULT.
- ⑥ ADAPTER ————— ONE EACH, ROMAC FLANGE COUPLING ADAPTER.
- ⑦ SPOOL ————— SPOOL PLANE-END x FLANGED D.I.P. (CLS2)
- ⑧ 1-1/2" VALVE ——— TWO EA. BRASS GATE VALVES FOR BY-PASS.
- ⑨ BEND ————— TWO EA. 1-1/2 INCH 90 BRASS BENDS.
- ⑩ UNION ————— ONE EA. 1-1/2 INCH TWO-PART UNION BRASS.
- ⑪ BY-PASS PIPE ——— 1-1/2 INCH BRASS PIPE AS NEEDED.
- ⑫ SADDLE ————— TWO EA. 1-1/2 INCH SMITH BLAIR TYPE 313 OR EQUAL.
- ⑬ TEE ————— 1-1/2" x 1-1/2" BRASS TEE.
- ⑭ BUSHING ————— 1 1/2" x 3/4" BUSHING WITH 3/4" PLUG.
- ⑮ WATER MAIN ——— CLASS 52 DUCTILE IRON PIPE WITH MEGALUG RESTRAINED JOINTS.
- ⑯ WALL FLANGE ——— TWO EACH
- ⑰ D.I. SLEEVE ——— TWO EACH (MJ) w/ RESTRAINED JOINTS.

\* SEE SHEET 1 FOR ADDITIONAL DETAILS

SHEET 2 OF 2

**ROTHHILL**

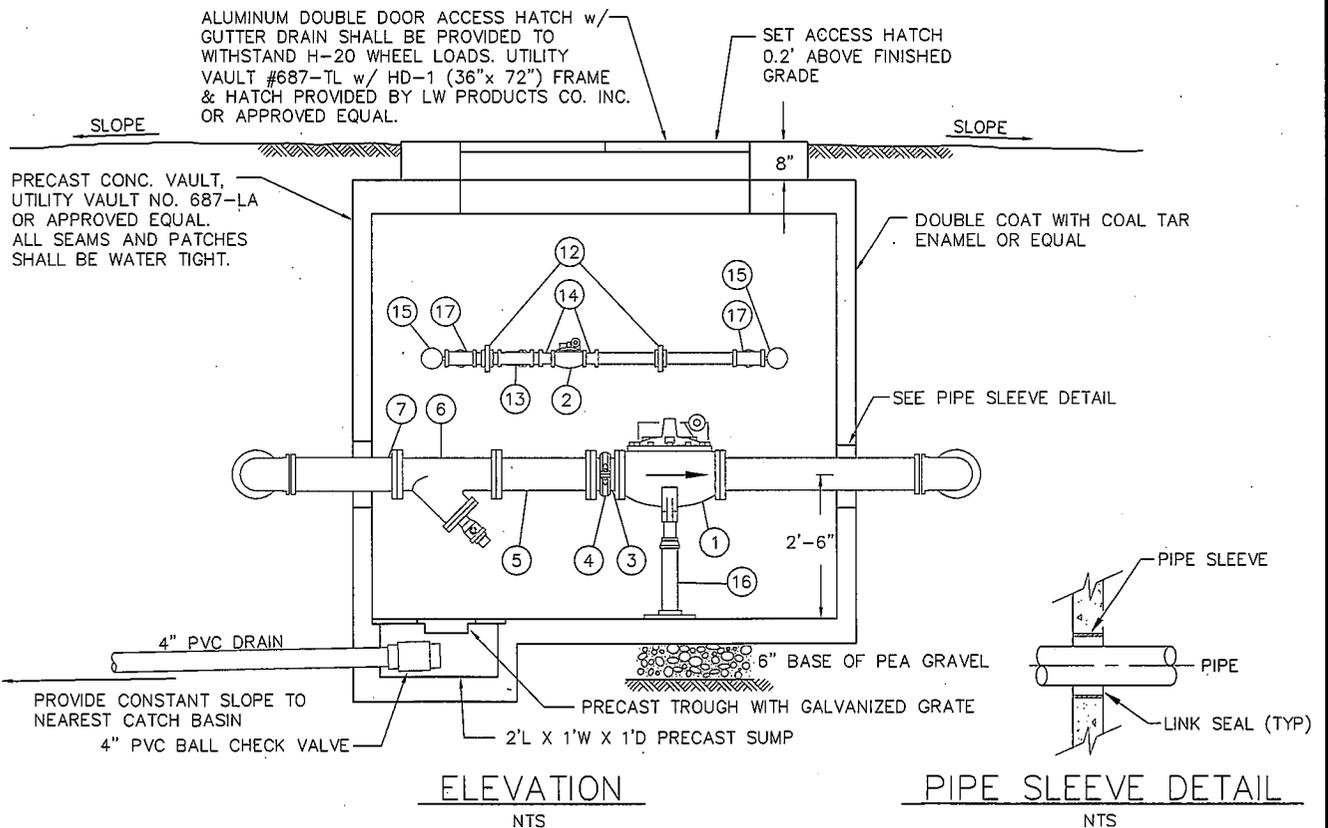
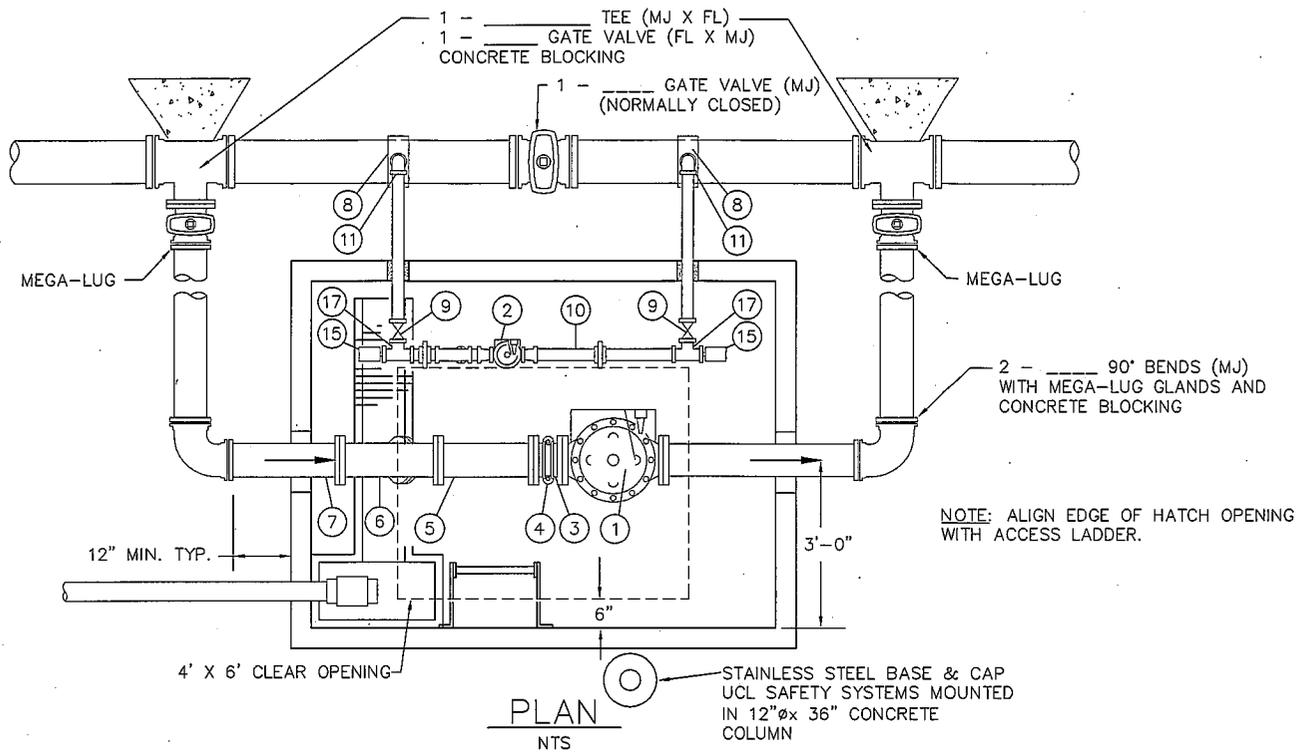
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Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**3", 4" & 6" METERS  
MAT'L. LIST & GENERAL NOTES**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS 1=1'	FILE NAME F:\DTL'S\CARNATION\WATER\W-22A	DATE APPROVED		

DWG. NO. W-22A



**ROTH HILL**

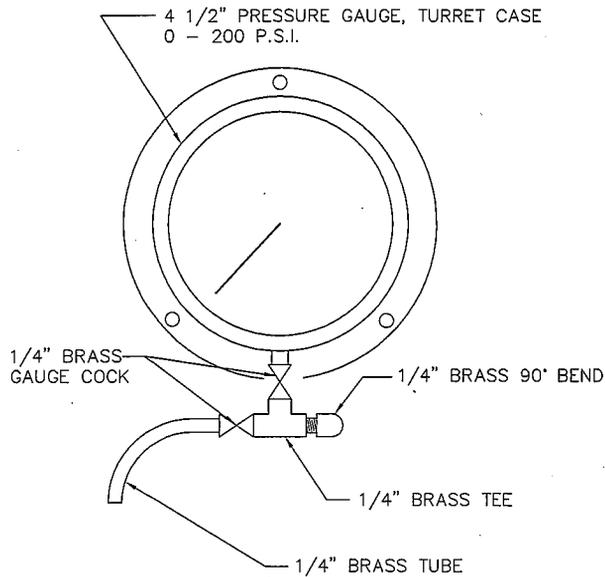
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**PRESSURE REDUCING STATION**

PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-23	DATE APPROVED		



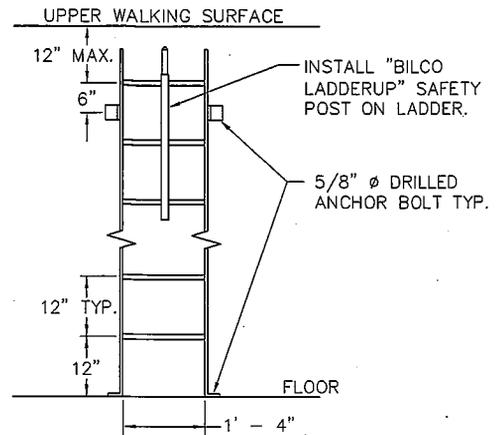
DWG. NO. W-23



DRILL AND TAP A 1/4" HOLE IN \_\_\_ D.I. PIPE FOR INSTALLATION.

### GAUGE ASSEMBLY

N.T.S.



LADDER AND MOUNTING BOLTS SHALL BE CONSTRUCTED OF HOT DIPPED GALVANIZED STEEL.

### LADDER DETAIL

N.T.S.

### MATERIALS LIST

1. \_\_\_ PRESSURE REDUCING VALVE (CLAYTON 90G-01 ABCSY)
2. \_\_\_ PRESSURE REDUCING VALVE (CLAYTON 90G-01 ABCS)
3. 8" OF \_\_\_ D.I. (FL X GROOVE)
4. VICTUALIC COUPLING OR EQUAL
5. 16" OF \_\_\_ D.I. (FL)
6. \_\_\_ WYE STRAINER (FL), 1/8" DIAM. SCREEN, WITH 2" CORP STOP ON DRAIN
7. \_\_\_ D.I PIPE (FL X PE)
8. \_\_\_ I.P. SERVICE SADDLE WITH DOUBLE STAINLESS STEEL STRAPS
9. \_\_\_ BRASS GATE VALVE
10. \_\_\_ PIPE
11. \_\_\_ 90° BEND
12. \_\_\_ UNION
13. \_\_\_ WYE STRAINER WITH 20 MESH SCREEN
14. \_\_\_ REDUCER
15. \_\_\_ 1/4" GAUGE COCK AND PRESSURE GAUGE
16. ADJUSTABLE PIPE SUPPORT
17. \_\_\_ TEE

ALL PIPE AND FITTINGS 3" DIA. AND SMALLER SHALL BE GALVANIZED UNLESS NOTED OTHERWISE.

### PRV DESCRIPTIONS

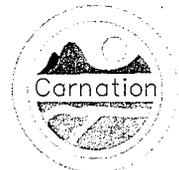
1. PRESSURE REDUCING VALVE
  - A) \_\_\_ GLOBE
  - B) FLANGED
  - C) CLASS 125
  - D) APPROXIMATE DOWNSTREAM PRESSURE SETTING - \_\_\_ P.S.I.
  - E) WYE STRAINER ON PILOT LINE
  - F) FLOW CLOSING SPEED CONTROL
  - G) VALVE POSITION INDICATOR
  - H) STAINLESS STEEL TRIM ON MAIN AND PILOT VALVE
2. PRESSURE REDUCING VALVE
  - A) \_\_\_ GLOBE
  - B) THREADED
  - C) CLASS 125
  - D) APPROXIMATE DOWNSTREAM PRESSURE SETTING - \_\_\_ P.S.I.
  - E) WYE STRAINER ON PILOT LINE
  - F) FLOW OPENING SPEED CONTROL
  - G) VALVE POSITION INDICATOR
  - H) STAINLESS STEEL TRIM ON MAIN AND PILOT VALVE

**ROTHHILL**

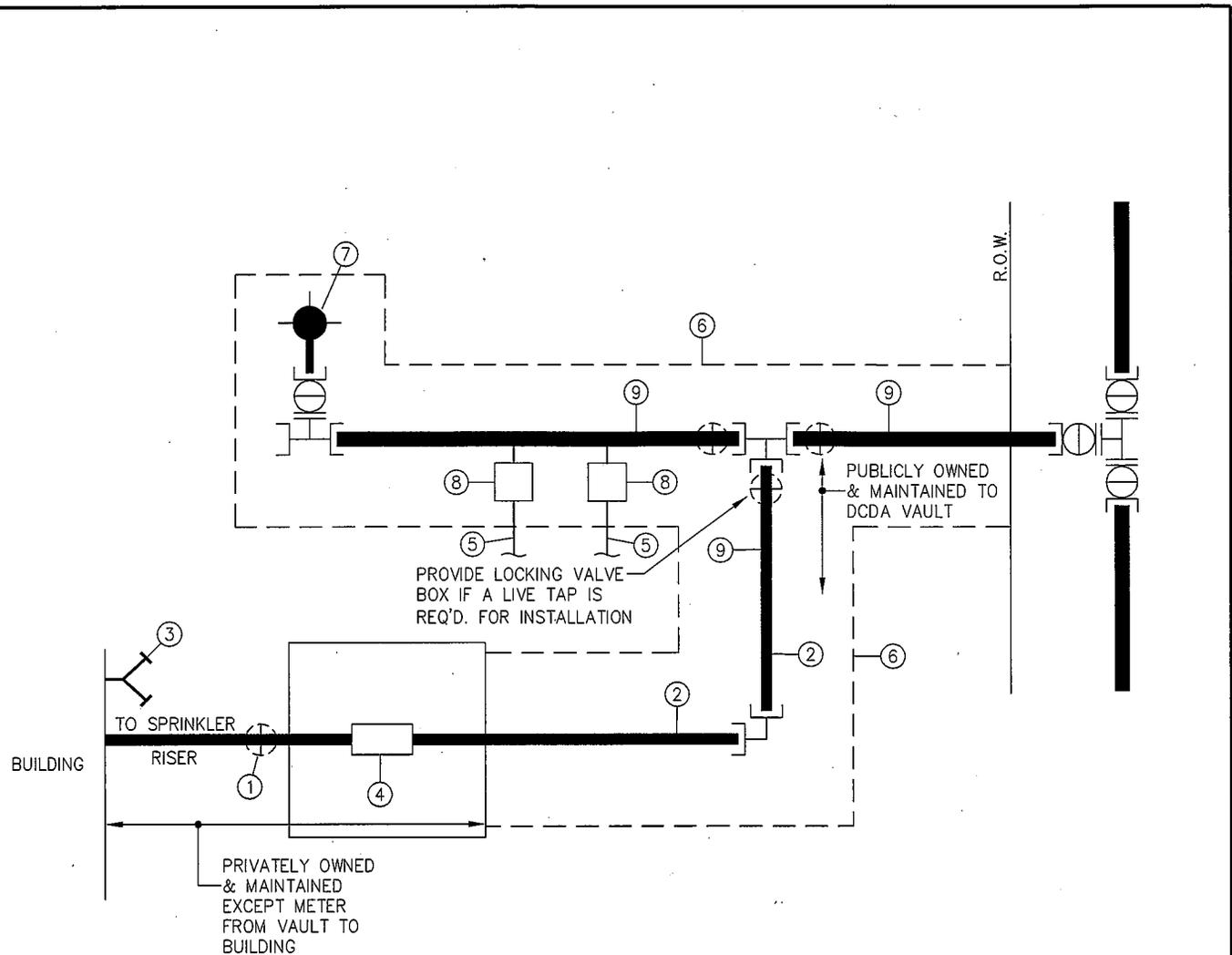
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## PRESSURE REDUCING STATION NOTES

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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARN\WATER\W-23A	DATE APPROVED		



DWG. NO. W-23A



**MATERIAL LIST**

- ① POST INDICATOR VALVE (PIV), LOCATION SPECIFIED BY FIRE MARSHAL.
- ② CL 52 DIP FIRE LINE. LINE SIZE DESIGNED BY OWNER'S SPRINKLER CONTRACTOR. INSTALLED BY LEVEL V OR LEVEL III CERTIFIED INSTALLER ONLY.
- ③ FIRE DEPARTMENT 2 PORT CONNECTION, LOCATION SPECIFIED BY FIRE MARSHAL.
- ④ BACKFLOW PREVENTOR - DOUBLE CHECK DETECTOR ASSY. (DCDA) & VAULT PER STD. DETAIL W-25.
- ⑤ DOMESTIC OR IRRIGATION LINES DESIGNED BY OWNER'S ENGINEER.
- ⑥ EASEMENT PER CITY STANDARDS.
- ⑦ FIRE HYDRANT WITH 5" STORTZ FITTING PER STANDARD DETAIL, LOCATION PER FIRE MARSHAL.
- ⑧ DOMESTIC OR IRRIGATION METERS PER STANDARD DETAIL.
- ⑨ 8" MINIMUM CL 52 DIP DO NOT COVER UNTIL INSPECTED BY CITY OF CARNATION.

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**FIRE DEPARTMENT SPRINKLER  
 UNDERGROUND DETAIL 4" & LARGER**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-24	DATE APPROVED		

DWG. NO. W-24

NOTE: ALIGN EDGE OF HATCH OPENING WITH ACCESS LADDER.

STAINLESS STEEL BASE & CAP FOR UCL SAFETY SYSTEM MOUNTED IN 12"Øx 36" CONC. COLUMN

SEE PIPE SLEEVE DETAIL

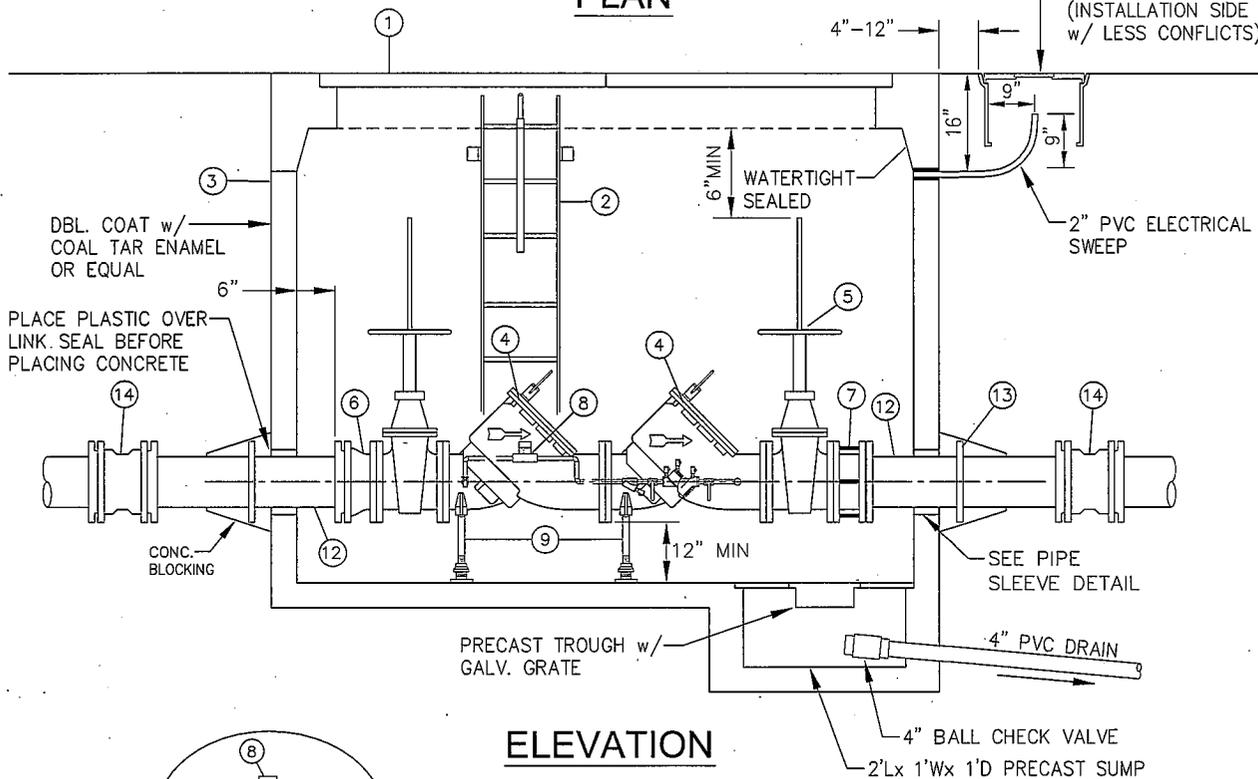
CONC. BLOCKING

HDPE METER BOX

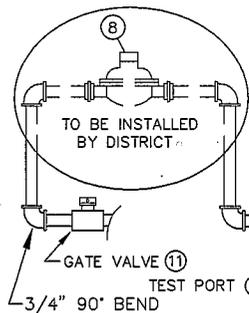
BRASS PIPE, SEE BY-PASS DETAIL

HDPE METER BOX NO. BCF111812BXL & DI METER LID w/ TOUCH READ NO. BCF1118AMR/TR (INSTALLATION SIDE w/ LESS CONFLICTS)

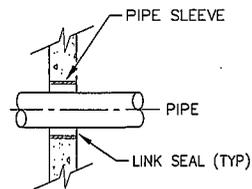
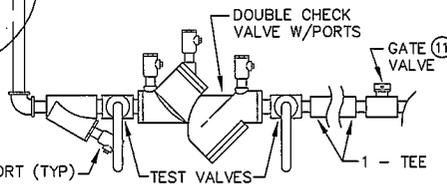
**PLAN**



**ELEVATION**



**BY-PASS DETAIL (BRASS PIPE)**



**PIPE SLEEVE DETAIL**

\* SEE SHEET 2 FOR ADDITIONAL NOTES & MATERIALS

SHEET 1 OF 2

**ROTH HILL**

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**DOUBLE CHECK DETECTOR  
BACKFLOW PREVENTION ASSY.**

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DWG. NO. W-25

PIPE SIZE	VAULT SIZES			
	CATALOG #	VAULT #	COVER #/ LW PRODUCTS CO HATCH #	BASE #
3" & 4"	575-LA	575-BL	57TL-HD1 36"x 72"	575-BL
6" & 8"	4484-LA	4484-ML	4484TL-HD3 48"x 96"	4484-BL
10"	5106-LA	5106-ML	5106TL-HD3 48"x 96"	5106-BL

**GENERAL NOTES:**

1. PAINT ALL INTERIOR METAL INCLUDING PIPE, VALVES, AND FITTINGS WITH TWO COATS OF EPOXY AS APPROVED BY THE ENGINEER. USE TNEMEC SERIES 135 CHEMBUILD, MODIFIED POLYAMIDOAMINE EPOXY. APPLY PER MANUFACTURERS INSTRUCTIONS.
2. THE ABOVE VAULT SIZES WERE SUPPLIED BY UTILITY VAULT CO. AS A REFERENCE FOR REQUIRED VAULT DIMENSIONS. SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL.
3. ALL ACCESS COVERS MUST BE MARKED "WATER", & BE LOCKING, & TRAFFIC BEARING AS REQ'D BY CITY WITH THREE (3) TAPPED 5/8" HOLES (SEE DWG. 25C). SQUARE HATCH MAY BE USED, SUBJECT TO APPROVAL BY CITY.
4. CLASS 52 D.I. PIPE IS REQUIRED.
5. THE ENDS OF THE VAULT SHALL BE SOLID WALL & CORE DRILLED TO SIZE FOR THE REQUIRED PIPE DIAMETER & LINK SEAL.
6. COVER SHALL EXTEND 6" ABOVE GRADE WHEN VAULT IS NOT IN TRAFFIC AREA & SHALL BE FLUSH IN TRAFFIC AREA.
7. SLOPE PAVEMENT AWAY FROM COVER WHEN VAULT IS IN TRAFFIC AREA.

**MATERIAL LIST**

- ① HATCH ————— ALUMINUM DOUBLE DOORS w/ GUTTER DRAIN H-20 VEHICLE RATING & LOCKING HASP (LW PRODUCTS CO. INC. OR APPROVED EQUAL) SEE #3 ABOVE.
- ② LADDER RUNGS ——— CAST IN PLACE 3/4" GALV. BAR AT 12" O.C. OR FABRICATED ALUMINUM LADDER SECURED AT TOP AND BOTTOM w/ "BILCO LADDERUP" SAFETY POST ON LADDER.
- ③ CONCRETE VAULT ——— SUBMIT DETAILS FOR APPROVAL. (SEE TABLE ABOVE)
- ④ DETECTOR ————— DOUBLE DETECTOR CHECK VALVE ASSEMBLY MUST BE APPROVED FOR INSTALLATION IN WASHINGTON STATE. TYPE SHALL BE APPROVED BY THE DISTRICT.
- ⑤ VALVE ————— TWO EACH, AWWA, FLANGED OS & Y GATE VALVES WITH HANDWHEEL. MUST BE LOCATED INSIDE OF VAULT.
- ⑥ ADAPTER ————— DUCTILE IRON (MJxFL) ADAPTER WITH MEGALUG RESTRAINT.
- ⑦ ADAPTER ————— ROMAC FLANGE COUPLING ADAPTER.
- ⑧ WATER METER ——— 5/8" x 3/4" TO BE INSTALLED BY THE DISTRICT.
- ⑨ PIPE STAND ——— 2" SCHEDULE 40 GALVANIZED PIPE STAND & BASE BOLTED TO FLOOR.
- ⑩ TEE ————— 3/4" BRASS WITH 3/4" PLUG.
- ⑪ GATE VALVE ——— 3/4" BRONZE BYPASS GATE VALVES (ASTM B62).
- ⑫ WATER MAIN ——— CLASS 52 D.I. PIPE WITH RESTRAINED JOINTS.
- ⑬ WALL FLANGE ——— TWO EACH
- ⑭ D.I. SLEEVE ——— TWO EACH (MJ) w/ RESTRAINED JOINTS.

\* SEE SHEET 1 FOR ADDITIONAL DETAILS

SHEET 2 OF 2

**ROTH HILL**

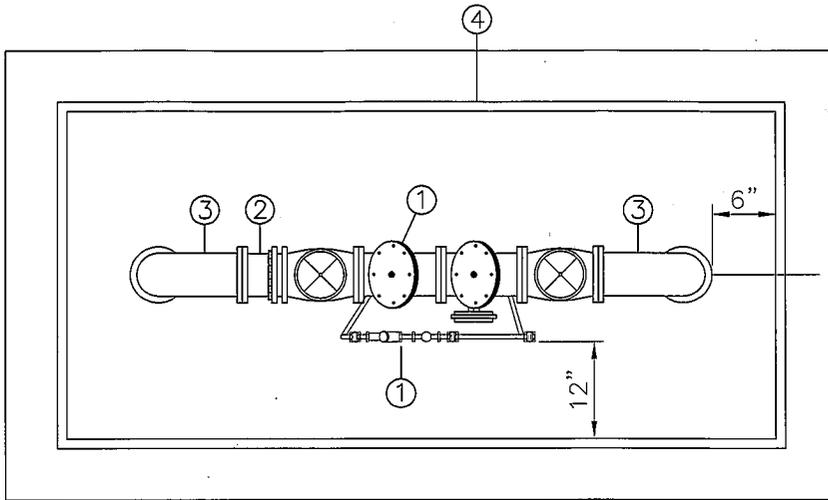
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**DOUBLE CHECK DETECTOR  
BACKFLOW PREVENTION ASSY.**

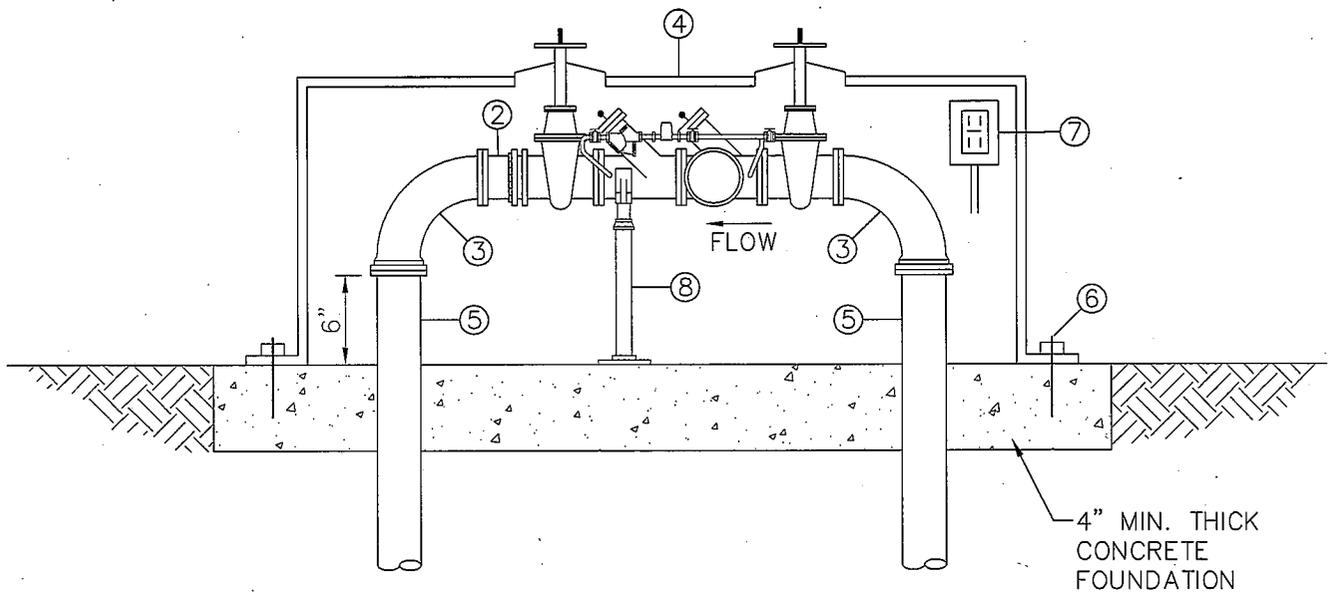


PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS 1=1	FILE NAME F:\DTL\S\CARNATION\WATER\W-25A	DATE APPROVED		

DWG. NO. **W-25A**



PLAN



ELEVATION

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 Tel. 425.869.9448

**REDUCED PRESSURE PRINCIPLE  
 DETECTOR ASSEMBLY**



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-26	DATE APPROVED		

DWG. NO. **W-26**

## LEGEND

- ① UL-FM LISTED SOFTSEATED STATE APPROVED REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY INCLUDING: 2-O.S.&Y. RESILIENT SEATED GATE VALVES, TEST COCKS, 3/4" BRASS OR COPPER BYPASS WITH IN LINE VALVES, 5/8" METER (METER TO READ IN CUBIC FEET), AND A 3/4" REDUCED PRESSURE BACKFLOW ASSEMBLY.
- ② UNI-FLANGE DI SPOOL.
- ③ 90° BEND (FLxMJ)
- ④ O,S & Y HOT BOX INSULATED ENCLOSURE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
- ⑤ DUCTILE IRON PIPE (SIZED AS REQUIRED) CLASS 52
- ⑥ STAINLESS STEEL ANCHOR BOLTS, SIZE AND NUMBER AS RECOMMENDED BY ENCLOSURE MANUFACTURER.
- ⑦ 120 VOLT, SINGLE PHASE, 15 AMP GROUND FAULT INTERRUPTING RECEPTACLE, U.L. STANDARD 943, N.E.M.A. 3R. POWER SERVICE SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND CITY OF CARNATION ORDINANCES. THE OUTLET SHALL BE MOUNTED A MINIMUM OF 2" OFF THE FLANGE FACE & 6" ABOVE THE HIGHEST POINT OF DISCHARGE.
- ⑧ 1 - ADJUSTIBLE PIPE SUPPORTS (GRINNELL #264 OR EQUAL)

## NOTES

- 1. TEE AND GATE VALVE REQUIRED ON MAIN.
- 2. ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.
- 3. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION & ANNUAL RECERTIFICATION.

**ROTH HILL**

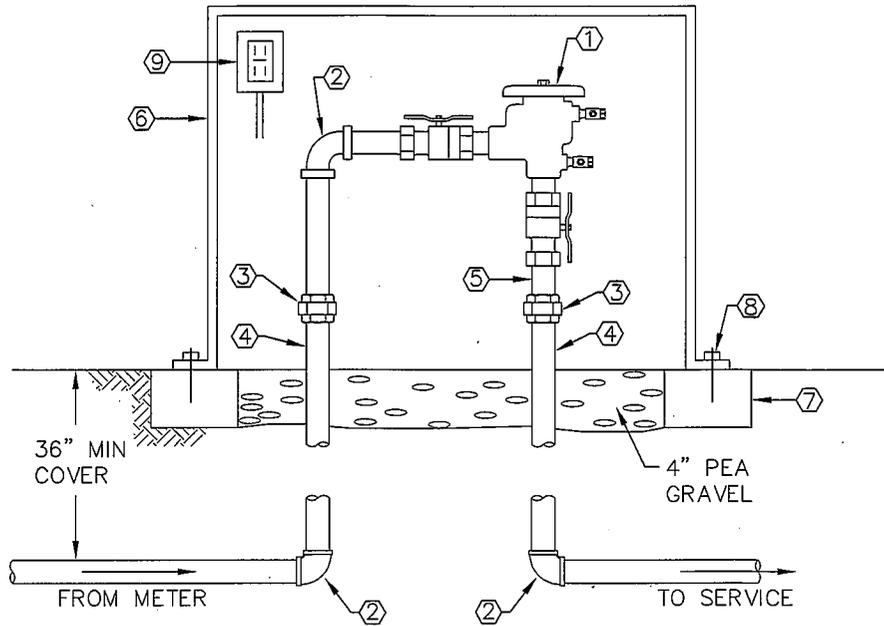
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## REDUCED PRESSURE DETECTOR ASSEMBLY



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DWG. NO. W-26A



1", 1-1/2", & 2" PRESSURE VACUUM BREAKER ASSEMBLY

LEGEND

- ① UL-FM LISTED PRESSURE VACUUM BREAKER ASSEMBLY WITH ISOLATION VALVES AND TEST COCKS. VALVE MUST BE ON LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES PREPARED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH DRINKING WATER PROGRAM.
- ② 90° BEND, THREADED BRASS
- ③ UNION, THREADED BRASS
- ④ SCHEDULE 80 RIGID COPPER PIPE
- ⑤ BRASS NIPPLE (LENGTH AS REQ'D)

IF INSTALLED OUTDOORS:

- ⑥ HEATED AND INSULATED FIBERGLASS ENCLOSURE WITH HINGED LOCKABLE LID WHICH EXPOSES TOP AND FRONT OF RPBP ASSEMBLY. SHALL BE EQUIPPED WITH A SCREENED DRAINAGE PORT AT THE BASE AND FLEXIBLE FLAPS TO PREVENT DRAFTS.  
 FOR 1" ASSEMBLY: HOT-BOX MODEL #1 - 27"L x 13"W x 23"H MINIMUM INSIDE DIMENSIONS.  
 FOR 1-1/2" ASSEMBLY: HOT-BOX MODEL #1.5 - 33"L x 21"W x 23"H MIN. INSIDE DIMENSIONS.  
 FOR 2" ASSEMBLY: HOT-BOX MODEL #2 - 39"L x 13"W x 35"H MINIMUM INSIDE DIMENSIONS.  
 AS MANUFACTURED BY NORTHEAST FLORIDA ENTERPRISES, INC.
- ⑦ 6" WIDE X 4" HIGH CAST-IN-PLACE CONCRETE FOOTING AROUND BASE OF ENCLOSURE.
- ⑧ STAINLESS STEEL ANCHOR BOLTS, SIZE AND NUMBER AS RECOMMENDED BY ENCLOSURE MANUFACTURER.
- ⑨ 120 VOLT, SINGLE PHASE, 15 AMP GROUND FAULT INTERRUPTING RECEPTACLE, U.L. STANDARD 943, N.E.M.A. 3R. POWER SERVICE SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND CITY OF CARNATION ORDINANCES. MOUNT RECEPTACLE AT TOP OF THE BACK WALL OF ENCLOSURE A MINIMUM OF 6" ABOVE THE HIGHEST POINT OF DISCHARGE.

NOTES:

1. ALL PIPE AND FITTINGS SHALL BE SAME SIZE AS THE PRESSURE VACUUM BREAKER.
2. PVB ASSEMBLY SHALL BE INSTALLED WITH TEST COCKS TOWARDS FRONT OF ENCLOSURE (FOR OUTDOOR INSTALLATIONS).
3. PVB ASSEMBLY MAY BE INSTALLED INDOORS FOR FREEZE PROTECTION. INDOOR INSTALLATIONS SHALL MEET CITY OF CARNATION PLUMBING CODES AND BE ACCESSIBLE AND AVAILABLE TO CITY STAFF FOR ANNUAL RECERTIFICATIONS.
4. PVB ASSEMBLY SHALL BE CERTIFIED BY THE CITY UPON INSTALLATION AND RECEIVE ANNUAL RECERTIFICATIONS.

**ROTH HILL**

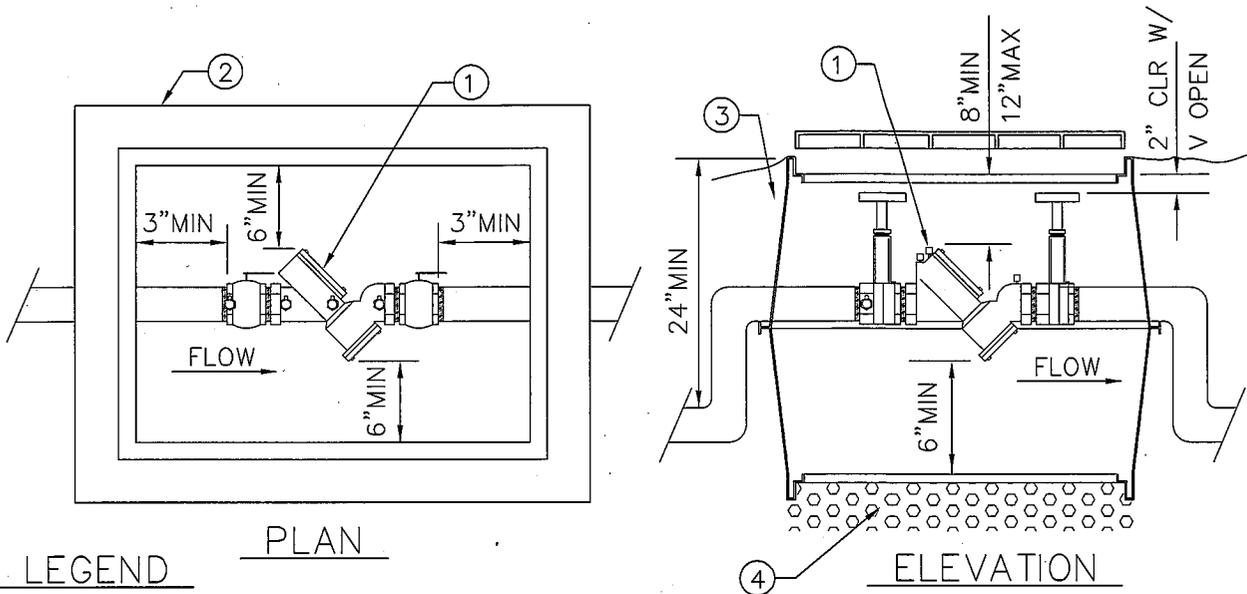
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 Suite 200  
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 Tel. 425.869.9448

1", 1 1/2" & 2" PRESSURE VACUUM  
 BREAKER ASSEMBLY



PLOTTING DATE 1/2/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DTLS\CARNATION\WATER\W-27	DATE APPROVED		

DWG. NO. W-27



- LEGEND**
- ① UL-FM LISTED REDUCED DOUBLE CHECK VALVE ASSEMBLY WITH ISOLATION VALVES AND TEST COCKS. VALVE MUST BE ON LIST OF APPROVED DOUBLE CHECK VALVE ASSEMBLIES PREPARED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH DRINKING WATER PROGRAM.
  - ② MID-STATES HDPE METER BOX #BCF111812BXL w/ FULL STEEL LID FOR 1" DCVA & BCF173012B FOR 1 1/2" & 2" DCVA (2 EACH).
  - ③ IF A DAYLIGHT DRAIN CANNOT BE PROVIDED, THERE MUST BE A 4" MINIMUM LAYER OF FREE DRAINING GRAVEL AT THE BOTTOM OF THE BOX.
  - ④ PROVIDE 4" OF PEA GRAVEL.

**NOTES**

- 1 ALL TEST COCKS MUST HAVE BRASS PLUGS.
- 2 TEST COCKS MUST FACE UP OR SIDWAYS, WHICH EVER IS MORE ACCESSIBLE
- 3 ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY.
- 4 ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.

**ROTH HILL**

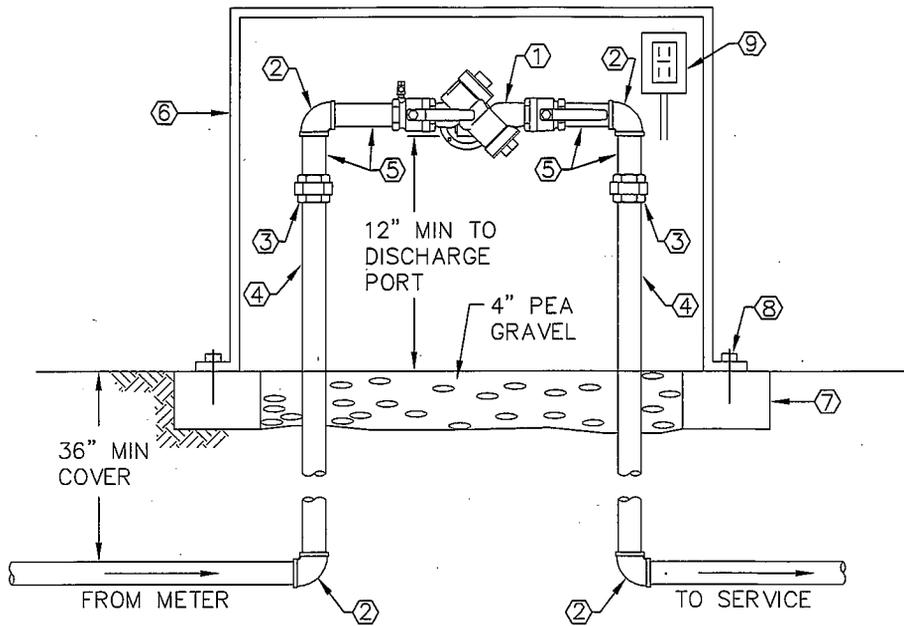
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**1", 1 1/2" & 2" DOUBLE CHECK VALVE ASSEMBLY**

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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DTLS\CARNATION\WATER\W-28	DATE APPROVED		



DWG. NO. W-28



1", 1-1/2", & 2" REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY

LEGEND

- ① UL-FM LISTED REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY WITH ISOLATION VALVES AND TEST COCKS. VALVE MUST BE ON LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES PREPARED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH DRINKING WATER PROGRAM.
- ② 90° BEND, THREADED BRASS
- ③ UNION, THREADED BRASS
- ④ SCHEDULE 80 RIGID COPPER PIPE
- ⑤ BRASS NIPPLE (LENGTH AS REQ'D)

IF INSTALLED OUTDOORS:

- ⑥ HEATED AND INSULATED FIBERGLASS ENCLOSURE WITH HINGED LOCKABLE LID WHICH EXPOSES TOP AND FRONT OF RBPB ASSEMBLY. SHALL BE EQUIPPED WITH A SCREENED DRAINAGE PORT AT THE BASE AND FLEXIBLE FLAPS TO PREVENT DRAFTS.  
 FOR 1" ASSEMBLY: HOT-BOX MODEL #1 - 27"L x 13"W x 23"H MINIMUM INSIDE DIMENSIONS.  
 FOR 1-1/2" ASSEMBLY: HOT-BOX MODEL #1.5 - 33"L x 21"W x 23"H MIN. INSIDE DIMENSIONS.  
 FOR 2" ASSEMBLY: HOT-BOX MODEL #2 - 39"L x 13"W x 35"H MINIMUM INSIDE DIMENSIONS.  
 AS MANUFACTURED BY NORTHEAST FLORIDA ENTERPRISES, INC.
- ⑦ 6" WIDE X 4" HIGH CAST-IN-PLACE CONCRETE FOOTING AROUND BASE OF ENCLOSURE.
- ⑧ STAINLESS STEEL ANCHOR BOLTS, SIZE AND NUMBER AS RECOMMENDED BY ENCLOSURE MANUFACTURER.
- ⑨ 120 VOLT, SINGLE PHASE, 15 AMP GROUND FAULT INTERRUPTING RECEPTACLE, U.L. STANDARD 943, N.E.M.A. 3R. POWER SERVICE SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND CITY OF CARNATION ORDINANCES. MOUNT RECEPTACLE AT TOP OF THE BACK WALL OF ENCLOSURE. THE OUTLET SHALL BE MOUNTED A MINIMUM OF 2" OFF THE FLANGE & 6" ABOVE THE HIGHEST POINT OF DISCHARGE.

NOTES:

1. ALL PIPE AND FITTINGS SHALL BE SAME SIZE AS RBPB VALVE.
2. RBPB ASSEMBLY SHALL BE INSTALLED WITH TEST COCKS TOWARDS FRONT OF ENCLOSURE (FOR OUTDOOR INSTALLATIONS).
3. RBPB ASSEMBLY MAY BE INSTALLED INDOORS FOR FREEZE PROTECTION. INDOOR INSTALLATIONS SHALL MEET CITY OF CARNATION PLUMBING CODES AND BE ACCESSIBLE AND AVAILABLE TO CITY STAFF FOR ANNUAL RECERTIFICATIONS.
4. RBPB ASSEMBLY SHALL BE CERTIFIED BY THE CITY UPON INSTALLATION AND RECEIVE ANNUAL RECERTIFICATIONS.

**ROTH HILL**

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 Suite 200  
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 Tel. 425.869.9448

1", 1 1/2" & 2" REDUCED  
 PRESSURE BACKFLOW  
 PREVENTER ASSEMBLY

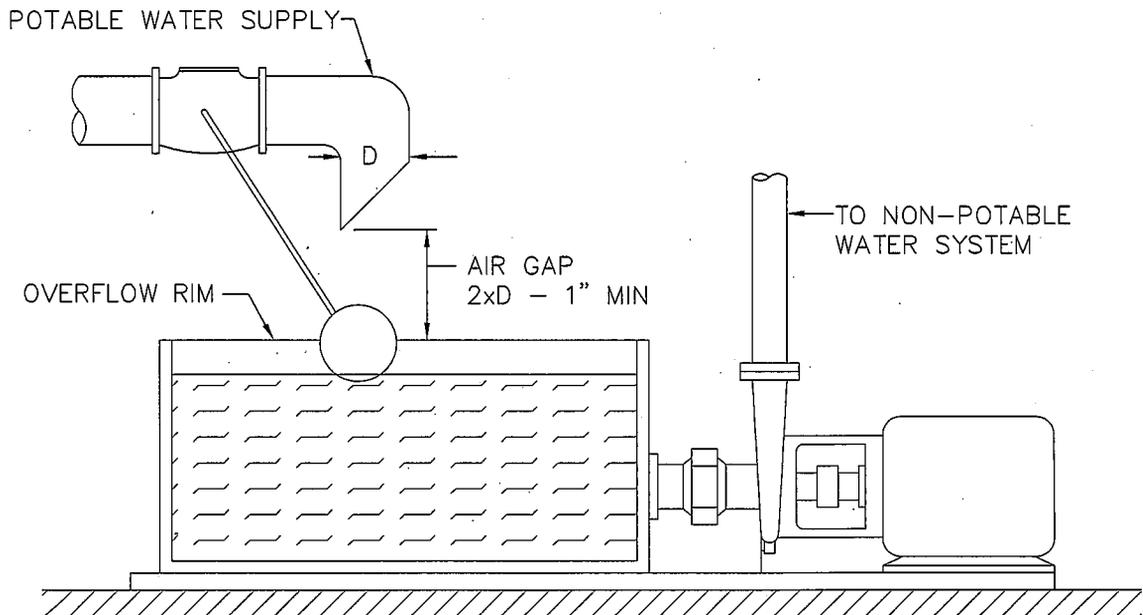
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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DTLS\CARNATION\WATER\W-29	DATE APPROVED		



DWG. NO. W-29

## APPROVED AIR GAP SEPARATION

AN APPROVED AIR GAP IS A PHYSICAL SEPARATION BETWEEN THE FREE FLOWING DISCHARGE END OF A POTABLE WATER SUPPLY PIPELINE AND THE OVERFLOW RIM OF AN OPEN OR NON-PRESSURE RECEIVING VESSEL. THESE VERTICAL, PHYSICAL SEPERATIONS MUST BE AT LEAST TWICE THE DIAMETER OF THE INLET PIPE BUT NEVER LESS THAN ONE INCH. IF SPLASHING IS A PROBLEM, TUBULAR SCREENS MAY BE ATTACHED OR THE SUPPLY LINE OUTLET MAY BE CUT AT A 45 DEGREE ANGLE. IF THE SUPPLY LINE IS CUT AT A 45 DEGREE ANGLE, THE AIR GAP DISTANCE IS MEASURED FROM THE CENTER OF THE ANGLE. HOSES ARE NOT ALLOWED. BYPASSES ARE NOT ALLOWED. THE INSPECTION OF AIR GAPS SHALL BE INCLUDED IN THE YEARLY TESTING PROGRAM FOR BACKFLOW DEVICES.



**ROTH HILL**

**Roth Hill, LLC**

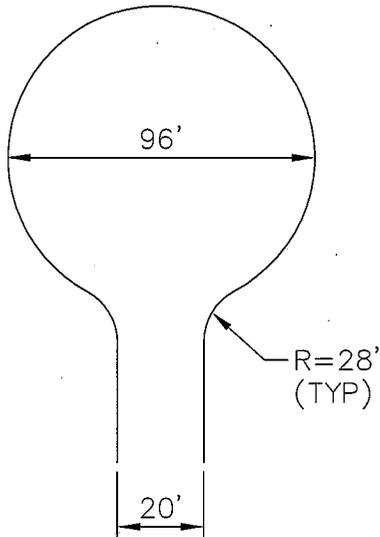
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### AIR GAP FOR MAKEUP TANK

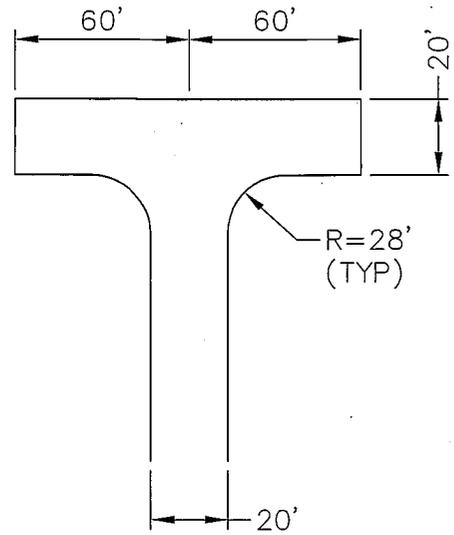
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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DTLS\CARNATION\WATER\W-30	DATE APPROVED		



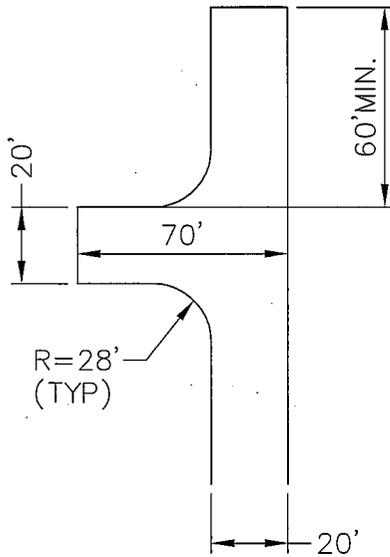
DWG. NO. | W-30



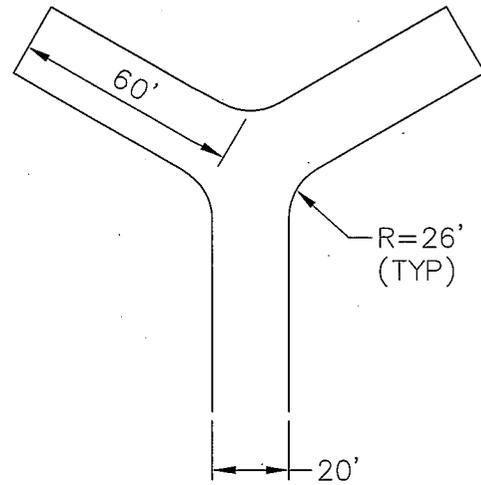
**96' DIAMETER  
CUL-DE-SAC**



**120' HAMMERHEAD**



**ACCEPTABLE ALT.  
TO 120' HAMMERHEAD**



**ACCEPTABLE ALT.  
TO 120' HAMMERHEAD**

**ROTH HILL**

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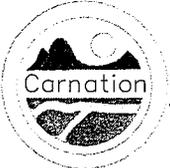
**FIRE DEPARTMENT  
ACCESS STANDARDS**

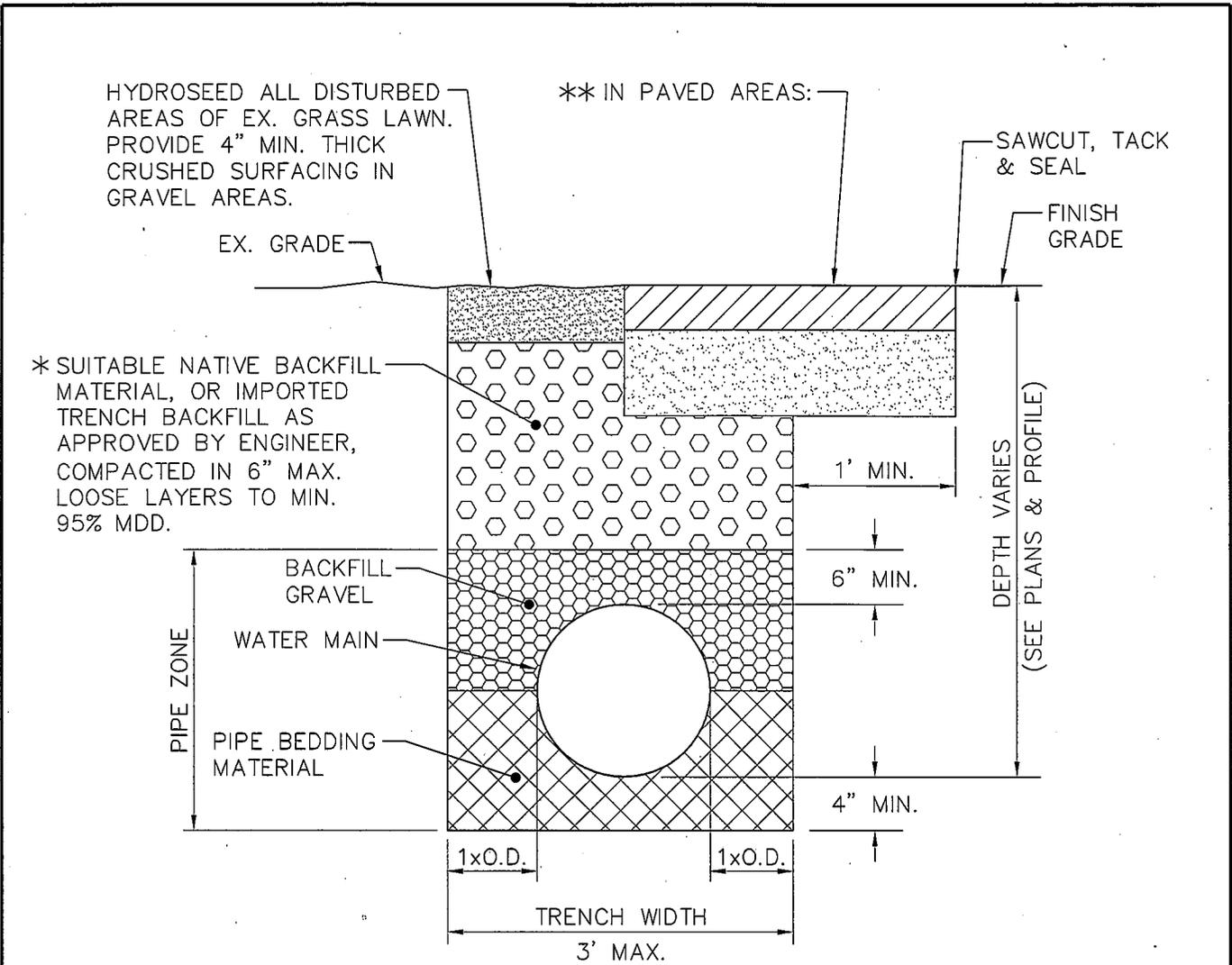
PLOTTING DATE 01/17/08	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARN\WATER\W-31A	DATE APPROVED		



DWG. NO. W-31A

- (1) ALL DESIGNATED FIRE LANES SHALL BE CLEARLY MARKED BY THE PROPERTY OWNER IN THE FOLLOWING MANNER: VERTICAL CURBS SHALL BE SIX-INCHES (6") IN HEIGHT AND SHALL BE PAINTED RED ON THE TOP AND SIDE, EXTENDING THE LENGTH OF THE DESIGNATED FIRE LANE WITH FOUR-INCH (4") WHITE BLOCK LETTERING STENCILED ON THE FACE "NO PARKING-FIRE LANE". THE STENCILING SHALL BE SPACED EVERY FIFTY FEET (50'). ROLLED CURBS OR SURFACES WITHOUT CURBS SHALL HAVE A RED SIX-INCH (6") WIDE STRIPE PAINTED EXTENDING THE LENGTH OF THE DESIGNATED FIRE LANE WITH FOUR-INCH (4") WHITE BLOCK LETTERING STENCILED ON THE STRIPE "NO PARKING-FIRE LANE". THE STENCILING SHALL BE SPACED EVERY FIFTY FEET (50').
- (2) AN EASEMENT OVER ALL FIRE LANES AND TURN-AROUNDS SHALL BE GRANTED TO THE CITY OF CARNATION. LEGAL DESCRIPTION OF THE FIRE LANES AND TURN-AROUNDS SHALL BE PREPARED BY THE OWNER'S SURVEYOR. THE CITY SHALL PREPARE THE EASEMENT.
- (3) SIGNS MAY BE SUBSTITUTED FOR CURB PAINTING WHEN APPROVED IN WRITING BY THE FIRE MARSHAL.
- (4) SIGNS SHALL NOT BE LESS THAN EIGHTEEN INCHES (18") IN HEIGHT BY TWELVE INCHES (12") IN WIDTH, WITH BLOCK LETTERING OF NOT LESS THAN THREE INCHES (3") HIGH BRUSH STROKE, READING: "NO PARKING-FIRE LANE". SUCH SIGNS SHALL BE REFLECTIVE IN NATURE, WITH RED LETTERING ON A WHITE BACKGROUND, AND SPACED AT INTERVALS OF NOT MORE THAN FIFTY FEET (50') APART. THE TOP OF SUCH SIGNS SHALL NOT BE LESS THAN FOUR FEET (4') OR MORE THAN SIX FEET (6') FROM THE GROUND. SIGNS MAY BE PLACED ON BUILDINGS WHEN APPROVED IN WRITING BY THE FIRE MARSHAL. WHEN POSTS ARE REQUIRED, THEY SHALL BE CONSTRUCTED OF EITHER TWO-INCH (2") OR GREATER GALVANIZED STEEL, OR FOUR-INCH BY FOUR-INCH (4"X4") OR GREATER PRESSURE TREATED WOOD.
- (5) THE FIRE MARSHAL MAY APPROVE DEVIATIONS FROM ANY OF THE SPECIFICATIONS WHEN APPROVED IN WRITING BY THE FIRE MARSHAL.
- (6) CONTACT EASTSIDE FIRE MARSHAL'S OFFICE @ (425) 837-3123 OR 837-3121 WITH QUESTIONS ABOUT THE SPECIFICATIONS.

<p><b>ROTHHILL</b></p> <p><b>Roth Hill, LLC</b>          11130 NE 33rd Place,          Suite 200          Bellevue, WA 98004          Tel. 425.869.9448</p>	<p><b>FIRE DEPARTMENT</b></p> <p><b>FIRE LANE STANDARDS</b></p>					
	PLOTING DATE	DRAWN	CHECKED	APPROVED		CITY
	01/17/08	DSH				
PLOTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARN\WATER\W-31B			DATE APPROVED	DWG. NO. W-31B	



\* SUIABLE NATIVE BACKFILL MATERIAL, OR IMPORTED TRENCH BACKFILL AS APPROVED BY ENGINEER, COMPACTED IN 6" MAX. LOOSE LAYERS TO MIN. 95% MDD.

HYDROSEED ALL DISTURBED AREAS OF EX. GRASS LAWN. PROVIDE 4" MIN. THICK CRUSHED SURFACING IN GRAVEL AREAS.

\*\* IN PAVED AREAS:

SAWCUT, TACK & SEAL

FINISH GRADE

EX. GRADE

PIPE ZONE

BACKFILL GRAVEL

WATER MAIN

PIPE BEDDING MATERIAL

1xO.D.

1xO.D.

TRENCH WIDTH

3' MAX.

1' MIN.

6" MIN.

4" MIN.

DEPTH VARIES (SEE PLANS & PROFILE)

**NOTE:**

1. PERPENDICULAR, OPEN CUT TRENCH CROSSINGS WITHIN THE RIGHT-OF-WAY SHALL BE BACKFILLED WITH 100% CRUSHED SURFACING TOP COURSE (CSTC) PER WSDOT 9-03.9 (3) OR CDF.
2. MINIMUM COVER FOR 8" DIAMETER WATER MAINS SHALL BE 3' MINIMUM COVER & FOR LARGER THAN 8" DIAMETER WATER MAINS SHALL BE 4'.
3. PIPE ZONE GRAVEL BACKFILL PER WSDOT 9.03.19 OR 9.03.9(3).
4. PIPE BEDDING MATERIAL NORMALLY SUIABLE NATIVE MATERIAL, OTHERWISE PER WSDOT 9.03.12(3).

\* BACKFILL COMPACTION ON PRIVATE EASEMENTS WHICH ARE NOT USED FOR DRIVING PURPOSES SHALL BE MINIMUM 90% MAX. DRY DENSITY (MDD).

\*\* IN R.O.W MATCH EXISTING PAVEMENT SECTION PLUS 1", BUT NOT LESS THAN 3" ACP CLASS B OVER 6" CSTC (COMPACTED THICKNESS), TACK & SEAL MEET LINES.

**ROTH HILL**

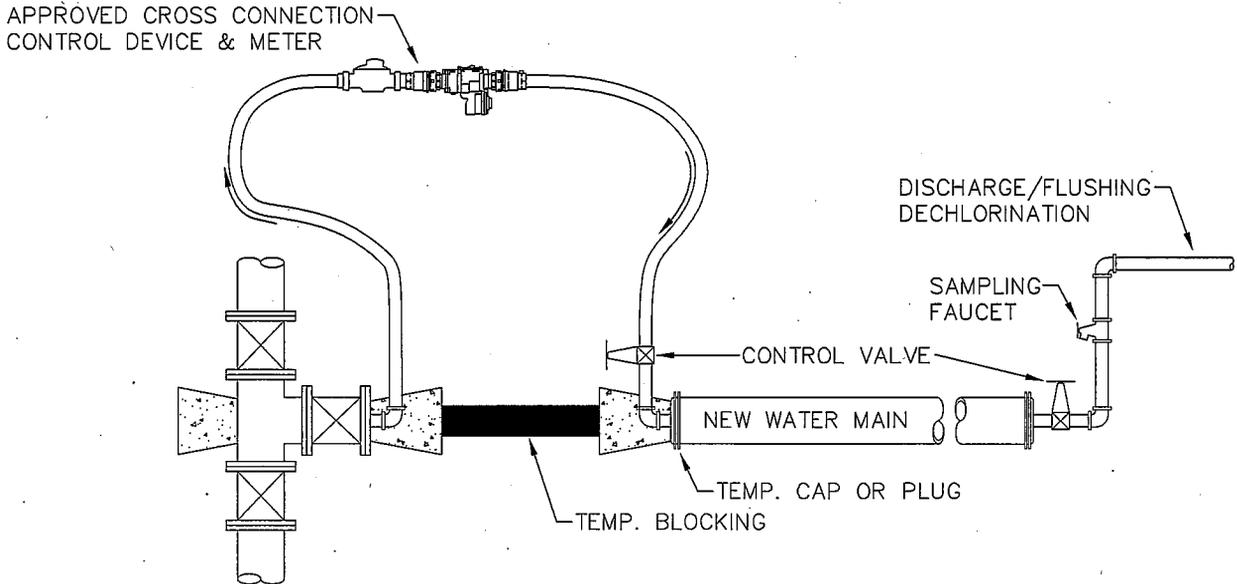
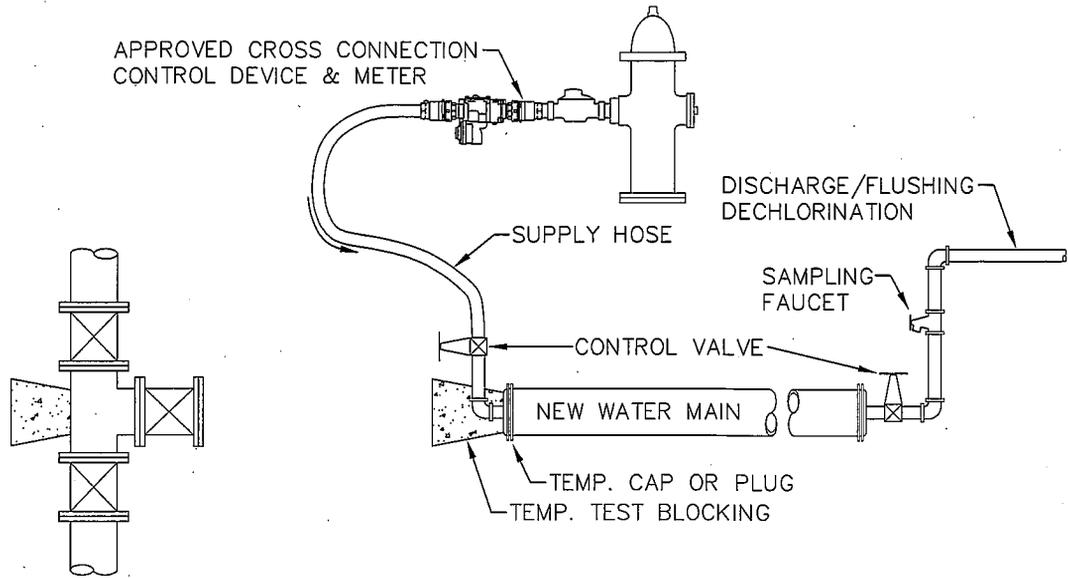
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**TYPICAL TRENCH DETAIL**



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DWG. NO. | W-34



**NOTES:**

1. WHEN PURITY SAMPLE RESULTS ARE SATISFACTORY & RECEIVED IN WRITING FROM THE STATE-CERTIFIED LABORATORY, & ALL OTHER CITY OF CARNATION WATER SYSTEM STANDARDS HAVE BEEN MET, THE CONTRACTOR SHALL BE ALLOWED TO CONNECT THE NEW MAINS TO THE EXISTING DISTRIBUTION SYSTEM FOLLOWING CITY OF CARNATION & AWWA STANDARDS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PREVENT, AT ALL TIMES, THE CONTAMINATION OF THE NEW & EXISTING WATER MAINS WITH TRENCH WATER, DIRT, DEBRIS, OR OTHER FOREIGN MATERIAL.
2. A CITY OF CARNATION REPRESENTATIVE MUST BE PRESENT TO WITNESS THE FINAL CONNECTION(S) TO THE EXISTING WATER SYSTEM, TO TURN ON & FLUSH THE NEW WATER SYSTEM, & TO PLACE THE NEW WATER SYSTEM & APPURTENANCES INTO SERVICE.

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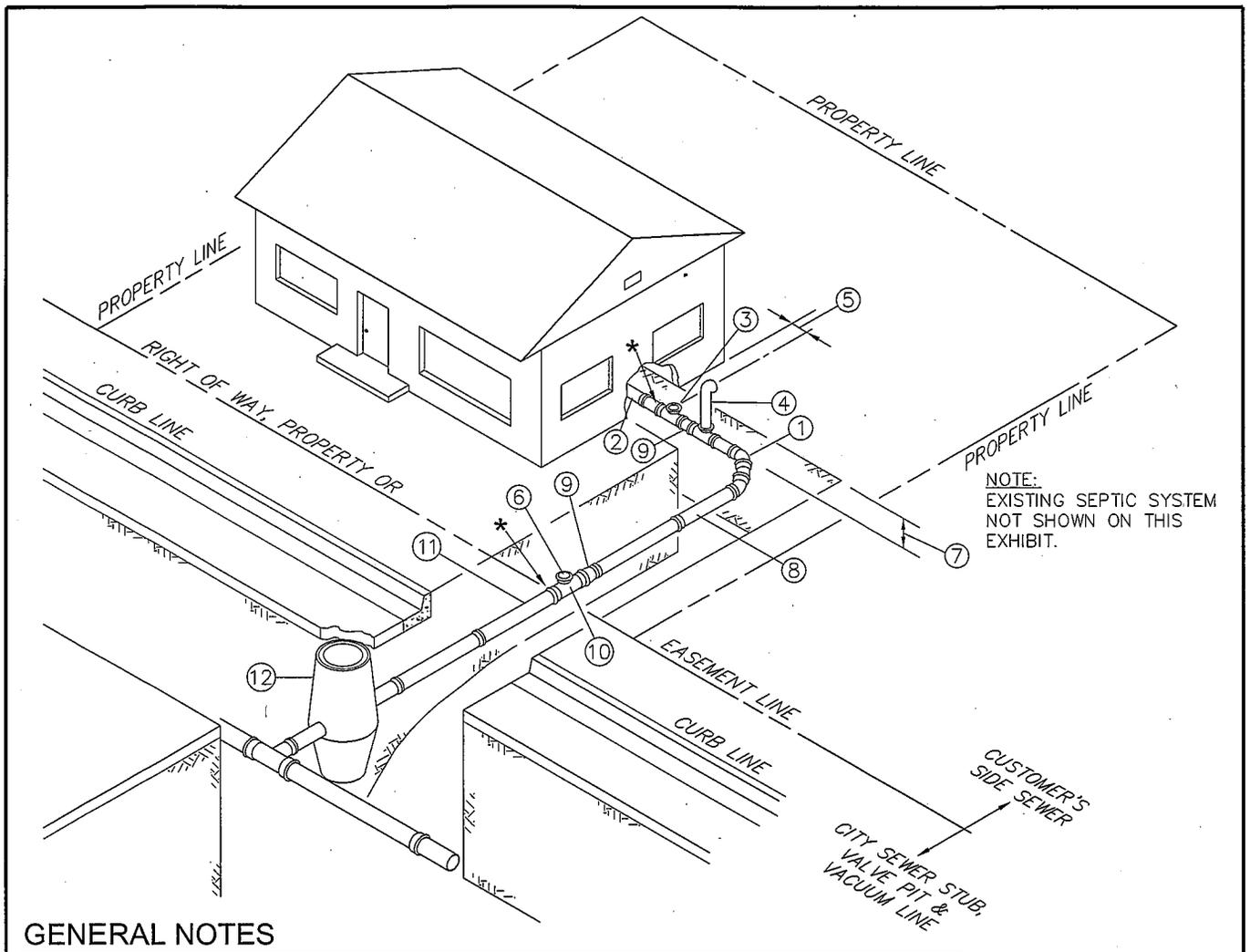
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**FINAL CONNECTION TO  
 THE EXISTING WATER MAIN**



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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\WATER\W-35	DATE APPROVED		

DWG. NO. | W-35



NOTE:  
EXISTING SEPTIC SYSTEM  
NOT SHOWN ON THIS  
EXHIBIT.

### GENERAL NOTES

- ① 45° BENDS WITH 24" MIN. SEPARATION BETWEEN BENDS.
- ② SIDE SEWER SHALL BE CONSTRUCTED TO EX. BLDG./ SEPTIC TANK LINE UNLESS APPROVED BY THE CITY. CONNECT EXISTING PLUMBING OR NEW PLUMBING TO SIDE SEWER WITH FLEXIBLE FORD OR ROMAC COUPLING. CONNECTION MAY BE INSIDE OR OUTSIDE OF BUILDING. CITY INSPECTION REQ'D. AT TIME OF CONNECTION.
- ③ BACKWATER VALVE PER DETAIL.
- ④ SURFACE AIR VENT PER STANDARD DETAIL. THE SURFACE AIR VENT MAY ALSO DOUBLE AS A SECONDARY CLEAN OUT AT OWNER'S OPTION. THE SURFACE AIR VENT MAY BE INSTALLED LATERAL TO THE SIDE SEWER LINE (MAX. 4'). LOCATION OF SURFACE AIR VENT IS AT OWNER'S DISCRETION BUT SHALL BE MIN. 10' UPSTREAM OF THE CITY SIDE SEWER CONNECTION UNLESS OTHERWISE APPROVED.
- ⑤ 18" TO 36" RECOMMENDED DISTANCE.
- ⑥ PLUG OR CLEANOUT AT OWNER'S OPTION.
- ⑦ 18" MIN. COVER.
- ⑧ 4" OR 6" SDR 21 PVC SIDE SEWER. SDR 35 P DUCTILE IRON PIPE ARE ALSO ACCEPTABLE.
- ⑨ 4"x 6" REDUCER FITTING AS REQUIRED.
- ⑩ 6" TEST TEE WITH PLUG. TEST TEE MAY DOUBLE AS A CLEAN OUT AT OWNER'S OPTION.
- ⑪ 6" SIDE SEWER STUB w/ CAP.
- ⑫ VALVE PIT

\*DURING TESTING, CAP INSTALLED SIDE SEWER AT THESE LOCATIONS. AFTER SUCCESSFUL TEST, REMOVE CITY-SIDE CAP & CONNECT TO CITY SEWER STUB. CONNECTION TO HOUSE TO FOLLOW LATER (SEE NOTE 2). TESTING METHODS ARE DESCRIBED IN THE CITY SIDE SEWER STANDARDS.

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## TYPICAL BUILDING CONNECTION

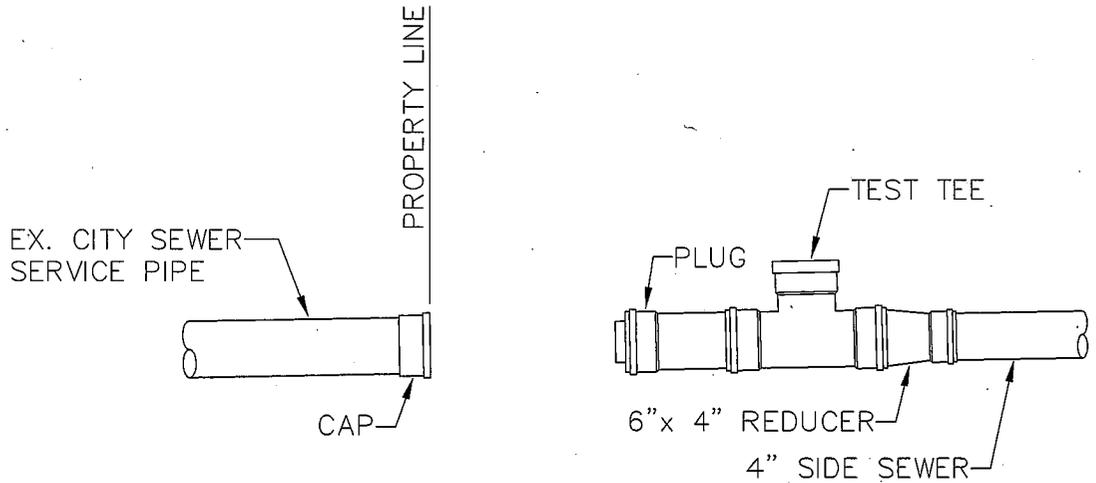


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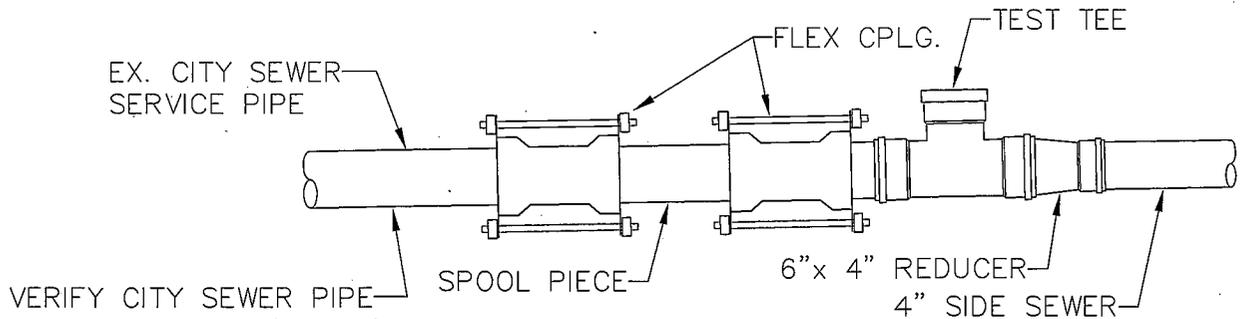
DWG. NO. S-1

**TO CONNECT SIDE SEWER AFTER TESTING:**

- ① CUT OFF CAP END OF CITY SEWER SERVICE PIPE.
- ② CUT OFF SIDE SEWER PLUG.
- ③ DRAIN PIPE INTO SUMP.
- ④ INSTALL SPOOL PIECE WITH FLEXIBLE COUPLINGS.
- ⑤ BACKFILL, COMPACTION & RESTORATION.



**PRIOR TO CONNECTION**



VERIFY CITY SEWER PIPE TYPE IS SDR 35 (GREEN) OR SDR 21 (WHITE) & USE THE APPROPRIATE GASKET w/ THE FLEX CPLG.

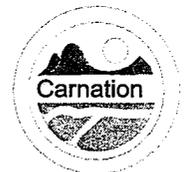
**AFTER CONNECTION**

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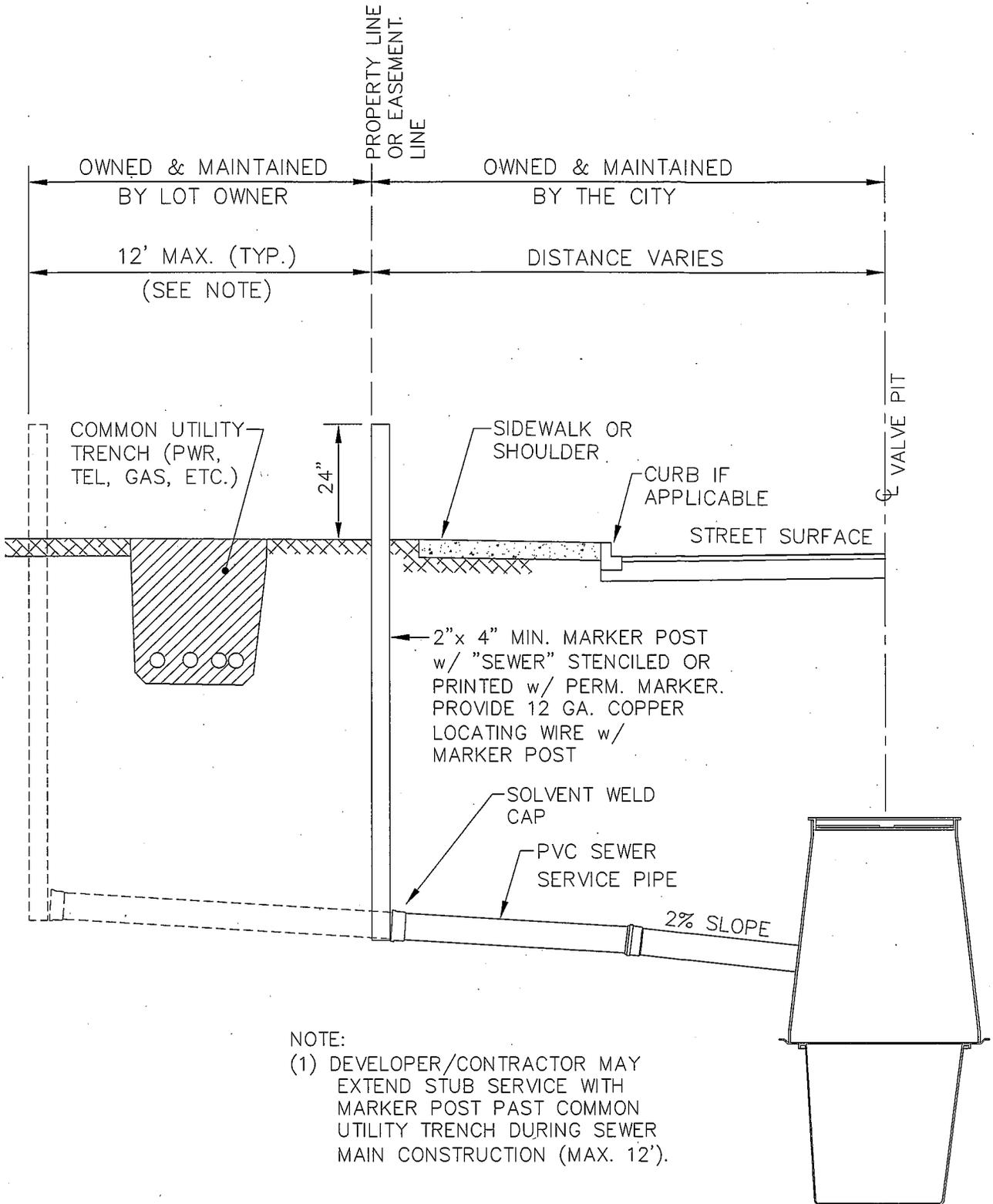
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**SIDE SEWER STANDARDS  
CONNECTION SCHEMATIC-  
SUPPLEMENT**

PLOTTING DATE 5/2007	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS:1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-1A	DATE APPROVED		



DWG. NO. | S-1A



NOTE:  
 (1) DEVELOPER/CONTRACTOR MAY EXTEND STUB SERVICE WITH MARKER POST PAST COMMON UTILITY TRENCH DURING SEWER MAIN CONSTRUCTION (MAX. 12').

**ELEVATION**

**ROTH HILL**

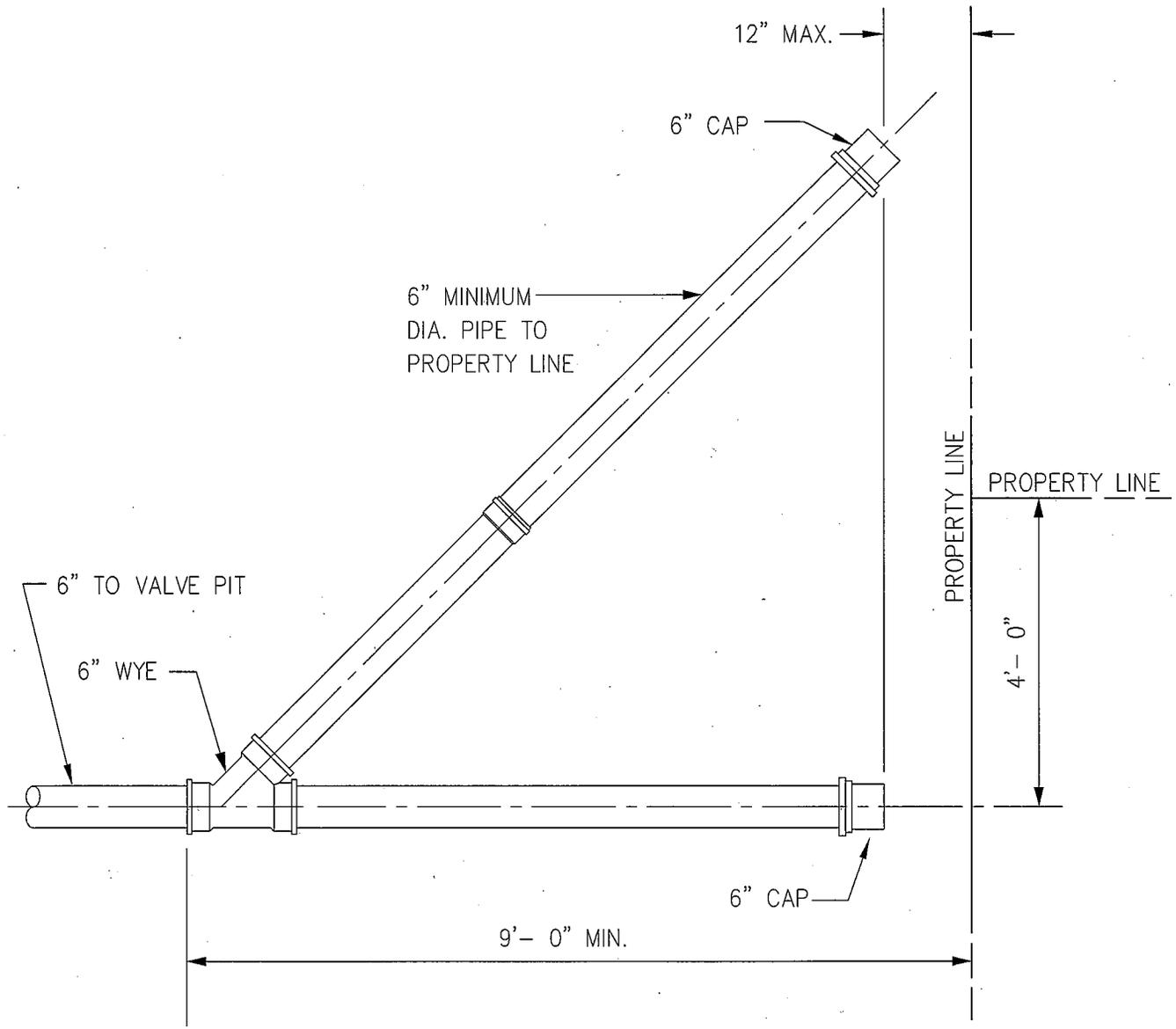
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**SIDE SEWER STUB SERVICE  
 CONSTRUCTION DETAIL**

PLOTTING DATE 3/2007	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-2	DATE APPROVED		



DWG. NO. **S-2**



PLAN VIEW

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**STANDARD PLAN  
 SIDE SEWER STUB**

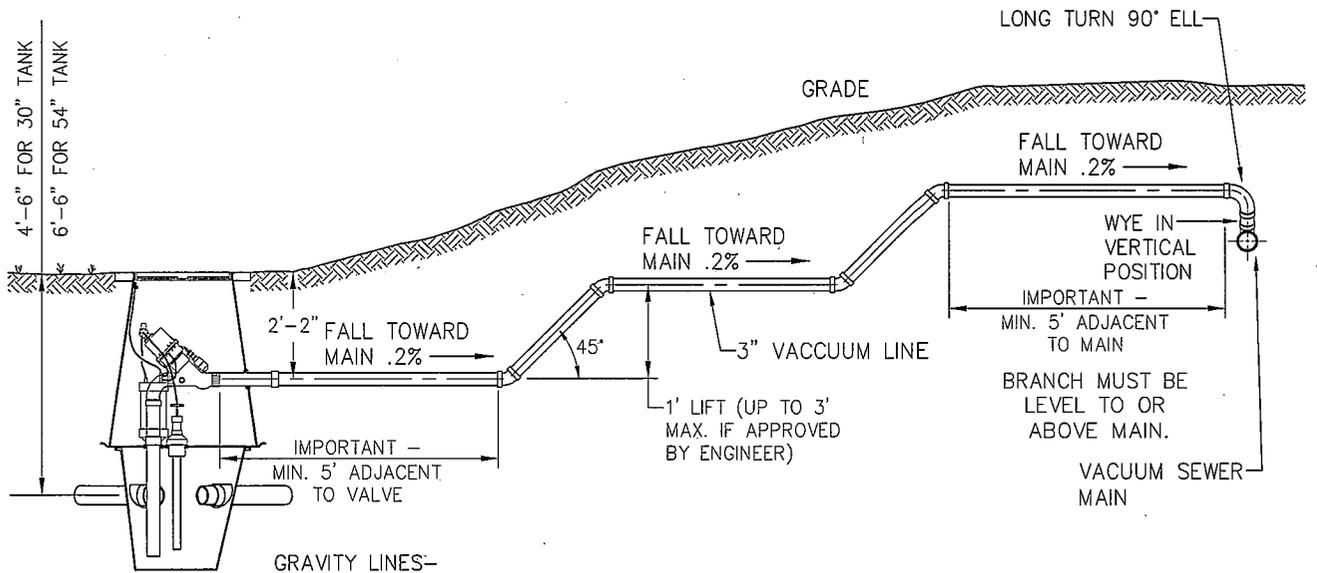
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PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-3	DATE APPROVED		



DWG. NO. **S-3**

**NOTES:**

1. ALL GROMMETS FOR VALVE PIT AND SUMP SUPPLIED BY AIRVAC AND INSTALLED BY CONTRACTOR.
2. ALL HOLES IN VALVE PIT AND PIT BOTTOM ARE FACTORY CUT. ALL GRAVITY LINE CONNECTION OPENING IN THE THE SUMP ARE FIELD CUT.
3. WHEN INSTALLING ANY PIPE THROUGH A GROMMET, USE ONLY WATER OR MILD DETERGENT AS A LUBRICANT, NEVER USE PIPE JOINT GREASE.
4. DO NOT INSTALL VACUUM VALVE UNTIL HOME GRAVITY LINE IS NEAR COMPLETION AND AIR INTAKE PIPING IS IN PLACE.
5. ALL HOMES THAT ARE CONNECTED TO A COMMON GRAVITY SEWER STUB AT THE PROPERTY LINE SHALL HAVE A BACKFLOW PREVENTER IN THE HOME OWNERS GRAVITY LINES.
6. VALVE INSTALLED BY CITY.

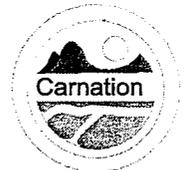


GRAVITY LINES-  
 IN ALL INSTALLATIONS, SEWAGE SHALL FLOW  
 BY GRAVITY TO THE 30 OR 60 GALLON HOLDING  
 TANK. INSTALL GRAVITY LINES IN ACCORDANCE  
 WITH ALL NATIONAL AND LOCAL CODES

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**VALVE PIT &  
 LATERAL INSTALLATION**

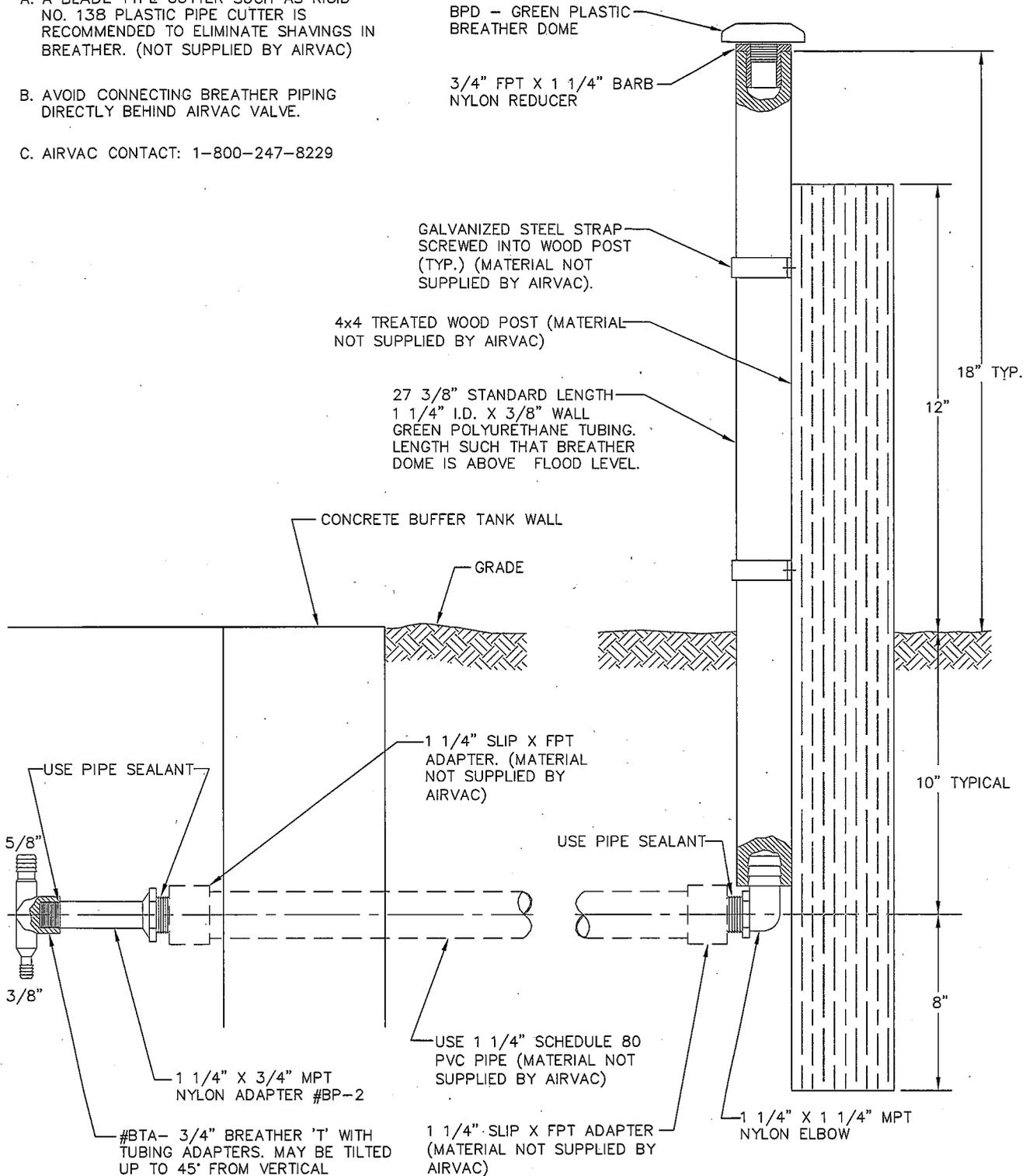


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PLOTTING SCALE NTS:1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-4	DATE APPROVED		DWG. NO.

DWG. NO. S-4

**NOTES:**

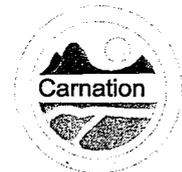
- A. A BLADE TYPE CUTTER SUCH AS RIGID NO. 138 PLASTIC PIPE CUTTER IS RECOMMENDED TO ELIMINATE SHAVINGS IN BREATHER. (NOT SUPPLIED BY AIRVAC)
- B. AVOID CONNECTING BREATHER PIPING DIRECTLY BEHIND AIRVAC VALVE.
- C. AIRVAC CONTACT: 1-800-247-8229



**ROTH HILL**

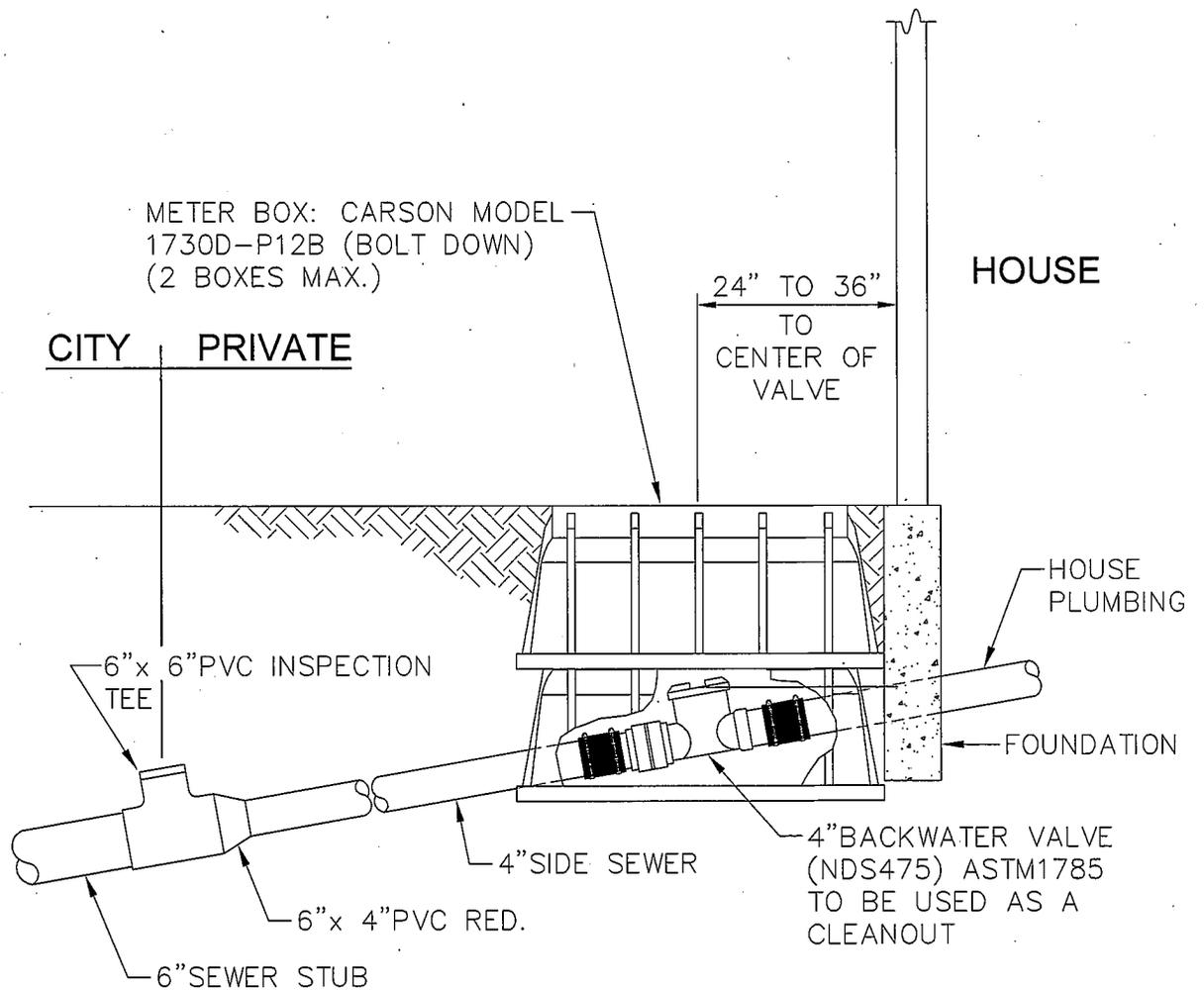
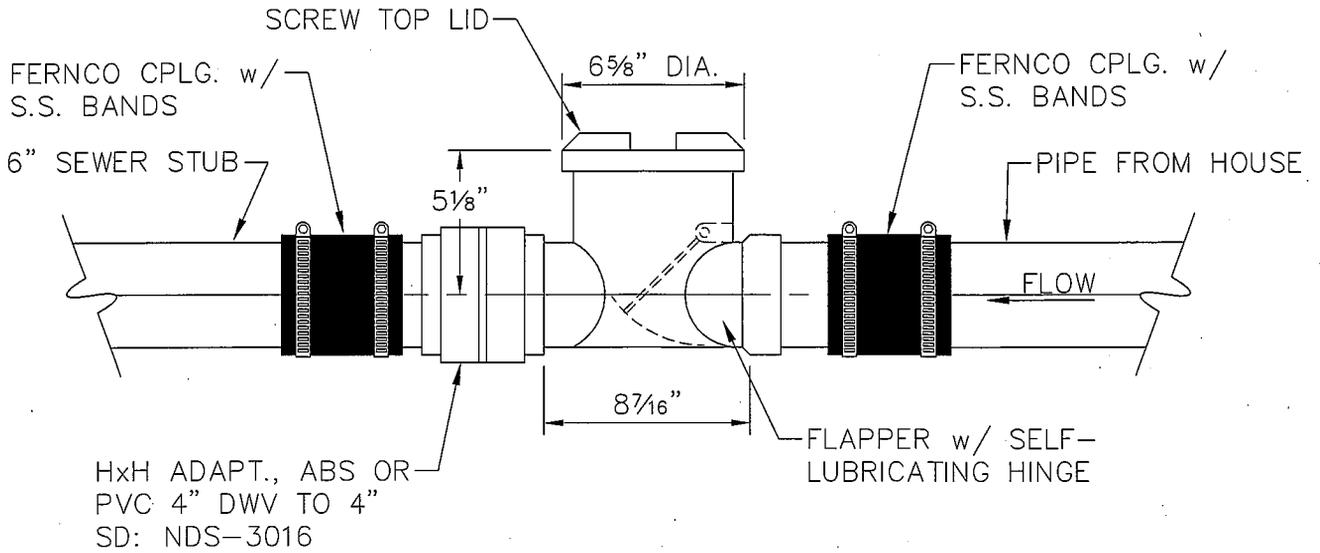
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**BUFFER TANK EXTERNAL  
 BREATHER ASSEMBLY**



PLOTTING DATE 3/2010	DRAWN TVW	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-5A	DATE APPROVED		

DWG. NO. S-5A

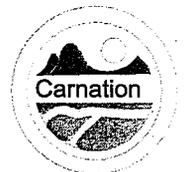


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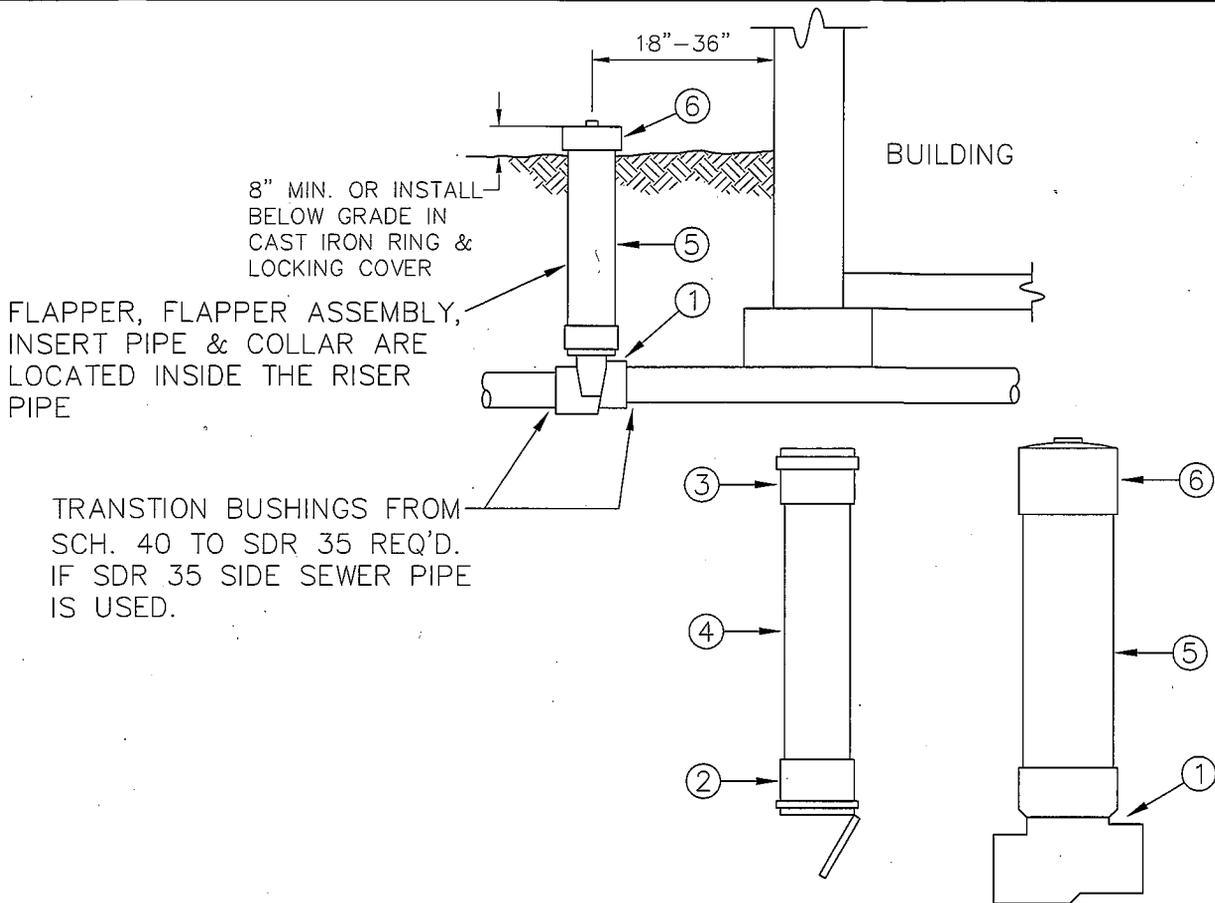
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**BACKWATER VALVE DETAIL  
 ALTERNATE NO. 1**

PLOTTING DATE 5/2008	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-6	DATE APPROVED		



DWG. NO. S-6



**MATERIAL LIST**

- ① CLEAN CHECK INC. 4" OR 6" SHOE VALVE BODY. USE 4" VALVE FOR SINGLE FAMILY RESIDENTIAL. USE 6" VALVE BODY FOR MULTI-FAMILY AND COMMERCIAL.
- ② FLAPPER AND FLAPPER ASSEMBLY BY CLEAN CHECK INC.
- ③ COLLAR BY CLEAN CHECK INC.
- ④ 4" OR 6" PVC INSERT PIPE. USE 4" INSERT PIPE FOR 4" VALVE. USE 6" INSERT PIPE FOR 6" VALVE. CUT INSERT PIPE TO LENGTH PER SPECIFICATIONS.
- ⑤ 6" OR 8" PVC RISER PIPE. USE 6" RISER FOR 4" VALVE. USE 8" RISER FOR 6" VALVE. CUT TO LENGTH TO MATCH GRADE FOR ABOVE GRADE INSTALLATION OR BELOW GRADE INSTALLATION WITH CAST IRON RING AND LOCKING COVER OR TRAFFIC BEARING METER BOX.
- ⑥ 6" OR 8" THREAD BY HUB ADAPTER WITH THREADED PLUG. ADAPTER SHALL BE INSTALLED BELOW GRADE INSIDE A CAST IRON RING AND LOCKING COVER OR TRAFFIC BEARING METER BOX IN AREAS OF VEHICLE OR PEDESTRIAN TRAFFIC. SEE SURFACE CLEANOUT DETAIL FOR ADDITIONAL INFORMATION.

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 Suite 200  
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**BACKWATER VALVE DETAIL  
 ALTERNATE NO. 2**



PLOTTING DATE 6/2007	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1F	FILE NAME \\DETAILS\CARNATION\SEWER\S-7A	DATE APPROVED		

DWG. NO. S-7

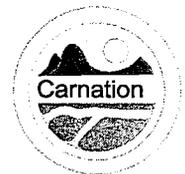
## INSTALLATION INSTRUCTIONS

1. PRIOR TO INSTALLATION SLIDE COLLAR THROUGH RISER PIPE. IF COLLAR DOES NOT SLIDE FREELY THROUGH PIPE, CHECK TO SEE IF PIPE IS "OUT-OF-ROUND". IF SO, REPLACE RISER PIPE.
2. INSTALL THE VALVE BODY IN THE SEWER LATERAL WITH THE "FLOW" ARROW ON THE BODY POINTING DOWNSTREAM. USE APPROVED SOLVENT CEMENT AS PER THE MANUFACTURER'S RECOMMENDATIONS.
3. ROTATE THE VALVE BODY UNTIL THE OPENING IS FACING DIRECTLY UPWARD. A LEVEL MAY BE USED ACROSS THE TOP OF THE VALVE BODY TO VERIFY HORIZONTAL POSITIONING.
4. CUT THE RISER PIPE TO THE REQUIRED LENGTH. INSERT AND CEMENT WHILE KEEPING THE INSIDE OF THE BODY CLEAN OF DEBRIS.
5. CUT THE INSERT PIPE TO A LENGTH (3-1/2") SHORTER THAN THE UNINSTALLED RISER PIPE.
6. CEMENT THE FLAPPER ASSEMBLY TO ONE END OF THE INSERT PIPE.
7. CEMENT THE COLLAR TO THE OTHER END OF THE INSERT PIPE. ALIGN THE CENTER OF THE FINGER HOLE WITH THE CENTER OF THE FLAPPER ON THE OPPOSITE END.
8. WHEN CEMENT IS DRY, SLIDE THE INSERT PIPE-FLAPPER ASSEMBLY FIRST- INTO THE RISER PIPE WITH THE FLAPPER FACING THE INLET SIDE OF THE VALVE BODY. LOWER THE INSERT PIPE UNTIL IT RESTS ON THE SEATING AREA OF THE VALVE BODY. SEAT THE FLAPPER ASSEMBLY BY ROTATING AS NECESSARY UNTIL IT LOCKS IN PLACE. VISUALLY INSPECT THAT THE FLAPPER ASSEMBLY IS INSTALLED CORRECTLY.
9. PRIOR TO INSTALLATION OF THE THREADED ADAPTER (WITH THE INSERT PIPE PROPERLY INSTALLED) CUT A REFERENCE NOTCH INTO THE RISER PIPE. THIS SAW CUT NOTCH SHOULD BE ALIGNED WITH THE MOLDED NOTCH IN THE COLLAR. FOR FUTURE REMOVAL, ALIGNMENT OF THE NOTCHES WILL QUICKLY INDICATE THAT THE FLAPPER IS SEATED CORRECTLY.
10. TIGHTEN THE 1/4" STAINLESS STEEL THUMBSCREW UNTIL IT SEATS SNUGLY AGAINST THE RISER PIPE, FIXING THE INSERT PIPE IN PLACE.
11. CEMENT THE THREADED ADAPTER TO THE RISER PIPE TO COMPLETE INSTALLATION AND SCREW THE THREADED PLUG INTO THE THREADED ADAPTER.
12. BE CERTAIN THAT EXCESS SOLVENT CEMENT HAS NOT IMPEDED PROPER SEATING OF THE FLAPPER ASSEMBLY INSERT OR THE PROPER SEATING OF THE FLAPPER SEALING SURFACE.

**ROTH HILL**

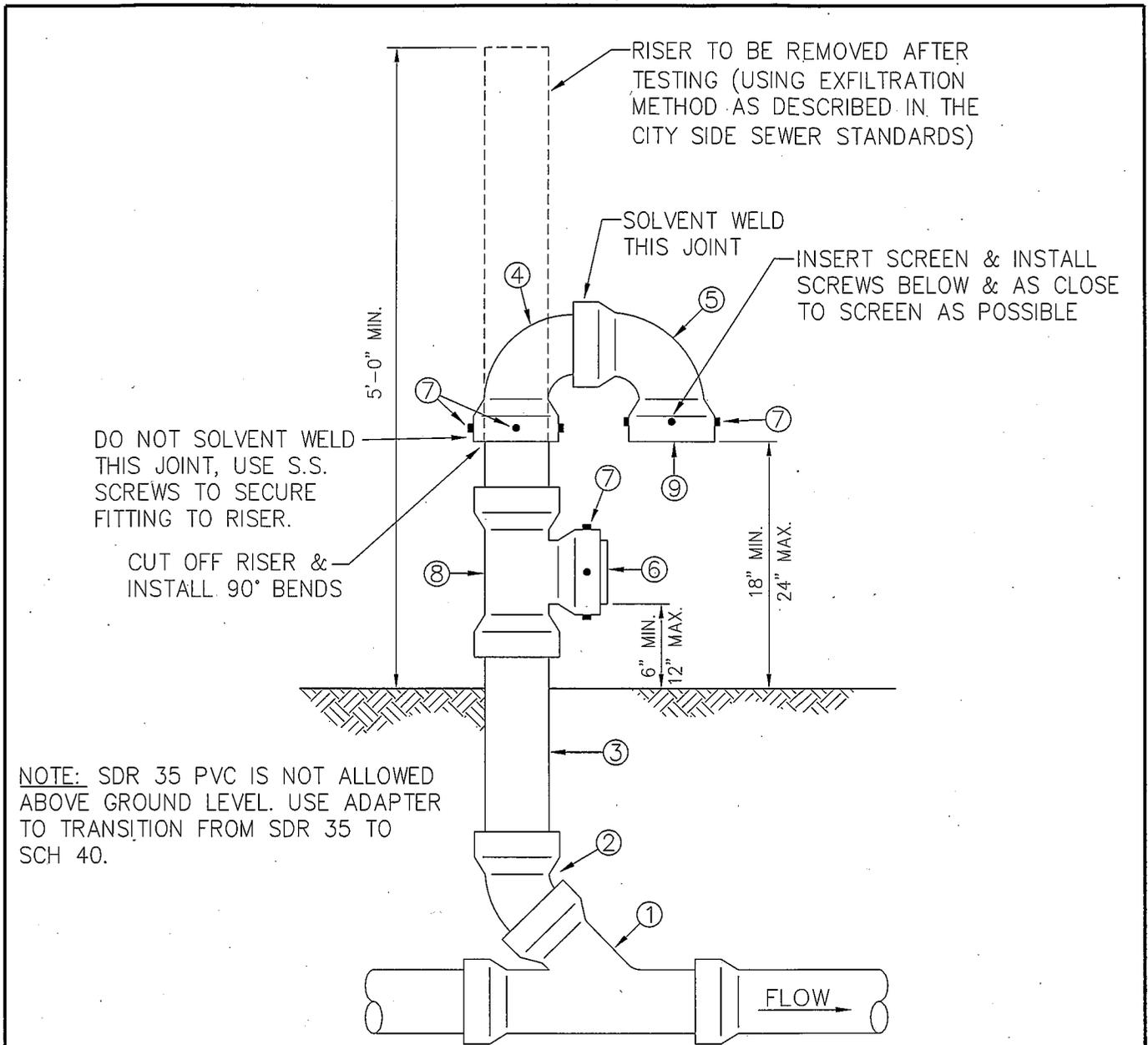
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

## BACKWATER VALVE INSTALLATION INSTRUCTIONS ALTERNATE NO. 2



PLOTTING DATE 3/2007	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1'	FILE NAME F:\DETAILS\CARNATION\SEWER\S-7B	DATE APPROVED		

DWG. NO. S-7A



### MATERIAL LIST

- |  |   |
|--|---|
| <p>① 4"x 4"x 4" OR 6"x 6"x 4" PVC WYE</p> <p>② 4" 45° BEND: PEXBELL</p> <p>③ 4" PVC AS REQ'D. AIR VENT MAY BE INSTALLED LATERAL TO THE SIDE SEWER AT OWNER'S OPTION (MAX. 4').</p> <p>④ 4" 90° BEND: PEXSOLVENT WELD DO NOT GLUE BELL TO 4" RISER, USE MIN. 4 S.S. SCREWS TO SECURE BELL TO RISER.</p> <p>⑤ 4" 90° BEND: SOLVENT WELD BELL</p> | <p>⑥ 4" DRAIN (SLOTTED) OR ATRIUM (SLOTTED CONE) GRATE WITH TRANSITION BUSHING IF REQUIRED.</p> <p>⑦ #6 EPOXY COATED, DECK OR S.S. SCREWS, 4 MIN.</p> <p>⑧ 4"x 4" TEE: SOLVENT WELD.</p> <p>⑨ 4" 300 SERIES S.S. SCREEN, 4.38" DIA. WIRE SIZE TO BE 0.047" w/ 4x4 MESH.</p> |
|--|---|

**ROTH HILL**

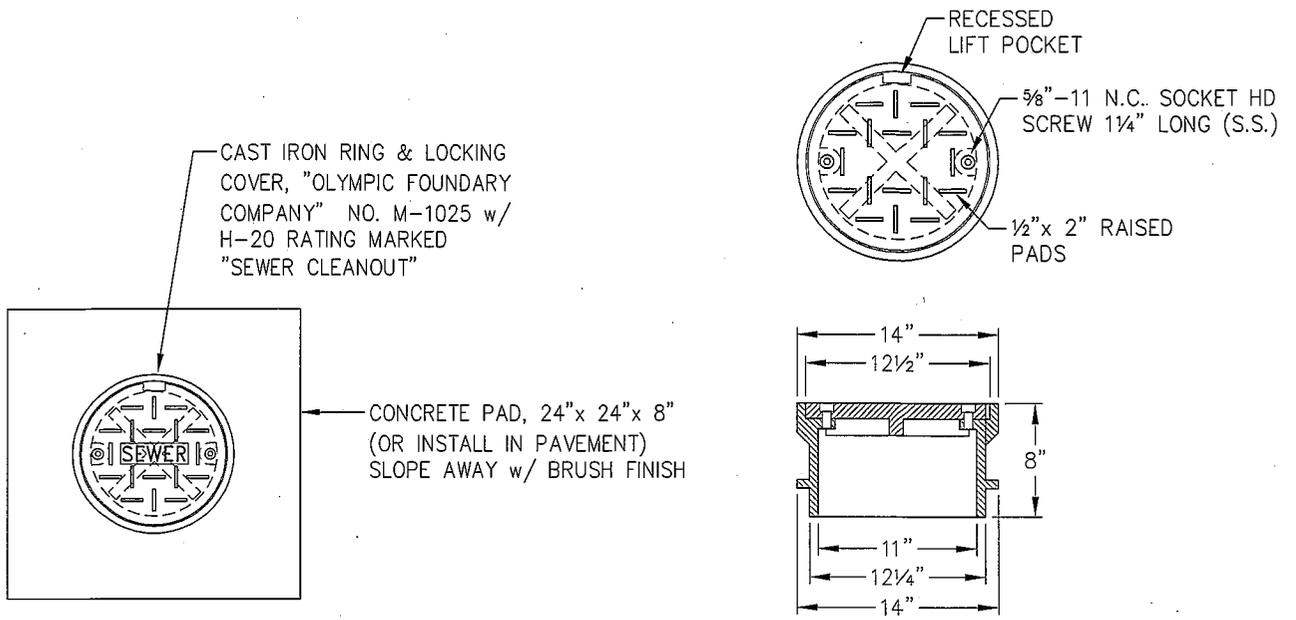
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

## AIR VENT DETAIL

PLOTTING DATE 5/2008	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-8	DATE APPROVED		

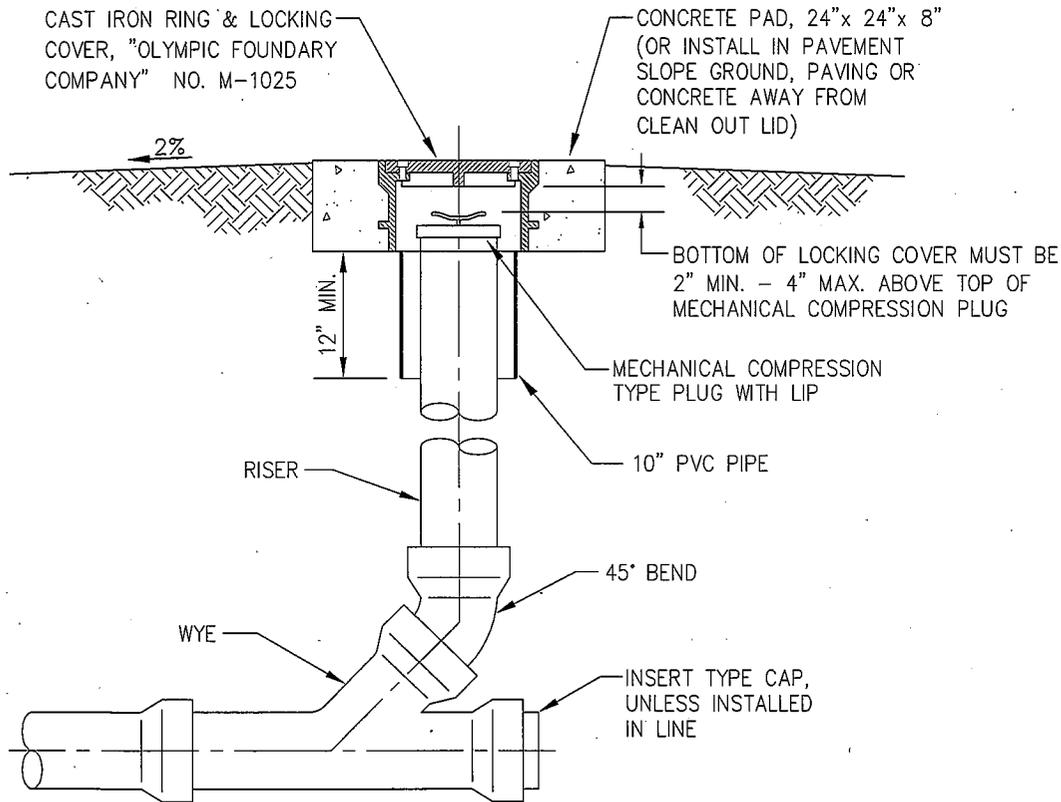


DWG. NO. S-8



**PLAN**

**11" x 8" LOCKING CLEANOUT**



**ELEVATION**

**ROTH HILL**

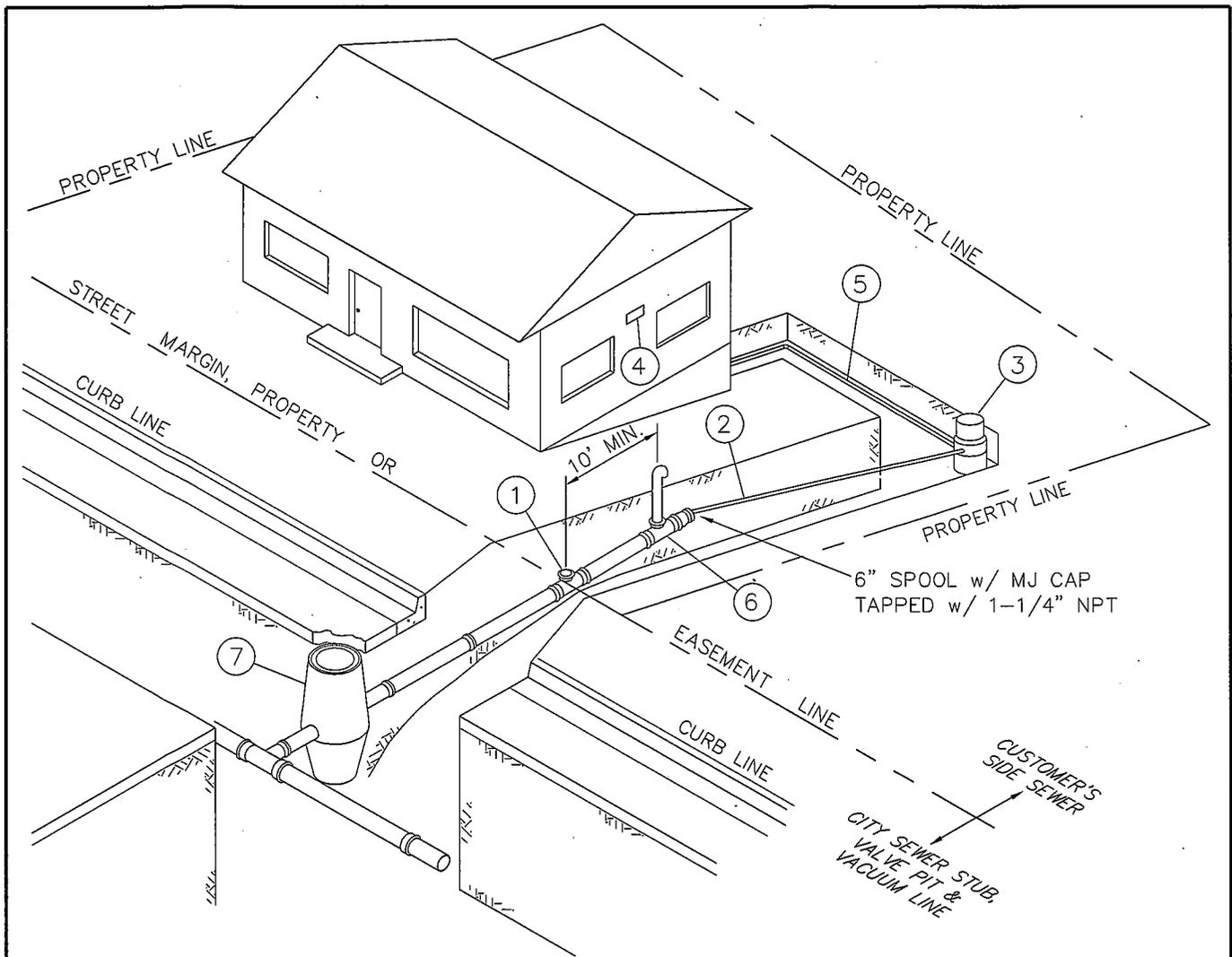
Roth Hill, LLC  
 11130 NE 33rd Place,  
 Suite 200  
 Bellevue, WA 98004  
 Tel. 425.869.9448

**SURFACE CLEANOUT  
 DETAIL**

PLOTTING DATE 9/2006	DRAWN DSH	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-8	DATE APPROVED		



DWG. NO. **S-9**



6" SPOOL w/ MJ CAP  
TAPPED w/ 1-1/4" NPT

**GENERAL NOTES**

- ① 6" TEE
- ② 1 1/4" HDPE ON-SITE SERVICE LINE WITH 16-GAUGE SOLID COPPER TRACER WIRE ALONG TOP OF HDPE FORCE MAIN.
- ③ GRINDER PUMP PER CITY STANDARDS. INSTALL PER MAUNUF. INSTRUCTIONS WITH BEDDING MATERIAL & CONCRETE ANCHOR. DO NOT BURY PUMP UNIT VENT OUTLET.
- ④ PUMP CONTROL PANEL. LOCATION MUST BE IN DIRECT LINE OF SIGHT FROM GRINDER PUMP, 3' MIN., 5' MAX. ABOVE GROUND. SEE STANDARD DETAILS S-12 & S-12A FOR ELECTRICAL INSTALLATION.
- ⑤ GRAVITY HOUSE SERVICE TO GRINDER PUMP. SEE STANDARD DETAIL S-1 AND SIDE SEWER STANDARDS FOR ADDITIONAL INFORMATION ON GRAVITY SIDE SEWER INSTALLATION & TESTING. A BACK WATER VALVE IS NOT REQUIRED FOR GRINDER PUMP SERVICE.
- ⑥ AIR VENT PER STANDARD DETAIL S-8.
- ⑦ VALVE PIT (OR BUFFER TANK, NOT SHOWN).

**ROTHHILL**  
Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

**TYPICAL BUILDING CONNECTION  
FOR GRINDER PUMP SERVICE**



PLOTTING DATE 6/2010	DRAWN IMM	CHECKED	APPROVED	CITY
PLOTTING SCALE NTS: 1=1	FILE NAME F:\DETAILS\CARNATION\SEWER\S-10	DATE APPROVED		

DWG. NO. S-10

## MATERIALS LIST

1. SDR-11 1 1/4" HDPE PIPE, DR11-55.
2. TRACER WIRE (16 GAUGE SOLID COPPER), NO. W14BLK-500 OREQUAL.
3. 1 1/4" HDPE BUTT FUSED JOINT.
4. 6" MJ CAP TAPPED 1 1/4" OR 2" IP WITH MJ KIT NO. IFD2MX5L.
5. 2" x 1 1/4" STAINLESS STEEL OR BRASS BUSHING.
6. CONFIRM GASKET NECESSARY TO INSTALL 6" MJ CAP TO SDR21 SEWER PIPE WITH SUPPLIER.

## SUPPLIER

HD FOWLER CO.  
(425) 746-8400  
BELLEVUE, WA

(THERE ARE OTHER SUPPLIERS THAT MAY CARRY THESE PARTS)

NOTE: GRINDER PUMP UNIT SHALL BE "ENVIRONMENT ONE".

**ROTHHILL**

Roth Hill, LLC  
11130 NE 33rd Place,  
Suite 200  
Bellevue, WA 98004  
Tel. 425.869.9448

### GRINDER PUMP INSTALLATION MATERIALS FOR CONNECTION TO GRAVITY STUB

PLOTING DATE	DRAWN	CHECKED	APPROVED	CITY
6/2010	IMM			
PLOTING SCALE	FILE NAME	DATE APPROVED		
NTS: 1=1	F:\DETAILS\CARNATION\SEWER\S-10			



DWG. NO. | S-11

# CITY OF CARNATION

## CROSS-CONNECTION CONTROL PROGRAM

### PURPOSE

The City of Carnation has developed this Cross-Connection Control Program under the requirements of the Washington Administrative Code (WAC 246-290-490) the purpose of which is to protect the public water system and public health from contamination via a cross-connection. This program addresses this requirement by establishing minimum operating policies, backflow assembly installation practices and testing procedures. It is supplemented with published documents and materials to aid in identifying hazards and devices and to better inform the public. The authority to enforce these practices and policies is set forth in WAC 246-290-490, Chapter 57.08 Revised Code of Washington.

### GENERAL POLICY

In order to provide for an orderly and adequate means of backflow prevention for the public water distribution system, new water service connections will be required to submit a water permit application as a condition of service. For customers supplied prior to the adoption of this Program, an implied service contract allows the City to protect the distribution system from contamination through requiring a backflow prevention assembly on the customer's service line, if applicable.

### RESPONSIBILITY

#### City

The City of Carnation or its designated representative will prevent the contamination of the water distribution system by eliminating or controlling cross-connections, providing guidance for new installations and existing connections, maintaining records on backflow assembly devices, and responding to customer inquiries to meet the requirements of the state regulations in cross-connection control.

The City's responsibility for cross-connection control shall begin at the water supply source; include all the public water treatment, storage and distribution facilities, and end at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter on the public right-of-way or utility held easement.

The City shall use a combination of in-premise and premise isolation as a means of controlling cross-connections.

- Premise isolation, as defined in WAC 246-290-010, is the City's preferred method of cross-connection control to isolate the consumer's water system from the City distribution system, whereby an approved air gap or approved backflow prevention assembly is installed at the service connection.
- When the in-premises isolation method is to be used for backflow protection for residential irrigation systems, residential swimming pools, spas, decorative ponds and boilers, the backflow prevention must provide a level of protection commensurate with

the City's assessed degree of hazard. In-premises isolation employs an approved air gap or approved backflow assembly that is located within the property lines of the customer's premises, which is generally a plumbing fixture. If the customer denies access for inspection and there is not an immediate hazard present, the City at the customer's expense shall install an air gap or reduced pressure backflow assembly at the property line.

### **Water Customer**

The water consumer shall be responsible for identifying and eliminating cross-connections or controlling them through the installation, regular testing and maintenance of approved backflow prevention assemblies.

The water customer shall be responsible for providing the necessary information, scheduling and providing access for inspection (as required) to allow a determination of cross-connection potential and the necessary control.

The water customer is responsible for notifying the City of any assemblies that the customer believes are no longer required.

The water customer is responsible for all costs associated with the installation, testing repair and replacement of backflow prevention assemblies.

### **Local Administrative Authority**

The City of Carnation agrees to delineate responsibilities and coordinate activities relating to cross-connection control. The City will be responsible for the protection of the water distribution system from back flow at the property line. The customer will be responsible for cross-connection control within the property lines as required by the International Plumbing Code.

## **PERSONNEL**

### **Program Administrator**

The Cross-Connection Control Specialist (CCS) is responsible for organizing and implementing the City of Carnation cross-connection program. The CCS shall hold a valid Washington State Cross-Connection Control Specialist certification in accordance with WAC 246-290-490 and be experienced in water works operations. Duties include:

- The initial screening of all service applications and determination of the need for the proper backflow prevention assembly;
- Issuing correspondence to customers and state health authorities;
- Record keeping of the program database;
- Periodic review of customer activities that would indicate changes;
- Initiation of enforcement action; and response to backflow incidents.
- Initial and repeat survey of facilities;
- Maintain a list of pre-approved Backflow Assembly Testers (BAT) to perform backflow prevention assembly inspection and testing;
- Review of testing done by a certified BAT within 30 days of receipt;
- Provide follow-up for test reports that are deficient in any way;

- Recommend installation standards and procedures required for premise isolation;
- Recommend material for public education;
- Input test results and device data into the cross-connection control program database.
- Report incidences of fraud or gross incompetence on the part of any BAT or CCS to the DOH Operator Certification staff.

## HAZARD EVALUATION

The Cross-Connection Control Specialist (CCS) for the City shall establish the priority for the Health Hazard Evaluation and repeat survey of new and existing premises for cross-connections, based on the risk management policies established by the City, and the minimum requirements imposed by the State Department of Health.

### Schedule For Initial Hazard Assessments

<b>Evaluation of Hazards Initial Assessment Task</b>	<b>Schedule</b>
Assessment of all new connections	At time of application for water service
Identification and assessment of high hazard premises which are listed on Table 9 of WAC 246-290-490	Within 9 months
Identification and assessment of hazardous premises supplemental to Table 9	Within 12 months
Identification of residential connections with special plumbing facilities and/or water use on the premises	Within 15 months.

The following schedule will be utilized in conducting hazard re-assessments.

<b>Type of Service</b>	<b>Frequency of Re-Evaluation</b>
Any services with Reduced Pressure Backflow Assemblies (RPBA) installed for premises isolation	None required as long as the RPBA passes annual tests and inspections
Commercial services with Double Check Valve Assemblies (DCVA)	Every two years and upon change in use or ownership
Commercial services when purveyor relies upon in-premises protection	Every two years and upon change in use, ownership or plumbing system
Residential services with special plumbing where the purveyor relies upon compliance with the International Plumbing Code (IPC)	Every 2 - 3 years
Residential services with DCVA installed for premises isolation	Every 4 – 5 years
Residential services with no known special plumbing or water use on the premises	Every 4 – 5 years and upon change in use, ownership or plumbing system

In accordance with the Washington State Department of Health regulations (WAC 246-290-490), and the Pacific Northwest Section of the American Water works Association, Cross-Connection Control Manual, Accepted Procedure and Practice sixth edition (or latest edition thereof), the CCS shall establish standards and procedures governing the application, installation, approval and testing of backflow prevention assemblies, and other related tasks. If deemed necessary to reduce the risk of contamination of the public water supply system, more stringent requirements may be established.

The systematic program of health hazard evaluations shall be established with priority given on the basis of risk to public health and shall be as follows:

The procedures for evaluating the backflow prevention requirements for new and existing customers are as follows:

### **New Service Connections**

For all new residential services, the City will require that the customer submit with the application for water service a completed "Water Use Questionnaire" (See appendix). If the customer's questionnaire indicates special plumbing, such as a lawn sprinkler system, or hazardous water use on premises, the City CCS will complete an evaluation of the hazard posed by the proposed special plumbing system and provide recommendations for the installation at the meter of either a Double Check Valve Assembly (DCVA) or a Reduced Pressure Backflow Assembly (RPBA).

As an alternative to the above requirement for a survey by the CCS, at the discretion of the City, may specify the type of backflow assembly required to be installed as a condition of service.

### **Existing Services**

For all existing non-residential services, the City will require the customer to submit, within nine months of notification, an evaluation by the City's CCS of the hazard posed by the plumbing system. The CCS will provide recommendations for the installation at the meter of either a DCVA or an RPBA.

As an alternative to the above requirement for a survey by the CCS, the customer may agree to install an Air Gap(AG) or RPBA for premises isolation within 90 days of notification by the City or an alternate time period acceptable to the City.

For all existing residential services, the City will require the customer to submit within four months of notification, a completed "Water Use questionnaire." If the customer's reply indicated special plumbing or water use on premises, the customer shall submit to an evaluation by the City's CCS of the hazard posed to the water system by the customer's plumbing system. The CCS will provide recommendations for the installation at the meter of either a DCVA or an RPBA.

As an alternative to the above requirement for a survey by a CCS, the City may specify the backflow assembly required as a condition of service. The City's CCS will provide guidance on the type of backflow assembly to be installed.

For all existing services where the customer fails to supply the required information for a hazard assessment or fails to submit a completed "Water Use Questionnaire," the City may have the

assessment made by the CCS, require the installation of a Reduced Pressure Backflow Assembly for premises isolation, or take other such actions consistent with the previously stated policies and bill the customer for any associated costs.

### **Inspection of High Hazard Sites**

Identification of the High Hazard Premises listed in Table 9 of WAC 246-290-490, shall be assigned priority inspections by the City. Special emphasis will be on the following types of facilities: Hospitals; schools; clinics; laboratories; piers and docks; mortuaries; sewage facilities; food and beverage processing plants; chemical plants using water process, metal plating industries, petroleum processing or storage plants, car washes, facilities having a non-potable auxiliary water supply, and any others as specified by the City.

The City shall notify the owner or other responsible party of the high hazard property or premises of the inspection requirement.

If during the site survey, a cross-connection is found that presents in the opinion of the CCS an imminent threat to public health water service to the site shall be immediately terminated, and shall remain off until the hazard is corrected.

The state certified CCS shall provide the customer, the property owner and the City a written notice of the results of the cross-connection survey including a list of any cross-connections found. If an approved backflow assembly is required on the customer's system, the type and location of the assembly shall be specified in the CCS' written notice. The owner shall have the required backflow prevention assembly installed and tested within 30 days after the date of the issuance of the written notice.

The water customer shall notify the City at the completion of the required work and certification that the backflow assembly has been installed and tested by a certified Backflow Assembly Tester, with a satisfactory test result.

If the water customer does not complete the work required in the CCS' letter within the time specified, the City will send a letter by certified mail, requiring the water customer to complete the work within 15 days and reminding the customer of the City's authority to deny water service to anyone who does not comply with backflow protection requirements. The City will levy a standard charge against the customer's water service account for each certified letter sent to the customer.

The City shall have the authority to collect any fees, charges and penalties levied or assessed against the customer's water service account under this program pursuant to the provisions of RCW 57.08.081 and as such statute is revised or amended, including the right to file and foreclose a lien for non-payment against the real property receiving water service.

Premises defined as having moderate or low health hazard conditions will be assigned lower priorities of inspections by the City CCS.

## **REGULATIONS AND REFERENCES**

The control or elimination of cross-connections shall be in accordance with the most recent revisions of applicable state, county and local rules and regulations, including but not limited to:

- The Federal Safe Drinking Water Act
- WAC 246-290-490 Cross-Connection Control
- Washington State Plumber Code 18.106 RCW
- Washington State Builders Code 19.27 RCW
- Washington State Public Water Systems Mandate RCW 70.119A.060
- Washington State powers and Duties of the State Board of Health RCW 43.20.050

The policies, procedures and criteria for determining and interpreting appropriate levels of protection and control shall be in accordance with the most current edition of the following references:

- Cross-Connection Control Manual: Accepted procedure and Practice published by the Cross-Connection Control Committee of the Pacific Northwest subsection of the American Water Works Association.
- Manual of Cross-Connection Control, published by the University of Southern California Foundation for Cross-Connection control and Hydraulic Research.
- Recommended Practice for Backflow Prevention and Cross-Connection Control (M-14), published by the American Water Works Association.

## **BACKFLOW PREVENTION REQUIREMENTS**

When cross-connections cannot be eliminated the following methods of backflow prevention control shall be considered as minimum protection for the City of Carnation:

- An Air Gap separation or a Reduced Pressure Backflow Assembly shall be installed if the cross-connection creates an actual or potential health hazard.
- When the cross-connection does not pose an unreasonable health risk, but causes an objectionable taste, odor or color, a Double Check Valve Assembly shall be installed.
- A Pressure Vacuum Breaker Assembly (PVBA) or an Atmospheric Vacuum Breaker (AVB) may be installed where the substance which could backflow is objectionable but does not pose an unreasonable risk to health, and where there is no possibility of back pressure in the downstream piping.

## **BACKFLOW ASSEMBLY INSTALLATION**

### **General Requirements**

The customer is solely responsible for compliance with all applicable regulations and for the prevention of contamination of his plumbing system from sources within the premises. Any action taken by the City to survey plumbing, inspect or test backflow prevention assemblies, or to require premise isolation is solely for the purposes of reducing the risk of contamination of the City's distribution system.

- All approved assemblies installed shall be the size, type and model pre-approved by the Washington State Department of Health and the City of Carnation.

- The orientation for which they are approved;
- A manner and location that facilitates their proper operation, maintenance, and testing or inspection;
- A manner that will protect them from weather-related conditions such as flooding and freezing; and
- Compliance with all applicable safety regulations.
- For installations where 24-hour uninterrupted service is necessary, a parallel backflow prevention assembly shall be provided to permit assembly testing and maintenance. The bypass or parallel assembly must be of the same type as the main assembly.

**Thermal Expansion**

A backflow assembly placed on a water service can cause thermal expansion. Serious damage could occur to a plumbing system if the pressure and high temperature caused by thermal expansion is not relieved. Excessive water temperature or pressure inside a hot water tank, if not relieved, could cause the tank to explode. The customer's hot water tank and connected plumbing system is normally protected by a temperature/pressure relief valve located at or near the top of the hot water heater. Some plumbing codes have additional requirements

**Schedule for Installation of Backflow Assemblies**

Type of Service	Schedule
New connections with cross-connections	Before service is initiated
Existing connections with Table 9 of WAC 246-290-490 and other high hazard cross-connection hazards	Within 90 days after notification
Existing connections with other than Table 9 of WAC 246-290-490 or high hazard cross-connections	Within 180 days after notification
Existing fire protection systems using chemicals or supplied by an unapproved auxiliary source	Within 90 days after notification
Existing fire protection systems not using chemicals and supplied by City water	Within 1 year after notification

**BACKFLOW ASSEMBLY TESTING**

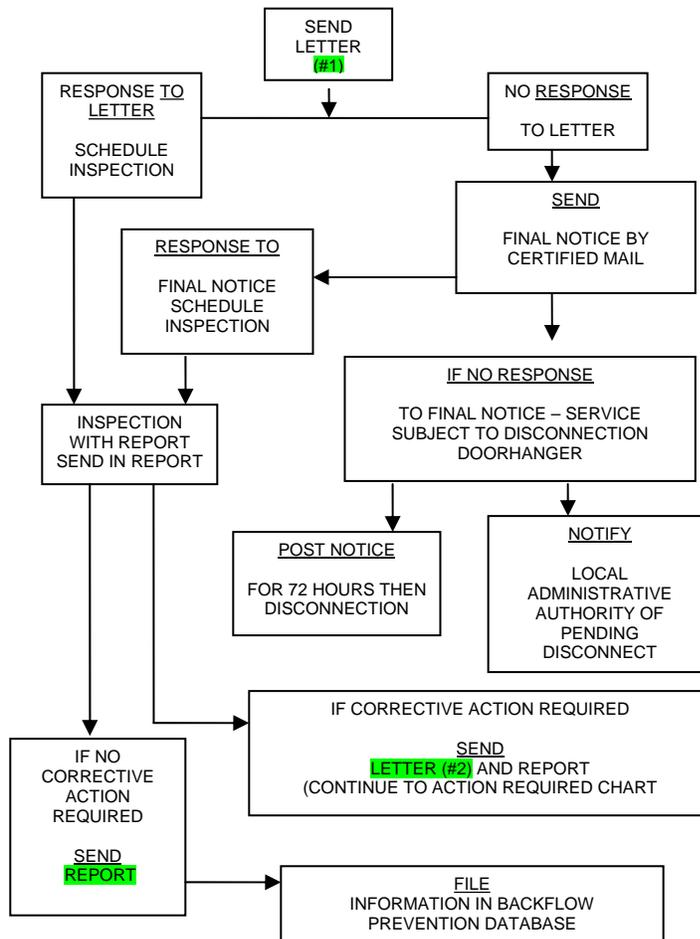
All Backflow preventers that the City relies on for protection of the water system shall be inspected and if applicable tested, including backflow preventers for in-premise protection. Inspection and testing will be conducted by a Washington State Department of Health (DOH) certified BAT for proper application and installation. A DOH certified CCS will perform inspections for the proper installation of devices (backflow preventer that can't be tested) and will conduct all testing of assemblies (backflow preventers that can be tested) relied upon by the City of Carnation to protect the public water system.

All backflow prevention devices and assemblies, approved by the Washington State Department of Health, shall be inspected and tested at the time of:

- Initial installation. If an assembly was installed prior to the adoption and implementation of this program, an initial inspection time shall be scheduled.
- After the assembly is repaired, reinstalled or relocated.
- Annually after the initial installation.
- As required by the City if testing indicates repeated failures.

Annual testing of backflow assemblies shall be per WAC 246-290-490. The City may require more frequent testing of assemblies if it deems necessary. The testing procedure shall be in accordance with the requirements of the Washington State Department of Health. The City will notify in writing all owners of backflow preventers that the City relies upon for protection of the City public water system that the device needs to be inspected and tested. This notice (letter #3) will be sent out not less than 30 days before the due date of inspection or testing. The notice will specify the date the inspection/test report must be received by the City.

### BACKFLOW PREVENTION INSPECTION PROCEDURE



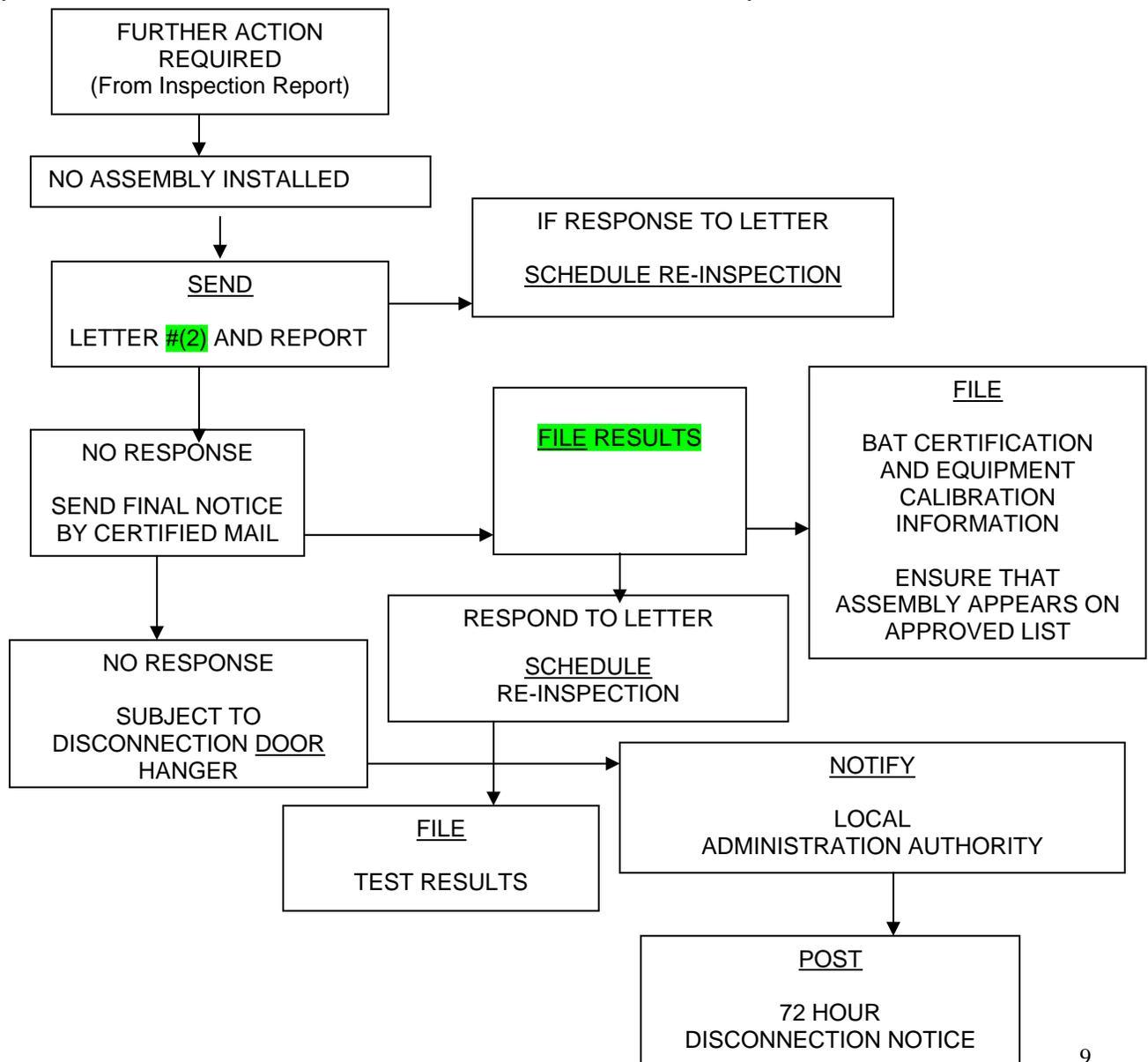
### Inspection and Testing of New Installations

All new assemblies shall be tested upon initial installation and the results forwarded to the City of Carnation. The City shall notify property owners of the required backflow prevention assemblies required, including air gaps and of required yearly inspection of newly installed backflow assemblies.

If at the inspection, the test of the newly installed backflow assembly fails its performance test, the installer/owner of the backflow assembly shall have the repair completed, and provide evidence of satisfactory performance by a state certified backflow assembly tester, submitted to the City within 30 days of the initial failed performance test. All test reports whether satisfactory or unsatisfactory shall be submitted to the City.

The City or its designated representative shall assess the degree of hazard prior to and after the elimination and removal of any assembly. An assembly no longer needed, and for which the site was inspected, shall be removed from the City's database of active backflow prevention devices.

**BACKFLOW PREVENTION INSPECTION  
(CUSTOMERS WITH NO BACKFLOW ASSEMBLY INSTALLED)**



## **Previously Installed Assemblies**

All assemblies shall be tested annually by a certified backflow assembly tester who has on file at the City a certificate providing verification of the accuracy of his test equipment. If this information is not on file, the tester shall submit verification prior to doing any testing.

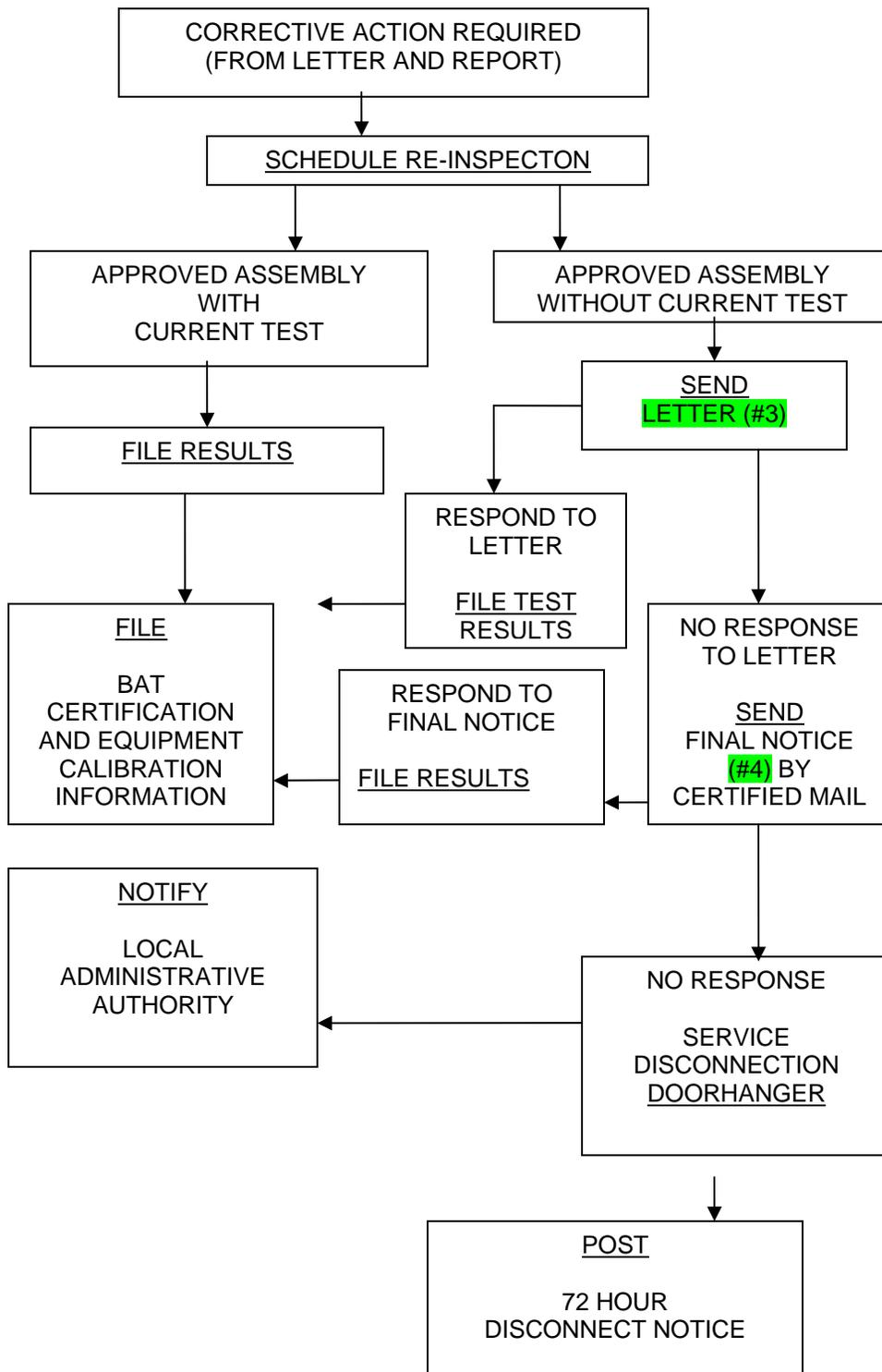
The City shall notify customers with backflow assembly devices of the requirement for testing not less than 30 days prior to the required test date. The completed satisfactory test results shall be forwarded to the City not more than 30 days after the test date.

If the satisfactory test results haven't been received by the City within 30 days of notification, a second letter (letter #4) will be sent to the property owner or customer, by certified mail, requesting satisfactory testing reports to be forwarded to the City within 15 days of the mailing of this second letter. If the City has not received satisfactory test results after this 45 day period, notification of water shut off within 72 hours shall be hand delivered to the premises.

If the City has determined a high health hazard exists, termination of water service will follow immediately thereafter. If the City determines there are a low health hazard and no imminent danger, the following corrective measures shall be followed.

- Denying or discontinuing water service to a customer's premises until the cross-connection hazard is eliminated or controlled to the satisfaction of the City. Shutoff will follow within 72 hours of the posting of the notice.
- Requiring the consumer to install an approved backflow assembly for premises isolation commensurate to the degree of hazard.
- The City will install an approved backflow assembly for premises isolation commensurate with the degree of hazard.
- The City shall levy a standard charge against the customer's water service account for each notification of water shut-off and/or installation of a backflow prevention assembly in order to achieve premises isolation.
- Water service shall be terminated if the backflow assembly is not tested and/or repaired and retested to the City's satisfaction and will remain disconnected until the testing is successfully completed and satisfactory reports are provided to the City. The City shall levy a standard charge against the customer's water account for each shut-off and turn-on action required at the affected address.
- The City or its designated representative may require testing more often than annually or may field verify test results if site conditions change or if the assembly has had previous failures.

BACKFLOW INSPECTION-ACTION REQUIRED  
 (CUSTOMERS WITH APPROVED BACKFLOW ASSEMBLY)



## **Inspection and Testing of Repaired or Replaced Installations**

Testing is required of any assembly that is repaired, replaced, reinstalled, or relocated due to problems found during the annual test or due to revisions of the plumbing system.

### **ENFORCEMENT**

The installation or maintenance of a cross-connection to the City of Carnation's public water supply is prohibited. The City may immediately terminate water service, require disconnection of service, or have the proper backflow assembly installed at the customer's expense when it has been determined a health hazard may exist. Such as when an uncontrolled cross-connection exists, or is not controlled commensurate with the degree of health hazard.

Termination of service will occur immediately if a cross-connection posing a High Hazard health risk is discovered.

Termination of service may also occur 72 hours after written notice has been delivered to the customer or posted on the customer's front door. Prior to taking action to disconnect or deny service to a premise, the appropriate Local Administrative Authority and Fire Marshal shall be notified.

In each of the following instances, enforcement options may be utilized:

- Refusal to install a backflow prevention assembly when required by the City, or the State Department of Health.
- Existence of an improper type, defective or improperly installed backflow prevention assembly.
- Failure to have the backflow prevention assembly tested per City and State requirements.
- Existence of a Low Health hazard cross-connection to the City public water system.
- Refusal to allow inspection of the premises.

In the event that the water service is terminated and/or the meter removed, then the service shall not be resumed nor the meter reinstalled until the customer has complied with the cross-connection program requirements, and paid any the delinquent rates, charges or fines. In addition the customer shall have paid the City's standard turn-on and/or meter reinstallation charges.

The City, at its option, may offer to arrange for the installation, inspection and/or testing of the customer-owned backflow assembly by a certified Backflow Assembly Tester and will bill the customer the actual or typical cost of inspection, installation and/or testing plus administrative costs.

The cost of disconnection or installation of a proper backflow assembly by the City shall be charged to the property, and payment enforced in the same manner as for other rates and charges.

The foregoing remedy for violations shall not be exclusive. The City, the State Department of Health, and/or other regulatory agencies shall be entitled to enforce the cross-connection prevention program and the attached regulations in any manner available by law.

The City shall not be liable for damages nor will allowances be made for loss of production, sales or services, or any other consequential damages arising from the implementation of any of the measures required by and/or contained in the cross-connection prevention program.

### **City Authorized To Hire Approved Contractor**

In the event the cross-connection is not abated within the prescribed time, water service to the premises will be discontinued unless the City Manager and CCS determine that the service should not be interrupted. The City then may hire a contractor to install the appropriate backflow protection required for the hazard that exists. In such event the City will bill the customer for all costs and administrative charges incurred.

### **RECORDS AND REPORTS**

An adequate record keeping system is essential for the operation of a cross-connection prevention program. These records form the basis for any enforcement action or legal defense by the City, as well as giving a basis for comparing test results of different backflow assemblies. In accordance with WAC 246-290-490(3) information kept in the City's cross-connection control database will consist of the following:

For approved air gaps:

- Customer address/ property owner
- Assessed health hazard level
- Exact location(s) on premises
- Installation date(s)
- Inspection results and history, test results and repairs
- Name of person conducting inspection

These records will be retained for as long as the air gap remains in use.

For approved backflow prevention assemblies:

- Customer address/ property owner
- Assessed health hazard level
- Required backflow assembly
- Assembly type, manufacturer, model, serial number, size
- Exact location(s) on premises
- Installation date(s)
- Inspection results and history, test results and repairs
- Name of person conducting inspection

These records will be retained for the life of the backflow assembly.

For approved Atmospheric Vacuum Breakers:

- Customer address/ property owner
- Assessed health hazard level
- Required backflow assembly
- Assembly type, manufacturer, model, serial number, size

- Exact location(s) on premises
- Installation date(s)
- Inspection results and history, test results and repairs
- Name of person conducting inspection

These records will be retained for the life of the backflow assembly.

In addition the following reports are required and are to be kept on file for five years:

- An annual Cross-Connection Control Program activities report for the calendar year, to be sent to the Department of Health when requested.
- Cross-Connection Control Summary information report when requested by DOH, or when there are significant policy changes.
- Backflow Incident report which shall be made available to the Washington State Department of Health upon demand and a copy to the PNWS-AWWA CCC Committee.

## **CONSUMER EDUCATION**

Public education is an important aspect of the cross-connection prevention program. Customers should be provided with information brochures describing cross-connection hazards in homes and the recommended devices that should be installed to reduce the hazard. The City's education efforts should make it clear that the information provided is based on its perspective of cross-connection control and the necessary backflow prevention required in protecting the public water supply, and that the customer has the obligation to comply with these requirements.

The Carnation public education program will explain the necessity of the cross-connection program and prevent misunderstandings. This education program consists of: speeches to local civic groups, articles in customer newsletters, fact sheets and brochures, consumer confidence reports, displays at public gatherings and special training sessions for City employees and interested persons.

### **Customer Information Packet**

The customer information packet will be handed out to each customer pertaining to the assessed degree of hazard at their premises. The priority will be determined from the risk assessment conducted by the City CCS. The packet will summarize the cross-connection control program and the responsibility to protect the public water system by both the City and the customer.

Explanation of the types of facilities requiring backflow prevention assemblies, which type of assembly is required to mitigate the hazard and an explanation of each assembly and its installation and testing requirements. An explanation of the annual inspection/ test reports, the time frame for returning reports, and the enforcement actions by the City.

## **BACKFLOW INCIDENT RESPONSE PROCEDURES**

Due to the potential impact on the public water system from contamination caused by cross-connections, the City shall respond to backflow incidents upon receipt of an incident report as soon as possible. The response time may vary depending upon the location of the incident,

time of day of the report and location of the responder, but the City will strive to respond within 30 minutes.

A backflow incident may be a complaint of bad tasting or smelling water; water that is discolored; or may involve a chemical that was back siphoned into the system.

When a water taste, odor and/or color complaint is received, the person responding should gather as much information from the caller as possible. While it is important to get a good description of the problem, the person taking the complaint should refrain from suggesting possible problems or situations as people tend to follow your expertise rather than carefully assessing the situation.

The next step is to determine what level of response is needed. Multiple calls dictate a larger number of responders. Certain steps need to be taken whether one call or many calls are received. These include:

1. Notify the City Manager and the Public Works Superintendent.
2. Respond to site and interview customer/caller to determine an obvious cause.
3. Try to determine the cause and eliminate it.
4. Note anything unusual (work activity, tanker trucks, sick people, etc) in the surrounding area.
5. Evaluate the complaint to determine further actions.
6. Take a water sample from the tap and from the meter. Take pH and chlorine residual readings.
7. Deliver samples to a certified laboratory for analysis.
8. If problem results in numerous calls, a portion of the system may need to be shut down, another source of water provided or a boil order issued. These actions require notification of the Department of Health.
9. CALL the media before they contact the City!

Actions for a confirmed contamination event are dependent upon consideration of involving law enforcement. If it is believed to be a simple backflow incident then the following response will be utilized. If, however, there has been a security breach, a threat to a public water supply, an eyewitness account of suspicious activity at a City facility or if in the opinion of staff that this is something other than a backflow incident, law enforcement needs to be notified immediately.

Once a confirmed backflow has occurred (probably multiple calls from the same area of the City), these immediate response procedures will be utilized:

1. A confirmed backflow incident should be treated the same as a hazardous materials spill in terms of personal safety. Use established protocols, safety equipment and common sense.
2. Respond to site and interview customer/caller to determine any obvious cause.
3. Determine the cause of the problem; give consideration to the distribution system as a potential source of the contaminant (e.g., air valve inlet below ground). Conduct a house-to-house survey to search for the source of contamination and the extent that the contaminant has spread through the distribution system. A check of water meters may show a return of water (meter running backward) to the distribution system.
4. Eliminate the source of the problem and minimize the effects of the backflow through containment (Isolating the area from the rest of the water system, leave one valve open to ensure that positive water pressure is maintained throughout the isolated system.) and

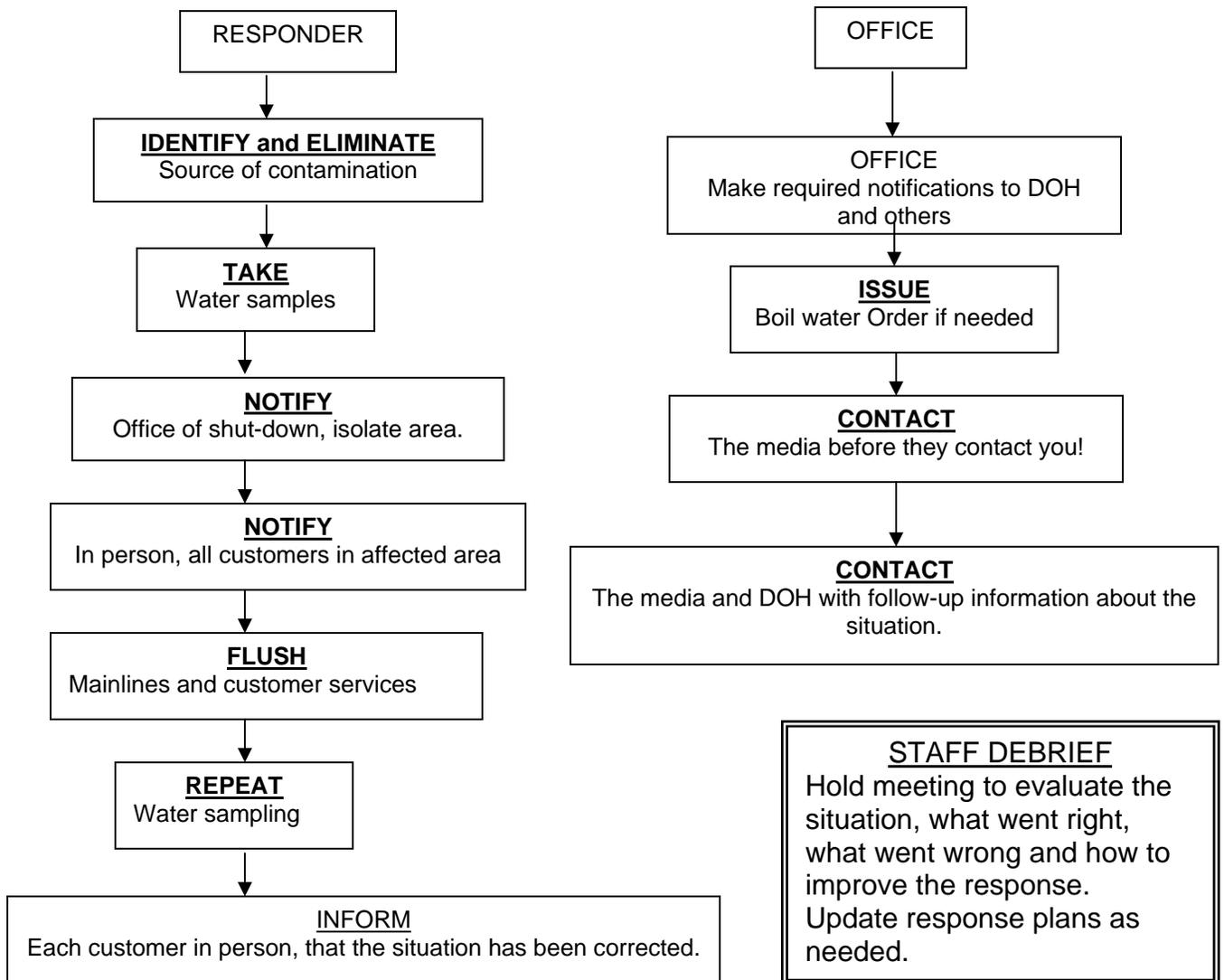
begin public notification. Contact DOH (1-877-481-4901) and follow any directions they may give. When the cross-connection responsible for the system contamination is located, discontinue water service to that customer, until the customer completes the corrective action ordered.

5. Begin customer notification as soon as possible, notify customers not to consume or use water. Start the notification with the customers nearest in location to the assumed source of contamination (usually the customer(s) making the water quality complaint). Inform the customer about the reason for the backflow incident investigation and the City's efforts to restore water quality as soon as possible. Let the customer know that they will be informed when they may use water, the need to boil water used for consumption until a satisfactory bacteriological test result is obtained from the lab, etc. Where a customer cannot be contacted immediately, place a written notice on the front door handle, and a follow-up visit will be made to confirm that the customer received notice about the possible contamination of the water supply.
6. When dealing with a backflow incident, let customers know that it could take several days to identify the source and type of contaminant(s) and to clean and disinfect the distribution system.
7. If appropriate, refer customers that may have consumed the contaminant or had their plumbing systems contaminated to public health personnel and the local administrative authority (plumbing inspector).
8. Take a water sample from the tap and from the meter. Take pH and chlorine residual readings.
9. Deliver samples to a certified laboratory for analysis.
10. CALL the media before they contact the City!
11. Restore water quality by flushing the customer's service line and the main line in the contaminated area. DO NOT start flushing until the source of contamination is identified (flushing may aggravate the backflow situation).
12. Take repeat chlorine and pH readings and water samples for lab analysis.

If local law enforcement has determined that the backflow incident is a terrorist event, the City will be acting in support of several other federal, state and local agencies.

## PROCEDURE FLOW CHART CONFIRMED BACKFLOW INCIDENT

The following actions will be utilized by the responder to a backflow incident and by the office in making notifications.



## PROTECTION OF STAFF

In most cases, the investigation of a suspected contamination site will not present a significant hazard. It is presumed that any contaminants that might be present are confined to water and are present in dilute concentrations where risk to personnel can be minimized through use of good safety practices including:

- DO NOT eat, drink or smoke at the site.
- DO NOT taste or smell the water samples.
- Avoid all skin contact with the water. If contact does occur, immediately flush the affected area with clean water brought to the site for that purpose.
- MINIMIZE the time personnel are on site collecting samples.

- DO USE personal protective equipment such as splash proof goggles, disposable gloves, proper footwear, disposable shoe covers, and disposable rain gear.
- Fill sampling bottles slowly to avoid volatilization or aerosolization of contaminants.

**EMERGENCY CONTACTS**

Cross Connection Control Specialist	425-333-4192 (day) 425-765-0508 (night)
City Manager/Public Information Officer	425-333-4192 (day) 425-765-0508 (night)
Department of Health DOH 24-hour hot line Regional Office	1-877-481-4901 253-395-6750
Seattle/King County Public Health	206-296-9755 206-296-4600
Television KOMO TV 4 KING TV 5 KIRO TV 7	206-404-4145 206-448-4547 206-728-8307

**DEFINITIONS (Definitions and acronyms from WAC 246-290-010)**

Approved Air Gap – is separation between the free flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be approved the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case is less than one-inch, when unaffected by vertical surfaces (sidewalls).
- Three times the diameter of the supply piping if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe. Or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than 1-1/2 inches.

Approved Atmospheric Vacuum Breaker – means an AVB of make, model and size that is approved by the Health Department. AVB’s that appear on current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies acceptable to the local administrative authority.

Approved Backflow Prevention – an air gap or backflow assembly that has been approved by the Department of Health.

Auxiliary Water Supply – any water supply on/or available to the premises, other than supplied by the City.

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

Backflow Assembly Tester (BAT) – a person certified by the Washington State Department of Health to test backflow prevention assemblies.

Backflow Prevention Assembly – a certified device that prevents backflow into the City water distribution system.

Backflow Prevention Device – refers to a backflow preventer that is not designated for in-line testing.

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

Backsiphonage – means backflow due to a reduction in system pressure in the purveyor’s distribution system and/or consumer’s water system.

Certified Cross-Connection Control Specialist – an individual certified by DOH and approved by the City to administer a cross-connection control program and to conduct cross-connection health hazard surveys.

Check Valve – is a generic term used for a variety of valves that specifically allow flow in one direction only.

CITY – The City of Carnation

Combined Fire Protection System – a fire sprinkler system that:

- Is supplied only by the purveyor’s water
- Does not have a fire department pumper connection; and
- Is constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer’s potable water system.

Consumers Water System – is any potable and/or industrial water system that begins at the point of delivery from the City water meter or connection and is located on the customer’s premises.

Contaminant – any substance present in drinking water that may adversely affect the health of the consumer or the aesthetic qualities of the water.

Cross-connection – any physical arrangement connected directly or indirectly to the City water distribution system whereby it may be possible for contaminated or used water or other substances to enter any part of the City’s water distribution system.

Cross-Connection Control Program – means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-292

Cross-Connection Control Specialist – means a person holding a valid CCS certificate issued in accordance with WAC 246-292.

Cross-Connection Control Summary Report –means the annual report that describes the status of the purveyor’s cross-connection program.

Customer – any person or organization who receives water from the City of Carnation.

Customer’s System – the water piping system located immediately downstream from the City water meter or service connection.

Degree of Hazard – shall express the results of an evaluation of a health, system or plumbing hazard.

Distribution System – the City’s network of pipes and other facilities which are used to distribute water from the source, treatment, transmission, or storage facilities to the water user.

Double Check Detector Assembly – an approved assembly consisting of two approved double check valve assemblies, set in parallel, equipped with a meter on the bypass line to detect small amounts of water leakage or use.

Double Check Valve Assembly – an approved assembly consisting of two single, independently acting check valves, loaded to the closed position by springs or weights, and installed as a unit with, and between, two resilient seated shutoff valves and having suitable connections for testing.

Facility Survey – the on site review for the purpose of evaluating any health hazards to the potable water system. A survey of the customer’s premises is not intended to be an inspection of the entire plumbing system, it allows the City CCS to make a judgment of what requirements will be imposed upon the customer to obtain, or continue to obtain water from the purveyor.

Flow Through Fire System – means a sprinkler system that:

- Is supplied by the purveyor’s water;
- Does not have a fire department pumper connection;
- Is constructed of approved water piping and materials to which sprinkler heads are attached; and
- Terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

High Health Hazard – a cross-connection which could impair the quality of potable water and create an actual public health hazard through poisoning or spread of disease by sewage, industrial liquids or waste.

In-Premise Protection – means a method of protecting the health of consumers served by the consumer’s potable water system, located within the property lines of the consumer’s premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

International Plumbing Code –This code establishes Citywide minimum plumbing standards applicable within the property lines of the customer’s premises.

Local Administrative Authority – the local official, board, department or agency authorized to administer and enforce the provisions of the International Plumbing Code. Low Health Hazard – a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

Maximum Contaminant Level (MCL) – the maximum amount of a contaminant allowed in a sample of water according to federal and state regulations.

Non-Potable Fluid – any water, other liquid, gas, or other substance which is not safe for human consumption, or is not part of the public potable water supply as described by the health authority.

Primary Disinfection – means a treatment process for achieving inactivation of Giardia lamblia cysts, viruses, or other pathogenic organisms of public health concern to comply with the treatment technique requirements of Part 6 of this chapter.

Potable Water – water that is safe for human consumption and free from harmful or objectionable materials, as described by the health authority.

Premises – a piece of land to which water is provided, including all structures and improvements located on it.

Reclaimed Water – means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would otherwise occur, and it is no longer considered wastewater.

Reduced Pressure Backflow Assembly (RPBA) – a device incorporating two or more check valves and an automatically opening differential relief valve located between the two checks, two shut off valves, and equipped with the necessary appurtenances for testing.

Reduced Pressure Detector Assembly (RPDA) – an approved assembly consisting of two approved reduced pressure backflow assemblies, set in parallel, equipped with a meter on a bypass line to detect small amounts of water leakage or use.

Safe Drinking Water Act – Legislation enacted by the US Congress in 1974 to ensure that the public is provided with safe drinking water.

Service Connection – the piping connection by means of which water is conveyed from the City's distribution main to a customer's property line, or to the end of the water connection.

Thermal Expansion – the pressure increase due to a rise in water temperature. The problem becomes acute in heated water piping systems when such a system becomes "closed" due to a malfunctioning backflow prevention assembly, which disallows expansion beyond that point.

Un-Approved Auxiliary Water Supply – means a supply (other than the purveyor's water supply) available to the customer's premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

Used Water – means water which has left the control of the purveyor.

USC FCCCHR – The abbreviation for the UNIVERSITY OF Southern California Foundation for Cross-Connection Control and Hydraulic Research. It is the agency which tests and approves backflow prevention assemblies by approved standards.

### **Abbreviations and Acronyms**

AG – Air Gap

AVB – Atmospheric Vacuum Breaker

BAT – Backflow Assembly Tester

CCS – Cross-Connection Control Specialist

DCDA – Double Check Detector Assembly

DCVA – Double Check Valve Assembly

IAPMO – International Association of Plumbing and Mechanical Officials

PVBA – Pressure Vacuum Breaker Assembly

RPBA – Reduced Pressure Backflow Assembly

RPDA – Reduced Pressure Detector Assembly

SVBA – Spill Resistant Vacuum Breaker Assembly

UBC – Uniform Building Code

UL – Underwriters laboratory

UPC – Uniform Plumbing Code

### **APPENDICES**

Appendix A	Application For Water Service
Appendix B	Pre Approved BAT
Appendix C	Cross-connection Hazard Survey
Appendix D	Water-Use Survey Report
Appendix E	Backflow Incident Report
Appendix F	Annual Summary Report Forms
Appendix G	Customer Information Packet
Appendix H	Letters

**APPENDIX A**

**Application for Water Service**

**CITY OF CARNATION**  
**Application for Water Service (Service Agreement)**

**Owner's Name:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

**Mailing Address:** \_\_\_\_\_

**Location Address:** \_\_\_\_\_

**Legal Description:** \_\_\_\_\_

The undersigned applicant hereby applies for a water connection to the above-described property.

1. The applicant is the owner of the described property or the authorized agent of the owner.
2. As a condition of City of Carnation, hereinafter referred to as the Purveyor, providing and continuing service to the above described property, the property owner, by signing this application, agrees to comply with:
  - a. All provisions of the City's current Ordinance and/or Cross Connection program, Resolution of the Purveyor, or latest revision thereof; and
  - b. Other such current and future rules and regulations that govern the Purveyor's water system.
3. The property owner specifically agrees:
  - a. To install and maintain at all times his plumbing system in compliance with the most current edition of the **International** Plumbing Code as it pertains to the prevention of potable water system contamination and prevention of pressure surges and thermal expansion in his water piping (for thermal expansion, it shall be assumed that a check valve is installed by the Purveyor on the water service pipe);
  - b. Within 30 days of the Purveyor's request (or alternate schedule acceptable to the Purveyor):
    - i) To install, maintain, test and repair in accordance with the Purveyor's cross-connection control standards all premises isolation backflow prevention assemblies required by the Purveyor to be installed to protect the public water system from contamination; and
    - ii) To report to the Purveyor the results of all assembly tests and/or repairs to the premises isolation backflow prevention assemblies.
  - c. As a condition of the Purveyor waiving the requirement for premises isolation by a reduced pressure backflow assembly on the property owner's service pipe:
    - i) To authorize the Purveyor to make periodic water use surveys of the premises;
    - ii) Within 30 days of the Purveyor's request, to install, test, maintain, and repair in accordance with the Purveyor's cross-connection control standards (copy received with

- this application) all in-premises backflow prevention assemblies that provide equivalent protection for the Purveyor's distribution system;
- iii) To report to the Purveyor within 30 days of obtaining the results of all tests and repairs to the aforementioned backflow prevention assemblies; and
  - iv) To report to the Purveyor any change to the plumbing system.
- d. Not to make a claim against the Purveyor or its agents or employees for damages and/or loss of production, sales or service, in case of water pressure variations, or the disruption of the water supply for water system repair, routine maintenance, power outages, and other conditions normally expected in the operation of a water system.
- e. To pay his water bill within 30 days from the date of billing.

30 days after the Purveyor mails a written notice to the property owner of his breach of this agreement, the Purveyor may terminate water service.

In the event legal action is required and commenced between the parties to this agreement to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.

**Applicant's Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Attachments received (have customer initial):**

- Water Rates/Charges** \_\_\_\_\_
- Service Connection Information** \_\_\_\_\_
- Water Service Policy** \_\_\_\_\_

**For Purveyor Use Only**

- \_\_\_\_/\_\_\_\_/\_\_\_\_ Date connection fee received
- \_\_\_\_/\_\_\_\_/\_\_\_\_ Date Water Use Survey questionnaire received
- \_\_\_\_/\_\_\_\_/\_\_\_\_ Date risk assessment completed; by \_\_\_\_\_  
Name of CCS
- \_\_\_\_/\_\_\_\_/\_\_\_\_ Date customer notified of requirement for BPA
- \_\_\_\_/\_\_\_\_/\_\_\_\_ Date BPA installation approved
- \_\_\_\_/\_\_\_\_/\_\_\_\_ Date BPA test report accepted
- \_\_\_\_/\_\_\_\_/\_\_\_\_ Date BPA information entered into database

**APPENDIX B**  
**Pre Approved BAT**

## **Backflow Assembly Testers Pre-Approved for Submitting Test Reports to the City of Carnation**

BAT testers must document that they appear on the approved BAT list of another nearby water system that has a testing QA/QC program acceptable to our system and on State certified BAT list.

WAC 246-290-490 requires a DOH-certified BAT to test all assemblies (RPBA, RPDA, DCVA, DCDA etc.) that protect the distribution system. Assemblies that protect the public water system must be tested in accordance with DOH-approved field test procedures:

- Upon installation, and annually thereafter;
- After repair, reinstallation, or relocation; and
- After a backflow incident.

Note: the DOH BAT certification is a special certification separate from other waterworks operator certification categories, plumbing licenses, contractor registration, etc. Other licenses, certifications and/or registrations may be required to install backflow prevention assemblies and/or perform maintenance work on assemblies within buildings. **However, only a currently DOH-certified BAT may test the assemblies that protect the public water system from contamination. A list of DOH approved BAT's is available upon request.**

## **APPENDIX C**

### **Cross-Connection Hazard Survey**

**Preliminary Cross-Connection Control Hazard Assessment Form  
Non-Residential Customers**

**Name of Customer or Business:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone Number:** \_\_\_\_\_

**Description of Business:** \_\_\_\_\_

Is your business or premises of a type included in the table below (check all that apply)?

Agricultural (farm or dairy)		Metal plating industry	
Beverage bottling plant		Mortuary	
Car wash		Petroleum processing or storage plant	
Chemical plant		Pier or dock	
Commercial laundry or dry-cleaners		Radioactive material processing plant or nuclear reactor	
Having both reclaimed water and potable water provided		Survey access denied or restricted	
Film processing facility		Wastewater lift station	
Food processing plant		Wastewater treatment plant	
Hospital, medical center, nursing home, veterinary, medical, or dental clinic, or blood plasma center		Having an unapproved auxiliary water supply interconnected with the potable water supply	
Having separate irrigation system using purveyor's water and adding chemicals*		<i>Beauty salon, Tattoo business</i>	
Laboratory		Other (describe) [See above]	

\*e.g., parks, playgrounds, golf courses, cemeteries, estates, etc.

Other potential cross-connection concerns:

Irrigation system

Fire sprinkler system, using  not using  chemicals or anti-freeze

Swimming pool

Other (describe): \_\_\_\_\_

**Note to Customer:** *This form is used for preliminary assessment only. The water purveyor may require a more thorough assessment at a later date.*

**This form was completed by (print name):** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Please return completed form by {insert date} and send to: {insert name/address}.**

## Cross-Connection Control Hazard Survey Report

### *Non-Residential Customers*

Survey date: \_\_\_\_\_

#### **Customer Information**

Premises name: \_\_\_\_\_ Telephone: \_\_\_\_\_

Address: \_\_\_\_\_ ZIP: \_\_\_\_\_

Contact person: \_\_\_\_\_ Title: \_\_\_\_\_

Description of premises: \_\_\_\_\_

Description of water use: \_\_\_\_\_

#### **Water Service and Backflow Prevention Assembly (BPA) Size/Type**

Service Type	Service Size	Meter Size	BPA Size	BPA Type
Domestic				
Fire				
Irrigation				
Other				

#### **Cross-Connection Control Specialist (CCS) Information**

Name: \_\_\_\_\_ Telephone: \_\_\_\_\_

Company name: \_\_\_\_\_

Address: \_\_\_\_\_ ZIP: \_\_\_\_\_

DOH CCS Certification #: \_\_\_\_\_ Year certified: \_\_\_\_\_



### Surveyor's Recommendations

I certify that this cross-connection hazard survey accurately reflects the overall risk posed by the customer's plumbing system to the Purveyor's distribution system. Based on the above survey, I certify that:

1. I found the following type(s) of premises isolation backflow preventer(s):  
Air Gap \_\_\_\_ RPBA/RPDA \_\_\_\_ DCVA/DCDA \_\_\_\_ None \_\_\_\_
2. The existing backflow preventer(s) is/are properly installed.  
Yes \_\_\_\_ No \_\_\_\_ N/A \_\_\_\_
3. The existing backflow preventer(s) is/are commensurate with the degree of hazard:  
Yes \_\_\_\_ No \_\_\_\_ N/A \_\_\_\_
4. Since no backflow preventer was installed for premises isolation, the premises owner should install a premises isolation backflow preventer of the following type:  
Air Gap \_\_\_\_ RPBA/RPDA \_\_\_\_ DCVA/DCDA \_\_\_\_ N/A \_\_\_\_
5. The premises owner should replace the existing premises isolation backflow preventer(s) with the following:  
Air Gap \_\_\_\_ RPBA/RPDA \_\_\_\_ DCVA/DCDA \_\_\_\_ N/A \_\_\_\_

The completed survey report shall be first signed by the CCS conducting the survey, and then counter-signed by the owner of the premises or the owner's authorized agent.

**CCS Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

As the Owner of the Premises (or Owner's authorized agent), I certify that I have received a copy of this completed Cross-Connection Control Hazard Survey Report.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Note: Customers and regulatory agencies should be aware that the Purveyor's requirement for this cross-connection hazard survey and/or for the installation of a specific backflow prevention assembly on a service pipe **do not** constitute an approval of the customer's plumbing system, compliance of the customer's plumbing system with the International Plumbing Code or an assurance of the absence of cross-connections in the customer's plumbing system.

**APPENDIX D**

**Water-Use Survey Report**

**SAMPLE 1**

**Water Use Questionnaire**  
*Residential Customers*

Customer Account Number (optional)  
Customer Name  
Address Line 1  
Address Line 2

Please indicate whether the special plumbing or activities listed below apply to your premises:

Yes	No	<b>Plumbing or Activity Present on Customer's Premises*</b>
		Underground sprinkler system
		Water treatment system (e.g., water softener)
		Solar heating system
		Residential fire sprinkler system
		Other water supply (whether or not connected to plumbing system)
		Sewage pumping facilities or grey water system
		Boat moorage with water supply
		Hobby farm
		Animal watering troughs
		Swimming pool or spa
		Greenhouse
		Decorative pond
		Photo lab or dark room
		Home-based business. If Yes, list type/describe (e.g., beauty salon, machine shop, etc.): _____ _____ _____

\* Based on their knowledge of residential connections served, public water systems may “customize” this list by adding or deleting plumbing categories or activities

Completed by (print name): \_\_\_\_\_

Date: \_\_\_\_\_

Resident's Signature: \_\_\_\_\_

**APPENDIX E**

**Backflow Incident Report**

## Backflow Incident Report Form

Reporting Agency: \_\_\_\_\_ Report Date: \_\_\_\_\_

Reported By: \_\_\_\_\_ Title: \_\_\_\_\_

Mail Address: \_\_\_\_\_ City: \_\_\_\_\_

State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ Telephone: \_\_\_\_\_

Date of Incident: \_\_\_\_\_ Time of Occurrence: \_\_\_\_\_

General Location (Street, etc.): \_\_\_\_\_

### Backflow Originated From:

Name of Premises: \_\_\_\_\_

Street Address: \_\_\_\_\_ City: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Telephone: \_\_\_\_\_

Type of Business: \_\_\_\_\_

### Description of Contaminants:

(Attach Chemical Analysis or MSDS if available)

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### Distribution of Contaminants:

Contained within customer's premises: Yes: \_\_\_\_\_ No: \_\_\_\_\_

Number of persons affected: \_\_\_\_\_

### Effect of Contamination:

Illness Reported: \_\_\_\_\_

Physical irritation reported: \_\_\_\_\_

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Cross-Connection Source of Contaminant (boiler, chemical pump, irrigation system, etc.):

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Cause of Backflow (main break, fire flow, etc.):

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Corrective Action Taken to Restore Water Quality (main flushing, disinfection, etc.):

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Corrective Action Ordered to Eliminate or Protect from Cross Connection (type of backflow preventer, location, etc.)

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Previous Cross-Connection Survey of Premises:

Date: \_\_\_\_\_  
By \_\_\_\_\_

Types of Backflow Preventer Isolating Premises:

RPBA: \_\_\_\_\_ RPDA: \_\_\_\_\_ DCVA: \_\_\_\_\_ DCDA: \_\_\_\_\_ PVBA: \_\_\_\_\_ SVBA: \_\_\_\_\_

AVB: \_\_\_\_\_ Air Gap: \_\_\_\_\_ None: \_\_\_\_\_ Other Type: \_\_\_\_\_

Date of Latest Test of Assembly: \_\_\_\_\_

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Notification of Washington State Health Department:

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Person Notified: \_\_\_\_\_

Attach sheets with additional information, sketches, and/or media information, and mail to:

*PNWS-AWWA CCC Committee  
c/o George Bratton  
1252 S. Farragut Drive  
Coupeville, WA 98239*

## **APPENDIX F**

### **Annual Summary Report Forms**

## **Annual Summary Report Forms**

Appendix E contains sample cross-connection control (CCC) Annual Summary Report forms. Per WAC 246-290-490, purveyors are required to complete these forms to report information on the status of a public water system's CCC program and implementation activities. When the Department of Health sends out hard copies or electronic copies of the forms, they are color-coded. Purveyors often refer to the forms by color instead of name. The respective color of each form is noted below.

The three forms are:

- 1. Cross-Connection Control Activities Annual Summary Report**

Purveyors use this form to report (for a calendar year) their CCC implementation activities, such as status of high-hazard premises protection, backflow preventer inventory/testing information, and hazard evaluations. This is the "blue form."

- 2. Cross-Connection Control Program Summary Report**

This form is use to report the type, policies, and provisions of a public water system's CCC written program. This is the "cream form."

- 3. Exceptions to High Health Hazard Premises Isolation Requirements**

Purveyors use this form to document and report exceptions to mandatory premises isolation requirements allowed under WAC 246-290-490(4) (b) (iii). Only purveyors granting exceptions need to complete and submit this form. This is the "green form."

The forms provided are those used for the reporting year indicated on the forms. For copies of forms for later years, or for versions suitable for completion on screen using MS Word, contact the DOH Office of Drinking Water (see Appendix F)

**Public Water System Cross-Connection Control Activities  
Annual Summary Report for Year 2009**

**Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information**

PWS ID:	PWS Name:	County:
Provide name and Certification Number of CCS who develops and implements your CCC program.		
CCS Name (Last, First & MI): _____ , _____		CCS Phone: (____) ____-____
CCS Cert. No.:		BAT Cert. No. (if applicable):
CCS is (check one): PWS owner or employee <input type="checkbox"/> On contract to PWS <input type="checkbox"/> Volunteer or other <input type="checkbox"/>		

**Part 2: Status of Cross-Connection Control (CCC) Program**

PWS has: A written CCC program Y <input type="checkbox"/> N <input type="checkbox"/>	CCC implementation activities Y <input type="checkbox"/> N <input type="checkbox"/>
(Written program may be a separate document or part of water system plan or small water system management program.)	

Please provide information regarding PWS's specific CCC Program Elements. Check one box in each column.

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is Currently:	
		Included in Written Program	Being Implemented or is Completed
1	Legal Authority Established	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
2	Hazard Evaluation Procedures and Schedules	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
3	CCC Procedures and Schedules	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
4	Certified CCS Provided	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
5	Backflow Preventer Inspection and Testing	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
6	Testing Quality Control Assurance Program	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
7	Backflow Incident Response Procedures	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
8	Public Education Program	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
9	CCC Records	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
10	Reclaimed Water Permit	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/>

**Part 3A: System Characteristics at End of 2009**

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). **Estimate if necessary.**

<b>Type of Service Connection</b>	<b>Number</b>
Residential (as defined by PWS)	
All Other (include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers and docks)	
Total Number of Connections	

**If PWS does not serve any high-hazard premises or systems, check here  and go to Part 4.**

- Complete all cells. Count only premises PWS serves water to. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 2009			
	Being Served Water by PWS <sup>1</sup>	With Premises Isolation by AG/RP <sup>2</sup>	With Premises Isolation AG/RP Inspected or Tested <sup>3</sup>	Granted Exception from Mandatory Premises Isolation
Agricultural (farms and dairies)				
Beverage bottling plants (including breweries)				
Car washes				
Chemical plants				
Commercial laundries and dry cleaners				
Both reclaimed water and potable water provided				
Film processing facilities				
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies				
Food processing plants (including canneries, slaughter houses, rendering plants)				
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers				
Separate irrigation systems using purveyor's water supply and chemical addition <sup>4</sup>				
Laboratories				
Metal plating industries				
Mortuaries				
Petroleum processing or storage plants				
Piers and docks				
Radioactive material processing plants or nuclear reactors				
Survey access denied or restricted				
Wastewater lift stations and pumping stations				
Wastewater treatment plants				
Unapproved auxiliary water supply interconnected with potable water supply				
Other high-hazard premises (list) <sup>5</sup>				
<b>Totals</b>				

Count only those connections with AG or RP installed for premises isolation. Do not include connections with only in-premises protection, or those with DCVA/DCDAs installed for premises isolation.

<sup>3</sup> Count only those connections **whose premises isolation preventers** were tested or inspected during year 2009

<sup>4</sup> For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

<sup>5</sup> Premises with hazardous materials or processes (requiring isolation by AG or RP), such as: aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, e.g.: other manufacturing, or other commercial. **If needed, attach additional sheet giving same information as requested by table.**

#### **Part 4A: Backflow Preventer Inventory and Testing Data During Year 2009**

- Complete all cells. Enter zero (0) if there are no backflow preventers in the category.
- **Count only the backflow preventers that the PWS relies upon for protection of the distribution system. If your records do not distinguish between premises isolation and in-premises protection preventers, enter all data in Premises Isolation section and check the box.**
- Count AVBs on irrigation systems only. **If you do not track AVBs, check box above the "AVB" column.**
- Count multiple tests or failures for any particular backflow preventers as one test or failure for that backflow preventer.
- Multiple Service or Parallel Connections: count each assembly separately.
- Assemblies on Dedicated Fire or Irrigation Lines: count as Premises Isolation Assemblies.  
**If PWS does not track AVBs check here**

Backflow Preventer Category and Testing/ Inspection Information		Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
<b>Premises Isolation, including preventers isolating PWS-owned facilities. <i>If In-Premises Protection preventers are also included,</i></b>									
<b><i>Rows 1 – 3 pertain ONLY to Premises Isolation preventers in service at beginning of 2009</i></b>									
1	Number In service at beginning								
2	Number Inspected and/or								
3	Failed Inspection or								
<b><i>Rows 4 – 6 pertain ONLY to NEW Premises Isolation preventers installed during 2009</i></b>									
4	Number of New preventers								
5	Inspected and/or								
6	Failed inspection or								
Premises Isolation Total at end of									
<b>Installed for In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.</b>									
<b><i>Rows 7 – 9 pertain ONLY to In-Premises Protection preventers in service at beginning of 2009</i></b>									
7	Number In service at beginning								
8	Number Inspected and/or								
9	Number Failed Inspection or								
<b><i>Rows 10 – 12 pertain ONLY to NEW In-Premises Protection preventers installed during 2009</i></b>									
10	Number New preventers								
11	Number Inspected and/or								
12	Number Failed inspection or								
In-Premises Protection Total at end of									
<b>Grand Total at end of 2009</b>									

<sup>1</sup> Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only using DOH/USC test procedures).

<sup>2</sup> Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced preventers those in service at beginning of 2009. Replacement preventers may be of a different type than the original.

<sup>3</sup> Total installed at end of 2009 can't be more than preventers in service at beginning of 2008 plus those installed during 2009. May be less due to changes in preventer type and preventers taken out of service during 2008.

**Part 4B: Other Implementation Activities in 2009**

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
<b>New</b> services connections evaluated for cross-connection hazards to PWS in 2009.	
<b>New</b> services connections requiring backflow protection to protect PWS. <sup>1</sup>	
<b>Existing</b> services connections evaluated for cross-connection hazards to PWS in 2009.	
<b>Existing</b> services connections requiring backflow protection to protect PWS. <sup>1, 2</sup>	
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b) in 2009. <sup>3</sup>	
CCC Corrective enforcement actions taken by PWS during 2009. <sup>4</sup>	

<sup>1</sup> Include services where either premises isolation or in-premises preventers were required to protect the PWS.

<sup>2</sup> Include existing services that need new, additional or higher level backflow prevention.

<sup>3</sup> A DOH Exception to Hazard Premises Form *must* be attached for each exception granted during the year.

<sup>4</sup> "Enforcement actions" mean actions taken by the PWS (such as water shut-off, PWS installation of backflow preventer) when the customer fails to comply with PWS's CCC requirements.

**Part 5: Backflow Incidents, Risk Factors and Indicators during 2009**

Backflow Incidents, Risk Factors and Indicators during 2009		Number (Enter 0 if none)	Check if Data Not Available
<b>Backflow Incidents during 2009</b>			
1	Backflow incidents that contaminated the PWS. <sup>5</sup>		<input type="checkbox"/>
2	Backflow incidents that contaminated the customer's drinking water system <b>only</b> . <sup>5</sup>		<input type="checkbox"/>
<b>Risk Factors for Backflow during 2009</b>			
3	Distribution main breaks per 100 miles of pipe.		<input type="checkbox"/>
4	Low pressure events (<20 psi in PWS distribution system).		<input type="checkbox"/>
5	Water outage events.		<input type="checkbox"/>
<b>Indicators of Possible Backflow during 2009</b>			
6	Total health-related complaints received by PWS. <sup>6</sup>		<input type="checkbox"/>
7	Received during BWA or PN events. <sup>7</sup>		<input type="checkbox"/>
8	Received during low pressure or water outage events.		<input type="checkbox"/>
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).		<input type="checkbox"/>
10	Received during BWA or PN events. <sup>7</sup>		<input type="checkbox"/>
11	Received during low pressure or water outage events.		<input type="checkbox"/>

<sup>5</sup> Complete and submit a Backflow Incident Report form for each known backflow incident.

<sup>6</sup> Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.

<sup>7</sup> "BWA" means **Boil Water Advisory** and "PN" means **Public Notification** for water quality reasons.

**Part 6: Comments and Clarifications**

Enter comments or clarifications to any of the information included in this report.

**Note for on-screen completion:** Comments will not “wordwrap” from one line to the next. Press <Enter> to continue on new line. Maximum length of each comment is 255 characters, including spaces.

Part No.	Comment

**Part 7: Report Completion Information**

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Administrator Name (Print):	Title:	
Signature:	Date:	
Phone: (____) ____ - ____	E-mail: _____@_____	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
General Manager Name (Print):	Title:	
Signature:	Op. Cert. No.:	Date:

**Cross-Connection Control Program Summary  
For 2009**

**Part 1: Public Water System (PWS) Identification**

PWS ID:	PWS Name:	County:
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**Part 2: Cross-Connection Control (CCC) Program Characteristics**

**A. Type of Program Currently Implemented**

Type of Program	Check One
Premises isolation only.	<input type="checkbox"/>
Combination program: reliance on both premises isolation and in-premises protection.	<input type="checkbox"/>
In transition from a combination program to a premises isolation only program.	<input type="checkbox"/>

**B. Coordination with Local Administrative Authority (LAA) on Cross-Connection Issues**

Indicate the status of coordination with LAAs in your service area. The LAA is the entity that enforces the International Plumbing Code. **Check one box in each of last 3 columns for each LAA in your service area.**

LAA No.	Name of LAA <sup>1</sup> ( e.g., the City or County Building Department)	PWS currently:		If not coordinating, did LAA Decline to Coordinate?
		Coordinate s with LAA	Has Written Agreement with LAA	
1		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
2		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
3		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
4		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
5		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>

<sup>1</sup> If more than 5 LAAs, attach separate sheet giving the above information.

### C. Corrective or Enforcement Actions Available to the Purveyor

Type of Corrective Action	Indicate Whether Available	Most Often Used (Check one)
Denial or discontinuance of water service.	Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>
purveyor installs backflow preventer and bills customer.	Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>
Assessment of fines (in addition to elimination or control of cross-connection).	Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>
Other corrective actions (describe below):	Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>

### D. CCC Program Typical Responsibilities

Typical responsibilities *do not* include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS.	<input type="checkbox"/>	<input type="checkbox"/>
Backflow preventer (BP) ownership.	<input type="checkbox"/>	<input type="checkbox"/>
BP installation.	<input type="checkbox"/>	<input type="checkbox"/>
BP <i>initial</i> inspection (for proper installation – all BPs).	<input type="checkbox"/>	<input type="checkbox"/>
BP <i>initial</i> test (for testable assemblies).	<input type="checkbox"/>	<input type="checkbox"/>
BP <i>annual</i> inspection (Air Gaps and AVBs).	<input type="checkbox"/>	<input type="checkbox"/>
BP <i>annual</i> test (for testable assemblies).	<input type="checkbox"/>	<input type="checkbox"/>
BP maintenance and repair.	<input type="checkbox"/>	<input type="checkbox"/>

### E. Backflow Protection for Fire Protection Systems

***Please remember to enter number of days allowed if you require retrofitting.***

PWS coordinates with <b>LAA</b> on CCC issues for fire protection systems (FPS).	Y <input type="checkbox"/>	N <input type="checkbox"/>	N/A <input type="checkbox"/>
PWS coordinates with <b>local Fire Marshal</b> on CCC issues for FPS.	Y <input type="checkbox"/>	N <input type="checkbox"/>	N/A <input type="checkbox"/>
PWS ensures backflow prevention is installed before serving <b>new</b> connections with FPS.	Y <input type="checkbox"/>	N <input type="checkbox"/>	
PWS requires retrofits to <b>high</b> -hazard FPS.	Y <input type="checkbox"/> (No. of days allowed: _____)	N <input type="checkbox"/>	N/A <input type="checkbox"/>
PWS requires retrofits to <b>low</b> -hazard FPS.	Y <input type="checkbox"/> (No. of days allowed: _____)	N <input type="checkbox"/>	N/A <input type="checkbox"/>

## F. Backflow Protection for Irrigation Systems

<b>Minimum</b> level of backflow prevention required on irrigation systems <b>without</b> chemical addition.	Not Addressed <input type="checkbox"/>	AVB <input type="checkbox"/>
	PV/SVBA <input type="checkbox"/>	DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
PWS currently inspects AVBs upon <b>initial</b> installation.	Y <input type="checkbox"/>	N <input type="checkbox"/> N/A <input type="checkbox"/>
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Y <input type="checkbox"/>	N <input type="checkbox"/> N/A <input type="checkbox"/>

## G. Used Water

PWS prohibits, by ordinance, rules, policy or agreement, the intentional return of used water (e.g., for heating or cooling) into the distribution system.	Y <input type="checkbox"/>	N <input type="checkbox"/>
If not prohibited at present, date plan to prohibit.	Date (mm/dd/yyyy):	N/A <input type="checkbox"/>
Current number of service connections returning used water to distribution system.		

## H. Backflow Protection for Unapproved Auxiliary Water Supplies<sup>1</sup> NOT Interconnected with PWS

Indicate the **minimum** backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies *when they are NOT interconnected to the PWS*. Check only one per row.

<b>Existing</b> service connections.	None <input type="checkbox"/>	DCVA <input type="checkbox"/>	RPBA <input type="checkbox"/>	AG <input type="checkbox"/>
Type of protection required.	None <input type="checkbox"/>	In-premises protection <input type="checkbox"/>	Premises isolation <input type="checkbox"/>	
<b>New</b> service connections.	None <input type="checkbox"/>	DCVA <input type="checkbox"/>	RPBA <input type="checkbox"/>	AG <input type="checkbox"/>
Type of protection required.	None <input type="checkbox"/>	In-premises protection <input type="checkbox"/>	Premises isolation <input type="checkbox"/>	

**I. Backflow Protection for Tanker Trucks and Temporary Water Connections**

<b>Minimum</b> level of backflow protection (installed on or associated with the truck) required for tanker trucks taking water from PWS.	AG <input type="checkbox"/> DCVA RPBA Not specified Tanker trucks not allowed
PWS requires tanker trucks to obtain water at designated filling sites each equipped with permanently installed backflow preventer(s).	Y <input type="checkbox"/> (Min. site protection: DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/> No sites provided <input type="checkbox"/>
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/>
<b>Minimum</b> level of backflow protection required for temporary water connections (e.g., for construction sites).	AG <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> Not specified <input type="checkbox"/> Temp. connections not allowed <input type="checkbox"/>
PWS requires testing each time the temporary connection backflow preventer is relocated.	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/> (Temp. connections not allowed)
PWS provides approved backflow preventer for temporary connections.	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/> (Temp. connections not allowed)

**J. Backflow Protection for Non-Residential Connections**

For each category shown, indicate whether the District has non-residential connections of that type and the **minimum** level of **premises isolation** backflow protection required (whether or not that type of customer currently exists).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Protection Required
Commercial	Y <input type="checkbox"/> N <input type="checkbox"/>	Not required <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Industrial	Y <input type="checkbox"/> N <input type="checkbox"/>	Not required <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Institutional	Y <input type="checkbox"/> N <input type="checkbox"/>	Not required <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Other (specify): _____	Y <input type="checkbox"/> N <input type="checkbox"/>	Not required <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Other (specify): _____	Y <input type="checkbox"/> N <input type="checkbox"/>	Not required <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>

**K. Backflow Protection for Wholesale Customers**

Indicate whether the District requires backflow protection at interties with wholesale customers (other PWSs).

Type of Intertie	District has (plans to have) Customers of this Type	Backflow Protection Required (If protection is required, indicate minimum level)
Existing	Y <input type="checkbox"/> N <input type="checkbox"/>	Not specified/Not required <input type="checkbox"/> Always required <input type="checkbox"/> Required only if purchaser's CCC program is inadequate <input type="checkbox"/> Minimum required (if applicable): DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
New	Y <input type="checkbox"/> N <input type="checkbox"/>	Not specified/Not required <input type="checkbox"/> Always required <input type="checkbox"/> Required only if purchaser's CCC program is inadequate <input type="checkbox"/> Minimum required (if applicable): DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>

**Part 3: CCC Program Record-Keeping and Inventory**

Indicate the type or name of computer software used by the District to track CCC records.

BMI <input type="checkbox"/> BPMS <input type="checkbox"/> Engsoft <input type="checkbox"/> Tokay <input type="checkbox"/> Other commercial CCC software <input type="checkbox"/> (specify): _____ Custom developed for or by PWS <sup>1</sup> <input type="checkbox"/> Other non-CCC software (e.g., Excel) <input type="checkbox"/> None Used <input type="checkbox"/>
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<sup>1</sup> Do not include customized commercial CCC software. Indicate these on line above.

**Part 4: Comments and Clarifications**

Enter comments or clarifications to any of the information included in this report.

Part No.	Comment

**Part 5: CCC Program Summary Completion Information**

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Program Summary is complete and accurate to the best of my knowledge.		
CCC Program Administrator Name (Print):	Title:	
Signature:	Date:	
Phone: (___) ___-___	E-mail: _____@_____	
I certify that the information provided in this report accurately represents the status and description of this water system's CCC Program.		
General Manager Name (Print):	Title:	
Signature:	Op. Cert No:	Date:

**Exceptions to High Health Hazard Premises Isolation Requirements  
For 2009 Annual Summary Report**

**Exceptions forms must be completed and submitted to the Department of Health (DOH) with the Annual Summary Report per WAC 246-290-490(4)(b)(iii).**

Complete one form for **each** exception that was granted:

- During 2009; or
- Prior to 2009, **if** you didn't submit an Exceptions form to DOH previously (i.e., don't duplicate previously submitted Exception forms).

If your system didn't grant any exceptions in 2009, and you have already submitted forms for exceptions granted prior to 2009, don't complete any Exception forms for 2009.

**Part 1: Public Water System (PWS) Information**

PWS ID:	PWS Name:	County:
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**Part 2: Premises Information**

Name of Premises		
Service Address	-----	
Premises Type or Category – Refer to Table 9 of WAC 246-290-490(4)(b)		
Additional Information or Description of Premises to help explain why exception is appropriate:		

**Part 3: Information Regarding Exception to Premises Isolation**

Enter dates in MM/DD/YYYY format.

Date of Hazard Evaluation	
Date Exception Granted	
Expiration Date of Exception (if any)	
Date of Next Hazard Evaluation	

**Part 4: Justification for not Requiring Premises Isolation Using AG, RPBA or RPDA**

- The reasons for not requiring mandatory premises isolation shown in the table are typical examples. *purveyors are not required to follow or apply any of these reasons.*
- purveyors may provide other reasons consistent with WAC 246-290-490(4)(b)(ii), i.e., no hazard exists for this particular service.

Reason that the Premises <b>Do Not</b> Pose a High Health Hazard to PWS	Check if Applicable
Medical/Health Services Facility not having laboratory or similar facilities, e.g., Psychiatric or Counseling Office.	<input type="checkbox"/>
Dental Office having independent water supplies for dental work (no interconnection with purveyor's water system).	<input type="checkbox"/>
"Bottling Plant" without bottling processes, e.g., Warehousing only.	<input type="checkbox"/>
Laundry or Dry Cleaners without cleaning processes on premises, e.g., customer drop-off and/or pick-up only.	<input type="checkbox"/>
Marina/Dock for small boat moorage only (no water/sewage facilities on board).	<input type="checkbox"/>
Agricultural Premises with "hobby farm" (non-commercial) activities only.	<input type="checkbox"/>
Other (please describe): _____	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

**Part 5: Form Completion Information**

Enter dates in MM/DD/YYYY format.

I am the Cross-Connection Control Specialist (CCS) who granted this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name (Print):		CCS Cert. No:
Signature:		Date:
Phone: (____) ____ - ____	E-mail: _____@_____	
I am the Manager* of the PWS and I concur with the granting of this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name (Print):		Title:
Signature :	Op. Cert. No:	Date:

\*The person that the CCS reports to or other manager having direct responsibility for and/or oversight of the CCC program. It is not required that this person be in charge of the entire water system.

**APPENDIX G**  
**Customer Information Packet**

## CUSTOMER INFORMATION PACKET

DEAR CUSTOMER:

Under Washington State Law, the City of Carnation has the responsibility to protect the public water supply from possible contamination due to cross-connections. A cross-connection is the connection point of two otherwise separate water systems, one of which is public containing safe drinking water and the other which is private containing water of questionable safe drinking quality, such as steam, gas or chemicals.

Cross-connection control is necessary because of physics. Water always flows towards the path of least resistance or to the point of lowest pressure. It is logical to assume that because water is under pressure, it can only flow in one direction, but this assumption is wrong. Under certain circumstances, such as loss or reduced pressure, water can and will flow backwards.

Imagine what could potentially happen if a water main broke just as your neighbor began to use a water hose to spray insecticide or flush a car radiator. Or the fire district turned on several hydrants to fight a fire just as someone was dispensing carbonated water from a soft drink machine. These contaminants could be siphoned into the public water system.

The City of Carnation cross-connection program consists of inspections to identify actual or potential cross-connections, requiring the installation of needed assemblies to mitigate the hazard, and the testing of installed backflow prevention assemblies on an annual basis.

Generally the risk to the public water supply can be assessed as either High Health Hazard or as a Low Health Hazard.

A High Health Hazard is one in which a substance could impair the quality of the potable water supply and create an actual public health hazard through the poisoning or spread of disease by sewage, industrial liquids or waste.

A Low Health Hazard is one in which a substance could cause an impairment of the quality of the potable water supply to the degree that it does not create a hazard to public health, but does adversely and unreasonably affect the aesthetic qualities for domestic use.

The City has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations and for the prevention of contamination of his plumbing system from sources within his/her premises. Any action taken by the City to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation, installation of a DCVA or RPBA on the service line, is solely for the purpose of reducing the risk of contamination of the City's public water system.

Any action taken by the City shall not be construed as guidance on the safety or reliability of the customer's plumbing system. Installation of backflow prevention

assemblies shall be in accordance with the most recently published edition of the Pacific Northwest Section, American Water Works Association Cross-connection Control Manual.

The City will notify each customer at least 30 days before the due date for each required inspection and or testing of any backflow devices by a certified Department of Health Cross-Connection Control Specialist (CCS) and/or a Backflow Assembly Tester (BAT). The City has on hand a list of certified testers.

The inspection or test reports conducted by the CCS and/or BAT are to be received by the City within 15 days following the due date. After this time enforcement actions may be taken.

#### TYPE OF FACILITY/REQUIRED DEVICE

##### AUXILIARY WATER SUPPLY

Any water supply on or available to a premise in addition to the City's approved potable water supply. Backflow protection requires an Air Gap or the installation of an approved Reduced Pressure Backflow Assembly downstream of the meter on the customer's property.

##### WATER RE-USE SYSTEMS

Reclaimed water can be systems that use treated sewage effluent, Stormwater reuse, and Graywater systems from untreated household wastewater that has not come in contact with toilet or food processing waste. All classes of reclaimed water are considered as a high health hazard and NO Direct connections to the City system will be allowed.

##### FIRE PROTECTION SYSTEMS

###### High-Hazard

This includes all fomite systems, systems with an auxiliary water supply connected to the fire system and systems with chemical additives. Backflow protection will be by a Reduced Pressure Backflow Assembly located at the service connection.

###### LOW-HAZARD

Are all other fire systems and require a Double Check Valve Assembly at the service connection.

##### SEWAGE LIFT/PUMPING STATIONS

All sewer lift and grinder pump stations pose a severe health hazard due to the potential presence of human pathogens. Backflow protection will be with an approve Reduce Pressure Backflow Assembly located at the service connection.

##### ACCESS RESTRICTED OR DENIED

The City must consider the health hazard to be severe unless it has the knowledge to make an assessment otherwise. Without the health hazard evaluation, backflow prevention is with an approved air gap of a reduced pressure backflow assembly.

##### CAR WASHES

Most automatic car washes use re-circulating water with chemical additives in heated water. The system is considered high hazard because of these chemicals and

bacteriological contaminants in the water. Backflow protection will be with a reduced pressure backflow assembly.

#### HOSPITALS, MEDICAL CENTERS, VETERINARY CLINICS, DENTAL CLINICS, MEDICAL CLINICS AND NURSING HOMES

The primary health hazard is the presence of waterborne disease transmitted in the feces, urine, and blood of humans and animals. The secondary health hazard is from the numerous chemicals used in these facilities. Backflow protection will be with an approved reduced pressure backflow assembly.

#### LABORATORIES

Laboratories are facilities using and handling chemicals and bacteriological materials such as medical, biological, chemical, environmental, and material testing laboratories including government agencies and schools.

All laboratories should be considered a high health hazard due to storage, use and/or processing of chemicals and soils, liquid's or products containing bacteria. An approved reduced pressure backflow assembly will be utilized for backflow prevention.

#### LAWN IRRIGATION SYSTEMS

Irrigation systems can be either assessed as either a low or high health hazard. High health hazard systems contain pumps or injectors for addition of chemicals. An approved air gap or reduced pressure backflow assembly is needed on these systems.

A low health hazard is assessed to all other irrigation systems. An approved double check valve assembly will provide backflow protection.

#### RETAIL CENTERS

Due to the high probability of changes in water use by tenants, retail centers are considered a high health hazard. An approved reduced pressure backflow assembly shall be installed to protect against backflow.

#### RECREATIONAL VEHICLE PARKS

Recreational vehicle parks usually contain a transient population that significantly increases the probability of cross-connections due to plumbing that has not been approved. As such a high health hazard is assessed and protection will be with a reduced pressure backflow assembly.

#### HEAT EXCHANGERS/SOLAR HOT WATER SYSTEMS

Heat exchangers physically separate one medium from another and either heat or cool a medium by transferring energy between the two mediums across an enlarged surface. Backflow conditions exist when a leak develops in the piping or tank walls separating potable from non-potable water. Backflow protection will utilize an approved reduce pressure backflow assembly.

#### BUILDINGS OVER 30" IN HEIGHT

Whenever the hydraulic gradient (water pressure) falls below the elevation of a plumbing fixture, backsiphonage conditions occur. This increased probability of backflow conditions elevates the risk for structures over thirty feet in height. Backflow protection will be with an approved reduced pressure backflow assembly.

## TANKER TRUCKS

Tanker trucks are assessed a high health hazard, the same as an unapproved auxiliary source. Chemical and bacteriological contaminants could be present in any tank. Backflow protection will be with an approved air gap or an approved reduced pressure backflow assembly. Additionally tankers may only connect to the District water supply after obtaining a permit and only at specific locations.

## SEWER FLUSHING

When sewer or storm lines are flushed, an approved air gap separation will be maintained to protect the potable water supply. If at all possible tanker trucks should be utilized to flush lines.

## OTHER

In cases where there has been a history of repeating the same or similar cross-connections or backflows, even though these conditions have been removed or disconnected, a high health hazard is assessed. Backflow prevention will be with an approved reduced pressure backflow assembly.

In cases where intricate plumbing makes it impractical to ascertain whether or not a cross-connection exists, or where any fixture is subject to being submerged, a high health hazard is assessed and protection will be with a reduced pressure backflow assembly.

## INSTALLATION STANDARDS

All backflow preventers relied upon by the City to protect the public water system shall meet the definition of "approved backflow preventer" as contained in WAC 246-290-010. The City will maintain a current list of assemblies approved for installation in Washington State.

Installation standards contained in the most recently published edition of the Pacific Northwest Section, American Water Works Association Cross-Connection Manual or the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research Manual shall be followed unless the manufacturer's requirements are more stringent.

Special considerations to note for each type of assembly are:

### Air Gap (AG)

- Separations are measured vertically and must be at least twice the inside diameter of the inlet pipe, but never less than one-inch.
- An obstruction around or near an AG may restrict flow of air into the outlet pipe and nullify the effectiveness in preventing backsiphonage. When affected by sidewalls the vertical separation must be at least three (3) times that of the inside pipe diameter.

### Reduced Pressure Backflow Assembly (RPBA)

- The RPBA must be installed above ground or maximum flood level whichever is greater.

- Because of the inherent design of a RPBA, fluctuating water supply pressure may cause nuisance dripping and potential fouling on the assembly. If located inside a building drainage should be provided for these discharges.

#### Double Check Valve Assembly (DCVA)

- Unless evaluated and approved otherwise a DCVA is only to be installed in the horizontal position.
- If installed in a pipe or meter box, adequate room must be provided for testing.
- Plugs must be installed in the test cocks to reduce the risk of ground water being siphoned through a leaking test cock.
- Sufficient drainage must be provided to prevent the assembly from becoming submerged.
- The DCVA must be protected from freezing, other severe weather and physical damage.

## **APPENDIX H**

### **Letters**

## Letter (#1) Requesting Customer to Complete Water Use Questionnaire

Date

Customer Account Number

Customer

Customer Address Line 1

Customer Address Line 2

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs help protect public health by preventing contamination of the drinking water as it is delivered to water system customers. The attached brochure explains what a cross-connection is, describes typical household cross-connections and what you can do to help protect your drinking water.

As part of our efforts to keep your drinking water safe, we are conducting a cross-connection control hazard survey of residential customers served by our system. The purpose of the survey is to help us determine if any of our residential customers have special plumbing or activities on their premises that could increase the risk of contamination to our water system.

For most residential customers, the cross-connection control hazard posed to the public water system is minimal. This is because your household plumbing was installed in compliance with the Uniform Plumbing Code. The Uniform Plumbing Code generally provides adequate protection of your potable water piping and our public water distribution system from cross-connections. However, a few customers with special plumbing or activities on their premises may pose an increased health risk to other customers served by our system. These customers may need to have a backflow preventer installed on their service lines or provide alternate protection to prevent contamination of the public water system.

**Please complete the attached questionnaire by checking the applicable boxes on the table; and return the completed, signed questionnaire by {insert date} to the address shown on the letterhead.**

Thanks in advance for filling out the questionnaire. We appreciate your cooperation in helping us to protect the drinking water we deliver to our customers. If you have any questions about the survey or how to fill out the questionnaire, please contact me at {insert phone number}. We will review your questionnaire and determine whether we need to contact you for further information.

Sincerely,

Name

CCC Program Manager

Enclosures: CCC Brochure  
Water Use Questionnaire

## Request to Install Backflow Prevention Assembly (**Letter#2**)

Date

Customer Account Number

Customer Name

Customer Address Line 1

Customer Address Line 2

Dear \_\_\_\_\_ Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs protect public health by preventing contamination of the drinking water as it is delivered to people served by the water system. **The purpose of this letter is to inform you of a requirement to install a backflow assembly.**

Our water system's policy considers each of our customer's plumbing systems, starting from the termination of the service pipe downstream of the water meter, to pose a potential cross-connection hazard to the public water system. Our policy requires a backflow prevention assembly commensurate with the degree of hazard to be installed on the service line. The purpose of this backflow prevention assembly is to isolate your plumbing system from the water distribution system. We've attached a copy of Resolution {**insert number**} describing our cross-connection control policy.

We have received the cross-connection control survey report submitted by your Cross-Connection Control Specialist (CCS). The survey assessed the overall public health hazard posed by your plumbing system (and water use) to the public water system. We agree with the assessment made by the CCS. **Based on the assessment, a Department of Health-approved {insert type of assembly} is required to be installed on your service line (at a location downstream of the water meter).**

Please make arrangements for the assembly to be installed by {insert date} or when your plumbing system is modified, whichever comes sooner. We realize that this expense was not anticipated, so if you are unable to comply with this deadline, please contact us to discuss an alternative date. We've enclosed a copy of our standard installation drawings for this type of assembly. Your CCS should oversee the installation of the assembly to ensure compliance with these standards.

We appreciate your cooperation in this matter. If you have any questions, please contact me at {insert phone number}.

Sincerely,

Name

CCC Program Manager

cc: {City/County Plumbing Inspector}

Enclosures: Standard Installation Drawings

**Request To Submit Test of Backflow Prevention Assembly (Letter #3)**

Date

Customer Account Number

Customer Name

Customer Address Line 1

Customer Address Line 2

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies have been installed on your water service(s) and/or within your plumbing system to protect our water distribution system. Annual testing is required to ensure that the backflow prevention assemblies properly function.

The purpose of this letter is to request that you now arrange for the annual testing of the reduced pressure principle (RPBA), double check valve (DCVA), and/or pressure vacuum breaker (PVBA or SVBA) assembly/assemblies described on the attached list. A Washington State Department of Health certified backflow assembly tester (BAT) must conduct the testing. **Testing results should be sent to the address above and submitted by {insert date}.**

For your convenience, we are enclosing a list of backflow assembly testers pre-approved to test assemblies that protect our water system. Test report forms are also enclosed. The test report forms need to be properly completed by the BAT, signed by the customer/assembly owner, and returned to us.

Note: the Uniform Plumbing Code in effect in Washington also requires annual assembly testing. In addition to the testing required for the assemblies that protect the public water system (i.e., identified on the attached list), you may wish to have all of the remaining assemblies within your premises tested at this time.

If you have any questions, please feel free to contact me at {insert phone number}.

Sincerely,

Name

CCC Program Manager

Enclosures: Assembly List  
Pre-Approved BAT List  
Assembly Test Report Forms

**Second Notice to Test Backflow Prevention Assembly (Letter#4)**

Date

Customer Account Number

Customer Name

Customer Address Line 1

Customer Address Line 2

Subject: Testing of Backflow Prevention Assembly - Second Notice

First Notice Date: \_\_\_\_\_

Second Notice Date: \_\_\_\_\_

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies were installed on your service or within your premises to protect our water distribution system from contamination. The WAC requires these assemblies to be tested annually to verify that they are in good working condition.

The assembly/assemblies identified in our letter of **{insert date}** (copy attached) must be tested by a Department of Health certified Backflow Assembly Tester (BAT) upon installation and annually thereafter. This requirement is a condition of our system continuing to supply potable water to your premises. **According to our records, as of today's date, you have not submitted the requested Assembly Test Report(s).** If you believe this is in error, please contact me as soon as possible at the number below.

If you have not submitted the Assembly Test Reports as requested, please:

- Immediately employ a DOH-certified BAT to test the listed assembly/assemblies; and
- Submit a signed copy of the completed Assembly Test Report(s) to me at the address above **within 15 days of the date of this letter.**

Your cooperation in this matter is essential for protecting your drinking water supply and the public water supply from contamination. Failure to comply with the annual assembly testing requirement will trigger an enforcement action by our system. Enforcement could include a shut-off of your water service.

If you have any questions, please contact me at **{insert phone number}**.

Sincerely,

Name

CCC Program Manager

Enclosure: First Test Notice Letter