

Appendix C – Water Conservation Plan

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Water Conservation Plan

INTRODUCTION

The City of Bonney Lake (City) recognizes that water is a valuable and essential natural resource that needs to be used wisely. This Water Conservation Plan provides an approach to increase water use efficiency within the City's water service area.

BACKGROUND

State Conservation Planning Requirements

The *Conservation Planning Requirements* published by the State Department of Ecology (DOE) and State Department of Health (DOH) in March 1994 identifies the water use reporting, forecasting and conservation program requirements for public water systems. A water conservation plan meeting these requirements is a necessary element of a Water System Plan as required by DOH and is necessary to obtain water right permits from DOE. The *Conservation Planning Requirements* defines the necessary components of a water conservation plan as 1) water use data collection, 2) water demand forecasting and 3) water conservation program. The *Conservation Planning Requirements* requires that the water conservation program identify goals and objectives, evaluate alternative conservation measures, and identify the selected measures including their schedule, cost, monitoring requirements and estimated water savings.

Additional requirements that conservation planning programs must now meet are outlined in the *2003 Municipal Water Law*, which became effective on September 9, 2003. The conservation planning portion of the law focuses on increasing water use efficiency through evaluating the cost effectiveness of conservation measures and through exploring opportunities for water reclamation.

Regional Water Conservation Planning

The Water Conservation Coalition of Puget Sound promotes water conservation on a regional basis. The Water Conservation Coalition of Puget Sound includes members from the greater Puget Sound area, including cities, towns, water districts, regional water associations and others. Its programs, thus far, include coordinating the distribution of summer lawn watering calendars and public education.

WATER CONSERVATION PROGRAM

As described above, the three required elements of a water conservation plan are water use data collection, demand forecasting and the conservation program. The water use data and system-wide demand forecasts are contained in **Chapter 4** of the City of Bonney Lake's *Comprehensive*

Water System Plan, and the conservation program is described herein. The City is committed to continue collecting water use data beyond the data presented in **Chapter 4** for evaluation of its conservation program and water use patterns, and for forecasting demands for future facility requirements. The City's water conservation program that follows includes a statement of its goals and objectives, the evaluation and selection of alternative conservation measures, the conservation program schedule and budget, and the method of program monitoring. In 2004, the City provided water service to approximately 10,307 customers and is subject to the conservation requirements defined in the *Conservation Planning Requirements* of a medium-sized system.

Previous Conservation Efforts

Since the City's last *Comprehensive Water System Plan*, the City has improved its public education efforts, completed system leak detection testing, replaced old meters to improve accuracy, and replaced leaking meters and water mains. As a result of this conservation program, per capita water use was reduced by approximately 18 percent from 1995 (112 gallons per capita per day) to 2003 (92 gallons per capita per day). However, the per capita demand has not decreased substantially between 1999 and 2004 and has held fairly constant at approximately 94 gallons per capita per day.

Conservation Program Goals and Objectives

The goals and objectives of the City of Bonney Lake Water Conservation Program consist of:

- Achieving additional system-wide average water use reduction of 5 percent by the year 2010 and 10 percent by the year 2024, with 2004 as the base year.
- Increase awareness among all water users of the value and importance of conserving water and of the methods available to achieve reductions in water use.
- Reduce unaccounted-for water to 5 percent or less.

The City of Bonney Lake will achieve these goals and objectives through the implementation of the water conservation program that follows.

Evaluation and Selection of Alternative Conservation Measures

The City's evaluation of conservation measures and selected levels of implementation are presented below. To date, no conservation measures have been discontinued.

Public Education

School Outreach - This conservation measure is only required for large systems. This measure requires educational programs that increase awareness of local water resources and encourage water conservation.

The City has not conducted school conservation programs in the past. Although school outreach is not required for systems of Bonney Lake's size, the City will consider encouraging the local schools to teach students about the benefits of conserving water and what they can do to help. If this measure is employed, the City will use existing educational materials to help keep costs to a minimum. Programs in the past have shown that in-school conservation programs are most

effective when conducted in fourth to sixth grade classes. Conservation and water-use education can easily be integrated into the science curriculum for these grades. The students will then take these concepts home to their parents.

It could potentially be cost-effective to implement a school outreach program, because of the low costs typically associated with in-school programs, especially if existing materials are utilized. In other Puget Sound areas, the estimated cost of in-school programs is \$70 per program. The City has six elementary schools in its service area. Assuming that two programs are done at the school each year, the cost to the City would be approximately \$840 and, based on an average class size of 20 students, the program would reach 240 students annually. If the program is carried out for six years, the number of students reached would be 1,440. Assuming each of these students reduces their annual water usage by 1.25 percent after conservation education, an average annual savings of 400,000 gallons would be realized. This water would have a value of just over \$440 and revenues would be reduced by approximately that amount. The measure is not cost effective, because more money is spent on the program than the actual value of the water saved. The City will continue to consider implementing in-school educational programs and will evaluate the expected costs of implementing the program more carefully.

Speakers Bureau - This conservation measure is described in the *Conservation Planning Requirements* as “Seeking speaking opportunities and making speakers available to a wide cross-section of services, community, and other groups.” This measure is also only required for large systems.

Although this measure isn't required, the City will strive to schedule speakers or have City staff speak to residents regarding water conservation measures and benefits, as resources allow. The City will encourage and make information available about upcoming water conservation speakers or meetings to City customers. The cost of this program and its predicted water savings are included in the program promotion measure described in the following section.

Program Promotion - This conservation measure is a required element of all water conservation programs. The *Conservation Planning Requirements* provides the following definition for this measure: “Publicize the need for water conservation through television and radio public service announcements, news articles, public water systems’ bill inserts, or other means. This includes promoting efficient indoor and outdoor water usage, distribution of Ecology/Health conservation brochures or other printed material, informing customers, builders and contractors of new plumbing code regulations requiring efficient plumbing fixtures, and other efforts.”

Water conservation tips are included on the City's website, the annual Consumer Confidence Report, and displays at the City Hall in an attempt to educate customers about the methods and reasons for conserving water. The City will continue these public education efforts with improvements in the future.

By itself, a public education program, which is comprised of program promotion, theme shows and fairs, and speakers bureaus for the City of Bonney Lake, can save between two percent and five percent of total system water use during non-crisis periods. The cost associated with the City's proposed program is approximately \$2,000 per year (including all customer assistance). A water usage reduction of two percent each year would equal approximately 30 million gallons of water annually at a value of \$35,000. This means that the value of water would only need to

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be \$0.07 per 1,000 gallons to be cost-effective, which is well below the City's current charge of \$1.14 per 1,000 gallons. Although it is cost-effective (i.e. less money spent on the program than the value of the water saved), revenues will decrease by the amount of water saved. However, the City will pursue the measure because it is prudent to support the City's long-range efforts to conserve water despite the decrease in revenues.

Theme Shows and Fairs - This measure requires that a portable display be made, along with educational materials to be exhibited at local fairs and theme shows. This measure is only required by large public water systems.

The City has not been involved with promoting conservation at theme shows and fairs. Although the measure is not required for the Bonney Lake system, the City will consider displaying any program promotion materials developed at City events. The cost of this program and its predicted water savings are included in the program promotion measure above.

Technical Assistance

Purveyor Assistance - This item is described in the *Conservation Planning Requirements* as "assistance from wholesale suppliers to aide wholesale customers in developing and implementing conservation programs tailored to their needs, and in carrying out the wholesale supplier's conservation program."

This measure will not be included in the City's conservation program at this time, because the City currently does not have any wholesale customers.

Customer Assistance - The *Conservation Planning Requirements* defines this conservation measure as the utility providing "assistance and information to customers which facilitates water conservation."

Water conservation information will be disseminated to customers in the distributed brochures and web site articles described above under "Program Promotion". The cost of this program and its predicted water savings are included in the program promotion measure section.

Technical Studies - This measure, primarily for larger systems, requires that "Studies would be designed and conducted by the public water system and/or regional organization."

The City will utilize studies conducted by larger water systems as they become publicly available. These studies will be used to evaluate the latest water conservation techniques applicable to the City's water system and how they can best be implemented. Since the City will utilize existing reports from other water purveyors, this method can be considered cost-effective.

Bill Showing Consumption History - According to the *Conservation Planning Requirements*, water billings for large and medium water systems should display a comparison of current water use with past water use from the same period of the previous year, and show a percent increase or decrease.

The City currently provides one year of consumption history on water bills.

System Measures

Source Meters - Metering of all sources is required for all new or expanding public water systems needing additional water rights.

Every source has a water meter that is read and recorded on a daily basis. The City also tabulates monthly and yearly totals from the source data. The meters are periodically tested and repaired or replaced, as necessary. While the City does not expect to receive any additional water savings from this program, the maintenance of source meters is vital for accurate unaccounted-for water calculations.

Service Meters - The *Conservation Planning Requirements* recommends that all utilities install individual service meters for all water users and maintain a periodic meter testing and repair program.

All of the City's service connections are metered. In addition, the City has an on-going customer meter replacement program, which attempts to replace meters every 25 years. Approximately two percent of all meters are replaced every year with a goal to replace four percent per year. The cost of this program is approximately \$40,000 per year. If water meters are recording less water than what is actually used, the City's revenue will increase and the amount of unaccounted-for water will decrease.

Unaccounted Water/Leak Detection - This measure is defined in the *Conservation Planning Requirements* as the following: "Conduct a regular and systematic program of finding and repairing leaks in system mains and laterals. This includes on-site testing using computer-assisted leak detection equipment on water distribution mains, valves, services, and meters." If unaccounted-for water is greater than 20 percent, the conservation program must include a program to detect and repair leaks, evaluate and repair meters if the meters are not functioning properly, or correct other system operation problems that may be contributing to the high level of unaccounted-for water.

The City experienced approximately 10 percent unaccounted-for water in 2003, with a 10-year average of 15 percent. Recent leak detection tests estimate that seven to ten percent of system water is lost to leaks. The leaks found by the leak detection testing have either been repaired or will be repaired as a part of the City's leaky water main replacement program. Leaks associated with customer meters shall be handled under the meter replacement program.

A large amount of the unaccounted-for water is likely from unauthorized use of fire hydrants, unauthorized use of water services during new construction, insufficient recordkeeping of usage by the fire department and insufficient recording of water used by the City for water and sewer main flushing. The City will attempt to improve the recording of these unaccounted sources of water. In addition, the City has had problems with the accuracy of billing records in the past, which may lead to an inflated unaccounted-for water percentage. The City will work to improve the accuracy of its billing system to lower the amount of unaccounted-for water.

The City will continue and improve its leak detection program and implement its \$6,000,000 leaking water main replacement program over the next three years in attempt to find any system leak and reduced the unaccounted-for water to less than 5 percent. The City's leak detection

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program will then be conducted annually with an expected cost of \$45,000 each year it takes place. The total cost of the leak detection program over 6 years is \$270,000 per year. The City expects to see a savings of two percent of the annual consumption, or 22 million gallons per year, by instituting this program. The value of this water is estimated at over \$25,000 annually, making this measure cost-effective. Leaks that are repaired can also have additional cost benefit through an extension in the service life of the water main.

In 2000, the City began a program to meter water used for construction and flushing. A program to record water used during construction can be cost-effective. Assuming that 21 MG of water is used per year for construction purposes, the City could increase revenue by \$24,000 per year for a minimal annual cost to maintain the program.

Incentives/Other Measures

Single-Family/Multi-Family Kits - The *Conservation Planning Requirements* defines this measure as the following: “Distribute kits containing easily installed water saving devices to single-family residential homes and the owners and managers of apartment buildings and condominiums.” These kits could include shower flow restrictors, toilet tank water displacement bags, leak detection dye tablets for toilets, and informational brochures.

The 1993 State Plumbing Code requires all new construction to install fixtures that comply with the following maximum water usage: toilets - 1.6 gallons per flush, urinals - 1.0 gallon per flush, shower heads and faucet aerators - 2.5 gallons per minute.

The City currently encourages voluntary water conservation by providing informational flyers to homeowners which contain simple methods for and the associated cost benefits of reducing water consumption. The City has supported regional plumbing retrofit programs in the past and will continue to enforce the use of low-flow plumbing fixtures through the building permit process. By continuing to enforce the use of these fixtures, the City can ensure that water conservation is achieved through the replacement of older fixtures with new, low-flow fixtures.

The City will allocate approximately \$1,000 annually to this program and provide customers with indoor and outdoor kits. The water savings from these kits are estimated at 9.5 gallons per day per capita for a conservation kit, which includes a reduced flow shower head, toilet tank displacement bag, toilet leak detection tablets, drip gauge and two faucet aerators. Assuming a cost of \$10 per kit, the City could provide 100 kits each year. Assuming an additional 100 kits are handed out each year, one kit per household and the average household has 2.94 people, the water savings over 6 years is an average of 3.5 million gallons per year. The value of this saved water is just over \$4,000, which makes this measure cost-effective.

It is estimated that 20 percent of homes have toilets that leak. The City will consider including dye tablets to detect toilet leaks in the indoor conservation kits. By repairing the toilet an estimated 4.8 gallons per capita per day could be realized further conserving water. The customer shall determine whether to repair the leak or not, so water savings from this method are difficult to estimate.

Nurseries/Agriculture - The *Conservation Planning Requirements* defines this measure as the following: “Encourage and/or require the application of current technology to water use practices of large agriculture/irrigation operations. Examples include nurseries and commercial agriculture.”

This measure will not be included in the City's conservation program at this time, because the City currently does not have any customers in this category.

Landscape Management/Playfields - Xeriscaping - The *Conservation Planning Requirements* defines this measure as the following: "Promote low water demand landscaping in all retail customer classes (private, public, commercial, industrial, etc.)." The promotion of low water demand landscaping can be accomplished by (1) preparing a demonstration garden which can provide an example of this type of landscaping to interested customers and developers, (2) working with local nurseries to promote the availability of low water demand plants and/or (3) developing codes that require landscaping on new development that is of the low demand type. The Water Conservation Coalition of Puget Sound works with the landscape industry to promote water conservation practices within the industry and to its customers. The Water Conservation Coalition of Puget Sound has worked with the Washington Association of Landscape Professionals and the Washington State Nursery and Landscape Association to develop informational brochures on proper irrigation and landscaping practices.

The City will develop a landscaping ordinance that gives preference to xeriscaping and other conservation landscaping techniques. The City will consider making conservation landscaping techniques mandatory in the future. The City encourages the use of drought resistant landscaping in City projects.

Outdoor water use can average between 30 and 60 gallons per person per day depending on the climate and landscape requirements, which can decrease irrigation water use by 10% to 20%. For cost-effectiveness analysis, the City used the lower range of 30 gallons per person per day, and a savings of 1% per person, due to limited implementation of water-efficient landscaping. Based on these assumptions, the estimated water savings each year is 9 million gallons, with a value of nearly \$10,000 dollars. The City will budget \$500 for this program, which makes this measure cost-effective.

Conservation Pricing - All conservation programs are required to consider the benefits and costs of implementing rate design techniques to provide economic incentives to conserve water.

The City currently charges a base rate for the first 7,480 gallons of water usage with an overage charge for water usage over this amount. This overage charge during winter months is 100 percent more than the base rate and during summer months is 240 percent more than the base rate.

Utility Financed Retrofit - This measure requires that large water systems "install water efficient fixtures in existing residences and commercial/industrial facilities by: (a) providing fixtures at no cost, (b) giving a rebate for consumer purchased fixtures, or (c) arranging for suppliers to provide fixtures at a reduced price." The evaluation of this measure is not required for Bonney Lake, because the *Conservation Planning Requirements* list it as a recommended measure for large and regional systems only.

The City does not plan to initiate a utility financed retrofit until the City has a larger customer base and the funds to operate a retrofit program. The City will monitor the number of customers interested in this type of program and determine its cost-effectiveness in the future.

Seasonal Demand Management - This includes conservation measures aimed at controlling peak seasonal demand. The evaluation of this measure is not required for Bonney Lake, because the *Conservation Planning Requirements* lists it as a recommended measure for large and regional systems only.

The City does not currently distribute mandatory lawn watering calendars to its customers. Although seasonal demand management is not required, the City will consider implementing a lawn-watering schedule to control summertime peak water demands and maximize lawn watering efficiency in its program promotion efforts.

Recycling/Reuse – Ecology requires that the large public water systems “Examine opportunities for water reuse and recycling as an approach to providing additional water.” A list of Bonney Lake’s largest water users in 2003 is shown in **Table 4-3** of the City of Bonney Lake’s Comprehensive Water System Plan. The use of reclaimed water by these customers may have the most impact on reducing overall water consumption. The top fifteen water user can be divided into five broad categories: schools, municipal uses, grocery stores, retail stores, and multi-family; therefore, the City will strive to pursue water reclamation activities that target these large water users. For more information, the City’s Water Reclamation Checklist is located at the end of the Conservation Plan.

The City will evaluate methods that would provide reclaimed or recycled water for non-potable uses such as irrigation, commercial and/or other beneficial uses.

Sumner and Dieringer School Districts

Potential Use: Landscape irrigation at schools

Potential Water Savings: 125,000 gallons per year

Operational Feasibility: Both the Sumner and the Dieringer School District’s schools are spread out over the City’s water service area. Irrigation pipe and associated appurtenances will need to be constructed to supply reclaimed water to the schools. Alternatively, water trucks may instead be used to haul water to the school sites. Regular irrigation of all landscaping would require a significant effort from City or school district staff.

Financial Feasibility: Construction of the irrigation pipe would be extremely expensive and with a potential water savings of less than \$100 annually, this measure may not be financially viable. Further financial analyses should be performed to determine potential cost sharing opportunities that may be achieved between the City, the school district, and other potential reclaimed water users that may be located along the proposed alignment. The labor hours necessary to haul water to irrigate all landscaping is more than the cost savings that may be realized by using reclaimed water.

Potential Use: Toilet and urinal flushing.

Potential Water Savings: 4,100,000 gallons per year.

Operation Feasibility: Pipe would need to be installed from the City's Wastewater Treatment Plant to the schools to provide reclaimed water for use in toilets and urinals. The plumbing at the schools would also need to be modified to use the reclaimed water for flushing.

Financial Feasibility: Construction of the pipe would be highly costly. Further financial analyses should be performed to determine potential cost sharing opportunities that may be achieved between the City, the school district, and other potential reclaimed water users that may be located along the proposed alignment.

Municipal Uses

Potential Use: Street sweeping, landscape irrigation for parks, washing sidewalks, dust control and other construction purposes.

Potential Water Savings: 300,000 gallons per year.

Operational Feasibility: The City could use reclaimed water from the wastewater treatment plant for street sweeping, dust control and other construction purposes, and washing sidewalks. Watering trucks would need to be filled with water at the wastewater treatment plant or at a new reclamation plant, depending on the source of the reclaimed water. The trucks would then go to the work sites and perform their function normally.

Financial Feasibility: Since the water trucks need to be filled with water regardless of the water source, there would be minimal additional cost for filling trucks with reclaimed water. The cost savings from utilizing reclaimed water would be more than the additional costs associated with this option.

Potential Use: City Parks, Trails, and Landscape Areas.

Potential Water Savings: 2,000,000 gallons per year.

Operational Feasibility: The City's parks and landscape areas are spread out over the City. Irrigation pipe and associated appurtenances will need to be constructed to supply reclaimed water to these sites. Alternatively, water trucks may instead be used to haul water to the sites. Regular irrigation of all landscaping would require a significant effort from City staff.

Financial Feasibility: Construction of the irrigation pipe would be highly costly. Further financial analyses should be performed to determine potential cost sharing opportunities that may be achieved between the City and other potential reclaimed water users that may be located along the proposed alignment. The labor hours necessary to haul water to irrigate all landscaping is more than the cost savings that may be realized by using reclaimed water.

Potential Use: Flushing of sanitary sewers.

Potential Water Savings: 15,000 gallons per year.

Operational Feasibility: The City could utilize reclaimed water when flushing sanitary sewer lines by using trucks to provide reclaimed water. Extra labor would be required due to the use of trucks compared to using municipal water on site.

Financial Feasibility: The extra costs associated with using trucks to provide reclaimed water for flushing sewer mains would be cost prohibitive for the City at this time. The City will look into the cost-effectiveness of providing reclaimed water for sanitary sewer flushing in areas that do not have municipal water on site such as new developments during construction.

Conservation Program Schedule and Budget

The conservation measures described above and selected for implementation by the City are summarized in **Table 1** with their corresponding schedule and budget. The successful implementation of this conservation program is expected to achieve a five percent water use reduction by the year 2010 and meet the other goals and objectives stated earlier.

Conservation Program Monitoring

The City will continue to monitor overall water use, per capita water use, and the amount of unaccounted-for water on an annual basis. The City will monitor the success or failure of its water conservation program by analyzing this data and determining the long-term trend in per capita water usage. The City will also evaluate the cost-effectiveness of water conservation methods, both implemented and not implemented, to determine if existing methods should be continued, or if new methods should be instituted. If the results of the program monitoring show that the water savings' goals for per capita water use are not being met, more rigorous program implementation or additional program items will be considered.

**Table 1
Conservation Program Schedule and Budget**

Conservation Measure	Schedule	Budget
Public Education		
Program Promotion	Ongoing	\$1,000/yr
Technical Assistance		
Customer Assistance	Ongoing	\$1,000/yr
System Measures		
Source Meters	2005	\$2,000
Service Meters - maintenance, repair and replacement	Ongoing	\$6,500/yr
Unaccounted Water/Leak Detection	2005-2007	\$2,000/yr
Incentives/Other Measures		
Single-Family/Multi-Family Kits	Ongoing	\$1,000/yr
Landscape Management/Playfields - Xeriscaping	Ongoing	\$500/yr
Conservation Pricing	Ongoing	\$500/yr
Seasonal Demand Management	Ongoing	\$500/yr
Water Recycling and Reuse Investigation	2010	\$1,000/yr

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Appendix D – Water System Standards

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SECTION 400 – WATER SYSTEM STANDARDS

401 GENERAL CONDITIONS

1. Method of Extensions: Extensions (a) may be constructed by the City and financed by means of assessments against the property benefited within the limits of the Utility Local Improvement District formed for this purpose, or (b) may be constructed by the property owner or Developer in accordance with these regulations. No extension of the City's system by owner or Developer will be permitted until all applications and permits required hereunder have been approved by the City and all provisions of the City's regulations concerning such extensions have been fulfilled.

Extensions shall be designed and sized to service all adjacent areas. Extensions will be installed to the "far" property line(s) to provide access to future development, as determined by the City. Extensions shall be installed within public rights of way, tract areas that will be dedicated to the City or easements that will be granted to the City and are consistent with the requirements in Section 300. The City shall reserve the right to determine where easements will be provided in lieu of tract areas.

2. Annexation: Territory adjacent to the City's water service area, which is not already served by another water utility, may be annexed in accordance with State law. Information regarding annexation procedures will be furnished upon request.
3. Procedural Notes:
 - a. At the time that the preliminary proposal is submitted to the City, a letter requesting the availability of water should be submitted to the City for approval. A map showing the area to be served should accompany this request.
 - b. Prior to the design review of water mains, a Developer's Agreement for Water Main Extensions must be signed by the Developer and approved by the City Council. The Agreement should be accompanied by an application fee in the amount as set forth by current City ordinance. After the agreement is approved by the City Council, the Developer may authorize his/her consulting engineer to proceed with design and furnish the City six copies of the preliminary drawings. After review and approval by all applicable agencies the Developer's engineer shall provide six copies of the final water system extension design to the City. Drawing standards shall be as described in Section 200.
 - c. It is required that the Developer secure the appropriate bonds as described in Section 300, and that Washington State licensed and bonded contractors be employed by the Developer.
 - d. The City shall be notified at least five (5) working days in advance of start of work. The City at this time may require a preconstruction conference. Any work that is performed without proper notification of the City may be summarily rejected.
 - e. During the progress of the work, the City shall be kept informed and inspection will be required. The City will determine the amount of inspection required and the Developer shall pay all costs incurred during said inspection as specified in Sections 200 and 300.

- f. Testing of improvements is required by the City as specified herein. The Developer shall be required to reimburse the City for all costs related to conducting tests including the cost of testing laboratories.
 - g. All fees shall be paid prior to ordering meters. This includes cut-in fees, engineering fees, inspection fees and connection charges that might be applicable.
 - h. The Developer shall furnish the City with all necessary As-Built Drawings prepared as specified in Section 300.
 - i. The Developer shall furnish the City with a detailed cost break-down showing the total cost of construction.
 - j. The Developer shall furnish the City permanent executed and recorded easements that are necessary or applicable to this installation. The easements shall be as specified in Section 300.
 - k. The Developer shall furnish to the City a Maintenance Bond as described in Section 300.
 - l. Any areas where excessive pressure exists (in excess of 80 pounds per square inch) the Developer is responsible for the installation a “regional” PRV station. The City will have sole and exclusive discretion in the determination of need for said PRV stations.
 - m. After acceptance of the Water System by the City, the Developer shall promptly sign a Bill of Sale (in format approved by City) deeding these improvements to the City.
4. Notification Required: Notification by the applicant shall take place in writing to the City Engineer:
- a. Five (5) working days prior to starting construction or any excavation.
 - b. Three (3) working days prior to any cut-in.
 - c. Five (5) working days prior to final inspection and acceptance.
 - d. Provide coordination with any other contractors or utilities, which may be affected by the extension construction, including proper notification of the “one-call” locating service prior to construction.
 - e. Complete the work, including cleanup, to the point where the work complies with the plans and specifications, and is ready for acceptance by the City within the time limit provided.
 - f. The City will notify customers (written “door” notification) of any water shutdown at least 24 hours in advance of scheduled shutdown.

5. Review and Approval Fees: The fee for service shall be on a time- and expense-basis. The Developer will be invoiced for actual costs incurred in the project review and approval process by the City of Bonney Lake, plus an additional amount to cover administrative and accounting costs as allowed under the Bonney Lake Municipal Code. The City will not give final approval of the improvements until all fees are paid. Review and approval fees for Developer Extensions cover the following:
 - a. Preapplication conference with the City Engineer on schematic drawings, as may be required/desired by the Developer and/or City.
 - b. Review of final design by the City Engineer of extensions granted preliminary approval.
 - c. Inspection and approval of the work in progress.
 - d. Inspection and approval of pressure tests.
 - e. Review and approval of Record Drawings.
 - f. Taking and submitting water samples for bacteriological test(s).
 - g. Legal review as necessary.
 - h. Other work necessary to assure compliance with City standards.
6. System Development Charge: The City presently has a system development charge for installation of meters for new water services. These fees are as currently established by the City Council and must be paid prior to meter installation and activation of the water service.
7. Late Comers Agreement: The City may enter into an agreement for reimbursement with the Developer, upon request, for those properties that can be served from the construction of a water extension that are not a party to this Agreement. The reimbursement will be in accordance with the current policies of the City.

All review(s), approval(s), and fees associated therewith, as may be required or solicited by the City in regard to planning, design, and/or construction of said extension, modification, connections, or revisions to the City system shall be assessed to the developer/proponent and such reasonable costs shall be promptly paid to the City upon receipt of said billing by the City prior to permits and/or approvals being granted by the City as may be applicable.

402 SPECIAL CONDITIONS

1. Grade and Alignment: The water main shall be installed on the ground or roadway rough grade with 42 inches minimum cover. The notice by the Developer to the City that the ground or roadway is ready for water main installation shall be considered a representation that the Developer has brought the ground or roadway to grade or subgrade, and that he intends no further grading work. Any modifications of the main or appurtenances required to adjust to grade changes shall be at the Developer's expense. If the Developer contemplates off-roadway grading after installation of the water main that will affect the setting of fire hydrants or other appurtenances, he shall so state in writing prior to the installation of the main. Any adjustments required by such grading shall be at the Developer's expense.

2. Cross Connection Control: Washington State Department of Health (DOH) regulations with regard to the protection of the public through the provisions of minimum requirements for design, construction, operation and maintenance of public water supplies are adopted herein by reference, and all applicants shall comply with such requirements and standards. Developers shall familiarize themselves with these regulations and insure compliance with to protect the public health. These referenced regulations and standards are minimum, and the City specifically reserves the right to require additional safety features and items as may be deemed appropriate by the City's Public Works Department.
3. Pressure Reducing Valves (PRV), Pressure Relief Valves, and Pressure Reducing Stations: There are two uniform plumbing codes. One is prepared by the International Association of Plumbing and Mechanical Officials; another is prepared by the International Conference of Building Officials. Both codes require installation of pressure reducing systems in the water system when static pressures exceed 80 psi. As a general rule, a PRV station as detailed herein will be required.
4. System Valves: System valves shall be installed at intervals of no more than 1,200 feet.

403 MINIMUM FIRE FLOW REQUIREMENTS

<u>Type of Development</u>	<u>Minimum Fire Flow Required (gpm)</u>	<u>Minimum Duration (Minutes)</u>
One and Two Family	1,000	45
Multi-Family	2,500	120
Commercial	2,500	120
Industrial	3,500	180

Flows shown above are minimum flows only for main extensions required for land development. Actual fire flow requirements for building permit approval/acquisition within the City of Bonney Lake shall be in accordance with Appendix B, Fire-Flow Requirements for Buildings, of the International Fire Code, currently adopted edition. Actual fire-flow requirements for building permit approval/acquisition shall be determined in accordance with Pierce County Code 15.12.083 when application is made for a County Building Permit.

404 MAXIMUM HYDRANT SPACING BASED ON MINIMUM FIRE FLOW REQUIREMENTS

<u>Type of Development</u>	<u>Maximum Spacing Between Fire Hydrants</u>
One and Two Family	600
All Others	300

1. Hydrants shall be provided along adjacent public and private roads. The location of fire hydrants shall be approved by the Fire Marshal and the City Engineer prior to installation. When practical, hydrants shall be located at street intersections.
2. In areas designated for one- and two-family development, fire hydrants shall be provided along adjacent public and private roads in such a manner as no lot is more than 400 feet (as measured from the center of the lot) from hydrant. In areas designated for all other types of development, fire hydrants shall be provided along adjacent public and private roads in such a manner as no lot is more than 300 feet (as measured from the center of the lot) from a fire hydrant.

3. Unless otherwise approved by the City, where streets are provided with median dividers or where arterial streets are provided with three or more traffic lanes and have a traffic count of more than 12,000 per day, fire hydrants shall be provided along both sides of adjacent public roads. Maximum hydrant spacing shall be in accordance with this section and shall be arranged on alternating basis.
4. Hydrants shall be supplied by 8 inch or larger water mains. Hydrants may be supplied by 6-inch water mains only if the main is less than 50 feet in length and if the main is part of an existing loop. In no case shall any hydrant be supplied by any water main smaller than 6 inches in diameter.

405 NUMBER OF HYDRANTS FOR BUILDING PERMIT APPROVAL

The number of fire hydrants required for the approval/acquisition of building permits shall be determined by the required fire flow for the building per Appendix B of the International Fire Code and the maximum spacing requirements outlined in Section 404. A minimum of one fire hydrant shall be provided for every 1,250 gallons per minute (gpm) of required fire flow or fraction thereof.

406 MATERIALS AND INSTALLATION

406-1 ENGINEERING SPECIFICATIONS

All work shall be constructed in conformance with the most current *Standard Specifications for Road, Bridge and Municipal Construction* and current amendments thereto, State of Washington revised as to form by the APWA Supplement to make reference to Local Governments, herein referenced to as "Standard Specifications" and the "Conditions and Standards" as adopted by the City, shall be included as part of the "Specifications." Where the Standard Specifications and the "Conditions and Standards" conflict with one another, the "Conditions and Standards" shall take precedence.

406-2 MATERIALS

1. General: The type or class of materials to be used shall be as shown on the project plans reviewed and approved by the City. Where no specific reference is shown, the following specifications shall govern the materials used. All materials shall be new and undamaged, of a known brand, with replacement parts readily available from the general Seattle/Tacoma area.

Prior to the installation of any facilities required for the project, all materials shall be approved by the City.

All reference specifications herein shall be of the latest revision.

2. Ductile Iron Pipe: The class of ductile iron pipe shall be Class 53 for 4-inch pipe and Class 50 for 6-inch and larger diameter pipe. Six-inch hydrant spools shall be Class 53.

The pipe shall have a nominal inside diameter of the size indicated on the City-approved Plans or as otherwise stated herein. All ductile iron pipe shall be push-on or mechanical joint. All pipe shall be of one manufacturer and be carefully installed in complete compliance with the manufacturer's recommendations and these Specifications. The City shall approve the manufacturer of ductile iron pipe. Preapproved manufacturers are:

- Pacific States Cast Iron Pipe Company
- Griffin Pipe Products Co.
- United States Pipe and Foundry Company

When necessary, water mains to be constructed under other utilities shall meet the minimum cover requirements. Where it is necessary to cross sanitary sewer or storm drain trenches, all trench backfill shall be removed and replaced with mechanically compacted granular material to provide a uniform support for the full length of the pipe.

The DOH requires a 10-foot horizontal separation between all sanitary sewer lines and water mains. A 5-foot horizontal separation is required between all water facilities and underground power, telephone, and other similar-type facilities. These dimensional separations shall be adhered to unless otherwise approved by the City.

Service Line Materials:

- a. Ductile Iron Service Pipe: Service connections greater than 4 inches in diameter shall be ductile iron pipe Class 50, or as approved by the City. Service lines 4 inches in diameter or less may be ductile iron Class 53, or as approved by the City.
 - b. Polyethylene Tubing: All service connections from the water main to the customer's service shall be made with polyethylene tubing SIDR 7 (I.P.S.) in conformance with WSDOT Standard Specifications, unless otherwise approved.
3. Fittings:
- a. Ductile Iron Fittings: Fittings for ductile iron pipe shall be ductile iron or Class 250 gray iron conforming to AWWA C110 and C111, and shall be cement-mortar lined conforming to AWWA C104 (ANSI Standard A21.4).

Rubber gaskets for push-on (Tyton) or mechanical joint (M.J.) in accordance with ANSI Standard A21.11 (AWWA C 111).
 - b. Transition, Reducing and Flexible Couplings: Couplings for steel pipe or asbestos cement pipe shall be Smith Blair or Romac. Couplings for cast iron pipe, ductile iron pipe, and PVC pipe shall be long-pattern sleeve mechanical joint.
4. Tapping Tee and Tapping Valve: Tapping tees shall be as specified in the standard plans.

5. Casing (Main Line): Welded steel pipe casing shall meet or exceed ASTM Designated A53 or comparable. Minimum wall thickness shall be determined by the city depending on local conditions and applications. Casing spacers and end seals (Cascade or owner-approved equivalent) shall be installed per the manufacturer's recommendations.
6. Fire Hydrants: Fire hydrants shall be a breakaway type and conform to AWWA Standard C502-73 and be one of the following types: Clow (Medallion), Waterous (Pacer), M&H (929), American AVK (Series 2780), or Mueller (Centurion).

They shall be non-rising stem compression-type which open counter-clockwise, and close with pressure. The main valve opening diameter shall be 5-1/4 inches, and the hydrant barrel shall have a diameter of 7 inches unless otherwise specified. The hydrant seat and hydrant seat retaining ring shall be bronze. All external bolts, nuts and studs shall be cadmium plated in accordance with ASTM A165 Type HS or rust proofed by some other process approved by the City. Gaskets shall be of rubber composition. Stortz adaptors are required on all fire hydrant assemblies.

The fire hydrants shall be painted with two (2) coats of rust inhibitive enamel paint, white in color or as specified by the City. See the standard details for additional specifications.

Fire hydrants shall be set as shown in the standard details.

No tool other than an approved hydrant operating wrench shall be used when opening or closing hydrant. Existing hydrants shall not be operated by the Contractor.

7. Gate and Ball Valves: Valves, 2 inches through 16 inches, shall be gate valves and conform with the requirements of AWWA Standard Specifications for gate valves for ordinary water works Service Number C 500 and C 509, except where superseded by the following:
 - a. They shall be iron body with epoxy coating inside and out with vulcanized resilient rubber wedge seat. The valves shall be non-rising stem, open to the left, and shall be equipped with standard 2-inch-square opening nuts. Valves shall be equipped with "O ring" packing. Valves shall be M&H, Waterous, Clow or Mueller.
 - b. One and one-half inch (1-1/2") and smaller diameter valves shall be ball valves approved by the City. Said ball valves shall be equipped with a slotted operator, and with an adapting 2-inch-square operating nut (Ford Cat. No. QT 67, or equal) secured with a stainless steel cotter pin.
 - c. Gate valves shall be set in the ground vertically and shall be opened and shut under pressure to check operation and, at the same time, show no leakage. Valves 6 inches and larger that are not flanged to other fittings shall be blocked in accordance with the standard plans.
8. Butterfly Valves: All valves larger than 16 inches shall be butterfly valves. Butterfly valves shall be Class 150 or better, either M&H 450 or 4500 or Pratt, and shall meet the requirements of AWWA C-504-70.
 - a. Valve shafts shall meet or exceed the strength requirements of AWWA C-504-70 and be one piece. Packing shall be "O ring" or other design approved by the City.

- b. Butterfly valves to be installed underground shall have sealed mechanical operators, open to the left and have 2-inch standard square operating nuts.
 - c. Complete manufacturer's specifications for the valves proposed for use shall be submitted to the City for approval. No valves shall be used which have not been approved by the City.
 - d. Butterfly valves shall be installed and tested in the same manner as gate valves. The Contractor is cautioned to test Butterfly Valves in strict compliance with manufacturer's recommendations. Test pressure may need to be adjusted accordingly.
9. Blow-Off Assembly: Installation and materials for blow-off assemblies shall be as shown on the standard plans. Blow-offs shall be installed at all dead ends and when directed by the City at low points in the water distribution system. The City shall determine the appropriate size of blow-off assemblies.
 10. Air and Vacuum Release Assembly: Air and vacuum release assemblies shall be sized and approved by the City Engineer and installed as shown in the standard details. Location of air and vacuum release valves shall be at localized high points of the system. Where required by the City's Engineer, the vertical alignment of the new main shall be designed to alleviate the need for these types of valve assemblies at "localized" system high points.
 11. Valve Boxes: Valve boxes shall be set flush in pavement with concrete collars. In gravel shoulder and in unimproved roadway areas, install a protective asphalt pad as shown in standard plans. Valve boxes shall be installed as shown in the standard plans.
 12. Valve Stem Extensions: Installation and materials for the valve stem extensions shall be as shown on the standard plans.
 13. Concrete Marker Posts: Concrete marker posts shall be 4 inches minimum square section and a minimum of 42 inches in length, with beveled edges and continuing at least one 3/8-inch by 37-inch bar of reinforcing steel. Paint shall be as for fire hydrants. Marker posts shall only be installed in approved locations as determined by the City.
 14. Locating Wire: Locating wire shall be required for all non-metallic pipe materials. Installation and materials for locating wire shall be as shown on the standard details. Continuity testing shall be completed as required by the City.
 15. Meter Boxes: Installation and materials for meter boxes shall be as shown on the standard details.
 16. Service Saddles: Installation and materials for service saddles shall be as shown on the standard details.
 17. Meters: Meters will be Neptune or Sensus touch-read.
 18. Asphalt Concrete Pavement Repair: See Section 600.
 19. Concrete Blocking: Installation and materials for concrete blocking shall be as shown on the standard details.

407 METHODS OF CONSTRUCTION

1. General: A preconstruction conference will be held at the City office prior to start of construction.
2. Alignment: All new water mains shall be placed 5 feet north or east of the centerline of the street right-of-way in all new plats and/or undeveloped rights-of-way. New water mains in and along existing roadways will be installed at a location approved by the City's Engineer. Unless otherwise specified, the location of the water mains, hydrants, valves, and principal fittings will be in accordance with the approved plans. The Developer shall provide sufficient horizontal control, in the form of centerline stakes, property corners, or other markers, as required for proper pipe location.
3. Excavation and Backfill:
 - a. Traffic to be Maintained: The Developer shall make suitable, safe, and adequate provision for necessary traffic around, over, or across the work in progress and shall schedule pavement patching to follow after backfill is completed.
 - b. Excavating in Paved Area: Prior to excavating in paved areas, the existing road surface shall be cut 1 foot (minimum) back from the outer edge of the excavation with a cutter and removed. The cuts are to be made in clean, straight lines to insure a minimum of damage to existing pavements. If the Developer fails to adequately protect the trench edges during trenching and backfilling, he will be required, at his own expense, to re-cut the edges prior to repairing the pavement.
 - c. Trench Excavation: Trench excavation shall meet the Standard Specifications and the following requirements:
 - (1) If a grade revision is made, during trench excavation, the cover over the water main must remain within the specified limits of these standards. Otherwise, the water main shall be reconstructed. All added costs of inspecting such water main reconstruction shall be charged to the Developer.
 - (2) The root systems of all trees that will not be removed during construction and are located on or near the easements and rights-of-way, shall not be cut or disturbed. Rather, they shall be tunneled or otherwise protected by the Developer to ensure that no damage is done.
 - (3) The maximum length of open trench permissible on any line, in advance of pipe laying, will be 100 feet, unless otherwise specifically approved by the City inspector.
 - (4) Upon completion of work each day, all open trenches shall be completely backfilled, leveled, and temporarily cold-patched, unless otherwise approved by the City.

- d. Trench Backfill: Trench backfill shall meet the Standard Specifications, standard details, and the following requirements:
- (1) All paved crossings shall have a temporary asphalt (cold mix) paved surfaced installed, which surface shall be a minimum of 4 inches in compacted thickness, and fully maintained level with existing undisturbed pavement until replaced with permanent repair. Sufficient cold mix to make immediate repairs and to maintain repairs until permanent repair is made, shall be on the jobsite.
- e. Boring: Boring may be ordered by the City under pavements or otherwise. The Developer may bore in lieu of open trenching for deep cuts.
4. Dewatering and Control of Water: The Developer shall dewater and dispose of the water so as not to cause injury to public or private property, or cause a nuisance or menace to the public. Dewatering systems shall be designed and operated so as to prevent the removal of natural soils.

During excavation, installation of water mains, placing of trench backfill, and the placing and setting of concrete, excavations shall be kept free of water. The static water level shall be drawn down below the bottom of the excavation so as to maintain the undisturbed state of the natural soils, and allow the placement of backfill to the required density. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. The control, routing, storage, release, etc., of storm, ground, and/or surface water shall be the Contractor's (Developer's) responsibility and be in strict conformance with all applicable regulatory agencies, applicable permits, and permit requirements. **At no time shall the Developer release groundwater into the pipe material that has been installed within the trench.** The Developer or his Contractor shall be responsible for obtaining and adhering to all relevant permits in this regard.

The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state in of the natural foundation soils, prevent disturbance of compacted backfill, and prevent flotation or movement of structures, and water mains.

In carrying out the work within the limits of streams, or an area that will drain to a stream during a rain event, the Developer is required to comply with the regulations of the appropriate local, State, and Federal Agencies.

The Developer shall contact the applicable agencies and secure such permits as may be necessary to cover his proposed method of operation within the areas described above. If no permit is necessary, and if directed by the City, he shall obtain a letter from the appropriate agency.

5. Compaction of Trench Backfill: Unless otherwise approved in writing by the City Engineer, compaction of trench material is required. The density of compacted backfill material shall meet requirements outlined in the Standard Specifications, or as otherwise approved in writing by the City. The City shall employ an independent soils laboratory to perform density test of areas specified by the City. The Developer shall pay all costs incurred by the City to employ the soils laboratory. In areas where it is demonstrated that the compaction standards have not been met, the area shall be excavated and re-compacted to the satisfaction of the City.

6. Trench Safety Systems: Safety systems that meet the requirements of the Washington Industrial Safety & Health Act, Chapter 49.17 RCW shall be provided for all trenches.
7. Foundation, Bedding, and Backfill Gravel: Foundation, bedding and backfill material shall be placed and compacted as required by the Standard Specifications and Standard Details.
8. Subterranean Road and Stream Crossings: The Developer may use methods that produce satisfactory results, and is acceptable to the City and the regulatory agencies having jurisdiction of the road or stream, provided that the Developer restores the road or stream to its original or superior condition. Normally, highway and stream crossings require the placing of a steel pipe casing by jacking or boring and laying the water main inside the casing. Casing materials and installation shall be as specified herein.
9. Erosion Control: The contractor/developer shall prepare and submit an erosion control plan for the City's review, comment, and approval prior to initiating construction activities. Erosion control plans shall be prepared in strict conformance with the most current Pierce County and Washington State Department of Ecology requirements. The City, by approving same, in no way warrants that the erosion control will satisfy Department of Ecology's requirements and assumes no liability in this regard. The Contractor shall be responsible for adhering to Best Management Practices in this regard.
10. Water Shutoff: Where it is necessary to shut off the existing mains to make a connection, the Developer shall notify the City 72 hours in advance of such shutoff, and the City will shut off the mains. Once the water has been shut off, the Developer shall diligently pursue the connection to completion so that the time required for the shutoff may be held to a minimum.

All connections to existing mains shall be completed the same day as they are started. The Developer shall have all necessary materials and equipment onsite for inspection by the City prior to shutting down service. If all materials and equipment are not available at the previously scheduled time for the shutdown, the shutdown will be rescheduled. All costs incurred by the City to reschedule a shutdown will be paid by the Developer.

Shutdowns that may affect commercial or emergency service may only be allowed during non-peak times (i.e., weekends or night hours at the discretion of the Public Works Department). **Unless otherwise approved in writing by the City, shutdowns will not be allowed on Mondays or Fridays.**

11. Service Connections: Prior to construction of the new water mains, and if so directed by the City, the Contractor or Developer shall remove, tag and deliver existing meters to the City of Bonney Lake Public Works yard and provide an approved and temporary jumper at existing meter locations in order to maintain service. The City staff will then inspect and overhaul the meters, and deliver them to the construction site when the Developer is ready to reinstall the meters.

Any relocated meters shall be reinstalled at the property line. A new service line shall be installed from the main to the meter setter (or service tee for double services). When a water main is relocated, a new service line shall be installed from the main to the meter setter (or service tee for double services). The Developer shall, at their sole expense, replace any sub-standard materials encountered during the relocation of meters and/or water mains. Any meters damaged or clogged during construction shall be replaced by the City and back charged to the Developer.

Service lines shall be installed up to the meter prior to conducting pressure testing. Upon installation, testing and disinfection of water mains, as witnessed and approved by the City, the services shall then be connected to meters.

12. Connections to Existing Facilities: Unless otherwise specified by the City, where it is necessary to connect to existing facilities, the operation of the existing facility shall be maintained, if possible, while making the connections. Wet-tap connections shall be installed as shown on the approved Plans and further detailed in the Standard Details. The tapping valve shall remain closed and operated only as directed by the City. Cut-in tees and crosses shall also be installed as shown on the City-approved Plans and the valves on the branches of the tee or cross shall also remain closed unless otherwise directed by the City. **Unless otherwise specifically approved by the City, in writing, a maximum of one connection to the existing system will be allowed until such time that pressure and purity tests of the “completed” system have been satisfactorily witnessed by the City.** The City will determine and approve of the initial “tie in” prior to installing same.

At connections of new piping to existing piping where no valve is installed to separate the system, all of the new piping, appurtenances and blocking shall have been installed, disinfected and tested up to the point of cutting into the existing line before the connection is made.

Prior to making a connection, the developer shall assemble all necessary material and equipment 48 hours before starting work to allow the City inspector to examine the material for acceptability. The City will notify all affected customers.

Before connection or cut-in, the fittings, pipes, valves, and couplings shall be cleaned and sterilized with chlorine solution in the same manner as provided for by the pipeline. The cleaning and sterilization shall be done immediately prior to installation and in the presence of the City. Once the water has been shut off, the Developer shall proceed rapidly and without interruption to complete the connection.

After connection to the existing system, the opening of the valves shall be done with the authorization of, and in the presence of, the City’s authorized representative.

The Developer shall not operate any valves or make any connections to the existing water main without prior approval of the City. The Developer shall make the necessary arrangements with the City for the connection to the existing water main.

13. Testing and Disinfecting: The water main pipes shall be satisfactorily disinfected, purged and tested before being placed in service. All water for testing and disinfecting must be obtained by the Developer by arrangement with the City. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Developer. When testing, “feed” for the pump shall be from a barrel or other suitable container, wherein the actual amount of “makeup” water can be measured periodically during the test period.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All concrete blocking shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Developer shall furnish and install temporary blocking.

The pipeline shall be subjected to a hydrostatic pressure test., leakage test, and disinfected as specified in the Standard Specifications. The hydrostatic and leakage tests shall be completed, to the City's satisfaction, only after all other utilities (both public and private) and the first lift of asphalt concrete pavement or asphalt treated base installation is complete.

Following the successful completion of pressure testing, water mains larger than 8 inches in diameter shall be cleaned through the use of poly pigs as indicated below or as directed by the City:

- a. A representative of the City shall be present to witness all poly pigging of water mains.
- b. The poly pig used shall be appropriately sized for the water main to be cleaned and shall be constructed of a bare durafoam (a tough, high-density polyurethane foam) that is capable of mild scraping and cleaning of residue in new water mains.
- c. The Contractor shall prepare a poly pigging plan and submit it to the City Engineer for approval prior to testing.
- d. The poly pig shall be inserted into the main via a poly pig launch at the locations shown in the approved plan.
- e. When the poly pig is removed, all debris collected in front of the poly pig shall be removed and disposed of in accordance with all local, state, and federal regulations.
- f. If required by the City, the Contractor shall use a "cleaning poly pig" that has a tough coat of polyurethane synthetic rubber applied in a criss-cross pattern. The "cleaning poly pig" shall be launched and debris shall be removed as previously described for poly pigging.
- g. Water used to propel the poly pigs shall be obtained from the City via a nearby fire hydrant with the use of approved backflow prevention and/or required metering devices.
- h. When the City determines that the main is clean of debris and organic matter, the water main shall be disinfected in accordance with these specifications.
- i. Fees for water usage that is supplied by the City's water system shall be as determined by the City.

The water system will not be acceptable to the City until a satisfactory test report for bacteriological analysis is received from the DOH or other certified independent laboratory.

Chlorinated water used for disinfection shall be discharged in strict compliance with regulatory guidelines and requirements. The contractor shall be responsible for procuring all permits, making adequate provisions, and incurring all costs in this regard, to include, but not be limited to, City approval of point and method(s) of discharge, hoses, trenching, hauling, etc.

14. Adjustment of New and Existing Utility Structures to Grade: This work consists of constructing and/or adjusting all new and existing utility structures encountered on the project to finished grade.

On asphalt concrete paving projects, the valve boxes shall not be adjusted until the pavement is completed, at which time the center of each valve box lid shall be relocated from references previously established by the Developer. The valve box lid shall be cleaned and free of debris prior to re-installation.

The asphalt concrete pavement shall be cut and removed to a neat circle, as further noted herein, and shown in the Standard Details. The valve box and lid shall be brought up to desired grade, which shall conform to the surrounding road surface. A concrete collar shall be placed per the Standard Details. Care shall be exercised to insure the valve box is oriented as shown in the Standard Details.

Asphalt concrete patching shall be completed in strict conformance with requirements specified in Section 600.

15. Final Inspection: The Developer shall bear all costs incurred in correcting any deficiencies found during inspection, including the cost of any additional inspection that may be required by the City to verify the correction of said deficiency. Authority of inspectors shall be as specified in Section 300.
16. Salvage: When directed by the City (or as shown on the approved construction plans), the Contractor shall salvage all abandoned fire hydrants, valve boxes, valve marker posts, hydrant guard posts, and other related appurtenances and/or pipe, and deliver the material to the City's Public Works yard. The Contractor shall prearrange delivery with the City's operation and maintenance supervisor. The Contractor shall not use salvaged materials in new construction unless otherwise approved in writing by the City. The Contractor shall remove hydrants by first cutting the supply pipe to avoid damage to the hydrant. The abandonment pipe shall be provided with a concrete plug and the excavation trench shall be satisfactorily backfilled and compacted. Excess waste shall be removed and waste hauled by the Contractor. Unless otherwise approved by the City, salvageable materials that for any reason are damaged or lost by the contractor shall be replaced with new materials and subsequently delivered to the City.
17. Standard Water Notes: The following notes shall be included on all plans for water main extensions:
 - a. Prior to any construction activity, the Developer shall arrange and attend a preconstruction conference with the City of Bonney Lake.
 - b. An approved copy of these Plans must be on the jobsite whenever construction is in progress.
 - c. All work and material shall be in accordance with the City of Bonney Lake approved standards.
 - d. All water system improvements shall be constructed in accordance with these approved Plans. Any deviation from the Plans will require approval from the owner, engineer, City and appropriate public agencies.
 - e. Notify the City of Bonney Lake five (5) working days prior to beginning construction and for any restarts of work.

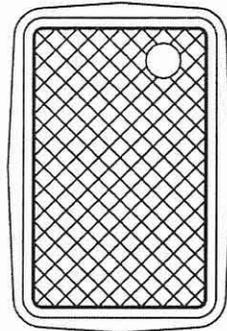
- f. The City of Bonney Lake shall be notified 3 working days prior to the time the Developer would like to connect to existing mains or for installation of tapping tees. The connection shall be done in accordance with the City requirements. Developer shall not operate any valves within the existing system; these will be operated by the City of Bonney Lake personnel only.
- g. For aid in utility location, call 1-800-424-5555, 48 hours (2 working days) prior to beginning of construction. Existing utilities, whether shown or not, shall be located prior to construction, so as to avoid damage or disturbance, and the Developer shall assume all responsibility and costs connected therewith to protect, maintain and repair, where necessary.
- h. Pipe shall be ductile iron, AWWA Class 53 for 4-inch pipe and Class 50 for 6-inch pipe or larger. Joints shall be rubber gasketed, push-on type, or mechanical joint, meeting AWWA specifications. Fittings shall be AWWA, cement lined, ductile iron, either mechanical joint or flanged, as indicated herein.
- i. Unless otherwise specified valves 12 inches and smaller shall be resilient seated gate valves: Acceptable valves are Mueller, Clow, M&H or Waterous. Valves larger than 12 inches shall be butterfly valves. Acceptable valves are M&H 450 or 4500 or Pratt equivalent.
- j. Hydrants shall be Mueller Centurion A-423, Clow Medallion, Waterous (Pacer), American AVK (Series 2780) or M&H (929). Hydrants shall conform to AWWA Standard C502-73.
- k. The water main construction phase will not be considered complete until the installation is acceptable to the City of Bonney Lake including a satisfactory hydrostatic pressure test, a satisfactory disinfection test, satisfactory flow of service lines, and completion of all items on the inspector's punch list.
- l. When directed by the City (or as shown on these approved construction plans), the Contractor shall salvage all abandoned fire hydrants, valve boxes, valve marker posts, hydrant guard posts, and other related appurtenances and/or pipe, and deliver the material to the City. Unless otherwise approved by the City, salvageable materials that for any reason are damaged or lost by the contractor shall be replaced with new materials and subsequently delivered to the City.

WATER STANDARD DETAILS

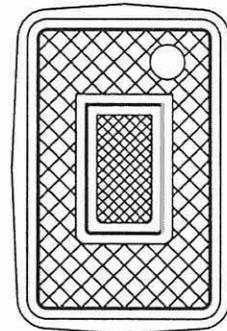
STANDARD WATER METER BOX	W1
WATER MAIN TRENCH SECTION	W2
TYPICAL UTILITY CROSSING	W3
CONCRETE THRUST BLOCK	W4
VERTICAL ANCHOR BLOCK	W5
WET TAP CONNECTION	W6
CUT IN CONNECTION	W7
FIRE HYDRANT INSTALLATION	W8
WATER SYSTEM VAULT	W9
1" AND SMALLER WATER SERVICE	W10
1-1/2" AND 2" WATER SERVICE	W11
METER ASSEMBLY 3" THROUGH 6"	W12
2" BLOW-OFF ASSEMBLY	W13
AIR AND VACUUM RELEASE ASSEMBLY	W14
WATER SAMPLING STATION	W15
VALVE BOX	W16
DOUBLE-CHECK DETECTOR WITH FIRE CONNECTION	W17
PRESSURE REDUCING STATION	W18
WATER VALVE STEM EXTENSION	W19
REDUCED PRESSURE BACKFLOW DEVICE	W20
"INDIVIDUAL" DOUBLE-CHECK DETECTOR ASSEMBLY	W21
FIRE SPRINKLER LINE WITH DOMESTIC SERVICE	W22

TRAFFIC AREA:
SOLID DUCTILE IRON LID

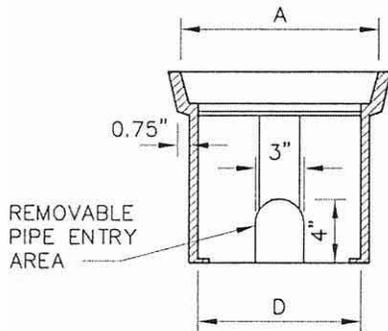
NON-TRAFFIC AREA:
DUCTILE IRON FLIP READER LID



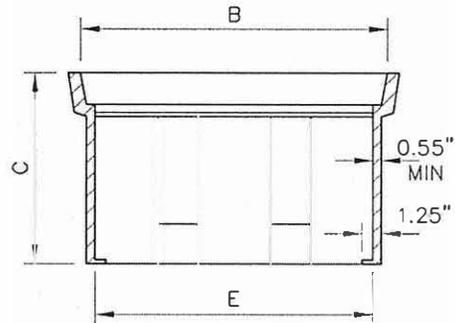
TOP VIEW



TOP VIEW



SHORT SIDE VIEW



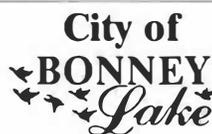
LONG SIDE VIEW

PART NUMBER	A	B	C	D	E
MSBCF1324-12	13.75"	23.1875"	12"	12.125"	21.5"
MSBCF1324-18XL	13.75"	23.1875"	18"	12.125"	21.5"
MSBCF1730-12	17.625"	30.5"	12"	16"	28.75"
MSBCF1730-18XL	17.625"	30.5"	18"	16"	28.75"

NOTES:

- METER BOXES SHALL BE MID-STATES PLASTICS (PRODUCT NUMBER AS SPECIFIED ABOVE) OR APPROVED EQUAL AND H-20 RATED WITH A DUCTILE IRON TOUCH READ LID.

1	Specified Ductile Iron Lids	12/07/06
Rev No.	Revisions	Date
Approved:		June 17, 2005
City Engineer		Date
WATER STANDARD DETAIL		



Dwg No:	W1
STANDARD WATER METER BOX	

FINISHED GRADE
OR SUB-GRADE

COMPACTED BACKFILL CONSISTING
OF SUITABLE EXCAVATED MATERIAL
OR SELECT BORROW (IN
ACCORDANCE W/WSDOT
9-03.14(2)), OR CRUSHED ROCK
AS REQUIRED BY THE CITY

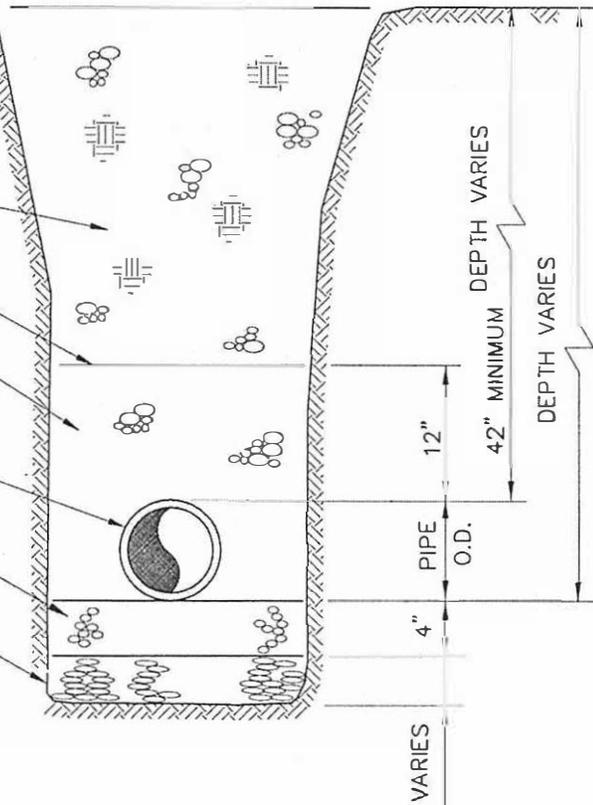
SPECIAL PRECAUTIONS TO
PROTECT PIPE TO THIS LEVEL

HAND-PLACED, COMPACTED
SELECT BACKFILL (SEE NOTE 1)

DUCTILE IRON PIPE

BEDDING (AS DIRECTED BY
THE CITY). SEE NOTE 2

FOUNDATION MATERIAL
AS REQUIRED



NOTES:

1. TRENCH SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE W/ WSDOT 7-09.3(10) & (11) OR AS DIRECTED BY THE CITY.
2. BEDDING (IF REQUIRED BY THE CITY), SHALL CONFORM TO WSDOT 7-09.3(9).

Approved:

City Engineer

WATER STANDARD DETAIL

June 17, 2005

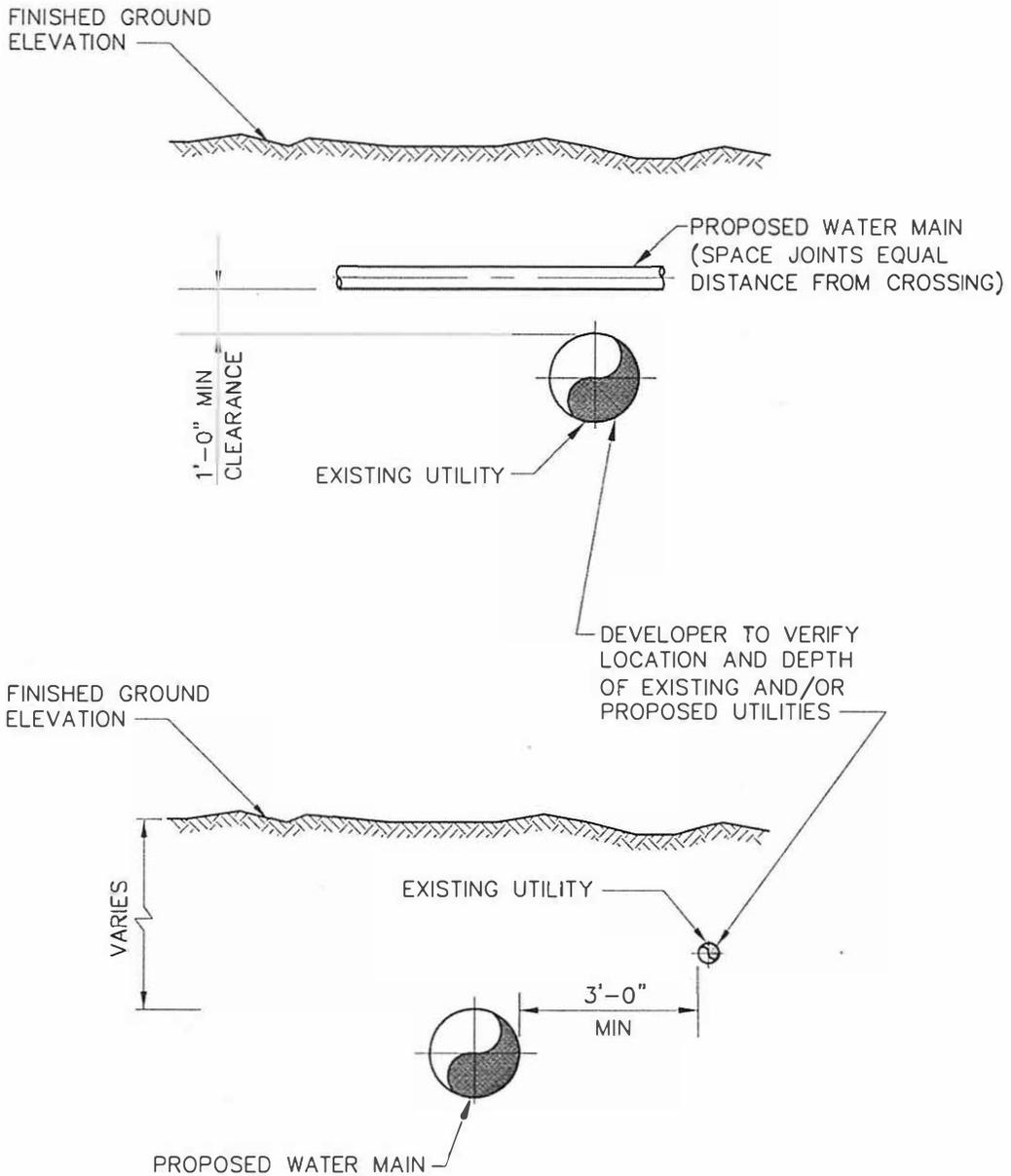
Date



Dwg No:

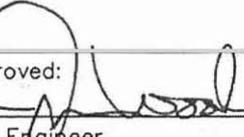
W2

WATER MAIN
TRENCH SECTION



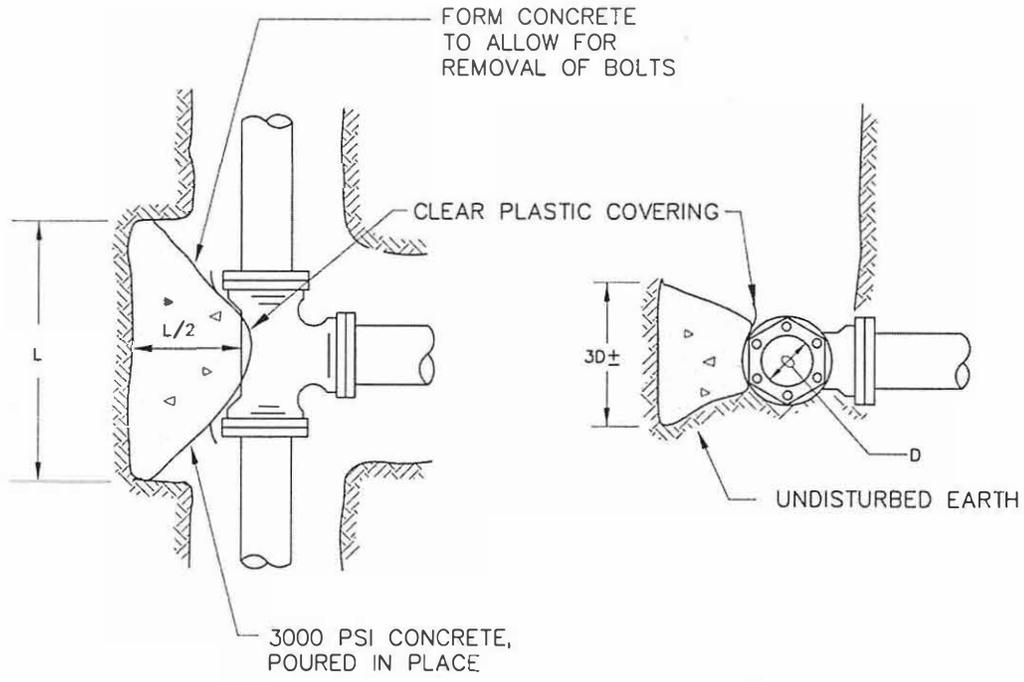
NOTES:

1. PIPE ENCASEMENT SHALL BE UTILIZED, IF APPROVED BY THE CITY, AT LOCALIZED UTILITY CROSSING IF MINIMUM PIPE SEPARATION (ELEVATION) CANNOT BE MAINTAINED/ACHIEVED. CASING MATERIALS, SPACERS AND END SEALS SHALL BE INSTALLED PER SECTION 406-2(5) OF THESE STANDARDS OR AS APPROVED BY THE CITY.
2. CLEARANCES SHOWN ON THIS PLAN ARE MINIMUM CLEARANCES FOR ALL UTILITIES EXCEPT SANITARY SEWER. IN CASES WHERE THE WATER MAIN WILL CROSS A SEWER MAIN, THE MINIMUM CLEARANCES AS SPECIFIED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH SHALL BE FOLLOWED. SEE SECTION 402(2).

Approved:  June 17, 2005
 City Engineer Date
 WATER STANDARD DETAIL



Dwg No: **W3**
TYPICAL UTILITY CROSSING



PLAN

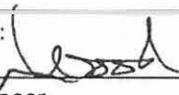
ELEVATION

MINIMUM BEARING AREA TABLE					
FITTING DIA	TEE	90°	45°	22 1/2°	11 1/4°
6"	4 SQ.FT.	5 SQ.FT.	3 SQ.FT.	2 SQ.FT.	2 SQ.FT.
8"	7 SQ.FT.	9 SQ.FT.	5 SQ.FT.	3 SQ.FT.	2 SQ.FT.
10"	10 SQ.FT.	14 SQ.FT.	8 SQ.FT.	4 SQ.FT.	2 SQ.FT.
12"	15 SQ.FT.	20 SQ.FT.	11 SQ.FT.	6 SQ.FT.	3 SQ.FT.
16"	25 SQ.FT.	36 SQ.FT.	20 SQ.FT.	10 SQ.FT.	5 SQ.FT.

NOTE:

BEARING AREA TABLE BASED ON 250 PSI PRESSURE AND 2000 PSF SOIL BEARING. IF PRESSURE IS GREATER OR SOIL BEARING IS LESS, THE THRUST BLOCK SIZE SHALL BE INCREASED. USE WSDOT STD PLAN B-22a FOR SIZING THRUST BLOCKS.

THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL THRUST BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS.

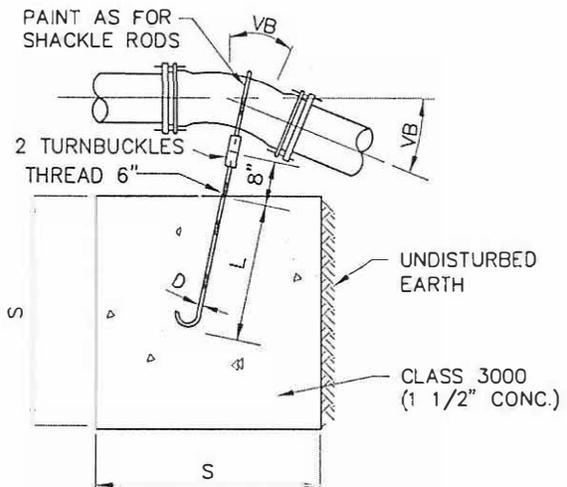
Approved:  June 17, 2005
 City Engineer Date
WATER STANDARD DETAIL



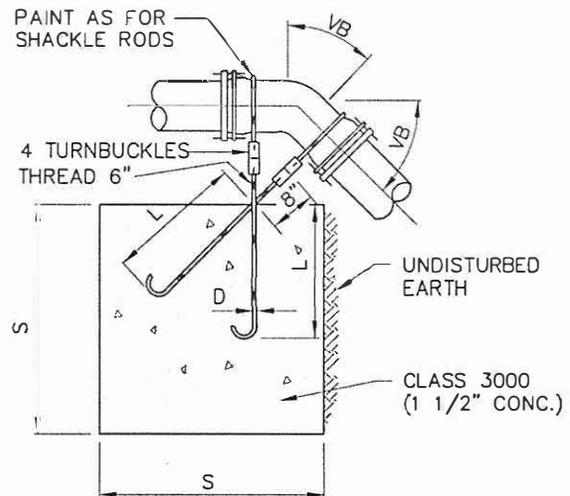
Dwg No: **W4**
CONCRETE THRUST BLOCK

TYPE "A" BLOCKING FOR 11 1/4'-22 1/2'-30' VERTICAL BENDS								
PIPE SIZE NOMINAL DIAMETER— INCHES	TEST PRESSURE PSI	VB		S	D	L		
		VERTICAL BEND DEGREES	No. OF CU. FT. OF CONC. BLOCKING	SIDE OF CUBE LIN. FT.	DIAM. OF SHACKLE RODS (2) INCHES	DEPTH OF RODS IN CONCRETE LIN. FT.		
4"	250	11 1/4	6	1.8	5/8"	1.5		
		22 1/2	12	2.3				
		45	22	2.8				
6"	250	11 1/4	14	2.4	5/8"	1.5		
		22 1/2	27	3.0				
		45	50	3.7				
8"	250	11 1/4	25	2.9	5/8"	1.5		
		22 1/2	48	3.6				
		45	89	4.5				
12"	250	11 1/4	55	3.8	5/8"	2.0		
		22 1/2	108	4.8				
		45	200	5.1			7/8"	2.0
16"	250	11 1/4	98	4.6	5/8"	1.5		
		22 1/2	192	5.8			7/8"	2.0
		45	355	7.1			1 1/8"	2.5

THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARD. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL ANCHOR BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS.



11.25° AND 22.5° BENDS



45° BENDS

Approved:

City Engineer

June 17, 2005

Date

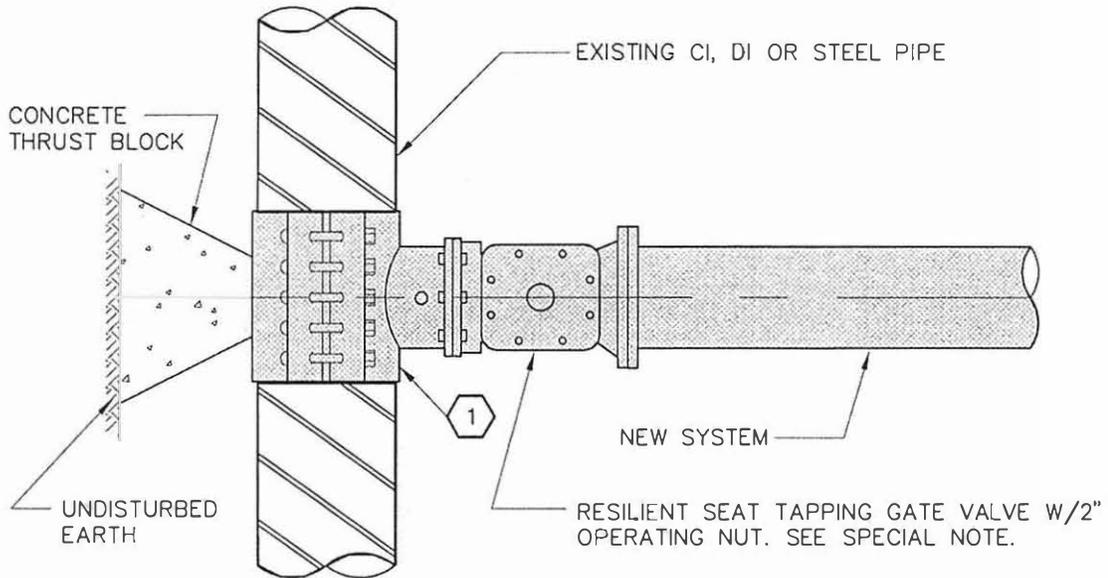
WATER STANDARD DETAIL

City of
BONNEY
Lake

Dwg No:

W5

**VERTICAL ANCHOR
BLOCK**



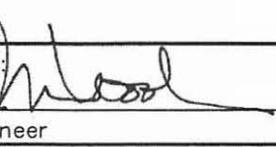
SPECIAL NOTE:
 OPERATION SHALL BE BY CITY PERSONNEL ONLY. CONTRACTOR SHALL NOT OPERATE VALVE

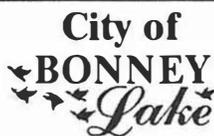
NOTES:

1. OD STEEL PIPE SHALL USE STAINLESS STEEL SLEEVE (FUSION COATED).
- 2.. COMPLETELY REMOVE PROTECTIVE COATING ON STEEL PIPE FOR TAPPING SLEEVE. COVER ALL BARE METAL WITH COAL TAR ENAMEL OUTSIDE OF SLEEVE.

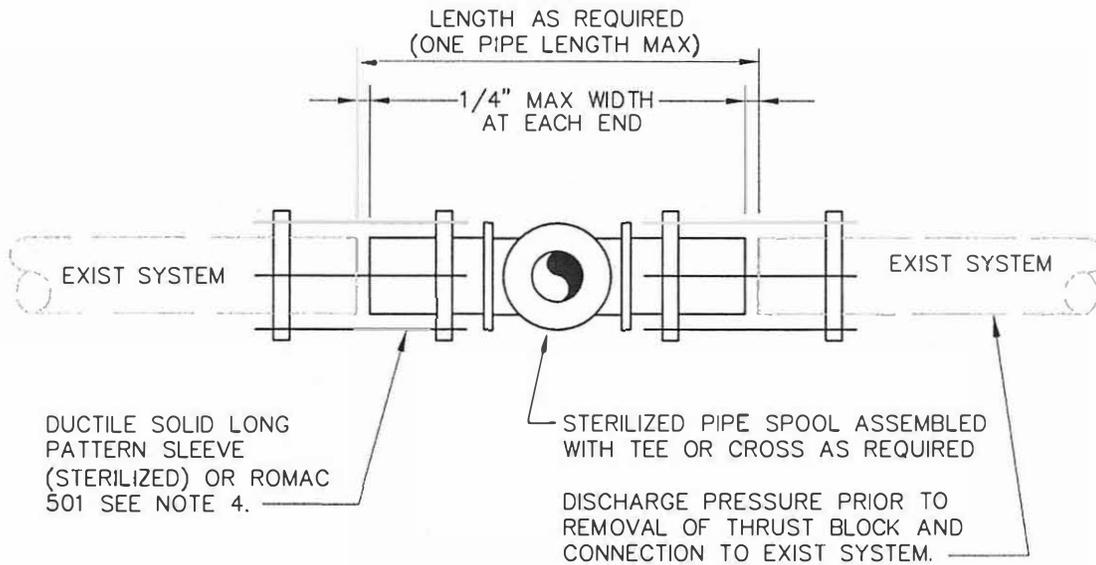
CONSTRUCTION NOTES:

- ① STAINLESS STEEL TAPPING SLEEVE. ROMAC OR APPROVED EQUAL.

Approved:  June 17, 2005
 City Engineer Date
WATER STANDARD DETAIL



Dwg No: **W6**
WET TAP CONNECTION



NOTES:

1. NO DEFLECTION SHALL BE ALLOWED AT EITHER COUPLING.
2. CUT-IN CONNECTIONS ON STEEL PIPE TO USE DI×OD STEEL TRANSITION COUPLINGS ROMAC OR EQUAL.
3. IN-LINE VALVE(S) IN EXISTING SYSTEM MAY BE REQUIRED AT THE SOLE DISCRETION OF THE CITY. (NOTE: VALVE(S) ARE NOT SHOWN ABOVE FOR CLARITY)
4. DUCTILE IRON LONG PATTERN SLEEVE IS REQUIRED WHEN CONNECTING TO CAST IRON, PVC, OR DUCTILE IRON PIPE. A ROMAC 501 COUPLING IS REQUIRED FOR CONNECTIONS TO ASBESTOS CONCRETE OR STEEL PIPE.

Approved

City Engineer

June 17, 2005

Date

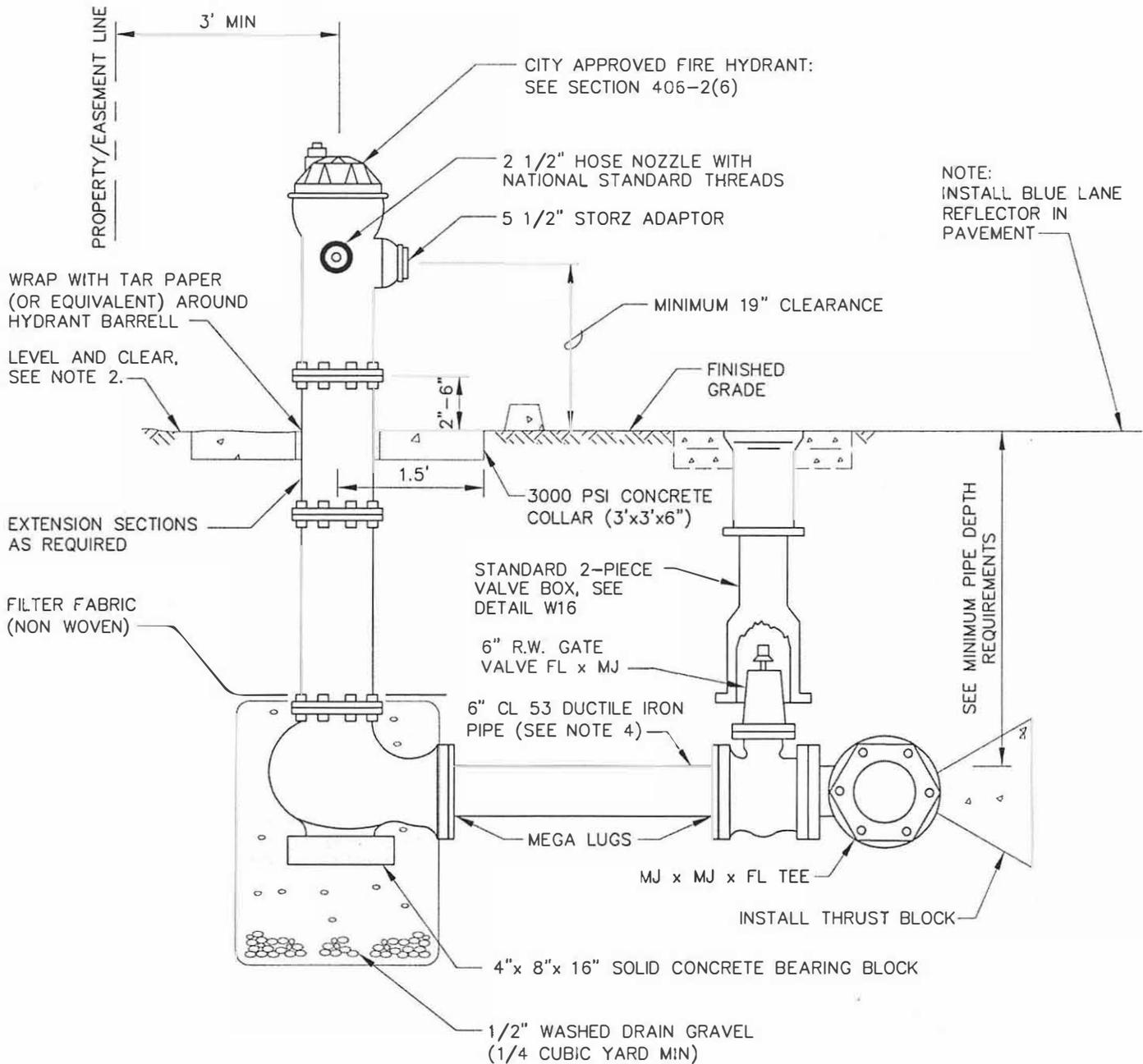
City of
BONNEY
Lake

Dwg No:

W7

**CUT IN
CONNECTION**

WATER STANDARD DETAIL



NOTES:

1. PAINT FOR FIRE HYDRANT SHALL BE AN OIL-BASED RUST INHIBITIVE ENAMEL, WHITE IN COLOR (RUSTOLEUM GLOSS WHITE #7792, KELLY MOORE #1700-100, OR APPROVED EQUAL). PAINT SHALL NOT BE APPLIED TO STORZ ADAPTOR.
2. A MINIMUM OF 3' (RADIUS) MUST BE MAINTAINED AT A LEVEL GRADE AROUND HYDRANT. GRADING TO INCLUDE RETAINING WALLS WHEN SLOPES MUST EXCEED 2H:1V TO ACHIEVE LEVEL AREA.
3. INSTALL APPROPRIATELY SIZED STORM CULVERT IN DITCH SECTIONS AS APPLICABLE. 15' MIN LENGTH AND 12" MIN DIAMETER.
4. RELOCATED HYDRANTS REQUIRE NEW 6" DI CL 53 PIPE WITH MEGALUGS BETWEEN THE GATE VALVE AND FIRE HYDRANT. NEW RUBBER GASKETS SHALL BE INSTALLED AT EACH CONNECTION.

Approved:

June 17, 2005

City Engineer

Date

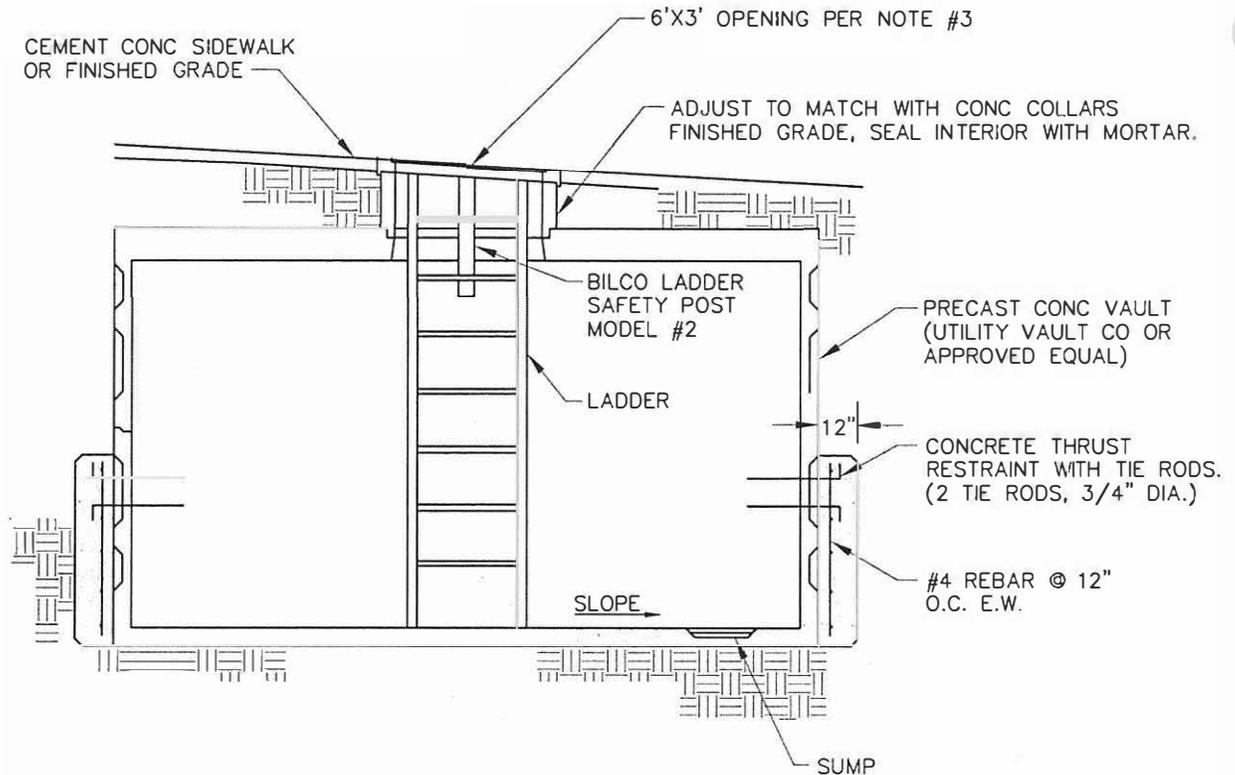
WATER STANDARD DETAIL



Dwg No:

W8

FIRE HYDRANT
INSTALLATION



NOTES:

1. CONNECT VAULT DRAIN TO CLOSED STORM SYSTEM, DAYLIGHT AT APPROVED LOCATION OR INSTALL HYDROMATIC PUMP (GC SYSTEMS MODEL #996633-51-2 W/ FLOAT SWITCH, OR APPROVED EQUAL, DOH APPROVED BACKFLOW PREVENTION DEVICE REQUIRED). PUMP DISCHARGE MUST DRAIN TO A CATCH BASIN OR OTHER APPROVED LOCATION, SEE SHEET 3 OF W18 FOR MORE INFORMATION ON PUMP DISCHARGE.
2. THE VAULT SHALL BE A PRECAST CONCRETE VAULT SIZED TO MEET ALL CLEARANCE REQUIREMENTS.
3. REMOVABLE DOORS SHALL BE A MINIMUM OF 6'-0" X 3'-0" DIAMOND PLATE HINGED LOCKING DOORS, WITH HINGES LOCATED AT EACH END OF OPENING. DOORS SHALL BE SPRING LOADED WITH OPEN POSITION LOCK. IN TRAFFIC AREAS, USE ROUND SOLID ALLUMINUM LOCK LIDS (30-INCH MINIMUM RADIUS AND MAXIMUM 16-INCH RISER SECTION).
4. A GALVANIZED STEEL OR ALUMINUM LADDER SHALL BE SET INSIDE THE VAULT FOR ACCESS INTO THE VAULT. IT SHALL BE SECURED TO THE VAULT WITH 1/2" DIA BOLTS EPOXIED TO THE VAULT LID AND FLOOR.
5. A BILCO LADDER SAFETY POST MODEL #2 SHALL BE ATTACHED TO THE LADDER STEPS.
6. ALL VAULT PENETRATIONS SHALL BE SEALED WITH NON-SHRINK GROUT
7. COAT INTERIOR WALLS, DI PIPE, FITTINGS AND STEEL FASTENERS W/ POLYIMIDE EPOXY PAINT, 2 COATS AT 5 DRY MILS EACH. COLORS: OFF WHITE FOR WALLS, LIGHT BLUE FOR PIPE. PIPE SHALL BE EMPTY DURING COATING.
8. COAT VAULT EXTERIOR WITH 20 MIL COAL TAR EPOXY.

Approved: _____

June 17, 2005

City Engineer

Date

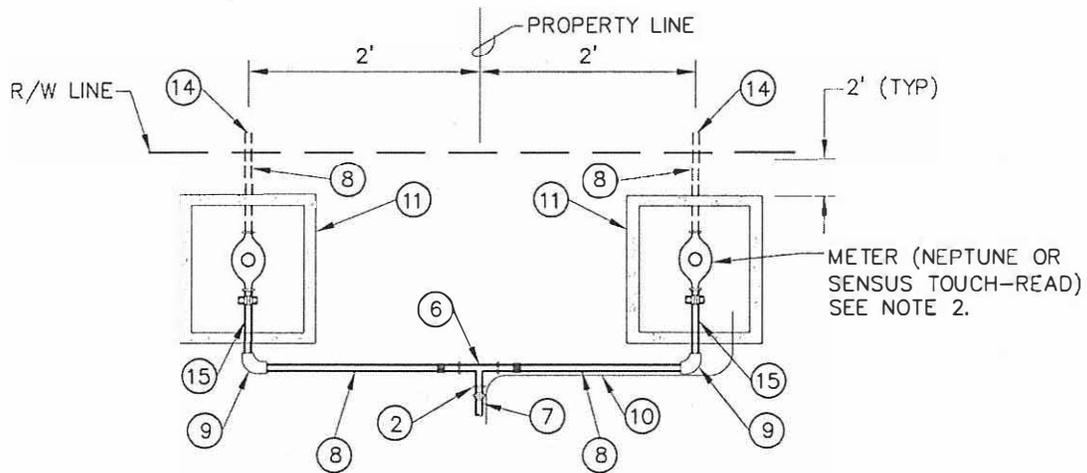
WATER STANDARD DETAIL



Dwg No:

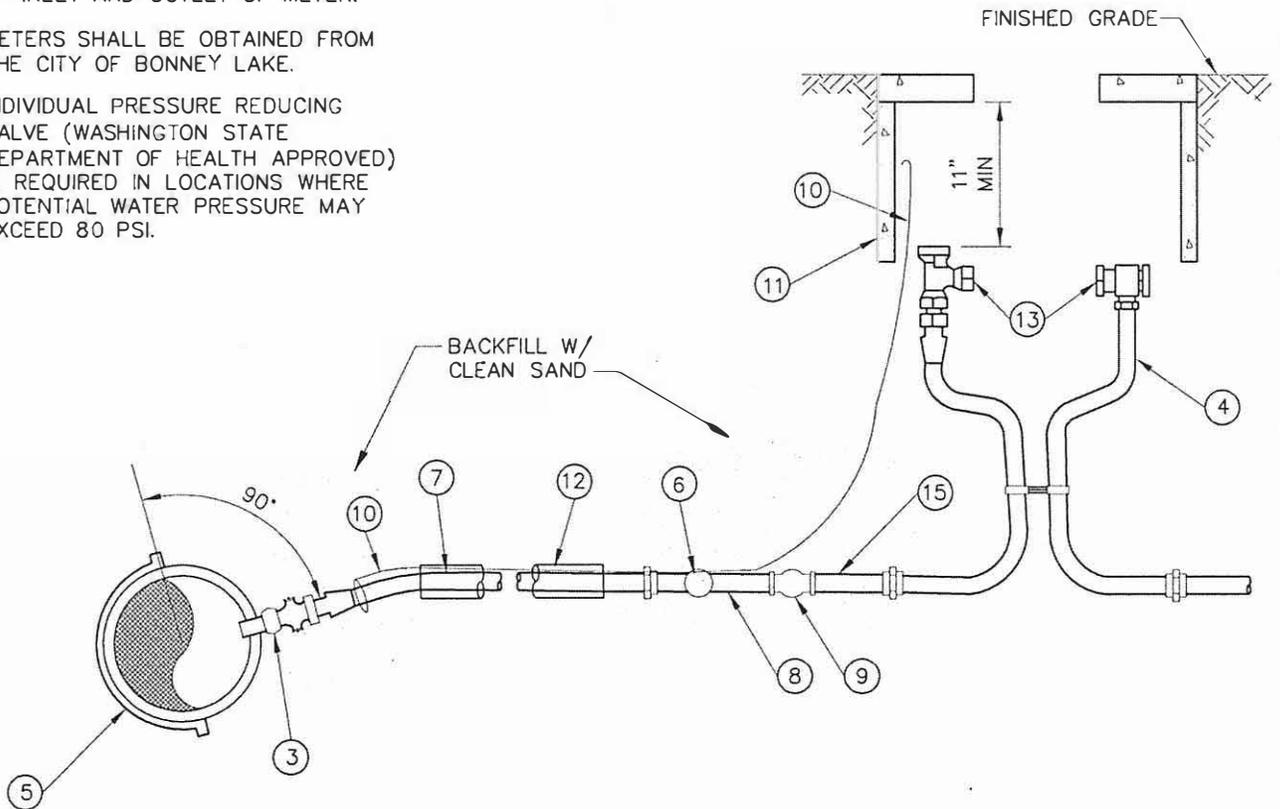
W9

**WATER SYSTEM
VAULT**

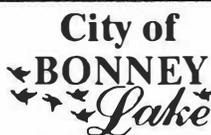


NOTES:

1. SET BOTTOM OF METER BOX AT TOP OF INLET AND OUTLET OF METER.
2. METERS SHALL BE OBTAINED FROM THE CITY OF BONNEY LAKE.
3. INDIVIDUAL PRESSURE REDUCING VALVE (WASHINGTON STATE DEPARTMENT OF HEALTH APPROVED) IS REQUIRED IN LOCATIONS WHERE POTENTIAL WATER PRESSURE MAY EXCEED 80 PSI.



Approved: *[Signature]* June 17, 2005
 City Engineer Date
WATER STANDARD DETAIL



Dwg No: **W10**
1" AND SMALLER WATER SERVICE

WATER SERVICE DETAIL 1" AND SMALLER

LEGEND

- ① 1" PACK JOINT x 3/4" MALE IRON PIPE.
- ② 1" MALE IRON PIPE x PACK JOINT ADAPTER EQUAL TO FORD C86-44.
- ③ 1" MALE IRON PIPE X PACK JOINT CORP STOP EQUAL TO FORD F1101.
- ④ COPPER SETTER EQUAL TO VBH72-12W WITH FORD C86-33.
- ⑤ ROMAC SADDLE SINGLE STRAP FOR PIPE DIAMETERS LESS THAN 10" AND DOUBLE STRAP FOR PIPE DIAMETERS 10" AND GREATER.
- ⑥ 1 X 3/4" X 3/4" BRASS TEE.
- ⑦ 1" HIGH MOLECULAR (200 PSI) SIDR7 POLYETHYLENE PIPE (LENGTH AS REQUIRED).
- ⑧ 3/4" BRASS NIPPLE (LENGTH AS REQUIRED).
- ⑨ 3/4" BRASS 90°ELL WITH BRASS NIPPLES.
- ⑩ 10 GAUGE WIRE FROM MAINLINE TAP TO METER BOX AND EXPOSE 6" MINIMUM IN BOX (RUN INSIDE 2" PVC GUARD CONDUIT WHERE APPLICABLE).
- ⑪ METER BOX - SEE DETAIL W1.
- ⑫ INSTALL SERVICE LINE IN 2" PVC SCHEDULE 40 SLEEVE WHEN CROSSING ROADWAY (6' MIN. BEYOND BACK OF CURB UNLESS OTHERWISE APPROVED BY THE CITY).
- ⑬ PROVIDE PVC PLUG AT INLET AND OUTLET OF SETTER.
- ⑭ PROVIDE APPROVED WATERTIGHT PLUG UNTIL CONNECTION TO PRIVATE SYSTEM OWNER.
- ⑮ 3/4" BRASS NIPPLE (6" LENGTH TYP.).

PAGE 2 OF

Approved:

City Engineer

June 17, 2005

Date

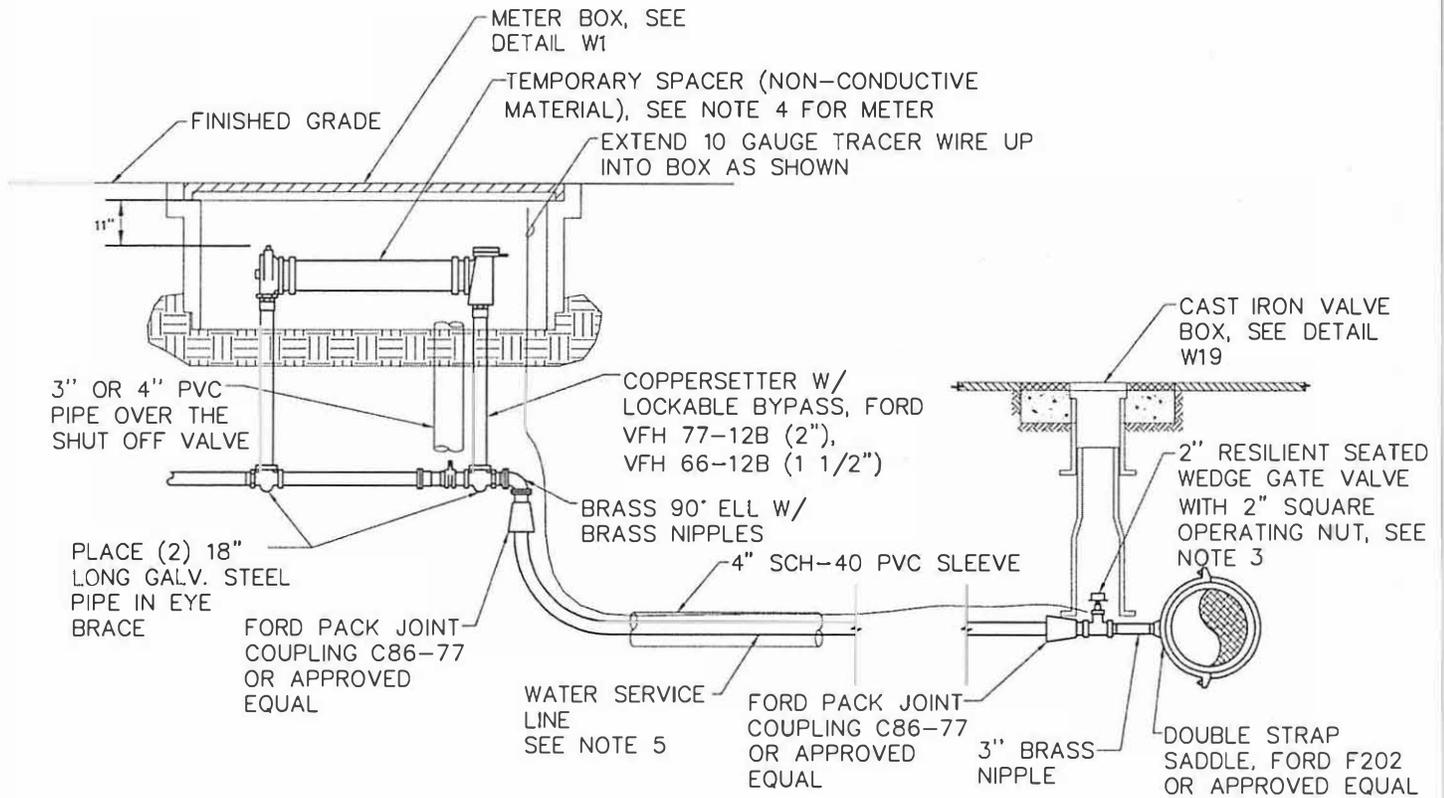
WATER STANDARD DETAIL



Dwg No:

W10

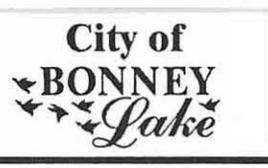
**1" AND SMALLER
WATER SERVICE**



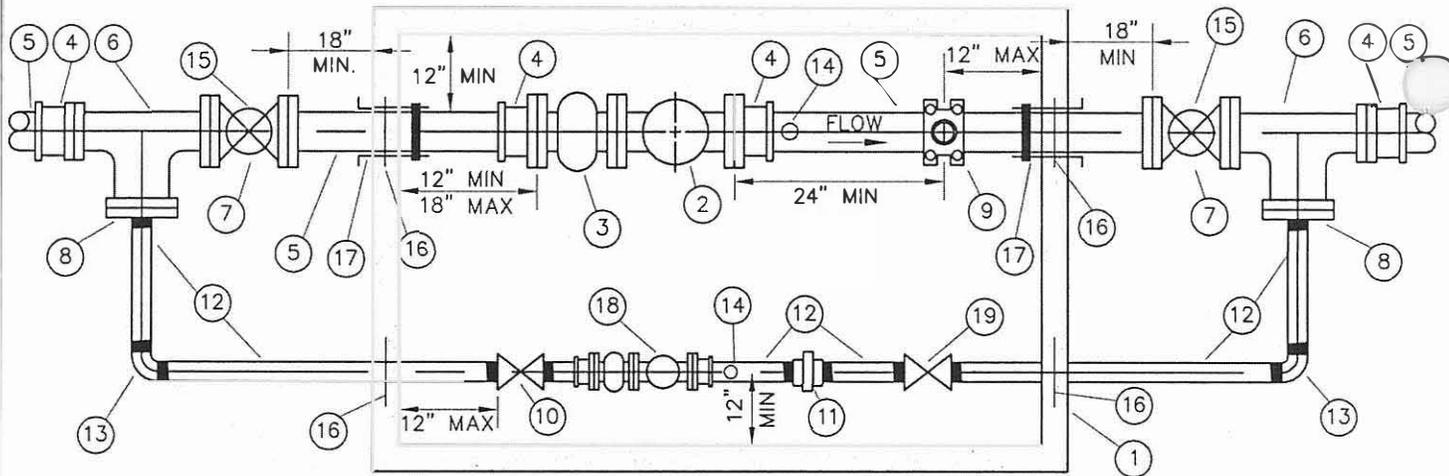
NOTES:

1. ALL MATERIALS AND FITTINGS SHALL BE AS SPECIFIED OR AN APPROVED EQUAL.
2. THE WATER METER SHALL BE LOCATED ADJACENT TO THE RIGHT-OF-WAY LINE AS DIRECTED BY THE CITY.
3. FOR A 1 1/2" WATER SERVICE A 1 1/2" BALL VALVE (FORD OR APPROVED EQUAL) SHALL BE USED.
4. METERS SHALL BE OBTAINED FROM THE CITY OF BONNEY LAKE.
5. PIPE MATERIAL SHALL BE HIGH MOLECULAR POLYETHYLENE SDR7 (200 PSI), OR APPROVED EQUAL.

Approved: *[Signature]* June 17, 2005
 City Engineer Date
WATER STANDARD DETAIL



Dwg No: **W11**
1-1/2" AND 2"
WATER SERVICE



- ① VAULT, UTILITY VAULT OR APPROVED EQUAL, SIZED TO MAINTAIN CLEARANCES. SEE DETAIL W9
 - ② *NEPTUNE OR SENSUS TOUCH-READ METER TO BE OBTAINED FROM THE CITY OF BONNEY LAKE AND INSTALLED BY THE DEVELOPER.
 - ③ *FLANGED STRAINER.
 - ④ *FLANGED COUPLING ADAPTOR.
 - ⑤ *DUCTILE IRON PIPE-CLASS 53 UNLESS OTHERWISE APPROVED BY THE CITY.
 - ⑥ *X*X* TEE (FLGxFLGxFLG).
 - ⑦ *GATE VALVE (FLGxMJ).
 - ⑧ *BLIND FLANGED W/2" THREADED OUTLET.
 - ⑨ *x2" DOUBLE STRAP D.I. SADDLE W/2" THRD. PLUG.
 - ⑩ 2" MUELLER 300 LOCKING BALL CURB VALVE B20200.20 OR EQUAL.
 - ⑪ 2" BRASS UNION
 - ⑫ 2" THRD. BRASS PIPE-CUT TO LENGTH REQUIRED.
 - ⑬ 2" THRD. BRASS ELL.
 - ⑭ GRINNELL PIPE SUPPORT.
 - ⑮ VALVE BOX, SEE DETAIL W16.
 - ⑯ SEAL W/ NON-SHRINK GROUT, TYPICAL FOR ALL VAULT PENETRATIONS.
 - ⑰ PIPE RESTRAINT (ROMAC 600 OR APPROVED EQUAL), SEE DETAIL W9 FOR CONCRETE THRUST RESTRAINT
 - ⑱ BYPASS METER TO BE OBTAINED FROM THE CITY OF BONNEY LAKE
 - ⑲ 2" RW GATE VALVE W/ 2" SQUARE OPERATING NUT
- * = 3", 4", OR 6" DEPENDING ON SERVICE LINE SIZE

ADDITIONAL NOTES:

- 1. METERS LARGER THAN 6" SHALL BE SUBMITTED TO THE CITY FOR APPROVAL.
- 2. ALL EXPOSED PIPE MATERIAL SHALL BE PAINTED W/ PARKER PAINT MARINE ENAMEL, MARATHON 1065 TAHOE BLUE OR APPROVED EQUAL.

Approved:

City Engineer

June 17, 2005

Date

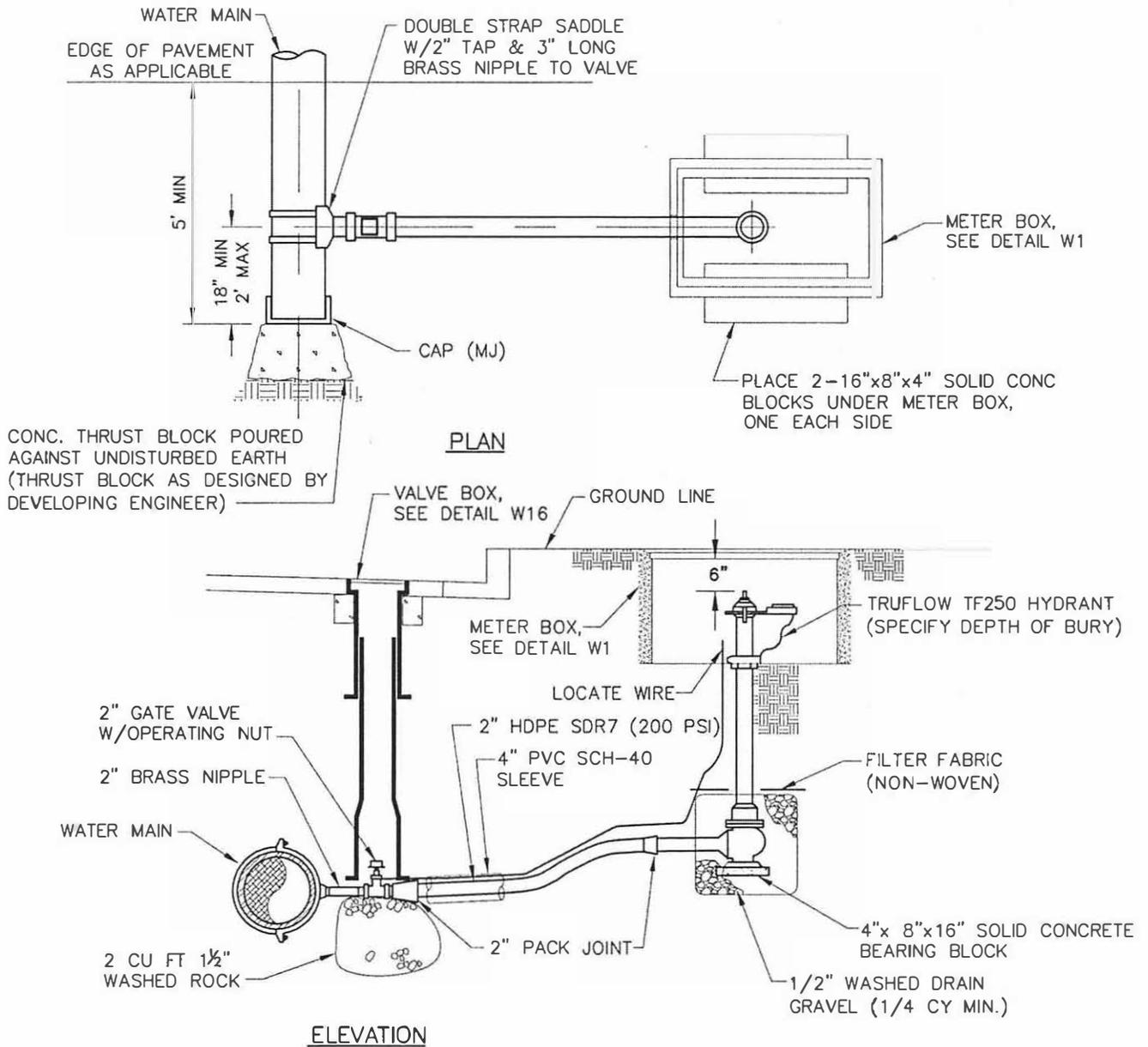
WATER STANDARD DETAIL



Dwg No:

W12

**METER ASSEMBLY
3" THROUGH 6"**



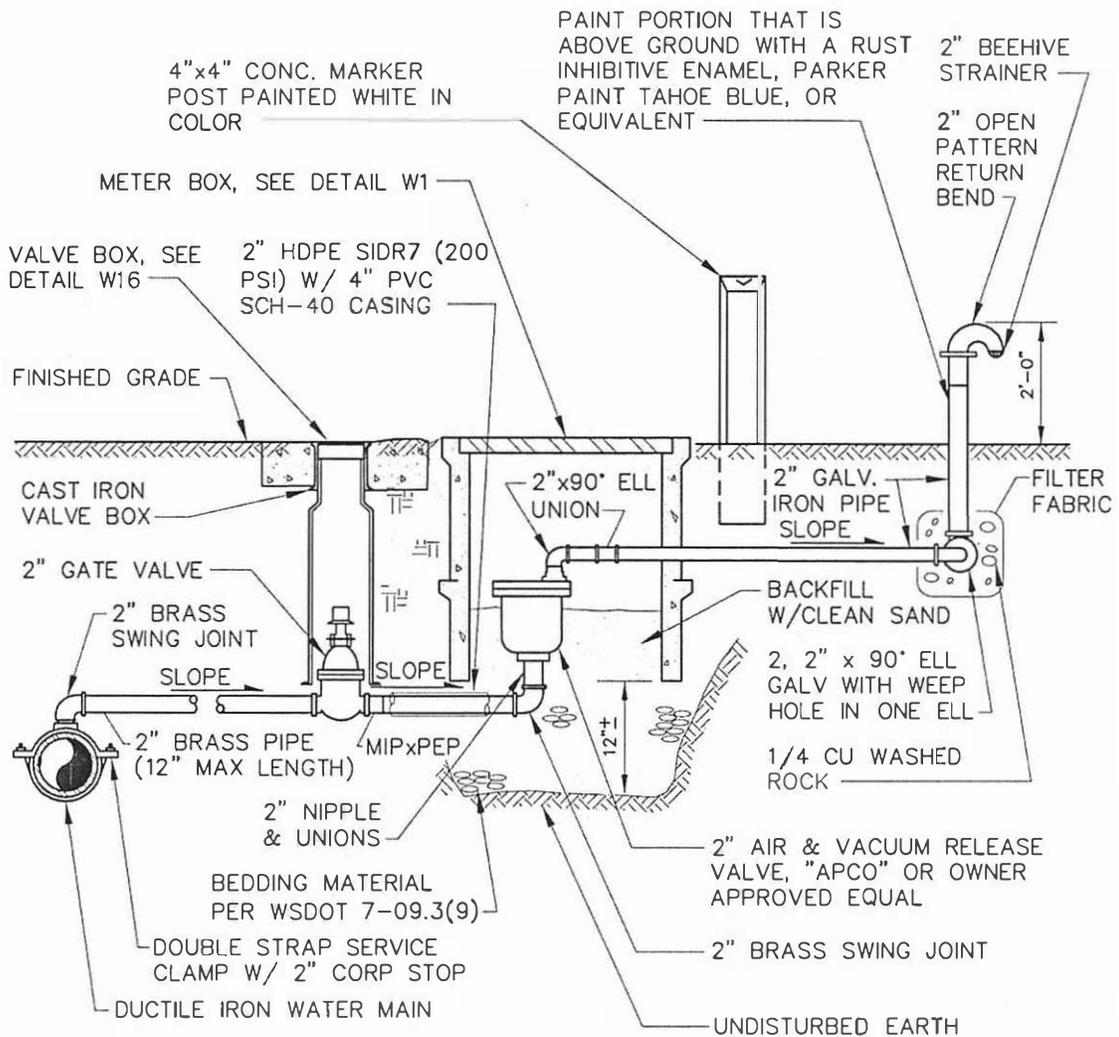
NOTES:

1. BLOW-OFF HYDRANTS SHALL BE NON-FREEZING, SELF-DRAINING TYPE.
2. SET UNDERGROUND IN CITY APPROVED METER BOX, THESE HYDRANTS WILL BE FURNISHED WITH A 2" FIP INLET, AND BE SERVICEABLE FROM ABOVE GRADE WITH NO DIGGING.
3. THE OUTLET SHALL ALSO BE BRONZE AND BE 2-1/2" NST.
4. HYDRANTS SHALL BE LOCKABLE TO PREVENT UNAUTHORIZED USE.
5. LOCATE WIRE SHALL BE 10 GAUGE WIRE FROM 2" GV TO METER BOX W/ 6" MIN. EXPOSED WITHIN BOX.

Approved: _____ June 17, 2005
 City Engineer _____ Date
WATER STANDARD DETAIL



Dwg No: **W13**
2" BLOW-OFF ASSEMBLY



NOTES:

1. GATE VALVE: AWWA RESILIENT SEAL, FIPT x FIPT WITH 2" OPERATING NUT.
2. ALL PIPING BETWEEN DOUBLE STRAP SADDLE AND INLET SIDE OF 2" GV SHALL BE BRASS.
3. TAP MAIN AT SYSTEM HIGH POINT. LOCATION TO BE APPROVED BY THE CITY.

Approved: _____

June 17, 2005

City Engineer

Date

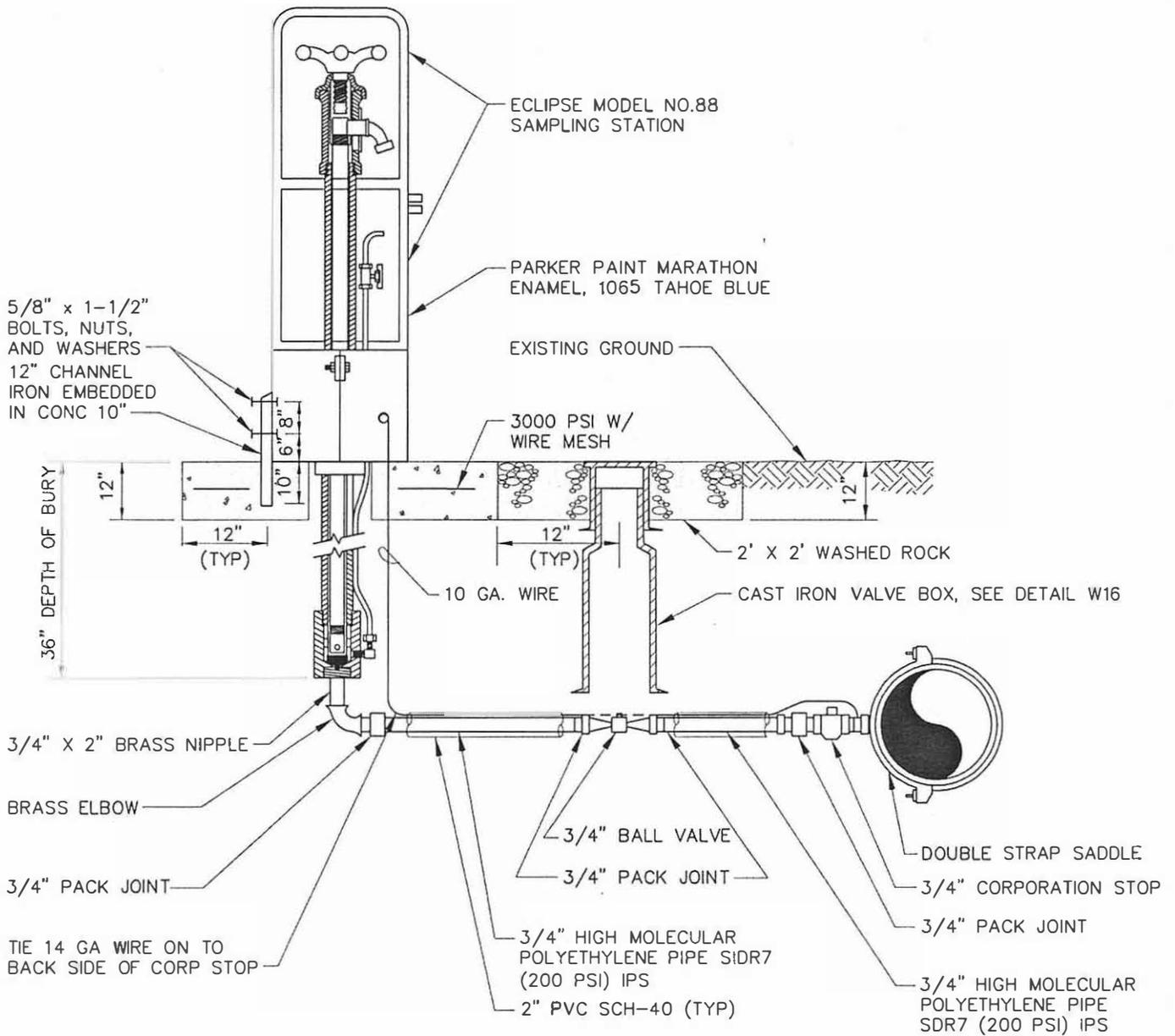
WATER STANDARD DETAIL



Dwg No:

W14

**AIR AND VACUUM
RELEASE ASSEMBLY**



Approved:

June 17, 2005

City Engineer

Date

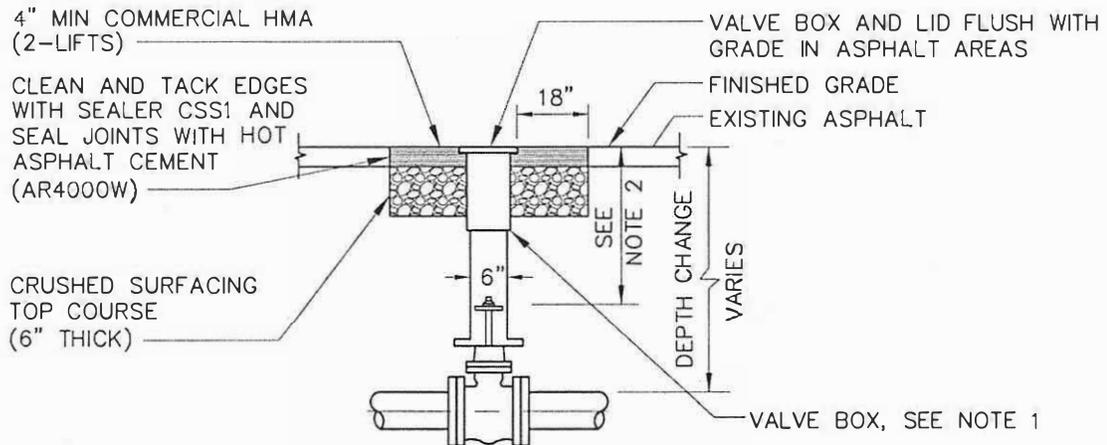
WATER STANDARD DETAIL



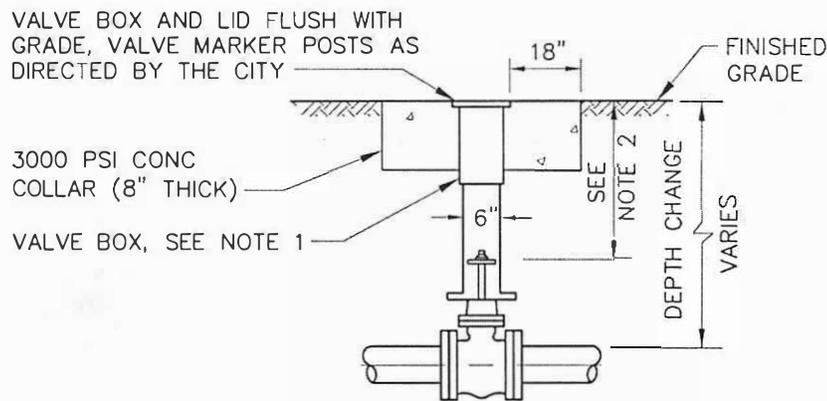
Dwg No:

W15

WATER SAMPLING STATION



VALVE BOX IN ASPHALT AREA



VALVE BOX IN UNIMPROVED AREA

NOTES:

1. EACH VALVE SHALL BE PROVIDED WITH AN ADJUSTABLE TWO-PIECE CAST IRON VALVE BOX, FOGTITE B-9 W/ FOGTITE B-9 TRAFFIC LID, OR APPROVED EQUAL.
2. 15" MINIMUM, 36" MAXIMUM FOR OPERATOR NUT. EXTENSION MAY BE REQUIRED, SEE DETAIL W19.
3. 4"x4" CONC. MARKER POST PAINTED WHITE, AS REQUIRED BY THE CITY.

Approved

City Engineer

WATER STANDARD DETAIL

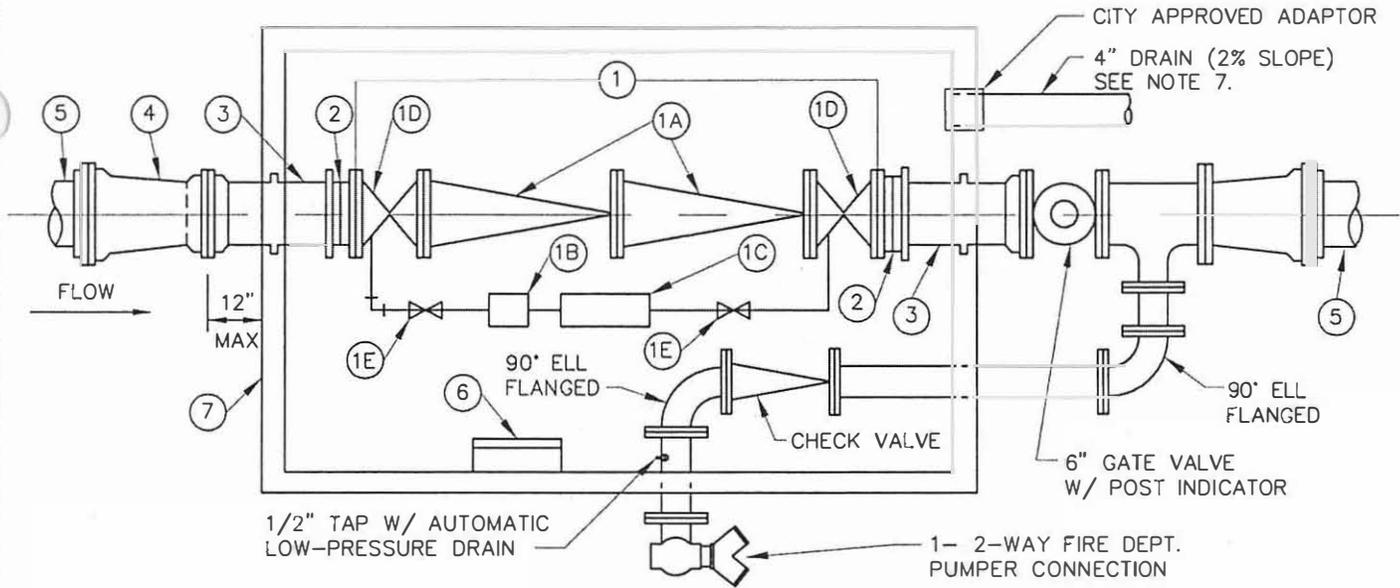
June 17, 2005

Date



Dwg No:

**W16
VALVE BOX**



LEGEND

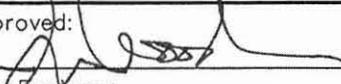
- ① DOUBLE-CHECK DETECTOR VALVE ASSEMBLY CAPABLE OF METERING WATER USAGE UNDER LOW FLOW CONDITIONS. 10.0 PSI HEAD LOSS AT 1600 GPM FOR 8" SIZE. ASSEMBLY TO BE STATE DOH APPROVED. SIZE AS SPECIFIED ON PLANS.
- ①A 2-CHECK VALVES, (FL)
- ①B 1-BY-PASS METER 5/8" X 3/4" NEPTUNE OR SENSUS CF READING METER COMPLETE WITH SPUD NUT.
- ①C 1-DOUBLE CHECK VALVE ASSEMBLY, 3/4" FOR 8" DDCV
- ①D 2-GATE VALVES, (FL) W/HAND WHEEL; RISING STEM, RESILIENT SEATED AS PER STATE REQUIREMENTS.
- ①E 2-GATE VALVES, (FL) W/HAND WHEEL; RISING STEM, RESILIENT SEATED AS PER STATE REQUIREMENTS.
- ② 2-FLANGED COUPLING ADAPTER, SIZE AS SPECIFIED ON PLANS. (LOCATE MINIMUM 6" FROM INNER WALL).
- ③ 2-PIPE SPOOLS, PLAIN END. SAME SIZE AS SPECIFIED ON PLANS.
- ④ 1-REDUCER (MJ X MJ), IF REQUIRED. SIZE AS SPECIFIED ON PIPE SUPPORT PLANS.
- ⑤ WATER MAIN CL50, SIZE AS SPECIFIED ON PLANS.
- ⑥ SEE W9 FOR LADDER SPECIFICATIONS.
- ⑦ SEE W9 FOR VAULT AND PIPE RESTRAINT SYSTEMS SPECIFICATIONS.
- ⑧ PROVIDE GRINNELL PIPE SUPPORTS, TO INCLUDE STEEL YOKE, BOLT TO VAULT FLOOR USING RECOMMENDED CONNECTION AND SIZES.

MIN. VAULT SIZES:

4"	5106 LA	--	5'-0"	X	10'-6"	X	6'-3"	HIGH
6"	5106 LA	--	5'-0"	X	10'-6"	X	6'-3"	HIGH
8"	612 LA	--	6'-0"	X	12'-0"	X	6'-6 1/2"	HIGH
10"	612 LA	--	6'-0"	X	12'-0"	X	6'-6 1/2"	HIGH

NOTES:

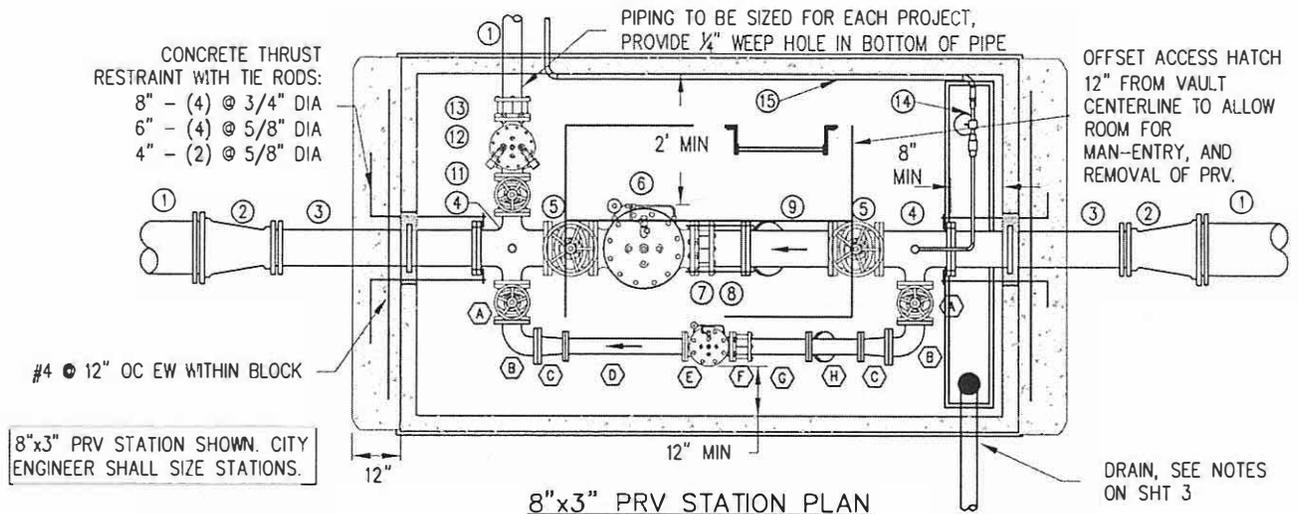
- 1. PAINT ALL PIPING WITH PARKER PAINT MARINE ENAMEL, MARATHON 1065 TAHOE BLUE (OR EQUIVALENT).
- 2. PROVIDE GRINNELL PIPE SUPPORTS, WHERE REQUIRED (3 MINIMUM).

Approved:  June 17, 2005
 City Engineer Date

WATER STANDARD DETAIL

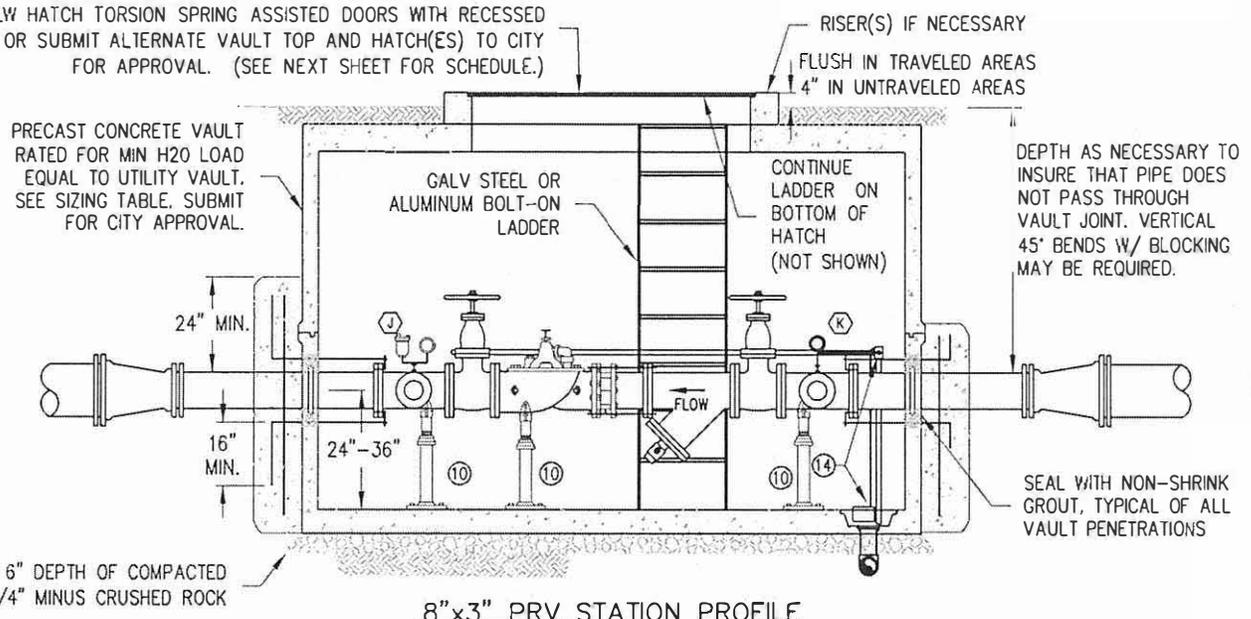


Dwg No: **W17**
DOUBLE-CHECK DETECTOR WITH FIRE CONNECTION



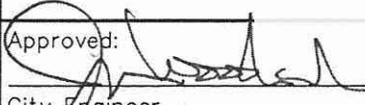
8"x3" PRV STATION PLAN

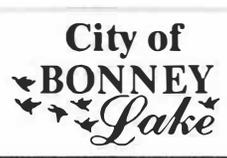
DOUBLE 4'x6' CLEAR OPENING H2O-RATED ALUMINUM ACCESS HATCH EQUAL TO LW HATCH TORSION SPRING ASSISTED DOORS WITH RECESSED LOCK HASP, OR SUBMIT ALTERNATE VAULT TOP AND HATCH(ES) TO CITY FOR APPROVAL. (SEE NEXT SHEET FOR SCHEDULE.)



8"x3" PRV STATION PROFILE

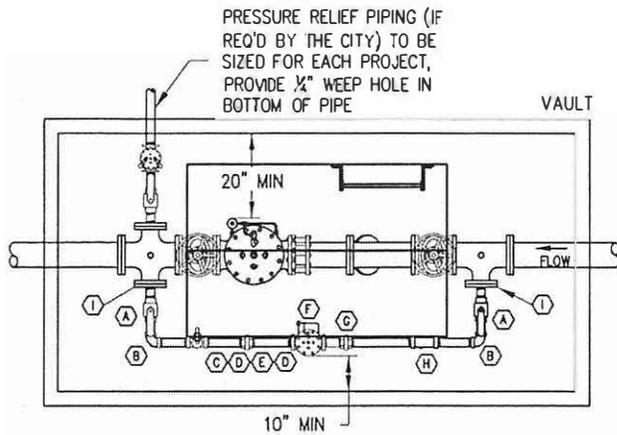
- | | | |
|--|---|---|
| <p>① DI PIPE, LENGTH TO FIT</p> <p>② DI REDUCER (MJxMJ)</p> <p>③ DI SPOOL WITH COLLAR (FLxPE) LTF</p> <p>④ DI REDUCING CROSS (FLxFLx4"FLx4"FL) w/1" TAP ON TOP</p> <p>⑤ RS GATE VALVE (FLxFL) w/HAND WHEEL</p> <p>⑥ PRESSURE REDUCING VALVE (FLxFL) EQUAL TO CLA-VAL 90G-01ABCS OR CITY APPROVED EQUAL, EPOXY LINING, VALVE POSITION INDICATOR, POLY PILOT LINES.</p> <p>⑦ FCA w/SHACKLE RESTRAINT</p> <p>⑧ DI PIPE (FLxPE) APPROX. 12" LENGTH</p> | <p>⑨ STRAINER (FLxFL) EQUAL TO WATTS 77F-D-FDA, EPOXY LINED AND BRASS BALL VALVE FOR BLOW OUT</p> <p>⑩ ADJUSTABLE SADDLE PIPE SUPPORT, RISER PIPE, AND BASE EQUAL TO GRINNELL FIGURE 264. ALSO PROVIDE (1) UNDER BYPASS LINE</p> <p>⑪ RS GATE VALVE (FLxFL) W/ HAND WHEEL</p> <p>⑫ PRESSURE RELIEF VALVE (FLxFL) EQUAL TO CLA-VAL 50G-01, EPOXY LINING, VALVE POSITION INDICATOR, POLY PILOT LINES</p> <p>⑬ FCA</p> <p>⑭ HYDROMATIC PUMP GC SYSTEMS MODEL #996633-51-2 W/ FLOAT SWITCH (IF REQUIRED, SEE NOTES ON W-19b)</p> <p>⑮ 1" PVC SCH-40 PUMP DISCHARGE PIPE SECURED TO VAULT WALL</p> | <p>Ⓐ 4" RS GATE VALVE (FL) W/ HAND WHEEL</p> <p>Ⓑ 4" DI 90° BEND (FL)</p> <p>Ⓒ 4"x3" DI REDUCER</p> <p>Ⓓ 3" DI PIPE (FL) 36" LENGTH</p> <p>Ⓔ PRESSURE REDUCING VALVE (FLxFL) EQUAL TO CLA-VAL, 90G-D1ABS, EPOXY LINING, VALVE POSITION INDICATOR, POLY PILOT LINES.</p> <p>Ⓕ FCA</p> <p>Ⓖ 4" DI PIPE (FLxPE) LTF</p> <p>Ⓗ STRAINER (FL) EQUAL TO WATTS 77F-D-FDA AND BRONZE BALL VALVE FOR BLOW OUT</p> <p>Ⓙ PRESSURE GAUGE AND AIR VALVE, SEE W-19b</p> <p>Ⓚ PRESSURE GAUGE, SEE W-19b</p> |
|--|---|---|

Approved:  June 17, 2005
 City Engineer Date
 WATER SYSTEM STANDARD DETAIL

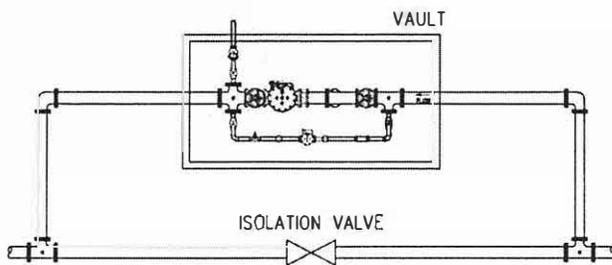


SHEET 1 of

Dwg No: **W18**
PRESSURE REDUCING STATION



6"x2" OR 4"x2" PRV STATION

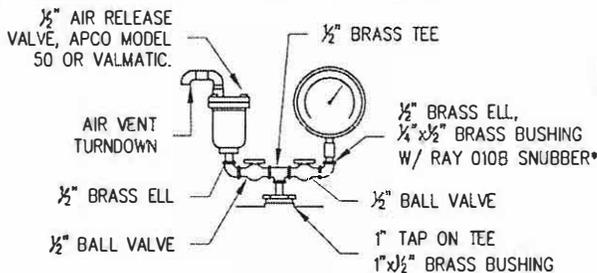


OFFLINE PRV STATION CONFIGURATION

- (A) 2" BRASS BALL VALVE (THREADED)
- (B) 2" BRASS 90° BEND (THREADED)
- (C) 2" BRASS TEE (THREADED)
3/4" HOSE BIB
- (D) 2" BRASS THREADxCOMPRESSION ADAPTOR
- (E) 2" BRASS PIPE, LTF
- (F) PRESSURE REDUCING VALVE (THREADED) EQUAL TO CLA-VAL, 90G-0IABS. EPOXY LINING, VALVE POSITION INDICATOR, POLY PILOT LINES AND STAINLESS STEEL TRIM.

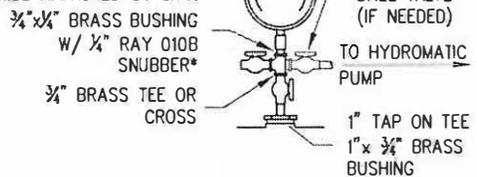
- (G) 2" BRASS UNION
- (H) STRAINER (THREADED) EQUAL TO WATTS 777S AND BRONZE BALL VALVE FOR BLOW OUT
- (I) 4" DI BLIND FLANGE w/2" TAP

USE THREADED BRASS NIPPLES (NOT CALLED OUT) ON BYPASS AND PRESSURE RELIEF PIPING. USE CLOSE NIPPLES WHEREVER POSSIBLE.



GAUGE & AIR VALVE

PRESSURE GAUGE w/4 1/2" FACE, OVERALL ACCURACY ± 1/2% OF FULL SCALE. RANGE 0-200 psi OR AS OTHERWISE APPROVED BY CITY.

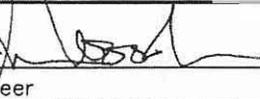


GAUGE

*OR APPROVED EQUAL

NOTE, BRASS NIPPLES NOT CALLED OUT, PROVIDE AS NECESSARY.

2	Added Offline PRV Station	12/25/06
1	Added PRV Piping Note	7/26/05
Rev No.	Revisions	Date

Approved:  June 17, 2005
City Engineer Date

WATER SYSTEM STANDARD DETAIL

City of
BONNEY
Lake

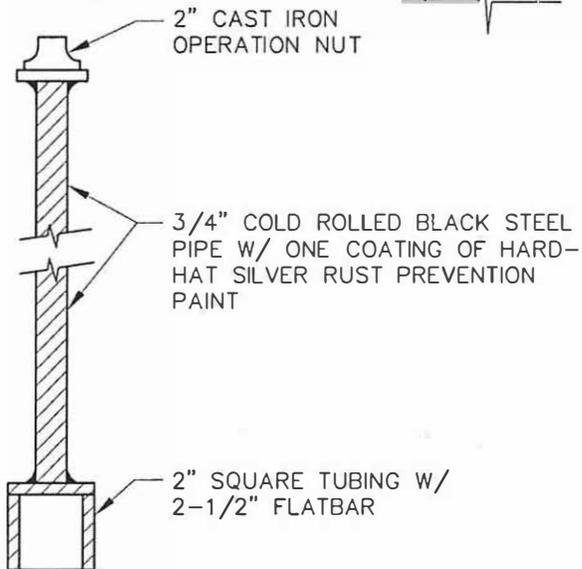
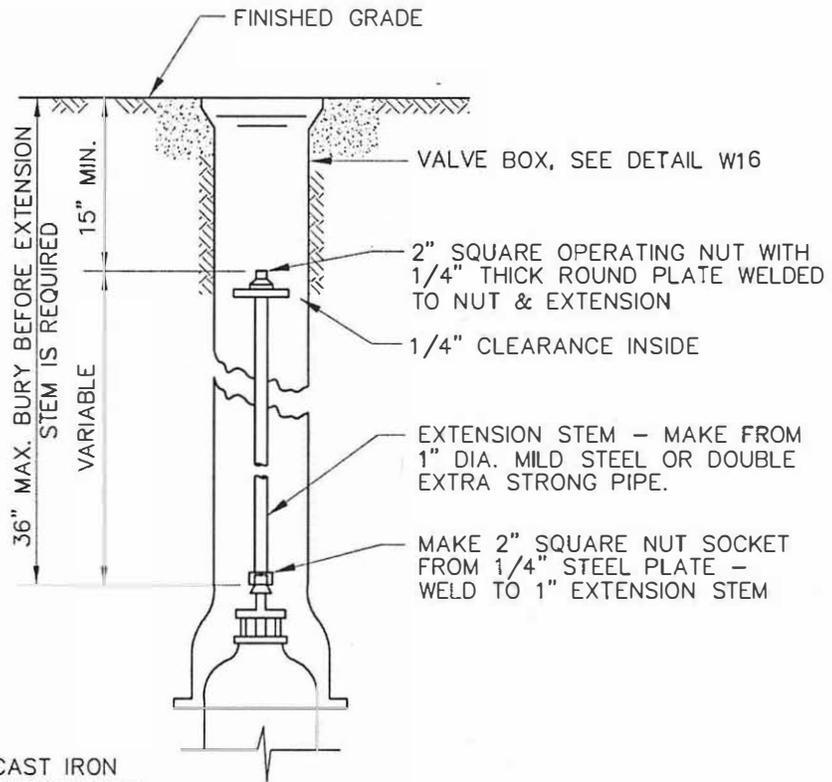
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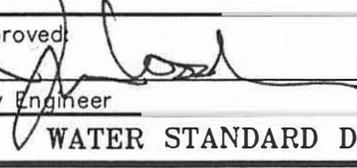
W18

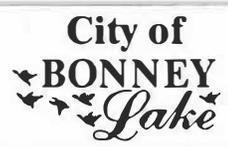
**PRESSURE REDUCING
STATION**

SIZING TABLE						
Main Line	Main PRV	Bypass Line	Pressure Relief	Utility Vault	Locking Steel Covers	
12"	8"	3"	Sized for	712-LA	L W PRODUCTS	"HD-2C"
10"	8"	3"	each	712-LA	L W PRODUCTS	"HD-2C"
8"	6"	2"	Project	612-LA	L W PRODUCTS	"HD-2C"
6"	4"	2"		612-LA	L W PRODUCTS	"HD-2C"

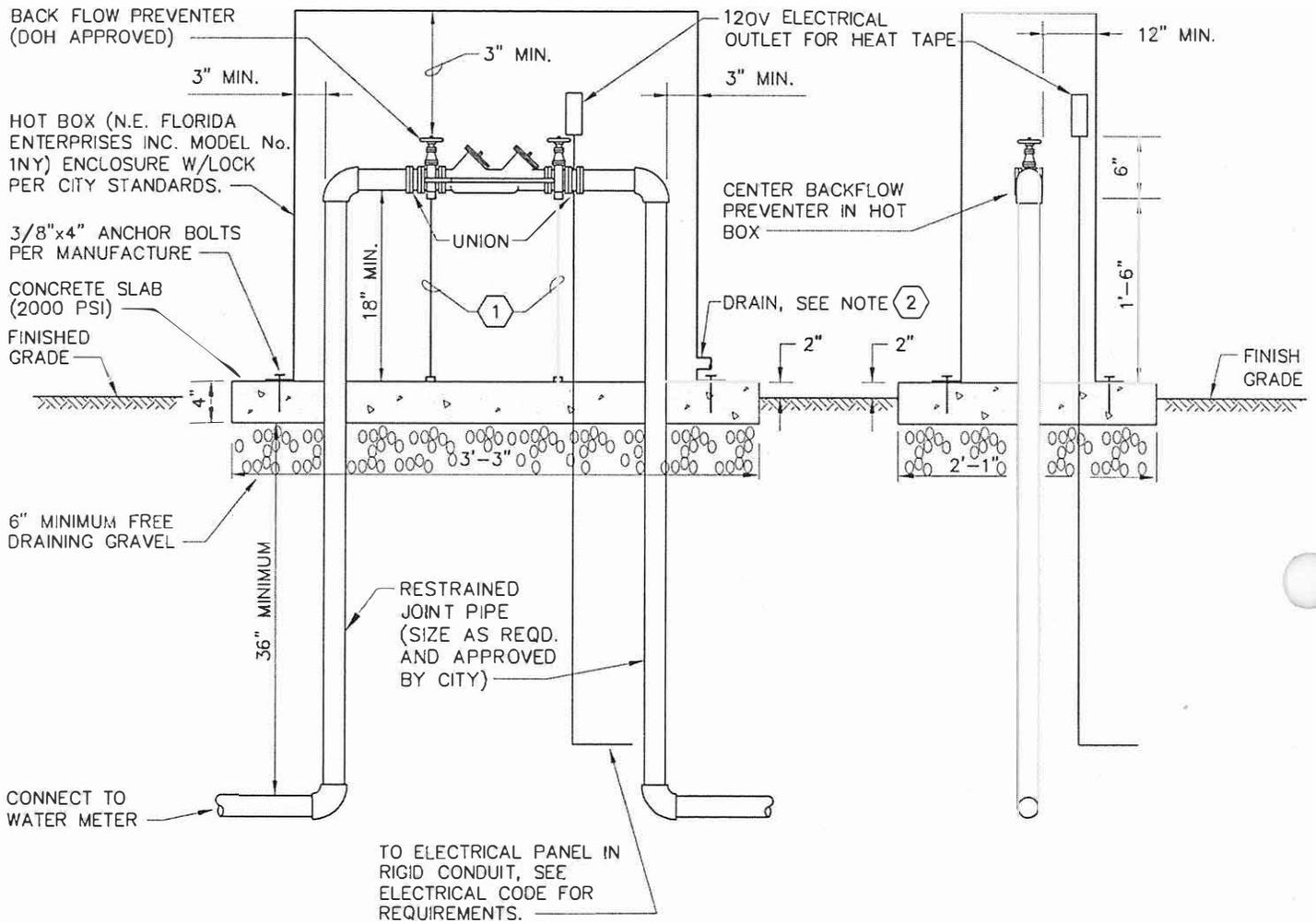
- SEE SHT 3 FOR ADDITIONAL STATION INFORMATION.
- PREP ALL SURFACES PER PAINT MANUFACTURER'S INSTRUCTIONS PRIOR TO APPLICATION. REMOVE ALL DIRT, GREASE, SCALE AND RUST. FACTORY COATINGS SHALL BE ROUGHENED TO PROVIDE ADEQUATE PROFILE FOR TOP COATS.
- COAT INTERIOR WALLS, DI PIPE, FITTINGS AND STEEL FASTENERS WITH POLYIMIDE EPOXY PAINT, 2 COATS AT 5 DRY MILS EACH. COLORS: OFF WHITE FOR WALLS, LIGHT BLUE FOR PIPE. PIPE SHALL BE EMPTY DURING COATING.
- COAT VAULT EXTERIOR WITH 20 MIL COAL TAR EPOXY.
- PROVIDE VAULT DRAINAGE EITHER BY:
 - 4" SCH 40 PVC DRAIN TO DAYLIGHT OR STORM SYSTEM, or
 - GC SYSTEMS HYDROMATIC (WATER-POWERED) PUMP MODEL #996633-51-2.
- ALL BALL VALVES AND CURB STOP SHALL BE FULL-PORT.
- ALL FASTENERS SHALL BE STAINLESS STEEL.



Approved:  June 17, 2005
 City Engineer Date
 WATER STANDARD DETAIL



Dwg No: **W19**
**WATER VALVE STEM
 EXTENSION**



REDUCED PRESSURE BACKFLOW DEVICE
NOT TO SCALE

- (1) PROVIDE CITY APPROVED SUPPORT FOR 2 1/2" AND LARGER DEVICES.
- (2) DRAIN TO BE SIZED AS PER DOH REQUIREMENTS

Approved:

City Engineer

June 17, 2005

Date

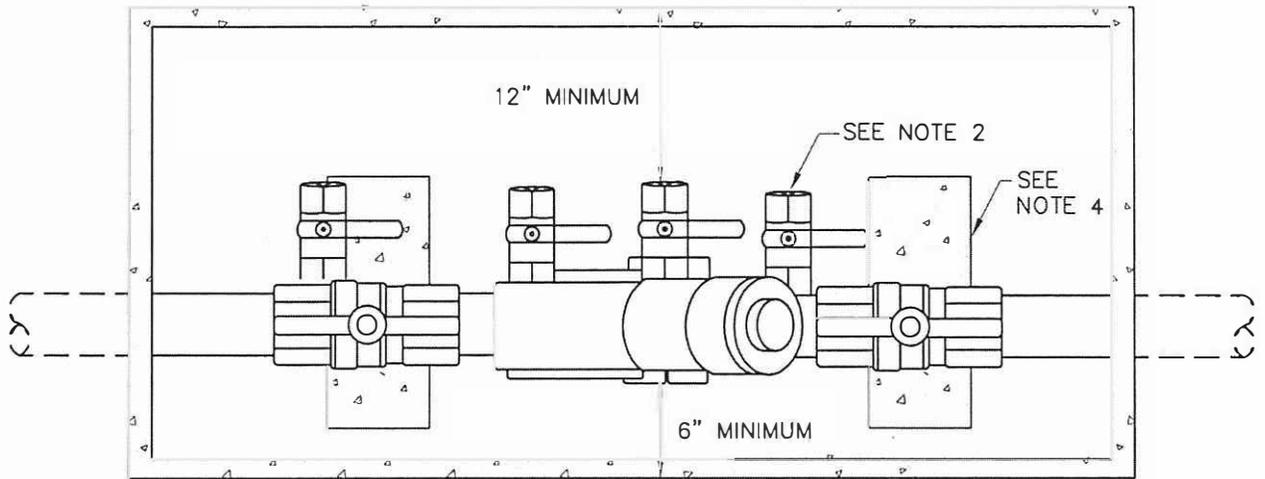
WATER STANDARD DETAIL



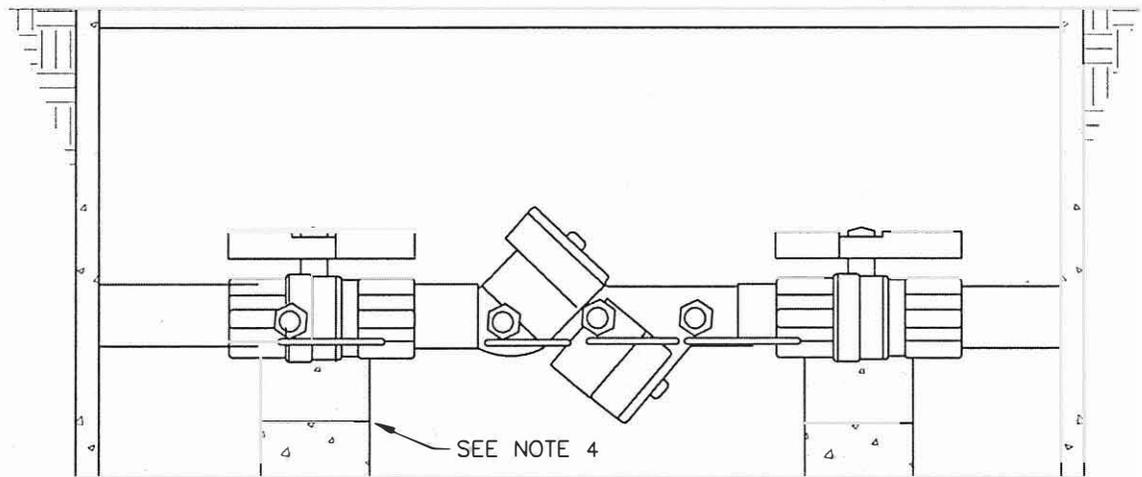
Dwg No:

W20

REDUCED PRESSURE
BACKFLOW DEVICE



PLAN VIEW



PEA GRAVEL
(6" MIN. DEPTH)

SEE NOTE 3

UNDISTURBED EARTH

PROFILE VIEW

NOTES:

1. MINIMUM BOX SIZE: $\frac{3}{4}$ "- 1" ASSEMBLIES, 10"x13"
1 $\frac{1}{4}$ "- 2" ASSEMBLIES, 14"x20"
2. ASSEMBLY MUST BE INSTALLED WITH TEST COCKS FACING UP OR TO ONE SIDE. INSTALL WATERTIGHT PLUGS IN ALL TEST COCKS.
3. SUFFICIENT DRAINAGE MUST BE PROVIDED TO PREVENT ASSEMBLY FROM BEING SUBMERGED.
4. PROVIDE SUPPPORT BLOCKS AS MAY BE REQUIRED.
5. PROVIDE A STRAINER WITH BLOW OUT TAPPING AHEAD OF DEVICE IF REQUIRED BY CITY.
6. THOROUGHLY FLUSH THE LINE, PRIOR TO THE INSTALLATION OF THE DCVA.
7. PROTECT DEVICE FROM FREEZING BY INSTALLING IN STRUCTURE OR PER "HOT BOX" SHOWN IN REDUCED PRESSURE BACKFLOW DEVICE DETAIL.

Approved:

June 17, 2005

City Engineer

Date

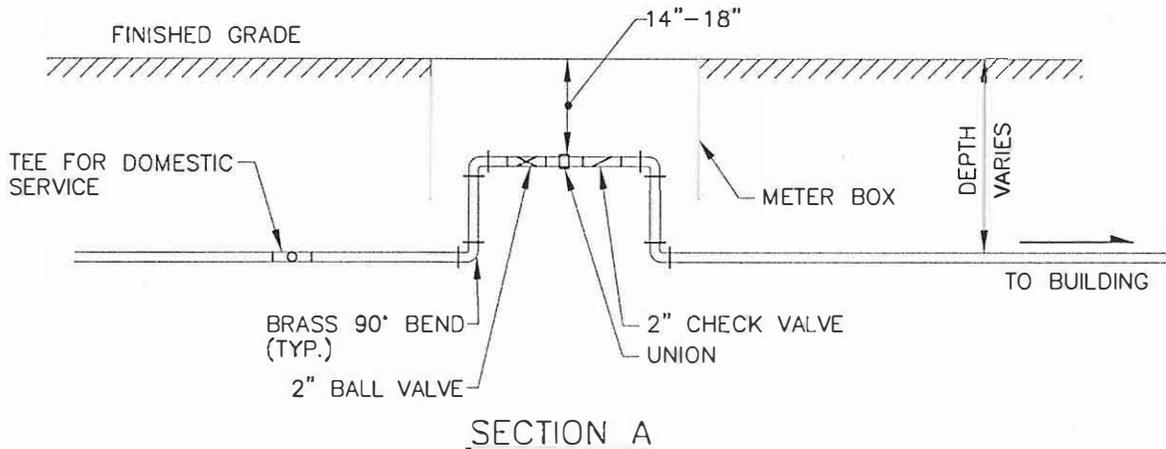
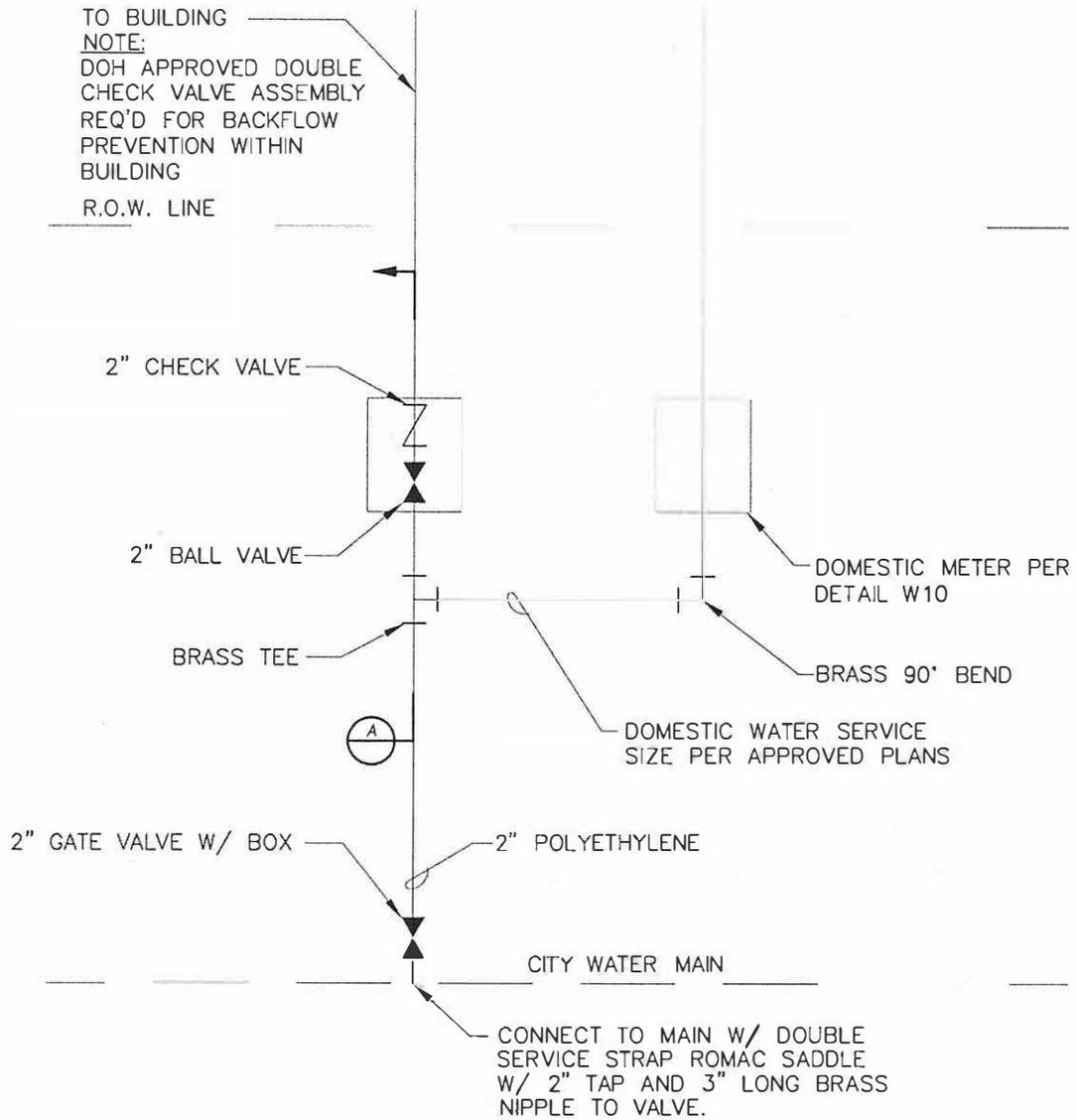
WATER STANDARD DETAIL



Dwg No:

W21

'INDIVIDUAL' DOUBLE CHECK
DETECTOR ASSEMBLY



Approved:

City Engineer

June 17, 2005

Date

WATER STANDARD DETAIL

City of
BONNEY
Lake

Dwg No:

W22

**FIRE SPRINKLER LINE WITH
DOMESTIC SERVICE**

***Appendix E – Cross Connection Control
Program***

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Cross-Connection Control Program

INTRODUCTION

A Cross-Connection Control (CCC) program is a proactive and ongoing effort of a water purveyor to protect the health of its customers by preventing contamination and pollution of the municipal water supply. This is done by preventing backflow of contaminants or pollutants through cross-connection. A cross-connection is any physical connection, actual or potential, between a water system and any source of non-potable substance. All public water systems in Washington State are required to implement a CCC program. The purpose of a purveyor's CCC program shall be to protect the public water system from contamination via cross-connections. All required elements of a local CCC program must be documented and included in either the Comprehensive Water System Plan (applicable to Bonney Lake) or Small Water System Management Program document (not applicable to Bonney Lake). Although general CCC rules have been in effect for over 20 years, the State mandate for CCC program and the required elements of a CCC program are contained in WAC 246-290-490 Cross-Connection Control, which became effective in April of 1999. The minimum required elements in a CCC program are as follows:

- An adopted local ordinance, resolution or code that establishes the purveyor's legal authority, describes operating policies and the corrective actions of a CCC program.
- Develop and implement procedures and schedules for evaluating new and existing service connections to assess hazards.
- Develop and implement procedures and schedules that eliminate or control cross-connections and ensure approved backflow preventers are properly installed.
- Ensure that personnel, including one certified Cross-Connection Control Specialist (CCS), are provided to develop and implement the CCC program.
- Develop and implement procedures to ensure approved backflow preventers are properly inspected and tested.
- Develop and implement a backflow prevention assembly testing quality control assurance program.
- Develop and implement procedures for backflow incident response.
- Include CCC program information in customer education materials.
- Develop and maintain CCC program records.

- Meet any additional CCC requirements if reclaimed water is distributed or received in the water service area.

PURPOSE AND SCOPE

This document establishes minimum standards for the City of Bonney Lake (City) to protect the public water supply from possible contamination from backflow. This document also describes minimum CCC program operating policies, provides guidelines for installation, testing and maintenance of approved backflow assemblies. In addition, permitting and inspection requirements for existing and new backflow prevention assemblies are described. The document concludes with recommendations that the City is advised to address in order to comply with the updated CCC program requirements.

AUTHORITY

The Federal Safe Drinking Water Act of 1974 and the statutes of the State of Washington Title 43 RCW require purveyors to protect the public water systems from contamination. In addition, Washington Administrative Code WAC 246-290-490 establishes CCC program requirements for the State. In Washington State, the Department of Health (DOH) is the lead agency for the development and administration of the State's CCC program. The City has adopted ordinance 577 requiring use of backflow devices; however the ordinance needs to be modified to reflect the requirements of WAC 246-290-490.

RESPONSIBILITY

The City is responsible for protecting its public water supply from contamination, due to backflow of pollutants through water service connections. If the City determines that a backflow prevention assembly is necessary at a customer's premise, the City will notify the customer to install an approved backflow assembly on the premise. Installation of said backflow assembly shall be a condition of continued water service from the City. Upon installation, the customer shall arrange for inspection and testing of said assembly. The customer will be responsible for all applicable testing and inspection fees.

FAILURE TO COMPLY

Any person, firm, or corporation who violates any of the provisions of this document or future CCC ordinances, may be punished in accordance with Bonney Lake Municipal Code. Any person, firm or corporation who violates any provisions and requirements of this document shall be subject to discontinuance of supply of City water to the premise. Discontinuance of the City potable supply to the premise shall remain in effect until corrective action, as required by the City, is completed, tested and approved.

CROSS-CONNECTION CONTROL PROGRAM

The City has implemented some of the required elements of the CCC program as listed above. This document will describe the City's current CCC program and will also discuss areas that the City needs to address in order to comply with the new CCC program requirements. The City is committed to protecting the public water supply from contamination by eliminating potential cross-

connections. The City's CCC program that follows includes a statement of its goals and objectives, the evaluation of CCC elements, the program implementation schedule, and recommendations.

CCC Program Goals and Objectives

The goals and objectives of the City's CCC Program consist of:

- Prevent contamination or pollution of the public water supply by eliminating or properly protecting actual or potential cross-connections.
- Inventory all potential cross-connections.
- Establish an inspection and testing program for all backflow prevention assemblies. Inspection shall include inspection of backflow prevention assembly installations, annual inspection of air gaps, and annual survey of high-hazard facilities. The City will notify customers when testing is due.

The City will achieve these goals and objectives through the implementation of the CCC program that follows.

Evaluation of CCC Program Elements

The City is required to develop and implement a CCC program. All required elements of a local CCC program must be documented and included in the City's Comprehensive Water System Plan. The evaluation of these CCC program elements and current level of implementation are presented below.

Cross-Connection Control Ordinance

This CCC program element requires that the purveyor "adopt a local ordinance, resolution, code, bylaw, or other written legal instrument" outlining the purveyor's program. In addition, this document must establish the purveyor's legal authority to implement a CCC program. Operating policies, technical provisions and corrective actions of the CCC program must also be addressed in the legal document. The City has adopted a CCC ordinance that establishes the City's authority in implementing a cross-connection program. See attached Ordinance No. 577.

Evaluation of Service Connections

This CCC program element requires that the purveyor develop and implement procedures for evaluating existing and new service connections to assess the risk of connecting the consumer's premises to the City's public water system. This element also requires that the purveyor notify the consumer within a reasonable time frame of the evaluation results. New connections are required to be evaluated prior to service. Existing connections shall be inspected on a schedule acceptable to DOH. The City has an established procedure for evaluating new service connections for potential cross connection. This risk assessment evaluation is performed during the building permit or utility service agreement application review process for new water service applicants. Existing customers are evaluated during the building permit review process for structure alterations or additions and during the business license review process. If a backflow assembly is required as a result of this evaluation, the assembly, owners name, property address, and other pertinent information is

recorded in a database that is maintained at the City’s Utilities Administrative Office. The City has performed a risk assessment of its existing service connections.

Table 1 lists standard abbreviations for backflow prevention assemblies. These abbreviations will be used in the tables that follow.

**Table 1
Abbreviations**

Abbreviation	Description	Level of Production
AG	Air Gap	1
RPBA	Reduced Pressure Backflow Assembly	2
RPDA	Reduced Pressure Detector Assembly	2
DCVA	Double Check Valve Assembly	3
DCDA	Double Check Detector Assembly	3
PVBA	Pressure Vacuum Breaker Assembly	4
AVB	Atmospheric Vacuum Breaker	5
SVBA	Spill Resistant Vacuum Beaker	5

Table 2 lists the premises that are required to have isolation by an air gap or reduced pressure backflow assembly to prevent contamination to the public water system.

**Table 2
Premises Requiring Mandatory Service Isolation by AG or RPBA**

Premises	Premises
Agricultural (farms and dairies)	Mortuaries
Beverage Bottling Plants	Nursing Homes
Car Washes	Petroleum Processing or Storage Plants
Chemical Plants	Piers and Docks
Commercial Laundries	Radioactive Material Processing Plants
Premises with Potable and Reclaimed Water	Nuclear Reactors
Film Processing Facilities	Survey Access Denied or Restricted
Food Processing Plants	Wastewater Lift Stations
Hospitals and Medical Centers	Wastewater Treatment Plants
Laboratories	Unapproved Auxiliary Supply
Metal Plating Industries	

Currently the City requires RPBA’s at industrial facilities, DDCVA’s at commercial facilities, and on fire sprinkler systems with a fire connection, DCVA’s at multi-family building greater than or equal to three stories, and DCVA’s for irrigation and sprinkler systems.

Table 3 shows various facilities that require or recommend back flow prevention devices.

**Table 3
Backflow Protection Requirements and Recommendations**

Required Service Isolation
Premises with Approved Auxiliary Supply
Premises with Fire Sprinkler Systems or Private Hydrants
Tall Buildings (Over 30 feet)
Recommended Service Isolation
Mobile Home Parks
Shopping Centers

Table 4 lists fixtures, equipment, and areas that have the potential to contaminate the public drinking water system. The table also shows the minimum protection required by the City to prevent such contamination.

**Table 4
Fixtures, Equipment and Areas with Backflow Potential**

Fixtures, Equipment and Areas	Protection	Fixtures, Equipment Areas	Protection
Air Compressors	DCVA	Janitor Sinks	AVB
Air Conditioning Systems	RPBA	Kitchen Equipment	AVB
Air Washers	RPBA	Laboratory Equipment	RPBA
Aquarium Make-Up Water	AG/RPBA	Laundry Machines, Commercial	RPBA
Aspirators, Medical	AVB	Lavatories	AVB
Aspirators, Vault Drain	RPBA	Livestock Drinking Tanks	DCVA
Aspirators, Weedicide/Herbicide/Pesticide	RPBA	Make-Up Tanks	AG/RPBA
Autoclaves	RPBA	Mobile Carpet Cleaners	RPBA
Autopsy Tables	RPBA	Mop Sinks	AVB
Baptismal Fountain	RPBA,AG/AVB	Outboard Motor Test Tanks	AG/RPBA
Bathtub, Below Rim Filler	Not Allowed	Perchloroethylene Reclaim	AG/RPBA
Bedpan Washers	RPBA	Pesticide Applicator Trucks	AG/RPBA
Beverage Dispensers using C02	RPBA	Photo Developing Tanks and Sinks	RPBA
Bidets	AVB/AG-Internal	Photostat Equipment	RPBA
Boat Lifts	RPBA	Pipette Washers	AVB
Boiler Feed Lines	AG/RPBA	Potato Peelers	AVB
Bottle Washing Equipment	RPBA	Poultry Feeders	RPBA

Continued on Next Page

Table Continued

Box Hydrants	DCVA	Private Hydrants	DCVA
Brine Tanks	AG/DCVA	Processing Tanks	AG/RPBA
Can Washing Equipment	RPBA	Pump Seal Water	AG/RPBA
Chemical Feeder Tanks	AG/RPBA	Pumps, Pneumatic Ejector	RPBA
Chilled Water Systems	RPBA	Pump Prime Lines	RPBA/DCVA
Chlorinators	RPBA	Pumps, Water Operated Ejector	RPBA
Coffee Urns	AG/AVB	Radiator Flushing Equipment	RPBA
Computer Cooling Lines	AG/RPBA	Recreational Vehicle Dump Stations	RPBA
Condensate Tanks	AG/RPBA	Serrated Faucets	AVB
Cooking Kettles	AG/AVB	Service Sinks	AVB
Cooling Towers	AG/RPBA	Sewer Connected Equipment	AG
Decorative Ponds	AG/RPBA	Sewer Flushing	AG
Degreasing Equipment	RPBA	Shampoo Basins/Hose Rinse	AVB
Demineralized Water System	RPBA	Showers, Telephone	AVB
Dental Cuspidors	RPBA	Sitz Baths	AVB
Detergent Dispensers (Dishwasher)	AVB	Soap Mixing Tanks	AG/RPBA
Dialysis Equipment	RPBA	Solar Heating Systems	RPBA
Dishwashers	AVB	Solution Tanks	AG/RPBA
Drinking Fountains	AG	Spas	AG/RPBA
Dye Vats and Tanks	AG/RPBA	Specimen Tanks	AG/RPBA
Dynamometers	DCVA	Starch Tanks	AG/RPBA
Emergency Generators	RPBA	Stream-Air Sprays	RPBA
Etching Tanks	AG/RPBA	Steam Cleaners	RPBA
Fermenting Tanks	AG/RPBA	Steam Ejectors	RPBA
Fertilizer Injection Equipment	RPBA	Steam Generating Facilities	RPBA
Film Processors	RPBA	Sterilizers	RPBA
Fire Department Connections w/o chemicals	DCVA/DCDA	Stills	RPBA
Fire Department Connections with chemicals	RPBA/RPDA	Sumps	AG
Fire Sprinkler Systems w/o chemicals	DCVA/DCDA	Swimming Pools	AG/RPBA
Fire Sprinkler Systems with chemicals	RPBA/RPDA	Toilets (Internal)	AG
Floor Drains	AG	Trap Primers	AG
Flushing Floor Drains	AVB	Ultrasonic Baths	AG
Foamite Systems	RPBA/RPDA	Urinals (Internal)	AG
Fountains, Ornamental	AG/RPBA	Used Water Systems	RPBA
Fume Hoods	RPBA	Vats	AG/RPBA
Garbage Can Washers	RPBA	Washing Pools	AG/RPBA
Garbage Disposals	RPBA	Wall Hydrants	AVB
Heat Exchangers	RPBA	Wash Basins	AG/AVB
Heat Pumps	RPBA	Wash-Up Sinks	AG/AVB
High Pressure Washers w/o chemicals	DCVA	Wash Tanks	AG/RPBA
High Pressure Washers with chemicals	RPBA	Wastewater Lines	AG
Hose Bibs	AVB	Water-Air Sprays	DCVA
Hoses, Kitchen Rinse	AVB	Water Closets (Internal)	AG
Hot Tubs	AG/RPBA	Water Cooled Equipment	RPBA
Hot Water Heating Systems	RPBA	Water Ejectors	RPBA
Hot Water Boilers	RPBA	Water Recirculating Systems	DCVA
Humidifier Tanks and Boxes	AG	Water Settling	RPBA
Hydraulically Operated Equipment	RPBA	Water Treatment Tanks	AG/RPBA
Hydrotherapy Baths	RPBA	Water Trucks	DCVA
Ice Makers	RPBA	Wet Vacuum Systems	RPBA
Industrial Fluid Systems	RPBA	Whirlpool Baths	AVB/DCVA
Interties (Looped) Water Systems	DCVA	Windshield Washer Fluid Aspirators	RPBA
Irrigation Systems w/o chemicals	DCVA	X-Ray Processors	RPBA
Irrigation Systems with chemicals	RPBA		

Table 5 summarizes the number of each type of backflow prevention assembly protecting the distribution system as of December 31, 2004.

**Table 5
Summary of Backflow Prevention Assemblies**

Type of Device	Quantity
AG	1
RP	158
DC	942
PVB	9
SVB	0
AVB	0
Other	186

Cross-Connection Control and Elimination

This CCC program element requires that the purveyor eliminate existing cross-connections wherever possible. If elimination is not possible, then approved backflow prevention assemblies should be installed properly to reduce the risk of contamination.

The City will endeavor to eliminate potential cross-connections where possible. The City will not allow any potential cross-connection unless it is protected by an approved backflow prevention assembly. Owners shall be responsible for following the provisions of the City’s CCC program. In addition, owners shall be responsible for the elimination or protection of all cross-connections on their premises. The City will conduct an inventory of existing backflow assemblies that it currently operates, maintains, and inspects. A separate inventory will include all assemblies on customer’s premises that are the responsibility of the customer to maintain. The City will keep these inventories on file and shall update the inventory as necessary.

Personnel Certification

WAC 246-290-490 requires that personnel, including one certified Cross-Connection Control Specialist (CCS), are provided by the purveyor to develop and implement a CCC program. **Table 6** shows the City’s personnel certifications. Mr. Rick Shannon, Operation Manager, Mr. Rocky Walston, and Mr. Gregg Ridge are all certified as Cross-Connection Control specialists. Mr. Rocky Walston, Mr. Sam Roseberry, and Mr. Larry Busch are certified Backflow Assembly Testers. In addition Mr. Larry Busch is a Licensed Plumber.

The City will continue to provide properly certified personnel to implement the CCC program. The City has the properly certified staff to implement and maintain a CCC program as outlined by the State.

Table 6
Water Division Personnel Certification

Public Works Current Training Certification C - Current Certification F - Future Certification R - Renewal of current	Rick Shannon	Gregg Ridge	Joe Lovett	Mary Briggs	Kassandra Sharer	Greg Hebling	Todd Bright	Brent Hoff	Jerry Revelee	Sam Roseberry	Dave Bauman	Dana Fugere	Rocky Walston	Bill Strand	Shawn Griffin	Curt Roundtree	Joe Langford	Lance Johnson	Steve Willadson	Al Young	Michelle Surdez	Triss Weber	Eric Smith	Notes
Asbestos		C	C		C																			Scheduled for July 2003 Renewal at the end of 2003
Backflow Assembly Tester		F																						
CDL			C																C					
CDL Tanker																			C					
CDL Hazmat			F																					Only hauling chlorine
Soils Comp Person			C																					
Confined Space																								
CPR	F	F	F	F	F	F	R	R	F	F	R	R	F	R	R	R	F	C	R	F	F	F	F	Renewal 2003 (setting up with Fire Department) All denoted with R are current through 2003
Cross Connection Control Specialist		C																						C. Controls, Totem & Madsen
Electrical																								
First Aid	F	F	F	R	F	R	R	R	F	R	R	R	F	R	R	R	F	C	F	F	F	F	F	Renewal 2003 (setting up with Fire Department) All denoted with R are current through 2003
Flagger	F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	R				C	Renewal 2/2004
Flyght Pumps																								
Sewer Collection																								Scheduled for July 2003. Not required, employees are proficient & trained.
Traffic Signal Tech I																								Totem, WSDOT serve as backup
Traffic Signal Tech II																								WSDOT serve as backup
Water Distribution II			R	F	F	R	R	R	R	R	R	R	R	R	R	R	R	R						All denoted with R have certification, but need a few more CEU's by end of 2003. Renewal good for 3 additional years.
Water Distribution I																								Same as above
Water Treatment Operation																								Will be required with the addition of the Grainger Springs Treatment and Ball Park filtration
Weed Control																								Recommend contract out
Playground Safety																								Recommended, but not required
Water Manager III		C																						One of the lead workers should also get certified.

Backflow Assembly Inspection and Testing

DOH requires that all backflow assemblies are routinely inspected and tested by certified personnel. Inspections are required at the time of installation, annually thereafter, after a backflow incident, and/or after the assembly is repaired, reinstalled, or relocated.

The City is responsible for maintaining those assemblies that are installed on the public water distribution system, not including those assemblies installed after a meter on private premises. For assemblies installed on customers' premise, the customer arranges for testing of said assemblies by a backflow prevention assembly tester approved by the City. The City notifies customers annually of required testing and the testing must be completed before a corrective action date passes. The customer will be subject to all applicable testing, maintenance and repair fees. On new installations, the City will (1) provide on-site evaluation and/or inspection of plans in order to determine the type of backflow assembly, if any, that will be required, and (2) will perform inspection. For existing premises, the City will perform evaluations and inspections of plans and/or premises and inform owners by letter of any corrective action deemed necessary, the method of achieving the correction, and the time allowed for the correction to be made. Ordinarily, corrections must be made within sixty days; however, the City may shorten this time period depending on the degree of hazard involved and the history of the assembly in question. Service may be discontinued immediately if necessary. The City will then inspect the premises on or after the expiration date of the required action to correct a cross-connection. If the premise is found not to be in compliance with the City's request, the owner shall receive written notice that water service to the premises will be discontinued. If the owner informs the City of extenuating circumstances as to why the correction has not been completed within five working days of receipt of the notice of termination, the City may grant a time extension up to, but not exceeding, thirty days.

Inspection and testing of assemblies shall be done (1) during the initial installation; (2) during on-site reviews of existing installations; (3) after any repairs or maintenance; (4) after any relocation; and (5) on an annual basis, but may be required more frequently for certain high hazard premises. When an initial installation or annual test indicates that a backflow assembly is not functioning properly, the owner shall correct the malfunction within five working days as directed by the City. After correcting the problem, the owner shall arrange for re-inspecting and testing of the assembly.

The owner shall be responsible for the payment of all fees for (1) for annual or semi-annual assembly inspection/testing; (2) for re-testing if the assembly fails to operate correctly; and (3) for any re-inspections for non-compliance with City requirements. The City will continue to maintain records of backflow assembly inspections.

Testing Quality Control Assurance Program

This program element requires development and implementation of a quality control assurance program for the testing of backflow prevention assemblies. Successful implementation of this program element assures that all backflow prevention assemblies are tested in a similar manner and kept in optimal condition.

The City shall ensure that all testing procedures are completed in a consistent manner. Only certified personnel shall be utilized to test all backflow assemblies. The City has a process for approving backflow assembly testers and only approved testers appearing on the City's approved list may be used for testing and repair. Personnel shall be trained as outlined by the State, fulfilling all necessary requirements in order to comply with WAC 246-290-490.

Testing shall be recorded on the proper forms and maintained at the Utilities Administration Office. Examples of testing forms can be found in the AWWA "Recommended Practice for Backflow Prevention and Cross-Connection Control" manual. In the future, the City will provide forms to their customers with the annual testing notification.

Testing personnel shall adhere to the following steps: (1) use only properly operating and calibrated gauge equipment; (2) follow proper field test procedure; (3) consult the manufacturer's repair and maintenance manual when disassembly is required; (4) use only original manufacturer spare parts; and (5) retest the backflow assembly immediately after repair or maintenance. Testers can only perform tests and repairs allowed by the Washington State Backflow Assembly Tester certification and all other repairs and installations require a Specialty Plumber's License. All persons performing tests, repairs, or installations shall have all required certifications and licenses and shall furnish the City with copies upon request.

In addition to the above steps, testing procedures performed by certified test personnel shall be in compliance with current test procedures approved by the DOH, the AWWA yellow manual or the USCS manual, which may include the following: (1) advise customer of an impending test/inspection so that the customer's staff may participate; (2) notify the fire department when shut down of a fire service is necessary; (3) flush residual dirt through test cocks before attaching test gauges; (4) ensure that the high and low pressure bypass hoses of the test kit are connected to the proper test cocks; open test cocks slowly when bleeding air through the bypass hoses; (5) test gauges shall be properly calibrated by a certified testing agency; and (6) assemblies should be tested before the warranty expiration date.

Incident Response

This CCC program element requires that the purveyor develop a backflow incident response plan. The following paragraph outlines the City's response to a backflow incident. Other emergency response procedures are included in the **City of Bonney Lake Emergency Response Plan**.

Emergency Condition: Water System Contamination and Pollution Due to a Backflow Incident

Impact on System: Potentially major impact. Water not suitable for potable use - loss of supply. Potential irreversible damage to water mains and pipes.

Emergency Response

1. Shut down the affected mains if possible to contain the affected contaminants.
2. Notify the Operations and City's Cross Connection Control Program Manager.
3. Notify DOH of the backflow incident.
4. Notify all customers of the problem and instruct them to boil all water to be used for consumption and cooking or issue a no-drinking warning.
5. Flush affected water mains to remove contaminants.
6. Disinfect reservoirs and water mains, as necessary, to remove contaminated residuals.
7. Analyze water quality in other parts of the distribution system to ensure that all contaminants were contained.

This document (and the City of Bonney Lake Emergency Response Plan) outlines procedures to be followed if an emergency arises. When a CCC emergency is called into the Bonney Lake Police Department, or other emergency responder during non-business hours, the responder will notify the Public Works Department on-call person. This person assesses the emergency and will notify any water division personnel as deemed necessary, depending on the severity

Cross-Connection Control Program

of the emergency. All emergencies are reported to Mr. Rick Shannon, Operations Manager. This person will be responsible for coordinating with water division personnel, as well as other emergency responders, if necessary.

Public Education

Another CCC program requirement is that educational information of the CCC program be included in existing water system materials that are distributed to customers. Educational materials can be included in pamphlets, brochures, bill inserts, public service announcements, and consumer confidence reports.

The City will develop CCC program education materials and will include them in bill inserts, city-wide newsletters and the City's website.

Record Keeping

Purveyors must also develop and maintain records of their CCC program, as mandated by DOH. At a minimum, purveyors must maintain the following records:

- Master list of service connections and/or premises where backflow prevention assemblies are protecting the public water system or fixtures
- Assessed hazard level of each backflow assembly
- Inventory information on approved air gaps, including location, degree of hazard, installation date, inspection history, inspection results, and personnel conducting inspections
- Backflow assembly inventory information including location, assembly description, installation date, inspection history, test and repair history, test results, and inspecting personnel
- Atmospheric Vacuum Breaker (AVB) and Spill Resistant Vacuum Beaker (SRVB) inventory including location, description, installation date, inspection history, and inspecting personnel
- Program summary and backflow incident reports

The City currently maintains program records, including hazard reports and backflow assembly inspection reports, at the Utilities Administration Office. The City will keep records as required by the new CCC program. At a minimum the City will maintain the following information: (1) installation date of assemblies; (2) location of backflow assemblies; (3) inspection and testing reports of backflow assemblies; (4) performances of backflow assemblies; and (5) performance of licensed testers.

Reclaimed Water Requirements

The final CCC program requirement is for systems that distribute or receive reclaimed water within their water service area. For these systems, additional CCC requirements may be imposed by DOH in any permits issued in accordance with Chapter 90.46 RCW.

The City currently does not distribute or receive reclaimed water within its service area; therefore these requirements are not applicable. However, if reclaimed water is used in the future, then the City will follow all requirements of the permits issued under Chapter 90.46 RCW.

PROGRAM IMPLEMENTATION AND RECOMMENDATIONS

The City's CCC program is an on-going effort that requires staffing and resources to ensure its effectiveness in protecting the quality of drinking water in the distribution system. It is recommended that the first step the City takes is to update ordinance 577. The language in this ordinance should reflect the requirements of WAC 246-290-490 and adopt the CCC program outlined in this document. In addition, the City should continue to reference the American Water Works Association (AWWA) manual entitled, "Recommended Practice for Backflow Prevention and Cross-Connection Control (AWWA M14)" for the development of its updated CCC program ordinance.

The City will prompt to implement also adopt a hazard evaluation program based on risk to the public drinking water supply. This evaluation ranks existing and potential cross-connections as high, medium and low risk. Based on the results of this evaluation, the City then begins an elimination program, eliminating the high-risk cross-connections first.

The City should also continue its inspection practices of the installed approved backflow assemblies. The City should continue documenting inspections in order to comply with the regulatory requirements.

The City currently meets the regulatory requirement of having at least one CCS (cross-connection specialist) within the water division to administer its CCC program. The City is encouraged to continue its active training program in order to comply with these requirements.

Finally, it is recommended that the City update its public education materials to include information on the City's CCC program. The City currently uses bill inserts and handouts to disseminate information to customers. The City could either add CCC program information to existing material, or create a separate CCC program handout.