CITY OF SNOHOMISH
WASHINGTON

DRAFT

WATER SYSTEM PLAN
(2019)

City of Snohomish
Comprehensive Water System Plan
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1 | INTRODUCTION

WATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Snohomish (City) is a municipal corporation that owns and operates a public water system within and outside of its city limits. Water system data on file at the Washington State Department of Health (DOH) for the City's system is shown in **Table 1-1**.

Table 1-1

Water System Ownership Information

Information Type	Description
System Type	Group A - Community - Public Water System
System Name	Snohomish, City of
County	Snohomish
DOH System ID Number	809158
Address	PO Box 1589, Snohomish, WA 98291
Contact	Mr. Tim Jackson, Public Works Utility Manager
Contact Phone Number	360-282-3170

OVERVIEW OF EXISTING SYSTEM

In 2016, the City provided water service to an average of approximately 3,323 customer connections, or 5,173 equivalent residential units (ERUs), within the City's water service area. The City limits comprise an area of approximately 3.6 square miles, and the existing retail water service area is approximately 5.3 square miles. The 2016 population served by the water system was approximately 10,696, whereas the population residing in the City limits was approximately 9,625.

The City's water supply currently is provided by the City of Everett through four interties on Transmission Line No. 5, and one intertie with Snohomish County PUD No. 1. Water storage is provided by two reservoirs that have a total capacity of 7.52 million gallons. A summary of the 2016 water system data is shown in **Table 1-2**.

Table 1-2
2016 Water System Data

Description	Data
Water Service Population	9,712
Water Service Area	5.3 Square Miles
Total Connections	3,081
Total ERUs	4,535
Demand per ERU	204 gallons per day
Annual Supply	337,000,000 gallons
Average Day Demand	642 gallons per minute
Distribution System Leakage (3-year Rolling Average)	8.2%
Maximum Day/Average Day Demand Factor	2.20
Peak Hour/Maximum Day Demand Factor	1.80
Number of Pressure Zones	9
Intertie Capacity	7,375 gallons per minute
Number of Reservoirs & Total Capacity	4 (8.85 MG)
Number of Pressure Reducing Stations	4
Total Length of Water Main	66 miles

The City also owns and operates the NEPA Pallet Water System located near the intersection of Highway 2 and Three Lakes Road. The system is supplied by the City of Everett's Transmission Line No. 5 and provides service to the UFP Western Division Inc. and one residential customer. Water system data on file at the DOH for the NEPA Pallet system is shown below in **Table 1-3**.

Table 1-3
NEPA Pallet Ownership Information

Information Type	Description
System Type	Group A - Non-Transient Non-Community
System Name	NEPA Pallet
County	Snohomish
DOH System ID Number	AA475K
Address	PO Box 1589, Snohomish, WA 98291
Contact	Mr. Tim Jackson, Public Works Utility Manager
Contact Phone Number	360-282-3170

AUTHORIZATION AND PURPOSE

The City authorized RH2 Engineering, Inc., (RH2) to prepare this Water System Plan (WSP) as required by state law under Washington Administrative Code (WAC) 246-290-100. In accordance with WAC 246-290-100, the plan shall be updated and submitted to the DOH every ten years. The previous WSP was prepared for the City in 2011. The purpose of this updated WSP is as follows:

- To evaluate existing water demand data and project future water demands;
- To analyze the existing water system to determine if it meets minimum requirements mandated by DOH and the City's own policies and design criteria;
- To identify water system improvements that resolve existing system deficiencies and accommodate the system's future needs for at least 20 years into the future;
- To prepare a schedule of improvements that meets the goals of the City's financial program;
- To evaluate past water quality and identify water quality improvements, as necessary;
- To document the City's operations and maintenance program;
- To prepare water use efficiency, cross-connection control, and water quality monitoring plans; and
- To comply with all other WSP requirements of DOH.

SUMMARY OF WSP CONTENTS

A brief summary of the content of the chapters in this WSP is as follows.

- The **Executive Summary** provides a brief summary of the key elements of this WSP.
- **Chapter 1** introduces the reader to the City's water system, the objectives of the WSP, and its organization.
- **Chapter 2** presents the water service area, describes the existing water system, and identifies the adjacent water purveyors.
- **Chapter 3** presents related plans, land use, and population characteristics.
- **Chapter 4** identifies existing water demands and projected future demands.
- **Chapter 5** presents the City's operational policies and design criteria.
- **Chapter 6** discusses the City's water source and water quality monitoring program.
- **Chapter 7** discusses the water system analyses and existing system deficiencies.
- **Chapter 8** discusses the City's operations and maintenance program.
- **Chapter 9** presents the proposed water system improvements, their estimated costs, and implementation schedule.
- **Chapter 10** summarizes the financial status of the water system and presents a plan for funding the water system improvements.
- The **Appendices** contain additional information and plans that supplement the main chapters of the WSP.

DEFINITION OF TERMS

The following terms are used throughout this WSP.

Capital Facilities Charge: A one-time fee paid by a property owner when connecting to the City's water system. This fee pays for the new customers' equitable share of the cost of the existing system. This fee offsets the cost of providing water to new customers and recognizes that the existing water system was largely built and paid for by the existing customers.

Consumption: The true volume of water used by the water system's customers. The volume is measured at each customer's connection to the distribution system.

Connection Charge: A one-time fee paid by a property owner when connecting to the City's system that is made up of both the Capital Facilities Charge and the Meter Service Connection Charge.

Cross Connection: A physical arrangement that connects a public water system, directly or indirectly, with facilities that could present the potential for contaminating the public water system.

Demand: The quantity of water required from a water supply source over a period of time necessary to meet the needs of domestic, commercial, industrial, and public uses, and to provide enough water to supply firefighting, system losses, and miscellaneous water uses. Demands are normally discussed in terms of flow rate, such as million gallons per day (MGD) or gallons per minute (gpm), and are described in terms of a volume of water delivered during a certain time period. Flow rates pertinent to the analysis and design of water systems are:

- **Average Day Demand (ADD):** The total amount of water delivered to the system in a year divided by the number of days in the year;
- **Maximum Day Demand (MDD):** The maximum amount of water delivered to the system during a 24-hour time period of a given year; and
- **Peak Hour Demand (PHD):** The maximum amount of water delivered to the system, excluding fire flow, during a 1-hour time period of a given year. A system's PHD usually occurs during the same day as the MDD.

Distribution System Leakage (DSL): Water that is measured as going into the distribution system but not metered as going out of the system.

Equivalent Residential Units (ERUs): One ERU represents the amount of water used by one single-family residence for a specific water system. The demand of other customer classes can be expressed in terms of ERUs by dividing the demand of each of the other customer classes by the demand represented by one ERU.

Fire Flow: The rate of flow of water required during firefighting, which is usually expressed in terms of gpm.

Head: A measure of pressure or force exerted by water. Head is measured in feet and can be converted to pounds per square inch (psi) by dividing feet by 2.31.

Head Loss: Pressure reduction resulting from pipeline wall friction, bends, physical restrictions, or obstructions.

Hydraulic Elevation: The height of a free water surface above a defined datum; the height above the ground to which water in a pressure pipeline would rise in a vertical open-end pipe.

Maximum Contaminant Level (MCL): The maximum permissible level of contaminant in the water that the purveyor delivers to any public water system user, measured at the locations identified under WAC 246-290-300, Table 3.

Meter Service Connection Charge: The installation charge or hook-up fee that is paid by a property owner to reimburse the City for the cost incurred to make the physical connection to the water system. This cost includes both direct and indirect costs for installing the service line off the system's water main to the customer's water meter. The charge also includes the cost of the water meter and meter box.

Potable: Water suitable for human consumption.

Pressure Zone: A portion of the water system that operates from sources at a common hydraulic elevation.

Purveyor: An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

Supply: Water that is delivered to a water system by one or more supply facilities, which may consist of supply stations, booster pump stations, springs, and wells.

Storage: Water that is "stored" in a reservoir to supplement the supply facilities of a system and provide water supply for emergency conditions. Storage is broken down into the following five components, which are defined and discussed in more detail in **Chapter 7**: operational storage; equalizing storage; standby storage; fire flow storage; and dead storage.

LIST OF ABBREVIATIONS

The abbreviations listed in **Table 1-4** are used throughout this WSP.

Table 1-4
Abbreviations

Abbreviation	Description
ADD	Average Day Demand
AWWA	American Water Works Association
CCR	Consumer Confidence Report
CIP	Capital Improvement Program
City	City of Snohomish
County	Snohomish County
DBP	Disinfection By-Product
DOH	Department of Health
DSL	Distribution System Leakage
EPA	Environmental Protection Agency
ERU	Equivalent Residential Unit
fps	feet per second
GMA	Growth Management Act
gpm	gallons per minute
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
mg/l	milligrams per liter
OSHA	Occupational Safety & Health Administration
PHD	Peak Hour Demand
psi	pounds per square inch
PUD	Snohomish County Public Utility District No. 1
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemical
SWTR	Surface Water Treatment Rule
THM	Trihalomethane
UGA	Urban Growth Area
USGS	United States Geological Survey
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety & Health Act

2 | WATER SYSTEM DESCRIPTION

INTRODUCTION

This chapter describes the City of Snohomish's (City) water service area and water service agreements and provides a thorough description of the water system and its individual components. The results of the evaluation and analyses of the existing water system are presented later in **Chapter 7**.

WATER SERVICE AREA

HISTORY

The Snohomish River valley's flat land and favorable soils began drawing settlers from Seattle in the late 1850s for agricultural use. A railway was developed through the valley and into the community of Snohomish in the 1880s and brought with it the lumber industry and the need for the community's first water system, which was originally constructed entirely of wood stave pipe. This water system was developed in 1884 and involved the pumping of water from a stream tributary to the Snohomish River located north of First Street. A water company was formed in 1887 that used the community's topography to provide water via gravity from Blackmans Lake.

In 1891, additional water was provided to the City via a pumping station and storage reservoir situated on the Pilchuck River to support the City's numerous lumber mills. Shortly after the City of Snohomish was incorporated in 1890, major fires disrupted business throughout the City, with 35 businesses destroyed in the 1911 fire. Over the next decade, the City was rebuilt, and in 1920, reached a population of over 3,000 people, which remained relatively constant for the next 40 years. In 1912, the existing water supply facilities were replaced with a dam on the Pilchuck River, a 12-inch wood stave transmission main and an open ground-level reservoir, which all have been either abandoned or replaced. An additional reservoir was constructed in 1925 at the same site as the original reservoir. This reservoir, Reservoir No. 1, had a capacity of 1.0 million gallons (MG). In October 2014, Reservoir No. 1 was decommissioned due to concerns with its structural integrity.

In the late 1920s and early 1930s, the City replaced the wood stave pipe distribution system with cast iron pipe. At this time a diversion dam was constructed on the Pilchuck River in nearly the same location as the original dam. Since the construction of the diversion dam was completed in 1934, a fish ladder and a continuous flow fingerling bypass were installed to keep the intake screen free of fingerlings. As of 2017, the City is no longer withdrawing water from the river, and is currently working with the Tulalip Tribes to remove the diversion dam. Current timelines project removal of the dam to occur in 2020 at the earliest.

A 5.0 MG reservoir, Reservoir No. 2, was constructed in 1953 at the same site as Reservoir No. 1 and the original reservoir. Reservoir No. 2 remains in operation today and provides the only storage for the City's 218 Zone. In the early 1950s, the City of Everett (Everett) constructed Transmission Line No. 5 near the northern boundary of the Snohomish City limits. Shortly after construction of this transmission main, the City installed an emergency connection on Terrace

Avenue. Although originally intended for emergency use only, the City eventually began using this connection for continuous water service to the northern portion of the City. This led to increased development north of 13th Street and created the need for additional transmission main connections, four of which are in service today, to serve the City's water service customers.

The City adopted a historic district ordinance in 1973 prohibiting inappropriate alterations and demolitions of historic buildings and structures, in addition to encouraging new structures to mimic the historic character of the district. In the following year, the 36-block area encompassing the historic business district was placed on the National Register of Historic Places.

Beginning in the 1980s, the City became a more popular destination for Everett and King County workers to call home as major highways allowed for easier commutes throughout the region. Throughout this period of growth the City was able to maintain its agricultural roots, although the Snohomish School District became the City's major employer. Most of the residential growth occurred north of the City limits as farmland was developed into rural subdivisions and small acreage, single-family parcels. These areas received water service from the City's interties along Everett's Transmission Line No. 5.

In 1981, a direct filtration water treatment plant was constructed near the Pilchuck River diversion dam to treat water being supplied to Reservoir Nos. 1 and 2. Soon after the water treatment plant was constructed, the original transmission main from the water treatment plant to the City was replaced and the City began serving the existing residential customers along the transmission main alignment. Many of these customers previously had illegal, unmetered connections to the transmission main and were not officially metered until the new transmission main was constructed. A 0.33 MG backwash tank located at the water treatment plant was utilized for backwashing the water treatment plant filtration cells and provided storage for customers along the Water Treatment Plant Transmission Main. In 2017, the Pilchuck River water treatment plant was decommissioned due to high cost of operation relative to purchasing water from Everett.

The City constructed Reservoir No. 3, a 68-foot tall, 2.52 MG steel standpipe, and immediately put it into operation in August 1991 to serve the City's 362 Zone. This reservoir is located one block east of Terrace Avenue and one block north of 16th Street, and is supplied by the Terrace Avenue intertie on Transmission Line No. 5. Reservoir No. 3 allows the City to limit the peak demands at the Terrace Avenue intertie and provides a limited amount of supply to the 362 Zone in the event that Transmission Line No. 5 is shut down. Temporary storage for the 384, 425, 438, and 450 Zones also may be provided by Reservoir No. 3, as was accomplished in 2009 and 2018 when supply was not available from Everett due to a planned shutdown of the filtration plant.

In an effort to reduce the amount of re-chlorination necessary to maintain the appropriate level of disinfection, the City covered and lined Reservoir Nos. 1 and 2 in 1992. At the same time, piping upgrades between the two reservoirs were completed. This increased the usable storage of the system by 1.0 MG, as the two reservoirs were originally designed to operate in series with each other, with Reservoir No. 1 serving as overflow storage for Reservoir No. 2. Although the piping upgrades connecting the two reservoirs increased the City's overall storage capacity, approximately 0.5 MG of storage from Reservoir No. 1 was displaced as a result of these upgrades. This is because Reservoir No. 2 was originally constructed at a slightly lower elevation than Reservoir No. 1 and dictated the water level in Reservoir No. 1. At the time of the upgrades, the two reservoirs combined provided approximately 6.0 MG of domestic and fire flow storage to the 218 Zone, and were operated at the same water level.

Since decommissioning the water treatment plant in 2017, the City now receives all supply from Everett, with the exception of the Water Treatment Plant Transmission Main customers. These customers are now supplied via a 2-inch-diameter intertie with Snohomish County Public Utility District No. 1 (PUD) located along the Robe Menzel Road. This intertie was originally constructed in July 2010 as a temporary agreement. The full-time agreement was established in 2016. Typically, the City operates this intertie at a flow rate higher than the demand of the transmission main customers to ensure that the water age in the transmission main does not become excessive. Due to the high leakage of the aging transmission main and issues with water age, the City is working to identify ways to transfer the transmission main customers to the PUD or to individual or community wells. The low density of customers (approximately 77) along the 14-mile transmission main makes rehabilitating the transmission main with new, smaller-diameter water main cost prohibitive to the City.

EXISTING RETAIL WATER SERVICE AREA

The City is located in western Snohomish County, Washington, near the confluence of the Pilchuck and Snohomish Rivers. The City boundaries encompass an area of approximately 3.6 square miles, as shown in **Figure 2-1**. The City's existing water distribution system extends south to Harvey Airfield and Marsh Road, north to 52nd Street SE, east to South Machias Road, and west to approximately 87th Avenue SE. The existing water distribution system extends beyond the City limits, including south of the Snohomish River, east of the Pilchuck River along 92nd Street SE and 86th Street SE, along Orchard Avenue, west of Highway 9 along 89th Avenue SE, and along the water transmission pipeline from the PUD intertie to the City limits, as shown in **Figure 2-1**.

The City's water service area boundary was originally defined in the *1991 North Snohomish County Coordinated Water System Plan*, a document which was most recently updated in December 2010. The City is responsible for providing public water service, utility management, and water system development within this area. However, requests for new water service outside the City limits will not be granted until such property is annexed into the City limits. The City Council may grant exceptions in the event of public health emergencies, pre-existing contractual obligations that limit the City's ability to require annexation, or as stated in the Growth Management Act. The Urban Growth Area (UGA) boundary extends north to approximately State Highway 2, east to the Pilchuck River, south to the Snohomish River, including Harvey Airfield, and west to approximately 83rd Avenue SE, encompassing an area of approximately 5.0 square miles. The City's retail water service area boundary generally follows the UGA boundary, but also includes areas east of the Pilchuck River and south of the Snohomish River that are not included in the UGA. The total area encompassed by the retail water service area boundary is approximately 5.3 square miles. The City also provides water service to approximately 77 service connections directly from the Water Treatment Plant Transmission Main. The City expects to transfer these connections to the PUD, other adjacent water purveyors, or to individual/community wells.

The City's existing water rights can be used throughout the defined water service area per the 2003 Municipal Water Law. The place of use for the City's water rights is the City of Snohomish and, according to the law, the place of use is defined as the area served. Thus, the City can use its water rights outside its corporate boundaries if the use is within the defined service area. **Figure 2-2** displays the existing retail water service area.

FUTURE WATER SERVICE AREA

The City's future water service area, as shown in **Figure 2-2**, includes all the area in the existing retail water service area, as well as an additional area east of Highway 9, between approximately 72nd Street SE and 78th Street SE. The future water service area is approximately 5.4 square miles.

TOPOGRAPHY

The topography of the City's water service area varies greatly in elevation. The north side of the service area is the highest, with land sloping gradually downward from State Highway 2 to the Snohomish River. Ground elevations range from over 335 feet near the crossing of State Route 9 and State Highway 2, to sea level along the Snohomish River. Steep slopes are located near the Pilchuck River, where the elevations rapidly drop nearly 200 feet.

GEOLOGY

The City is located in western Snohomish County, Washington, near the confluence of the Pilchuck and Snohomish Rivers. The City is primarily located on glacial deposits on the uplands above the floodplains of the Snohomish and Pilchuck Rivers. The last glacial epoch, which began approximately 15,000 years ago, deposited sand and gravel from advancing glaciers, which was overridden and compressed by glacial ice. Glacial till, or hardpan, was deposited concurrently with the movement of glacial ice. The hardpan is a dense mixture of sand, silt, and gravel. As glaciers retreated between 10,000 and 13,500 years ago, additional layers of loose sand and gravel were deposited within surficial depressions underlain by glacial till and advance outwash. The Snohomish and Pilchuck River floodplains are filled with a 40- to 120-foot-thick layer of post-glacial sand, silt, and gravel sediment deposited by their respective rivers.

The geologic units immediately underlying the City's retail water service area are comprised primarily of a 10- to 70-foot-thick layer of glacial till, with isolated areas underlain by thin layers (2 to 50 feet) of recessional outwash at higher elevations. Advance outwash is only exposed at the surface, along steep slopes above the stream channels of the Pilchuck River and Cemetery Creek.

INVENTORY OF EXISTING WATER FACILITIES

This section provides a detailed description of the existing water system and the current operation of the facilities. The analysis of the existing water facilities is presented in **Chapter 7**. Additional information on the City's existing water system facilities is included on the Washington State Department of Health (DOH) Water Facilities Inventory (WFI) form in **Appendix A**.

PRESSURE ZONES

The City currently serves customers within an elevation range of approximately 15 feet along Marsh Road to approximately 295 feet near Reservoir No. 3. The wide range of elevations requires that water pressure be increased or decreased to maintain pressures that are safe and sufficient to meet the system's flow requirements. The City achieves this by dividing the water system into six distinct pressure zones, as shown in **Figure 2-1**. Two additional pressure zones

are located along the Water Treatment Plant Transmission Main. The NEPA Pallet water system is operated as a standalone system, as it is not connected directly to the rest of the City's system.

The pressures in the 362 Zone and the 218 Zone are regulated by reservoir levels, as illustrated in the hydraulic profile, **Figure 2-3**. Pressures in the 218 Zone, which has a maximum hydraulic elevation of 218 feet, are established by the surface water level in Reservoir No. 2. The 218 Zone is primarily located south of 10th Street and includes downtown Snohomish and the areas surrounding the Harvey Airfield. Service elevations in the 218 Zone range from approximately 15 feet to approximately 140 feet. Pressures in the 362 Zone, which has a maximum hydraulic elevation of 362 feet, are established by the surface water level in Reservoir No. 3. The 362 Zone predominately serves the central portion of the City limits. Service elevations in the 362 Zone range from approximately 85 to 250 feet.

The 384, 425, 438, and 450 Zones are supplied with water directly from Everett's Transmission Line No. 5 through interties located adjacent to the transmission line. The 384 Zone is supplied by the Bickford Avenue Intertie along Transmission Line No. 5. The 384 Zone has a maximum hydraulic elevation of 384 feet and serves the northwestern portion of the City limits along Bickford Avenue west of State Highway 9. Service elevations within this zone range from approximately 120 to 250 feet.

The 425 Zone is supplied by the Terrace Avenue Intertie with water from Transmission Line No. 5. The 425 Zone has a maximum hydraulic elevation of 425 feet and serves the northeastern portion of the City limits along Terrace Avenue between 13th Street and 22nd Street. Elevations within this zone range from approximately 215 to 295 feet.

The 438 Zone is supplied by the King Charley's Intertie with water from Transmission Line No. 5, located at King Charley's on 99th Avenue SE. The 438 Zone, which has a maximum hydraulic elevation of 438 feet, primarily serves the area along 99th Avenue SE and 22nd Street in the northern portion of the City limits. Service elevations within this zone range from approximately 170 to 265 feet.

The 450 Zone is supplied by the Park Avenue Intertie with water from Transmission Line No. 5, located on Park Avenue at Cascade View Elementary. The 450 Zone, which has a maximum hydraulic elevation of 450 feet, primarily serves the northeastern portion of the City limits along Park Avenue, including Cascade View Elementary and the Clark's Pond single-family residential development. Service elevations within this zone range from approximately 200 to 245 feet.

The City currently serves approximately 77 connections along the Water Treatment Plant Transmission Main between the PUD intertie, which is located at an elevation of approximately 425 feet, and Reservoir No. 2. The hydraulic grade available from the PUD is approximately 772 feet, or 150 pounds per square inch (psi). A pressure reducing valve (PRV) at the intertie provides an initial pressure reduction to a maximum hydraulic grade of approximately 471 feet, and pressures must be further reduced with two PRVs along OK Mill Road and South Machias Road to achieve satisfactory service pressures. PRV No. 2, located near the intersection of OK Mill Road and Russell Road, serves customers at a maximum hydraulic grade of approximately 338 feet. PRV No. 1, located near the intersection of South Machias Road and Dubuque Road, serves customers at a maximum hydraulic elevation of approximately 286 feet.

The City owns and operates the NEPA Pallet Water System, which is supplied by the NEPA Pallet Intertie near the intersection of Highway 2 and Three Lakes Road. The elevation at this intertie is approximately 80 feet. The NEPA Pallet Water System has a hydraulic grade of

approximately 278 feet and serves the NEPA Pallet Company (ownership has recently changed and the new company name is UFP Washington, LLC) and one residential customer.

SUPPLY FACILITIES

Introduction

The City's water supply is provided from connections to Everett's Transmission Line No. 5 and an intertie with the PUD. The Pilchuck River source, which was formerly the system's primary water supply, is no longer used as of 2017.

City of Everett Interties

The City has four connections to Everett's Transmission Line No. 5, which serve the northern pressure zones. One additional connection serves the NEPA Pallet Water System. Water supply is treated by Everett before it reaches the City and is not rechlorinated or subjected to any additional treatment prior to entering the City's distribution system. Everett does not limit the amount of water that the City can withdraw from the connections on an annual or instantaneous basis. The Everett interties consist of a below-grade concrete vault with a flow meter and a second below-grade concrete vault equipped with two PRVs to maintain the pressure of the supply from Everett. The Terrace Avenue Intertie is equipped with two pressure reducing valve vaults that supply two different pressure zones. A summary of the interties providing water to the City's system is shown in **Table 2-1**.

Table 2-1
Intertie Facilities Summary

Intertie	Location	Pressure Zone (Existing)	Pressure Zone (Future)[1]	Existing Capacity (gpm)	Future Capacity (gpm)[1]	Master Meter Size (gpm)	PRV Size (inches)
Bickford Avenue Intertie	Bickford Ave and 52nd St SE	384 Zone	362 Zone	4,900	4,900	10	10, 6, and 2
King Charley's Intertie	Lake Ave and 56th St SE	438 Zone	362 Zone	1,600	3,100	8	8 and 4
Park Avenue Intertie	Approx. Park Ave and Rainbow Pl	450 Zone	362 Zone	3,500	4,900	10	10 and 3
Terrace Avenue Intertie	2014 Terrace Ave	362 Zone 425 Zone	362 Zone 425 Zone	4,900 1,500	4,900 1,500	8	362 Zone: 10 and 6 425 Zone: 8 and 3
NEPA Pallet Intertie	Three Lakes Rd and Highway 2	278 Zone	278 Zone	1,200	1,200	4	4
PUD Intertie	Robe Menzel Rd, S of 36th St NE	Transmission Main	Transmission Main	95	210	2	2

1 = Future capacity is intertie capacity after CIP PZ1 and CIP TM2 have been completed.

STORAGE FACILITIES

The City's water system has two storage facilities that provide storage to the 218 and 362 Zones. A summary of the storage facilities is shown in **Table 2-2**, and a detailed description of each facility is provided below. Additional data also is contained in **Appendix N**.

Table 2-2
Storage Facilities Summary

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Dimensions (feet)	Base Elev. (feet)	Overflow Elev. (feet)
Reservoir No. 2	Pine Ave and 13th St	218 Zone	1953	Concrete	5.00	282 x 198 (Ground Level)	197.4	218.2
Reservoir No. 3	1701 Terrace Ave	362 Zone[1]	1991	Steel	2.52	81 (Diameter)	296.5	362.0

1 = The Reservoir No. 3 operating area includes the 362, 384, 425, 438, and 450 Zones if normally closed zone valves between the zones are opened.

Reservoir No. 2

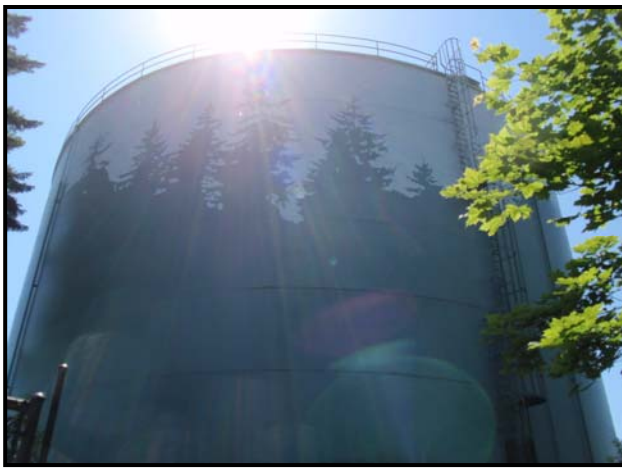
The 5.0 MG Reservoir No. 2 is located on the same site as the decommissioned Reservoir No. 1, and provides water storage directly to the 218 Zone. The 20.8-foot deep, below-grade reservoir was constructed in 1953, and was covered and lined in 1992. The Hypalon cover was replaced with a polypropylene cover in July 2009.

Reservoir No. 2

The reservoir measures approximately 282 feet by 198 feet at the ground surface. The storage volume per foot of height varies from the reservoir's base elevation of 197.4 feet to the reservoir's overflow elevation of 218.2 feet. The reservoir is primarily filled from the Reservoir No. 2 PRV. A 16-inch-diameter cast iron water main serves as the reservoir's outlet pipe.

Reservoir No. 3

The 2.52 MG Reservoir No. 3 is located at the edge of a residential neighborhood near the eastern boundary of the Snohomish City limits. The 81-foot diameter, 65.5-foot tall steel stand pipe was constructed in 1991 and provides approximately 38,500 gallons of storage per foot height for the 362 Zone. The actual storage capacity of the reservoir is approximately 2.47 MG, as the weir within the tank was constructed at a height of 64 feet. A single 16-inch-diameter ductile iron water main serves as the reservoir's common inlet/outlet pipe. The reservoir's two 10-inch-diameter altitude valves, which are set at 61.5 feet, are located within a below-grade concrete vault and control the inflow and outflow to the reservoir when the telemetry system is inoperative. The City has used Reservoir No. 3 to supply the 384, 425, 438, and 450 Zones during periods of interrupted service from Transmission Main No. 5.



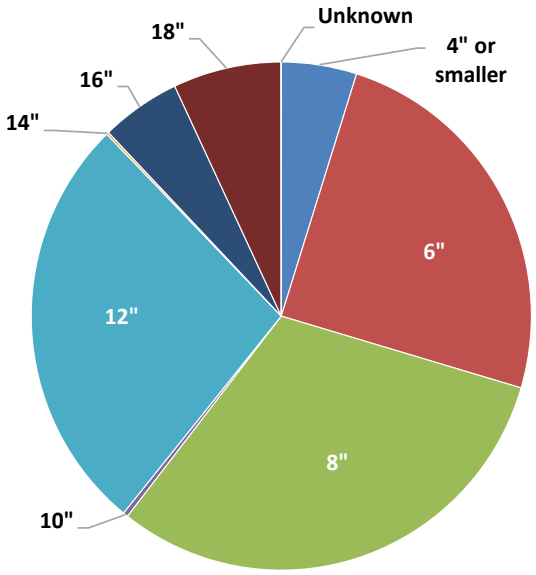
Reservoir No. 3

DISTRIBUTION AND TRANSMISSION SYSTEM

The City's water service area contains approximately 67 miles of water main ranging in size from 2 to 18 inches. As shown in **Table 2-3**, most of the water main (approximately 56 percent) within the service area is 6- or 8-inch diameter, and an additional 39 percent of all water main is 12 inches in diameter or larger.

Table 2-3
Water Main Diameter Inventory

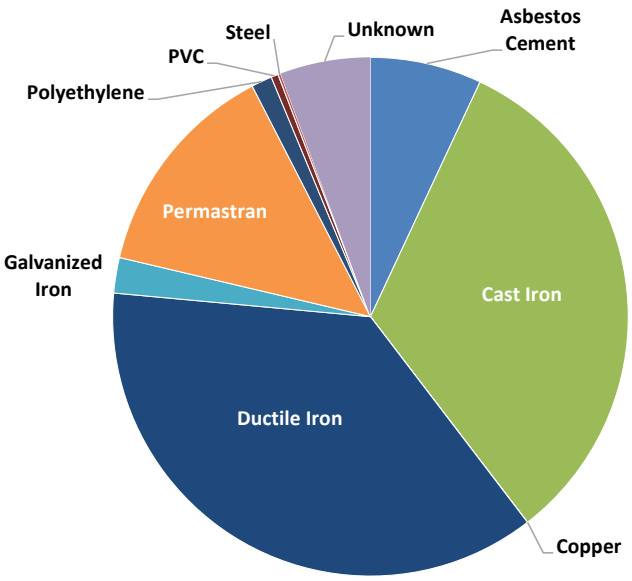
Diameter (Inches)	Length (Feet)	% of Total
4 or smaller	17,349	4.9%
6	87,920	24.7%
8	110,345	31.0%
10	1,121	0.3%
12	95,500	26.8%
14	559	0.2%
16	18,290	5.1%
18	24,916	7.0%
Unknown	49	0.0%
Total	**356,049**	**100%**



Water main in the City's system is generally constructed of asbestos cement, cast iron, copper, ductile iron, galvanized iron, permastran, polyethylene, polyvinyl chloride (PVC), and steel, with approximately 33 percent of the water main constructed of cast iron and approximately 37 percent constructed of ductile iron. Approximately 6 percent of the City's water main is constructed of unknown material. All new water main installations are required to use ductile iron water main in accordance with the City's development and construction standards. A detailed breakdown of the City's water main material inventory is shown in **Table 2-4**.

Table 2-4
Water Main Material Inventory

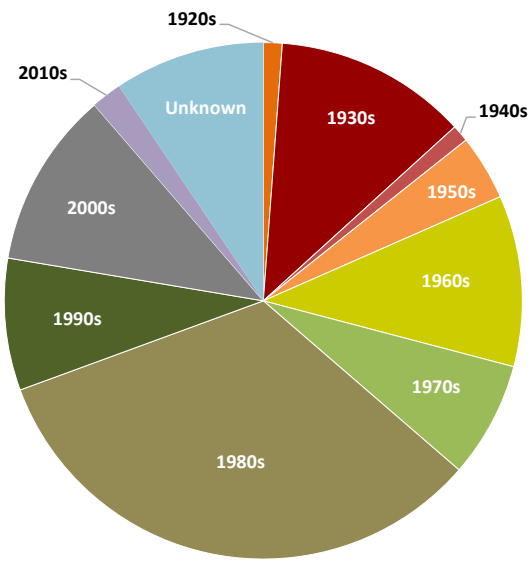
Material	Length (Feet)	% of Total
Asbestos Cement	24,916	7.0%
Cast Iron	115,961	32.6%
Copper	15	0.0%
Ductile Iron	131,309	36.9%
Galvanized Iron	7,884	2.2%
Permastran	48,964	13.8%
Polyethylene	4,626	1.3%
PVC	1,607	0.5%
Steel	575	0.2%
Unknown	20,192	5.7%
Total	**356,049**	**100%**



Per industry standard, the life expectancy of water main is generally 50 to 75 years, depending on a variety of piping, water quality, and soil conditions. Approximately 36 percent of water main within the City's system is known to have been constructed in the 1970s or before and is reaching or has reached its projected life expectancy. The majority of this older water main is cast iron. The remainder of the water main in the City's water system (discounting water main of unknown installation year), was constructed in the 1980s or later and is generally in good condition. A detailed breakdown of the City's water main installation per year is shown in **Table 2-5**.

Table 2-5
Water Main Installation per Year

Year Installed	Length (Feet)	% of Total
1920s	4,179	1.2%
1930s	42,950	12.1%
1940s	3,813	1.1%
1950s	14,536	4.1%
1960s	38,146	10.7%
1970s	25,869	7.3%
1980s	117,578	33.0%
1990s	29,408	8.3%
2000s	39,315	11.0%
2010s	6,799	1.9%
Unknown	33,456	9.4%
Total	**356,049**	**100%**



PRESSURE REDUCING, PRESSURE SUSTAINING, AND FLOW CONTROL STATIONS

Pressure reducing stations are connections between adjacent pressure zones that allow water to flow from the higher pressure zone to the lower pressure zone by reducing the pressure of the water as it flows through the station, thereby maintaining an optimal range of pressures in the lower zone. A pressure reducing station is essentially a below-grade vault (typically concrete) that normally contains two pressure reducing valves, sometimes a pressure relief valve, piping, and other appurtenances. The pressure reducing valve hydraulically varies the flow rate through the valve (up to the flow capacity of the valve) to maintain a constant set pressure on the downstream side of the valve for water flowing into the lower pressure zone.

Pressure reducing stations can serve multiple purposes. They can function as an active supply facility by maintaining a continuous supply of water into a lower zone that has no other source of supply. Pressure reducing stations also can function as standby supply facilities that are normally inactive (no water flowing through them). The operation of this type of station is typically triggered by a drop in water pressure near the downstream side of the station. A typical application of this function is a pressure reducing station that is needed only to supply additional water to a lower zone during a fire flow situation. The pressure setting of the control valve within the station allows it to remain closed during normal system operation and open only during high demand conditions, like fire flows, to provide the additional supply needed.

The City's water system has a total of five active pressure reducing stations, as shown in profile view in **Figure 2-3**. Two of the pressure reducing stations are located along the transmission main, which formerly conveyed water from the Pilchuck River water treatment plant and now conveys water from the PUD intertie. These two stations are located on South Machias Road at Dubuque Road (PRV No. 1) and OK Mill Road at Russell Road (PRV No. 2). The pressure reducing stations reduce the pressure in the transmission main to adequate levels for the

customers served directly off the transmission main. The remaining three pressure reducing stations are located at the intersection of 9th Street and Avenue A, at the intersection of 10th Street and Avenue D, and at the Reservoir No. 2 site. These three pressure reducing stations function as active supply facilities to provide water to the 218 Zone from the 362 Zone. A summary of these PRVs is shown in **Table 2-6**, and a listing of all pressure reducing stations and related data is contained in **Appendix N**.

Table 2-6
Pressure Reducing Station Inventory

Station Name	Upper Pressure Zone	Lower Pressure Zone	PRV Size (inches)
PRV No. 1	338 Zone	286 Zone	12 and 3
PRV No. 2	471 Zone	338 Zone	12 and 3
9th Street and Avenue A PRV	362 Zone	218 Zone	12 and 3
10th Street and Avenue D PRV	362 Zone	218 Zone	6 and 2
Reservoir No. 2 PRV	362 Zone	218 Zone	8 and 3

The City has three additional PRV stations that are currently inactive. These are located near the intersection of Bickford Avenue and Seneca Avenue, OK Mill Road and Newberg Road, and OK Mill Road and Creswell Road. The City currently does not have plans to operate these stations.

MASTER METERS

The City of Everett has master meters at all four of the City's main interties: Bickford Avenue; King Charley's; Park Avenue; and Terrace Avenue. Everett also has a master meter located at the NEPA Pallet Intertie.

WATER SYSTEM OPERATION AND CONTROL

Overview

Water supply is provided by four metered connections from Everett's Transmission Line No. 5, which follows an alignment through the north of the Snohomish City limits, as well as from the PUD intertie, as shown in **Figure 2-1**. The Everett interties are the system's primary water supply source.

City of Everett Transmission Line No. 5 Water Source

Water supply to the City's 362, 384, 425, 438, and 450 Zones is provided directly through four metered connections on Transmission Line No. 5. The Bickford Avenue Intertie provides water directly to the 384 Zone. A zone valve at the intersection of Highway 9 and 72nd Street SE is normally closed and restricts the movement of water between the 384 and the 362 Zones. The King Charley's Intertie provides water directly to the 438 Zone. A zone valve that is normally closed restricts the movement of water between the 438 and 450 Zones. The Park Avenue Intertie provides water directly to the 450 Zone. Zone valves that are normally closed restrict the movement of water between the 450 and 362 Zones. The Terrace Avenue Intertie provides water directly to the 425 Zone and fills Reservoir No. 3, which serves the 362 Zone. The zone valves between the 362, 425, 438, and 450 Zones can be opened to allow Reservoir No. 3 to supply all

four northern zones. The settings of the Terrace Avenue Intertie and water usage throughout the system dictate the amount of water flowing into or out of Reservoir No. 3. Water supply to Reservoir No. 3 is controlled by a level transducer that fills the reservoir when the water level drops to 45 feet and closes when the water level reaches 61.5 feet. An altitude valve provides secondary control of the amount of water flowing into or out of Reservoir No. 3 if the level transducer fails. Two zone valves restrict the movement of water between the 362 Zone and the 218 Zone and both are normally closed.

PUD Water Source

Water is supplied to the Water Treatment Plant Transmission Main customers from the PUD Intertie. To reduce water age along the transmission main, the City typically flows water in excess of customer demands. This is accomplished by manually adjusting a valve at the Reservoir No. 2 site. Water in excess of customer demands flows into Reservoir No. 2.

TELEMETRY AND SUPERVISORY CONTROL SYSTEM

Successful operation of any municipal water system requires gathering and using accurate water system information. A telemetry and supervisory control system gathers information and can efficiently control a system by automatically optimizing facility operations. A telemetry and supervisory control system also provides instant alarm notification to operations personnel in the event of equipment failure, operation problem, flood, fire, or other emergency situations.
The City's telemetry and supervisory control system was installed in approximately 1990 and manufactured by RUGID Computer, Inc. The system consists of master telemetry units at both the City shop located at 1801 First Street and at the water treatment plant.Telemetry stations are located at Reservoir No. 3, the chlorine building and flow vault on the same site as the decommissioned Reservoir No. 1, and the Terrace Avenue intertie.

In 2012 the SCADA system was upgraded, with the outdated Rugid computers and Motorola radios being replaced. PLCs were installed at Reservoir No. 3 and the Terrace Avenue PRV and new Cal-Amp Viper radios where installed to replace the outdated Motorola radios. A repeater was installed at Reservoir No. 2 to relay the radio signals from Reservoir No. 3, the Terrace Avenue intertie, the flow vault on the same site as Reservoir No. 1, and some of the City's sewage pump stations to the MTU (Master Telemetry Unit) located at the CSO Pump Station. The CSO pump station hosts the main control server for the Water Distribution and Collections System along with a new modem for alarming and remote access.

The SCADA software used for control and data collection is Wonderware System Platform (at time of 2012 upgrade, version 2012 R2). The SCADA software is comprised of Wonderware Intouch (for viewing screens and system monitoring), Wonderware Historian (for data logging and trending historical data), and drivers for communicating with the PLCs and control equipment.

As part of the upgrade, standalone work stations were installed in the Water Distribution and the Utility Manager's offices. From these standalone work stations, staff can view real-time information from the 362 Zone, the 218 Zone, and the Terrace Avenue intertie. Data such as water levels, valve status, current set points and alarm status can be monitored. From these work stations, staff can also change set points and acknowledge alarms.

Remote monitoring was also included in this upgrade. The City purchased an iPad for the Water Distribution staff to access information when they are in the field or on standby. Using the iPad, staff has remote access to the MTU located at the CSO pump station, allowing staff to view real-time information from the 362 Zone, the 218 Zone and Terrace Avenue Intertie, such as water levels, valve status, current set points and alarm status. From these work stations, staff can also change set point and acknowledge alarms.

Also implemented during the 2012 upgrade were Historian and WIN-911. Historian allows historical information such as reservoir levels, flows and system alarms to be archived and retrieved later for data review and reporting. WIN-911 allows real-time alarms to be sent out to staff via e-mail/SMS to their iPhones and iPads for viewing and acknowledgement. WIN-911 also allows the staff to prioritize who receives the alarms, and also allows a hierarchy list to be developed so that in the event an alarm has not been acknowledged within 5 minutes, an additional alarm is sent out to the next staff person on the list.

In late 2018 and early 2019 the SCADA system once again was upgraded. Due to the aging equipment and outdated software, a new server was purchased and installed at the Waste Water Treatment Plant (WWTP). The SCADA software was upgraded from Wonderware System Platform 2012 R2 to Wonderware System Platform 2014 R2. WIN-911 was also upgraded to the latest version (Win911 Interactive 3.18.17) to maintain compatibility with the new version of Wonderware. Due to cell service provider changes, 3G was no longer going to be available, so a new 4G (Multitech Cellular Verizon) modem was installed. New software licenses were purchased and updated versions of Wonderware and WIN-911 were installed.

WATER SYSTEM INTERTIES

Water system interties are physical connections between two adjacent water systems. Interties are normally separated by a closed isolation valve or control valve. Emergency supply interties provide water from one system to another during emergency situations only. An emergency situation may occur when a water system loses its main source of supply or a major transmission main and is unable to provide a sufficient quantity of water to its customers. Normal supply interties provide water from one system to another during non-emergency situations and typically are supplying water at all times.

The City's water system currently has four normal supply interties with Everett. These supply interties provide water to all the City's customers, with the exception of those located along the Water Treatment Plant Transmission Main. A fifth normal supply intertie with Everett provides water to the NEPA Pallet Water System. The City has been purchasing water from Everett since at least 1925, although a formal agreement does not exist between the City and Everett for these normal supply interties.

A wholesale water agreement exists between the City and the PUD to supply PUD water via an intertie to the City's customers located along the Water Treatment Plant Transmission Main. A copy of this agreement is included in **Appendix C**.

The City currently has no plans for future interties with new parties.

WATER SERVICE AGREEMENTS

WATER SERVICE AREA AGREEMENT

All water purveyors located within a Critical Water Supply Service Area (CWSSA) are required to have a water service area agreement that identifies the external boundary of their water service area. North Snohomish County was declared a CWSSA on October 19, 1988. The City prepared and signed a water service area agreement during the development of the *North Snohomish County Coordinated Water System Plan*, which was finalized in 1991, and most recently updated in December 2010. A copy of this agreement is contained in **Appendix B**.

CITY OF EVERETT WATER SERVICE AGREEMENT

An informal water service agreement has existed between the City and Everett since at least 1925 to supplement the City's existing water supply. Although a formal contract for this water service does not currently exist, Everett plans to continue providing water supply to the City from Transmission Line No. 5. Everett owns and operates meters at each connection along Transmission Line No. 5 and provides the City with monthly water consumption and billing information. The City is currently pursuing a formal water service agreement with Everett to ensure the availability of water for the City's continued use in the future.

NEPA PALLET WATER SERVICE AGREEMENT

The City owns and operates the NEPA Pallet Water System located near the intersection of Highway 2 and Three Lakes Road. The system is supplied directly from Transmission Line No. 5. The system serves the UFP Western Division Inc.and one residential customer. It is unknown when the water system was connected to Transmission Line No. 5 and when the City began operating the water system. Ownership and operation of the NEPA Pallet Water System may be transferred to the customers in the future.

WHOLESALE WATER SERVICE AGREEMENTS

Informal water service agreements exist between the City and two wholesale customers, the Green Velvet Water System (Group B) and the Lowell Snohmish River Road Water District (Group B). The Green Velvet Water Department meter is located at 520 North Carpenter Road along the Water Treatment Plant Transmission Main. The Lowell Snohomish River Road Water District meter is located at 5804 Lowell River Road, and primarily serves agricultural customers south of the Snohomish River.

SATELLITE SYSTEM MANAGEMENT

A Satellite System Management Agency (SSMA) is defined as a person or entity that is certified by the Washington State Department of Health (DOH) to own or operate more than one public water system without the necessity for a physical connection between such systems. SSMAs were created to stop the proliferation of small water systems, many of which could not meet federal and state water quality and water system planning regulations. Based on the success of SSMAs, DOH made recommendations to the legislature to include rules for designating entities as qualified SSMAs.

In July 1995, Senate Bill 5448 became law, governing approval of new water systems and setting forth requirements for SSMAs. The goal of the law is to ensure that the people of Washington State will receive safe and reliable water supplies in the future from professionally managed or properly operated water systems. SSMAs can provide three different levels of service:

1. Ownership of the satellite system;
2. Operations and management of the satellite system; or
3. Contract services only.

The service can be provided to new systems, existing systems that are no longer viable, or existing systems placed into receivership status by DOH.

The City is not currently an SSMA but it owns and operates the NEPA Pallet Water System. General water system data for NEPA Pallet is summarized on the DOH WFI Form, a copy of which is contained in **Appendix A**.

The City has been approached by neighboring water systems, many of whom are served directly from their own connection to Transmission Line No. 5, requesting satellite system management or to be served directly by the City's water system. However, the City does not wish to provide satellite system management service to small neighboring water systems. Instead, the City desires to directly serve these small neighboring water systems and will evaluate providing these services on a case by case basis. Requests for service have been denied by the City mostly because of undersized water mains in the neighboring systems. The City requires that systems requesting direct services meet the City's minimum standards for water main design, which are contained in **Appendix H**. The PUD is an approved SSMA and currently operates several satellite systems in the area.

ADJACENT WATER SYSTEMS

The largest water systems adjacent to the City's water service area are the Cross Valley Water District, the City of Monroe, and the Snohomish PUD (Integrated) system. Several smaller water systems are located within or near the City's water service area, many of which are supplied by Transmission Line No. 5. Thirteen water systems located adjacent to or within the City's service area boundary are shown in **Figure 2-2**. A brief description of each water system follows.

BLACKMANS LAKE WATER DISTRICT

Blackmans Lake Water District is a small water system located within the northern portion of the City's water service area, and provides water service to customers both inside and outside the Snohomish City limits. The system has approximately 18 service connections. Water is supplied to the system by Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

BUNK FOSS SYSTEM

The Bunk Foss System is located partially within the northern portion of the City's water service area. The system has approximately 16 service connections and is supplied by Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

MONROE WATER SYSTEM

Monroe Water System (Monroe) is located to the south and east of the City's water service area. Monroe has approximately 7,625 service connections and is supplied by Everett's Transmission Line No. 5. There are no plans for interties between Monroe and the City.

CROSS VALLEY WATER DISTRICT

The Cross Valley Water District (Cross Valley) is located to the west and south of the City's service area boundary. Cross Valley has approximately 6,499 service connections. Water is supplied to the system by Everett and two groundwater wells. Cross Valley has a large service area that is mostly situated between the cities of Bothell and Monroe, but also extends north to the City limits of Snohomish and Everett. Two portions of Cross Valley's service area overlap with the City's service area, as shown on **Figure 2-2**.

FOBES WATER DISTRICT

The Fobes Water District overlaps the northwest corner of the City's water service area and includes a portion of the northwest corner of the City limits. The system has approximately 47 service connections. Water is supplied to the system from Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

NEPA PALLET

The NEPA Pallet system, located to the east of the City's water service area boundary, is owned and operated by the City. The system has two service connections and is supplied directly from Everett Transmission Line No. 5. The City plans to transfer ownership and operation of the system to the current customers by October 31st, 2019.

NORTH RIDGE WATER CORPORATION

The North Ridge Water Corporation is located within the northeast portion of the City's water service area and has approximately 45 service connections. Water is supplied to the system by Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

PILCHUCK 26 TRACTS

The Pilchuck 26 Tracts water system is located east of the City's water service area, adjacent to the NEPA Pallet Water System. The system has approximately 23 service connections. Water is supplied to the system by Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

SCHLUTER WATER ASSOCIATION

The Schluter Water Association is a small water system located within the northwest portion of the City's water service area, and provides water service to customers both inside and outside the Snohomish City limits. The system has approximately 80 service connections. Water is supplied to the system by Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

SNOHOMISH COUNTY PUD NO. 1

The PUD provides water service throughout Snohomish County, including to the north and east of the City limits and adjacent to the Water Treatment Plant Transmission Main. Water is supplied to the system in these locations by Everett's Transmission Line Nos. 2, 3, 4, and 5. The City has an intertie with the PUD located along Robe Menzel Road, which has supplied water to the City's transmission main customers since the water treatment plant was decommissioned in 2017.

TWIN ROADS WATER ASSOCIATION

The Twin Roads Water Association is located within the northwest portion of the City's water service area boundary, just outside the City limits. The system has approximately 19 service connections and is supplied by Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

WILKSHIRE LANE WATER DISTRICT

The Wilkshire Lane Water District is located within the northwest portion of the City's water service area, just outside the City limits. The system has approximately 122 customers. Water is supplied to the system by Everett's Transmission Line No. 5. There are no plans for interties between this system and the City.

Table of Contents

3 | LAND USE AND POPULATION

INTRODUCTION

The *City of Snohomish Comprehensive Plan* was originally prepared in 1995 and was last updated in March 2016. The plan was developed to meet the requirements of the State of Washington's Growth Management Act (GMA). The GMA requires, among other things, consistency between land use and utility plans and their implementation.

This chapter demonstrates the compatibility of the Water System Plan (WSP) with other plans, identifies the designated land uses within the existing and future service area, and identifies population projections within the City of Snohomish's (City) planning area.

COMPATIBILITY WITH OTHER PLANS

INTRODUCTION

To ensure that the WSP is consistent with the land use policies that guide it and other related plans, the following planning documents were examined.

- Growth Management Act
- *City of Snohomish Comprehensive Plan* (Comprehensive Plan)
- *Snohomish County Comprehensive Plan*
- *North Snohomish County Coordinated Water System Plan*

GROWTH MANAGEMENT ACT

The State of Washington Growth Management Act of 1990 (and its multiple amendments) defined four goals relevant to this WSP.

1. Growth and services should be in urban areas.
2. There should be consistency between land use and utility plans and their implementation.
3. There should be concurrency of growth with public facilities and services.
4. Critical areas should be designated and protected.

Urban Growth Area

The GMA requires that Snohomish County (County) and the City cooperate in designating an Urban Growth Area (UGA). As part of the development of its 1995 Comprehensive Plan, the City and the County designated a UGA that would accommodate the City's projected population growth and provide resource conservation. The City continues to coordinate occasional updates to the UGA with the County. The current UGA is shown in **Figure 3-1**.

Consistency

The GMA requires planning consistency from two perspectives. First, it requires consistency of plans among jurisdictions. This means that City and County plans and policies must be consistent per Revised Code of Washington (RCW) 36.70A.100. Second, the GMA requires the implementation of the WSP be consistent with the comprehensive plans (RCW 36.70A.120).

The 2003 Municipal Water Law also requires that water system plans be consistent with local plans and regulations. The signed Consistency Statement Checklists included in **Appendix D** from the City and Snohomish County Planning Departments document the determination that this WSP is consistent with their plans and regulations.

Concurrency

Concurrency means that adequate public facilities and services be provided at the time growth occurs. For example, growth should not occur where schools, roads, and other public facilities are overloaded. To achieve this objective, the GMA directs growth to areas already served or readily served by public facilities and services (RCW 36.70A.110). It also requires that when public facilities and services cannot be maintained at an acceptable level of service, new development should be prohibited (RCW 36.70A.110).

Critical Areas

The GMA requires that critical areas be designated and protected. Critical areas include fish and wildlife habitat, flood zones, aquifer recharge areas, streams, creeks, rivers, lakes, wetlands and other surface water, as well as geologic hazard areas such as steep slopes and liquefaction zones. The City has adopted development regulations identifying and protecting critical areas as required. The State Environmental Policy Act (SEPA) Checklist in **Appendix E** addresses other environmental concerns.

CITY OF SNOHOMISH COMPREHENSIVE PLAN

The City adopted its first Comprehensive Plan in 1964 to help guide growth of the community while protecting the Historic District and maintaining the City's identity. The Comprehensive Plan was significantly revised in 1976. Another significant revision was adopted in 1995 in response to the GMA. Several revisions to the 1995 Comprehensive Plan have occurred since its original adoption, with the last occurring on March 15, 2016.

The Land Use Element of the City's Comprehensive Plan is the City's vision of how growth and development should occur over a 20-year horizon. While the Land Use Element goals and policies set forth general standards for locating land uses, the Land Use Map, which has been reproduced and is shown in **Figure 3-1**, indicates geographically where certain types of uses may be appropriate. **Figure 3-1** also shows the City's Historic District boundary, which was adopted as an ordinance in 1973 and placed on the National Register of Historic Places in 1974. Located in downtown Snohomish, the 36-block area includes predominantly historic business and single-family land uses and prohibits inappropriate alteration and demolition of historic buildings and structures. In addition, new structures are encouraged to mimic the historic character of the district.

The Land Use Element seeks to accommodate population and employment growth while preserving the community's character and protecting environmentally critical areas. It considers the general location of land uses, as well as their appropriate intensity and density given current development trends. The Utilities, Transportation System, and Capital Facilities Elements ensure that new development will be adequately serviced without compromising existing levels of service, similar to the principal of concurrency as defined in the GMA. The City's WSP is reviewed and taken into consideration during the development of and subsequent revisions to the Capital Facilities Element of the Comprehensive Plan.

The City encompasses an area of approximately 2,306 acres or 3.60 square miles. Vacant land within the City limits for single-family residential use is nearly depleted and infilling is expected. It is expected that much of the new single-family residential developments will occur outside of the City limits but within the UGA. The City's UGA consists of approximately 3,175 acres, or approximately 4.96 square miles.

SNOHOMISH COUNTY COMPREHENSIVE PLAN

The County adopted its Comprehensive Plan on June 28, 1995. The plan took effect on July 10, 1995. Since that time, the Comprehensive Plan has been amended several times to incorporate UGA changes, capital facility plan changes, and land use changes. The current version of the Comprehensive Plan was adopted in 2015 and consists of the following five sections.

- General Policy Plan
- Future Land Use Map
- Transportation Element
- Capital Facilities Plan
- Parks and Recreation Element

The County's Comprehensive Plan guides development in rural, unincorporated Snohomish County and designates land use in the unincorporated UGA. Similar to the City's Comprehensive Plan, the County's plan contains the following land use goals, which:

> …form the basis of the County's land use strategy and:
>
> - provide for a supply and distribution of land use types to accommodate the majority of county population and employment growth within urban growth areas;
> - reduce land consuming urban development patterns and provide structure for urban development within neighborhoods or urban centers;
> - reduce development pressures and patterns of sprawl within rural areas;
> - conserve agricultural, forest and mineral resource lands of long-term commercial significance; and
> - preserve and protect open space, scenic and cultural resources.

County land use inside the City's future water service area is shown in **Figure 3-1**; the Comprehensive Plan can be referenced for County land use outside the future water service area.

NORTH SNOHOMISH COUNTY COORDINATED WATER SYSTEM PLAN

The North Snohomish County *Coordinated Water System Plan* (CWSP), originally dated October 1991, and updated in December 2010, was developed under the direction of the County's Water Utility Coordinating Committee (WUCC), the County, Tulalip Ethnic groups, and Snohomish County Public Utility District No. 1 (PUD). The members of the WUCC represent the collective efforts of all public water systems with more than ten service connections that provide service within the Critical Water Supply Service Area (CWSSA). The Snohomish County Council declared North Snohomish County a CWSSA on October 19, 1988.

The purpose of the CWSP is to assist the area's water utilities in establishing an effective process for planning and developing public water systems, and restricting the proliferation of small public water systems. The CWSP accomplishes this by establishing future service area boundaries, minimum design standards, service review procedures, appeals procedures, long-term regional water supply strategies, a water use efficiency program and goals, and the satellite system management program. As can be seen in the following sections of this WSP, the City has established policies, design criteria, and goals that meet or exceed the requirements and goals of the CWSP.

LAND USE

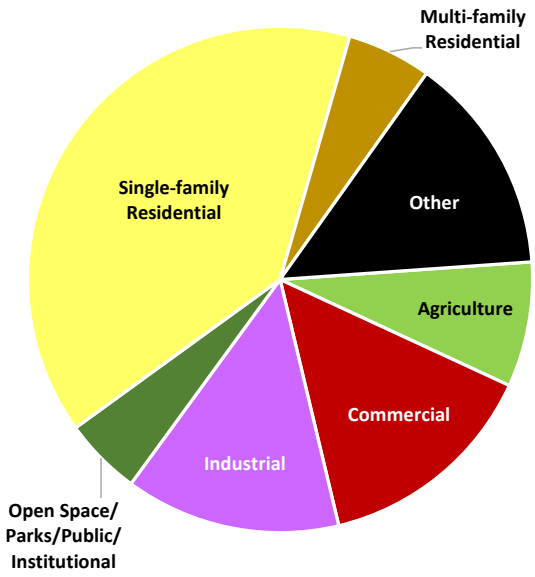
The City limits currently encompass an area of approximately 2,306 acres. The City's UGA encompasses an additional 869 acres outside of the current City limits, with a total area of approximately 3,175 acres. The existing retail water service area, which includes most of the City limits and UGA, as well as some areas outside the UGA, encompasses a total area of approximately 3,411 acres. The future water service area, which includes an area west of Highway 9 not included in the existing retail water service area, encompasses a total area of approximately 3,446 acres. The Land Use Map, shown in **Figure 3-1**, guides development within the future water service area. Land use within the City limits is designated by the City, and land use inside and beyond the UGA is designated by the County, as shown on **Figure 3-1**.

Most of the area within the future water service area, approximately 39 percent, is designated for single-family residential use, as indicated in **Table 3-1**. Approximately 5 percent is designated for multi-family residential use. Commercial land use types account for approximately 14 percent of the future water service area, and industrial land use types also account for approximately 14 percent. Agricultural land use accounts for approximately 8 percent, and open space, parks, and public/institutional land uses account for approximately 5 percent. The remaining land, comprising approximately 14 percent of the future water service area, includes rights-of-way, water bodies, and otherwise undesignated land use.

Table 3-1
Land Use Inside Future Water Service Area

Land Use Type	Acres	% of Total
Agriculture[1]	275	8.0%
Commercial[2]	496	14.4%
Industrial	475	13.8%
Open Space/Parks/Public/Institutional	172	5.0%
Single-family Residential	1,359	39.4%
Multi-family Residential[3]	186	5.4%
Other	483	14.0%
Total	**3,446**	**100%**

1 = Includes Urban Horticulture (UH and SC-UHORT) land use types.
2 = Includes Business Park (BP), Historic Business District (HBD), Mixed Use (MU), and Pilchuck District (PIL) land use types.
3 = Includes Low Density Residential (LDR), Medium Density Residential (MDR), and High Density Residential (HDR) land use types.



TRANSFER OF DEVELOPMENT RIGHTS

With Ordinance 2216, the City implemented a transfer of development rights program that allows important agricultural lands along the Snohomish and Pilchuck Rivers to be conserved. Owners of agricultural land within a specified area are eligible to sell the development rights of the land, while keeping the ability to use the land in a manner that optimizes natural resources. Developers who purchase development rights from agricultural land owners can use them to develop or redevelop land to a higher density within the designated receiving area known as the Pilchuck District, which is shown in **Figure 3-1**.

POPULATION

HOUSEHOLD TRENDS

The City is primarily a residential community comprised largely of single-family residences. In 2017, the Office of Financial Management (OFM) estimated that 2,556 housing units, or 61 percent of the total of 4,211 units within the City limits, were single-family detached homes. Approximately 1,599 housing units, or 38 percent of the total, had two or more units, and approximately 56 housing units, or 1 percent of the total, were mobile homes or other special housing units.

In the 2012 Buildable Lands Report, the County identified the additional housing unit capacity within the City and UGA. The results indicated that the remaining capacity will support the construction of approximately 1,114 additional single-family dwellings, 679 multi-family dwellings, and 9 senior apartments.

According to the U.S. Census Bureau, the average household size in the City was 2.41 persons in 2010. The average number of people per household was 2.59 for owner-occupied housing units and 2.20 for renter-occupied units. The average household size in unincorporated Snohomish County was 2.74 persons per household in 2010.

EXISTING AND FUTURE CITY POPULATION

Snohomish County has experienced rapid population growth and extensive physical development in recent years. The County's population increased approximately 33 percent from 2000 to 2018 based on OFM estimates. Within the City limits, the population has increased nearly 19 percent during the same time period. **Table 3-2** illustrates the City's historical population growth since 2000, with years 1990 and 1995 for reference. The historic City limits population since 2000 is shown in **Chart 3-1**.

Projected future growth for the City and UGA is shown in **Table 3-3**. Projections are based on City and UGA population estimates for years 2011 (UGA only, from Comprehensive Plan), 2025, and 2030. Projected population for intermediate years was calculated by assuming a uniform population growth rate between data points. Projected population beyond 2035 is calculated assuming that the 2025 to 2035 growth rate will continue at the same rate. The total City + UGA population is expected to experience an average annual growth rate of approximately 1.3 percent between 2018 and 2038. Population projections for the City and UGA are displayed in **Chart 3-1**.

Table 3-2
Population Trends within the City Limits

Year	Population
1990	6,499
1995	7,609
2000	8,494
2005	8,623
2010	9,098
2011	9,200
2012	9,215
2013	9,220
2014	9,270
2015	9,385
2016	9,625
2017	10,010
2018	10,150

NOTE: The historical population represents the population within the City limits. The sources of the historical population numbers are the decennial census and OFM intercensal estimates.

Chart 3-1
Population Projections

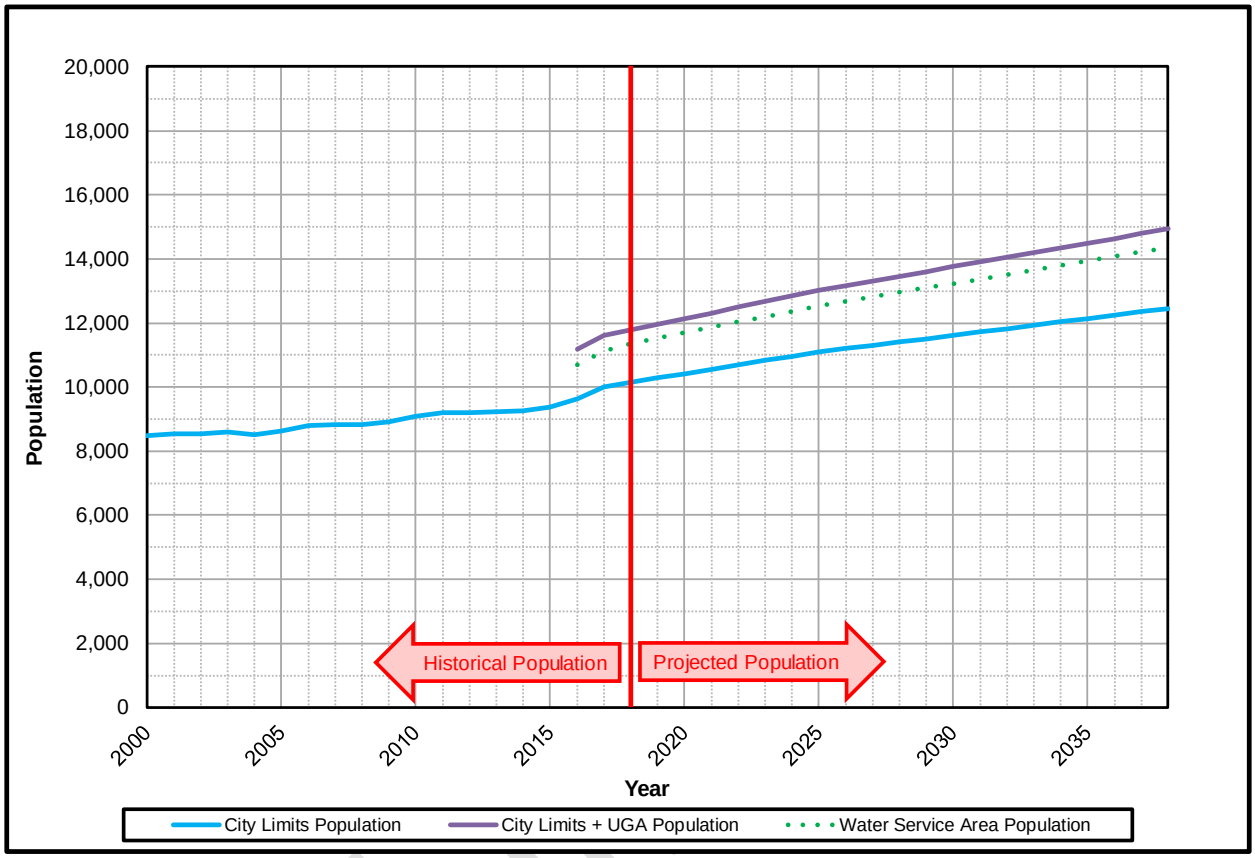


Table 3-3
Water System Population Projections

Year	City Population	UGA Population	City + UGA Population	Water System Population
		Existing		
2016	9,625	1,560	11,185	10,696
2017	10,010	1,600	11,610	11,114
2018	10,150	1,641	11,791	11,359
		Projected		
2019	10,285	1,681	11,966	11,527
2020	10,420	1,721	12,141	11,695
2021	10,555	1,761	12,316	11,862
2022	10,690	1,801	12,491	12,030
2023	10,825	1,842	12,667	12,198
2024	10,960	1,882	12,842	12,366
2025	11,095	1,922	13,017	12,533
2026	11,199	1,965	13,165	12,673
2027	11,304	2,008	13,312	12,814
2028 (+ 10 years)	**11,408**	**2,052**	**13,460**	**12,954**
2029	11,513	2,095	13,607	13,094
2030	11,617	2,138	13,755	13,234
2031	11,721	2,181	13,903	13,374
2032	11,826	2,224	14,050	13,514
2033	11,930	2,268	14,198	13,654
2034	12,035	2,311	14,345	13,794
2035	12,139	2,354	14,493	13,935
2036	12,243	2,397	14,641	14,075
2037	12,348	2,440	14,788	14,215
2038 (+ 20 years)	**12,452**	**2,484**	**14,936**	**14,355**

WATER SYSTEM POPULATION

The actual population served by the water system differs from the population that resides within the City limits and UGA. There are small areas of the City limits and UGA that are not located within the existing or future water service area. There are also areas adjacent to, but outside the UGA, which are located within the existing and future water service area. The City also provides water service to customers outside the UGA along the Water Treatment Plant Transmission Main and one residential connection via the NEPA Pallet Intertie. Finally, there are several other water systems, located partly or entirely inside the City's existing and future water service area, whose customers are not currently supplied by the City.

The actual population served by the existing water system, shown in **Table 3-3**, was calculated by adjusting the combined City and UGA population. To adjust this population to the actual water system population, the number of housing units to be added or subtracted from the water

service area were counted, and the totals were multiplied by the average household size for the City or unincorporated Snohomish County, depending on the location of the property.

For the water system population projections, it was assumed that, with some exceptions, the water system would serve the entire future water service area by 2038. It was assumed that the entire Aldercrest Water Users system would be incorporated into the City's water system by 2018, but that all other systems located within the City's future water service area would remain independent from the City's system. Additionally, it was assumed that for areas inside the City limits or UGA but not in the future water service area, and for areas outside the UGA but inside the future water service area, that the existing population would remain constant. Finally, it was assumed that the Water Treatment Plant Transmission Main and NEPA Pallet customers would no longer be supplied by the City by 2038.

These population projections, along with the historical per capita water use data presented in **Chapter 4**, form the basis for determining future water demands for the City's water system.

4 | WATER DEMANDS

INTRODUCTION

A detailed analysis of system demands is crucial to the planning efforts of a water supplier. A demand analysis first identifies current demands to determine if the existing system can effectively provide an adequate quantity of water to its customers under the most crucial conditions, in accordance with federal and state laws. A future demand analysis identifies projected demands to determine how much water will be needed to satisfy the water system's future growth and continue to meet federal and state laws.

The magnitude of water demands is typically based on three main factors: 1) population; 2) weather; and 3) water use classification. Population and weather have the two largest impacts on water system demands. Population growth has a tendency to increase the annual demand, whereas high temperatures have a tendency to increase the demand over a short period of time. Population does not solely determine demand because different user types use varying amounts of water. The use varies based on the number of users in each customer class, land use density, and irrigation practices. Water use efficiency efforts also impact demands and can be used to accommodate a portion of the system's growth without increasing a system's supply capacity.

Demands on a water system determine the size of storage reservoirs, supply facilities, water mains, and treatment facilities. Several different types of demands were analyzed and are addressed in this chapter, including average day demand (ADD), maximum day demand (MDD), peak hour demand (PHD), fire flow demand, future demands, and a demand reduction forecast based on the Water Use Efficiency program.

CERTIFICATE OF WATER AVAILABILITY

In accordance with the requirements of the Growth Management Act (GMA), the City of Snohomish (City) must identify that water is available prior to issuing a building permit. The requirement for providing evidence of an adequate water supply was codified in 1990 under Revised Code of Washington (RCW) 19.27.097 in the Building Code section.

Per Snohomish Municipal Code (SMC) 15.04.022, connection to or use of City utility services for property located outside the City limits shall not be allowed until the property is annexed into the City. Exceptions may be made by the City Council, for public health emergencies, where pre-existing contractual obligations limit the City's ability to require annexation, or as otherwise provided in the Growth Management Act.

CURRENT POPULATION AND SERVICE CONNECTIONS

WATER USE CLASSIFICATIONS

The City has divided all water customers into nine different classes for billing purposes. These consist of single-family residential, multi-family residential, mixed use, commercial, wholesale, irrigation, city accounts, school district, and park/open space. For planning purposes, the water customers have been combined into seven different groups: 1) single-family residential;

2) multi-family residential; 3) mixed use; 4) commercial; 5) wholesale; 6) irrigation; and 7) other. The "other" group includes the following billing classes: city accounts, school district, and park/open space. The demand analysis that follows will report on the water use patterns of these seven user groups. Because the City has different rate structures for customers inside the City limits and outside the City limits (not including transmission main customers), as well as for customers connected to the Water Treatment Plant transmission main, each subset of connections is shown separately.

RESIDENTIAL POPULATION SERVED

The population within the City limits was 9,625 in 2016, based on estimates from the Washington State Office of Financial Management (OFM). Since the City provides water service to many customers outside the City limits, the actual population served by the City's water system is larger. The 2016 residential population served by the City's water system is estimated to be approximately 10,696. The computation of the population served is discussed in **Chapter 3**, along with a more detailed discussion of the City's population and household trends.

As shown in **Table 4-1a,** the City provided water service to an average of 3,146 connections inside the City limits in 2016. Approximately 2,630 connections (84 percent) were single-family residential customers, 88 connections (3 percent) were multi-family residential customers, 28 connections (1 percent) were mixed use customers, 301 connections (10 percent) were commercial customers, 34 connections (1 percent) were irrigation customers, and 65 connections (2 percent) were all other customer types.

Table 4-1a
Average Annual Metered Consumption and Service Connections – Inside City Limits

Year	Customer Class: Single-Family Residential	Multi-Family Residential	Mixed Use	Commercial	Wholesale	Irrigation	Other	Totals
Average Number of Connections								
2009	2,426	99	28	290	-	24	67	2,934
2010	2,479	82	23	292	-	29	62	2,967
2011	2,494	82	27	294	-	30	62	2,989
2012	2,505	82	26	294	-	30	63	3,000
2013	2,515	82	26	298	-	31	63	3,015
2014	2,527	88	27	299	-	34	65	3,038
2015	2,563	88	28	299	-	34	66	3,078
2016	2,630	88	28	301	-	34	65	3,146
Average Annual Consumption (gallons)								
2009	150,457,956	34,876,996	3,585,912	55,005,676	-	9,308,860	12,067,484	265,302,884
2010	133,255,452	31,144,476	1,962,004	46,878,656	-	5,948,844	8,577,316	227,766,748
2011	129,158,656	31,719,688	4,042,940	46,943,732	-	5,673,580	15,426,004	232,964,600
2012	131,538,792	31,099,596	4,245,648	49,157,812	-	8,067,180	15,890,512	239,999,540
2013	128,073,308	30,005,272	4,166,360	49,397,920	-	5,829,164	14,232,196	231,704,220
2014	127,157,008	32,026,368	4,602,444	52,094,460	-	5,921,916	13,685,408	235,487,604
2015	129,896,932	32,684,608	4,493,236	54,205,316	-	8,129,264	15,445,452	244,854,808
2016	129,179,600	31,784,764	4,360,092	55,104,412	-	6,437,288	12,538,724	239,404,880
Average Daily Consumption Per Connection (gal/day/conn)								
2009	170	970	353	519	-	1,055	496	248
2010	147	1,043	234	440	-	562	377	210
2011	142	1,060	410	438	-	521	682	214
2012	143	1,036	441	457	-	735	687	219
2013	139	1,003	439	455	-	510	621	211
2014	138	1,003	470	478	-	484	578	212
2015	139	1,018	448	497	-	655	640	218
2016	134	987	425	500	-	517	527	208
Average	**144**	**1,015**	**402**	**473**	**-**	**630**	**576**	**217**

As shown in **Table 4-1b,** the City provided water service to an average of 101 connections outside the City limits (not including transmission main customers) in 2016. Approximately 75 connections (74 percent) were single-family residential customers, 1 connection (1 percent) was a multi-family residential customer, 4 connections (4 percent) were mixed use customers, 16 connections (16 percent) were commercial customers, 1 connection (1 percent) was a wholesale customer, and 5 connections (5 percent) were all other customer types.

Table 4-1b
Average Annual Metered Consumption and Service Connections – Outside City Limits

	Customer Class							
Year	Single-Family Residential	Multi-Family Residential	Mixed Use	Commercial	Wholesale	Irrigation	Other	Totals
Average Number of Connections								
2009	73	2	5	18	-	-	5	102
2010	73	1	5	16	1	-	5	101
2011	73	1	5	16	1	-	5	101
2012	73	1	5	16	1	-	5	101
2013	73	1	5	16	1	-	5	101
2014	73	1	5	16	1	-	5	101
2015	73	1	5	16	1	-	5	101
2016	75	1	4	16	1	-	5	101
Average Annual Consumption (gallons)								
2009	5,486,580	2,097,392	869,924	10,966,428	-	-	119,680	19,540,004
2010	4,915,856	1,397,264	843,744	9,105,404	2,538,712	-	77,044	18,878,024
2011	5,185,136	1,675,520	673,948	6,899,552	553,520	-	59,092	15,046,768
2012	5,749,876	2,002,396	801,856	4,574,768	444,312	-	61,336	13,634,544
2013	5,684,052	2,033,064	636,548	6,298,160	385,968	-	166,056	15,203,848
2014	5,331,744	2,024,836	714,340	6,607,084	273,768	-	180,268	15,132,040
2015	5,787,276	2,071,960	949,960	6,245,800	240,856	-	174,284	15,470,136
2016	5,773,064	2,056,252	844,492	5,427,488	232,628	-	153,340	14,487,264
Average Daily Consumption Per Connection (gal/day/conn)								
2009	206	2,873	511	1,717	-	-	66	524
2010	185	3,828	462	1,559	6,955	-	42	513
2011	195	4,590	369	1,181	1,516	-	32	408
2012	215	5,471	438	773	1,214	-	34	368
2013	214	5,570	349	1,078	1,057	-	91	414
2014	200	5,547	391	1,131	750	-	99	410
2015	217	5,677	521	1,069	660	-	95	419
2016	212	5,618	577	927	636	-	87	391
Average	**205**	**4,897**	**452**	**1,180**	**1,827**	**-**	**68**	**431**

As shown in **Table 4-1c,** the City provided water service to an average of 76 connections along the transmission main in 2016. Approximately 69 connections (91 percent) were single-family residential customers, 1 connection (1 percent) was a multi-family residential customer, 3 connections (4 percent) were commercial customers, 1 connection (1 percent) was a wholesale customer (Green Velvet Water Department), and 2 connections (3 percent) were all other customer types.

Table 4-1c

Average Annual Metered Consumption and Service Connections – Transmission Main

	Customer Class							
Year	Single-family Residential	Multi-family Residential	Mixed Use	Commercial	Wholesale	Irrigation	Other	Totals
				Average Number of Connections				
2009	83	2	-	3	-	-	4	92
2010	71	1	-	3	1	-	2	78
2011	71	1	-	3	1	-	2	78
2012	69	1	-	3	1	-	2	76
2013	69	1	-	3	1	-	2	76
2014	69	1	-	3	1	-	2	76
2015	69	1	-	3	1	-	2	76
2016	69	1	-	3	1	-	2	76
				Average Annual Consumption (gallons)				
2009	17,978,928	1,125,740	-	339,592	-	-	604,384	20,048,644
2010	4,897,156	691,152	-	255,068	442,068	-	250,580	6,536,024
2011	4,648,820	588,676	-	151,096	436,832	-	270,028	6,095,452
2012	4,233,680	593,164	-	226,644	673,948	-	200,464	5,927,900
2013	4,469,300	588,676	-	170,544	777,920	-	343,332	6,349,772
2014	4,203,760	553,520	-	249,832	1,074,876	-	179,520	6,261,508
2015	4,574,020	638,792	-	167,552	449,548	-	204,952	6,034,864
2016	4,078,096	466,004	-	123,420	475,728	-	327,624	5,470,872
				Average Daily Consumption Per Connection (gal/day/conn)				
2009	593	1,542	-	310	-	-	432	598
2010	189	1,894	-	233	1,211	-	343	230
2011	179	1,613	-	138	1,197	-	370	213
2012	168	1,621	-	206	1,841	-	329	214
2013	177	1,613	-	156	2,131	-	470	228
2014	167	1,516	-	228	2,945	-	246	226
2015	181	1,750	-	153	1,232	-	281	217
2016	161	1,273	-	112	1,300	-	448	196
Average	**227**	**1,603**	**-**	**192**	**1,694**	**-**	**365**	**265**

System-wide, as shown in **Table 4-1d,** the City provided water service to an average of 3,323 connections in 2016. Approximately 2,773 connections (83 percent) were single-family residential customers, 90 connections (3 percent) were multi-family residential customers, 32 connections (1 percent) were mixed use customers, 320 connections (10 percent) were commercial customers, 2 connections (less than 1 percent) were wholesale customers, 34 connections (1 percent) were irrigation customers, and 72 connections (2 percent) were all other customer types.

Several changes occurred in the system in 2010 which are reflected in the consumption tables:

- The City completed a transition from HMS software to Springbrook for utility billing and consumption/account data.
- A number of customers were moved from the multi-family residential to the wholesale customer class.
- Snohomish County Public Utility District No. 1 (Snohomish PUD) took over a portion of the City's transmission main customers.

Table 4-1d

Average Annual Metered Consumption and Service Connections – Total System

	Customer Class							
Year	Single-family Residential	Multi-family Residential	Mixed Use	Commercial	Wholesale	Irrigation	Other	Totals
				Average Number of Connections				
2009	2,582	103	33	311	-	24	76	3,128
2010	2,623	84	28	311	2	29	69	3,146
2011	2,639	84	32	313	2	30	69	3,168
2012	2,647	84	31	313	2	30	70	3,177
2013	2,657	84	31	317	2	31	70	3,192
2014	2,668	90	32	318	2	34	72	3,215
2015	2,705	90	33	318	2	34	73	3,255
2016	2,773	90	32	320	2	34	72	3,323
				Average Annual Consumption (gallons)				
2009	173,923,464	38,100,128	4,455,836	66,311,696	-	9,308,860	12,791,548	304,891,532
2010	143,068,464	33,232,892	2,805,748	56,239,128	2,980,780	5,948,844	8,904,940	253,180,796
2011	138,992,612	33,983,884	4,716,888	53,994,380	990,352	5,673,580	15,755,124	254,106,820
2012	141,522,348	33,695,156	5,047,504	53,959,224	1,118,260	8,067,180	16,152,312	259,561,984
2013	138,226,660	32,627,012	4,802,908	55,866,624	1,163,888	5,829,164	14,741,584	253,257,840
2014	136,692,512	34,604,724	5,316,784	58,951,376	1,348,644	5,921,916	14,045,196	256,881,152
2015	140,258,228	35,395,360	5,443,196	60,618,668	690,404	8,129,264	15,824,688	266,359,808
2016	139,030,760	34,307,020	5,204,584	60,655,320	708,356	6,437,288	13,019,688	259,363,016
				Average Daily Consumption Per Connection (gal/day/conn)				
2009	185	1,018	376	585	-	1,055	464	267
2010	149	1,086	275	496	4,083	562	352	220
2011	144	1,108	404	473	1,357	521	626	220
2012	146	1,096	440	471	1,528	735	632	223
2013	143	1,064	424	483	1,594	510	578	217
2014	140	1,059	458	508	1,847	484	536	219
2015	142	1,077	459	523	946	655	593	224
2016	137	1,042	444	518	968	517	495	213
Average	**148**	**1,069**	**410**	**507**	**1,760**	**630**	**534**	**226**

Table 4-2 lists the approximate total number of dwelling units and average daily consumption per unit for the multi-family residential billing class. Some multi-unit dwellings are included in the City's single-family and mixed use billing classes; these are not included in the totals listed in **Table 4-2**.

Table 4-2
Multi-Family Units

Year	Approximate Total Multi-Family Units[1]	Approximate Average Daily Consumption Per Unit (gal/day/unit)
2009	1,225	85
2010	1,012	90
2011	1,014	92
2012	1,014	91
2013	1,002	89
2014	1,048	90
2015	1,054	92
2016	1,055	89
Average	**1,053**	**90**

1 = Does not include multi-family units included in single-family and mixed use billing classes.

EXISTING WATER DEMANDS

WATER CONSUMPTION

Water consumption is the amount of water used by all customers of the system, as measured by the customer's meters. **Tables 4-1a, 4-1b, 4-1c,** and **4-1d** show the historical average number of connections, average annual consumption, and average daily consumption per connection of each customer class for the City from 2009 through 2016 inside the City, outside the City (not including transmission main customers), along the transmission main, and for the entire water system, respectively.

The number of multi-family connections is less than the number of units served since one connection serves several units. **Table 4-2** shows the historical approximate total of multi-family units, and the approximate average daily consumption per multi-family unit within the City's water service area from 2009 through 2016.

The total connections and consumption by customer class inside the City limits are shown in **Charts 4-1a** and **4-1b**. For the areas outside the City limits (not including transmission main customers), the total connections and consumption by customer class are shown in **Charts 4-2a** and **4-2b**. For the transmission main customers, the total connections and consumption by customer class are shown in **Charts 4-3a** and **4-3b**. System-wide connection and consumption totals by customer class are shown in **Charts 4-4a** and **4-4b**.

Chart 4-1a
2016 Water Connections by Customer Class (Inside City Limits)

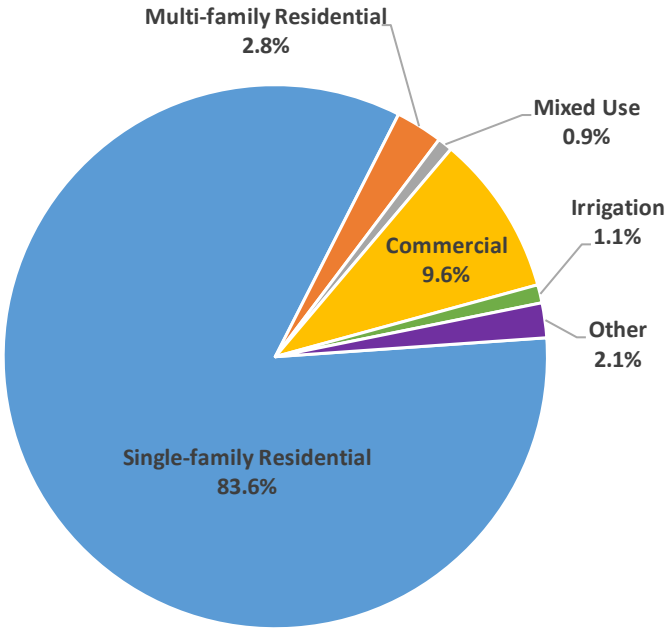


Chart 4-1b
2016 Water Consumption by Customer Class (Inside City Limits)

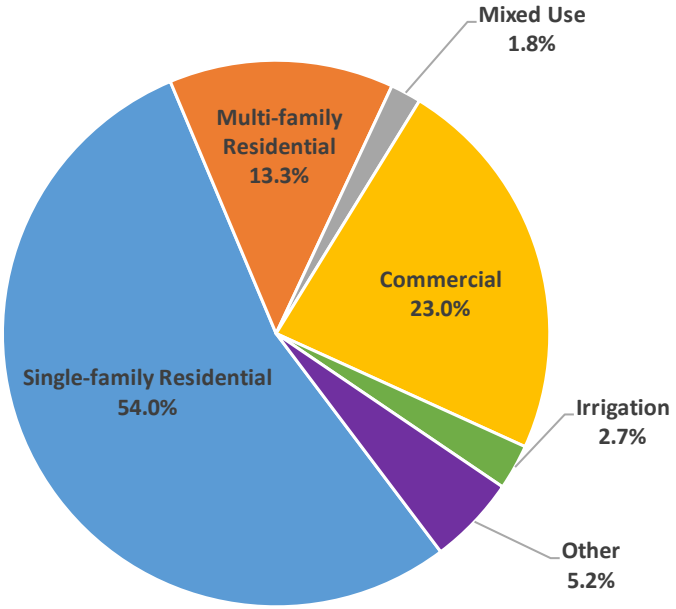


Chart 4-2a
2016 Water Connections by Customer Class
(Outside City Limits, not including Transmission Main Connections)

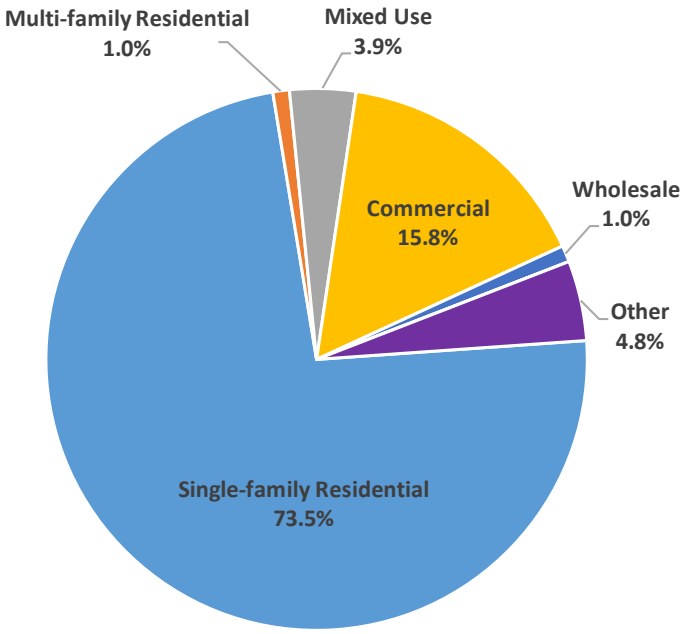


Chart 4-2b
2016 Water Consumption by Customer Class
(Outside City Limits, not including Transmission Main Connections)

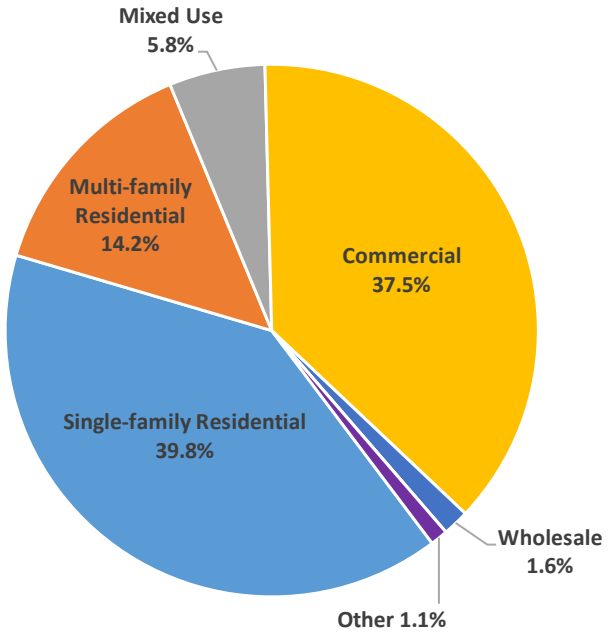


Chart 4-3a
2016 Water Connections by Customer Class (Transmission Main)

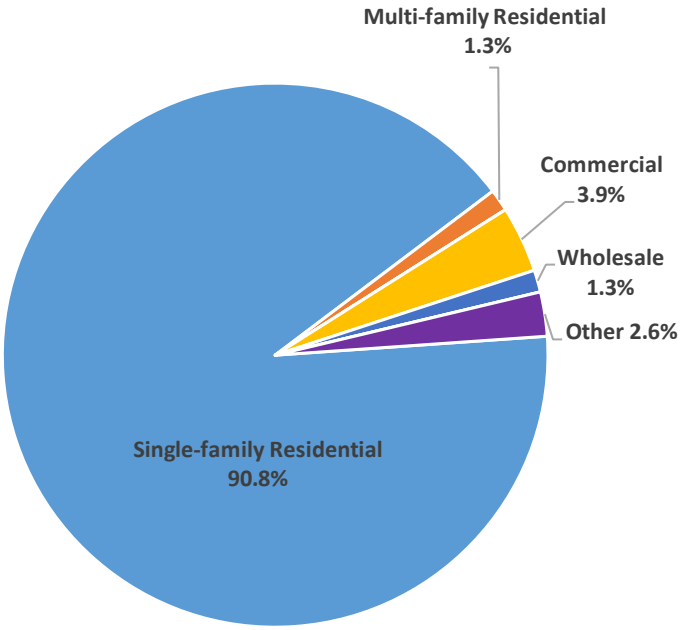


Chart 4-3b
2016 Water Consumption by Customer Class (Transmission Main)

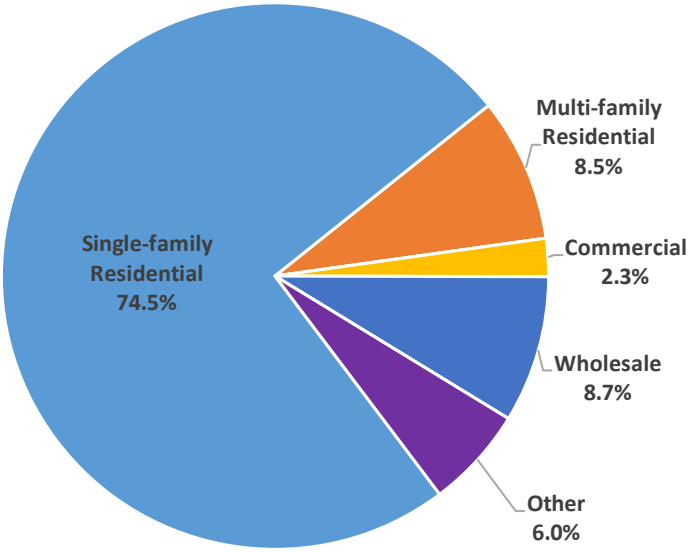


Chart 4-4a
2016 Water Connections by Customer Class (Total System)

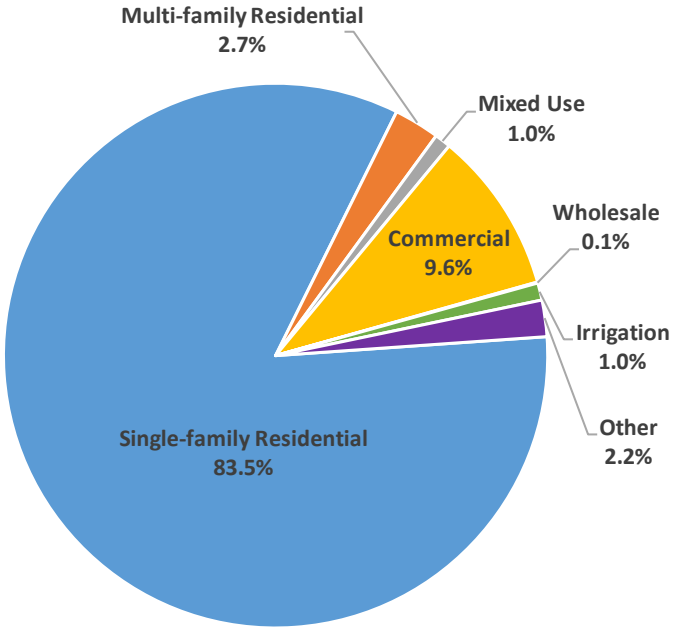
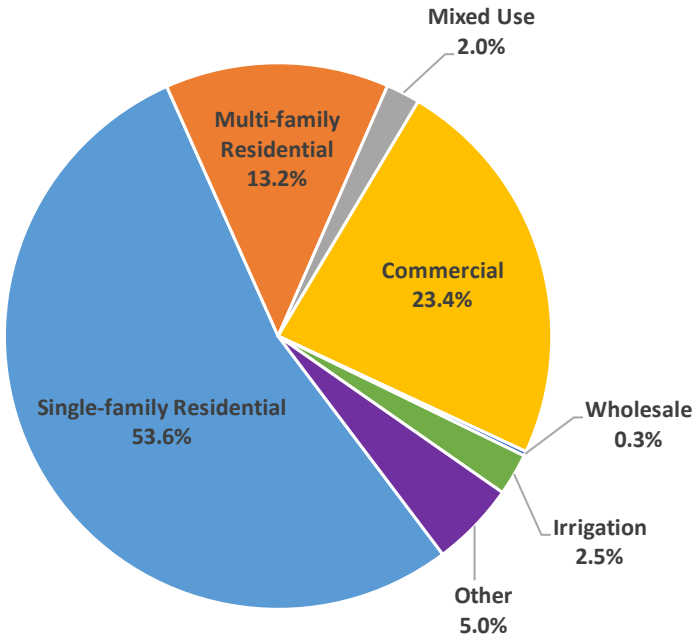


Chart 4-4b
2016 Water Consumption by Customer Class (Total System)



As shown in **Charts 4-1a**, **4-1b**, **4-2a**, **4-2b**, **4-3a**, **4-3b**, **4-4a**, and **4-4b**, the percentage of single-family connections throughout the system is higher than the percentage of consumption attributed to these customers. This is due to single-family residential customers generally having a lower consumption per connection compared to other customer types. System-wide, as shown in **Table 4-1d**, single-family residential customers use an average of 148 gallons per day (gpd) per connection, compared to multi-family customers that use an average of 1,069 gpd per connection, mixed use customers that use an average of 410 gpd per connection, and commercial users that use an average of 507 gpd per connection. Since multiple units are typically served by one multi-family connection, **Table 4-2** includes the average daily consumption per unit for the multi-family class, which historically has been approximately 90 gpd per unit. The lower consumption of multi-family customers is expected since the average household size of multi-family units is usually less than the average household size of single-family units, and multi-family units consume considerably less water for lawn and garden maintenance. Additionally, the higher consumption of commercial customers is expected since these customers include the system's highest individual water users.

Table 4-3 shows the largest water users of the system in 2016 and their total amount of metered consumption for the year. The total water consumption of these 20 water accounts represented approximately 10.1 percent of the system's total metered consumption in 2016.

Table 4-3
Largest Water Users

Address	Total Annual Consumption (gals)
1705 Terrace Avenue	4,955,500
800 Tenth Street	4,232,184
1301 Avenue D	3,161,048
2801 Bickford Avenue	1,875,984
1419 Avenue D	1,661,308
1119 13th Street	1,264,120
200 Third Street	1,054,680
511 Maple Avenue	828,784
3100 Bickford Avenue	734,536
821 Second Street	697,136
1120 Avenue D	695,640
1431 Avenue D	689,656
1830 Bickford Avenue	687,412
2811 Bickford Avenue	652,256
801 Avenue D	629,068
303 Second Street	506,396
711 First Street	487,696
1101 First Street	486,200
111 Avenue A	478,720
N/A	458,524
Largest Water Users Total Consumption	26,236,848
Water System Total Metered Consumption	259,363,016
Percent of Total	10.1%

The City reads water meters bi-monthly. Bi-monthly consumption for each customer class (single-family, multi-family, mixed use, commercial, wholesale, irrigation, and other) is shown in **Charts 4-5**, **4-6**, **4-7**, **4-8**, **4-9**, **4-10**, and **4-11**. For each customer class, bi-monthly consumption is shown for the customers inside the City limits, outside the City limits (not including the transmission main customers), transmission main customers, and the total system, respectively. For years 2009 through 2016, there were no mixed use customers on the transmission main, wholesale customers inside the City limits, or irrigation customers outside the City limits, so there are no charts shown for these customer types.

Single-family residential, commercial, irrigation, and "other" demand varies throughout the year, typically peaking in the hot summer months, as shown in **Chart 4-5**, **Chart 4-8**, **Chart 4-10**, and **Chart 4-11.** Multi-family residential, mixed use, and wholesale consumption has less pronounced peaks, as shown in **Chart 4-6**, **Chart 4-7**, and **Chart 4-9**.

Chart 4-5a
Historical Bi-Monthly Single-Family Consumption (Inside City Limits)

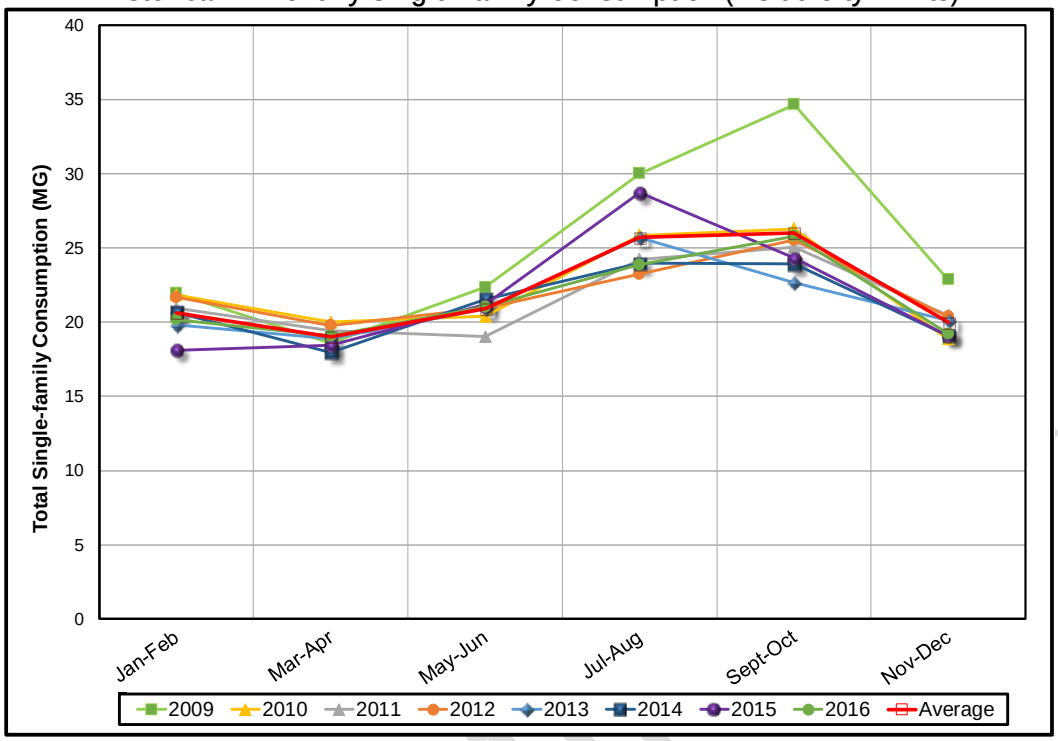


Chart 4-5b
Historical Bi-Monthly Single-Family Consumption
(Outside City Limits, not including Transmission Main Customers)

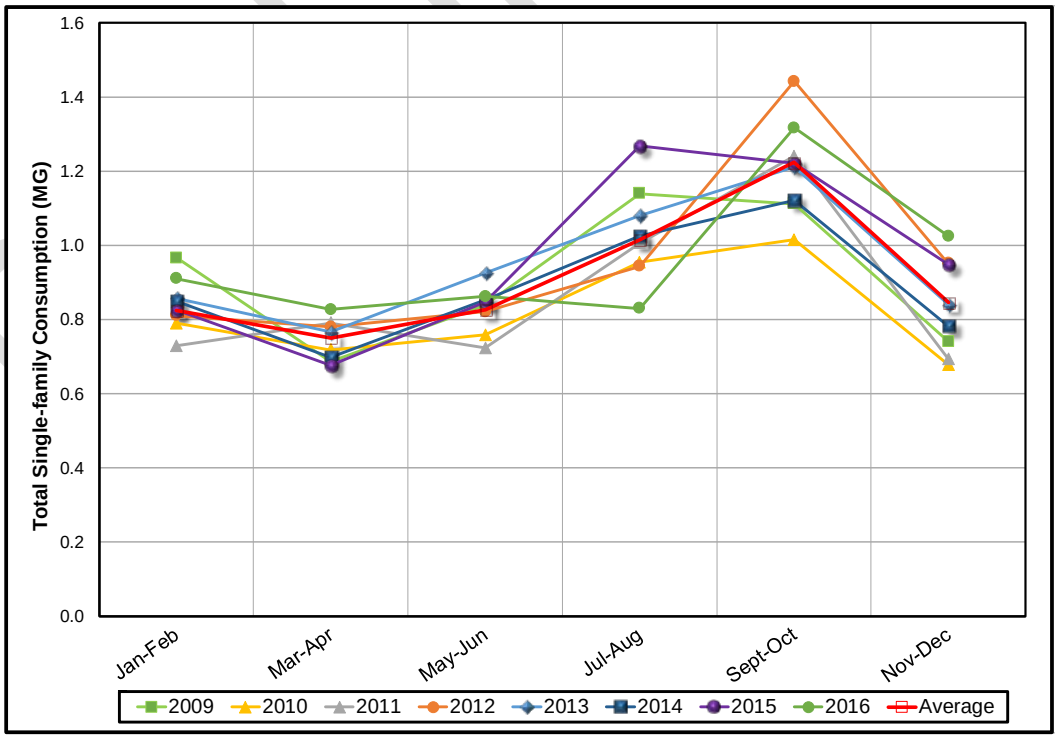


Chart 4-5c
Historical Bi-Monthly Single-Family Consumption (Transmission Main)

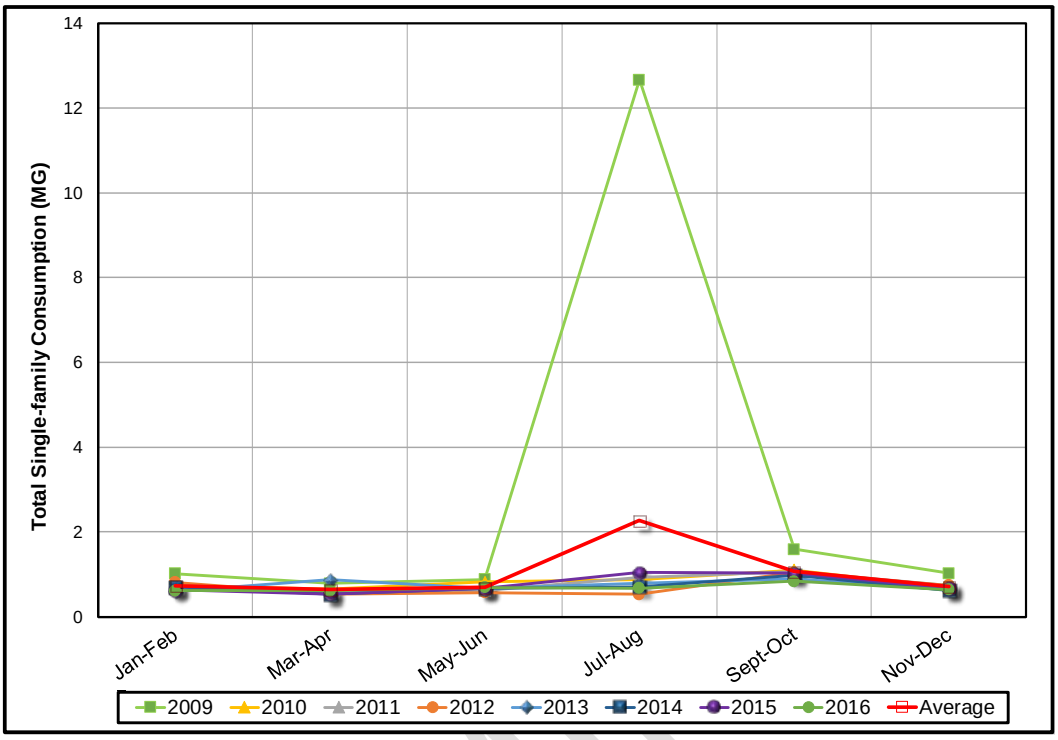


Chart 4-5d
Historical Bi-Monthly Single-Family Consumption (Total System)

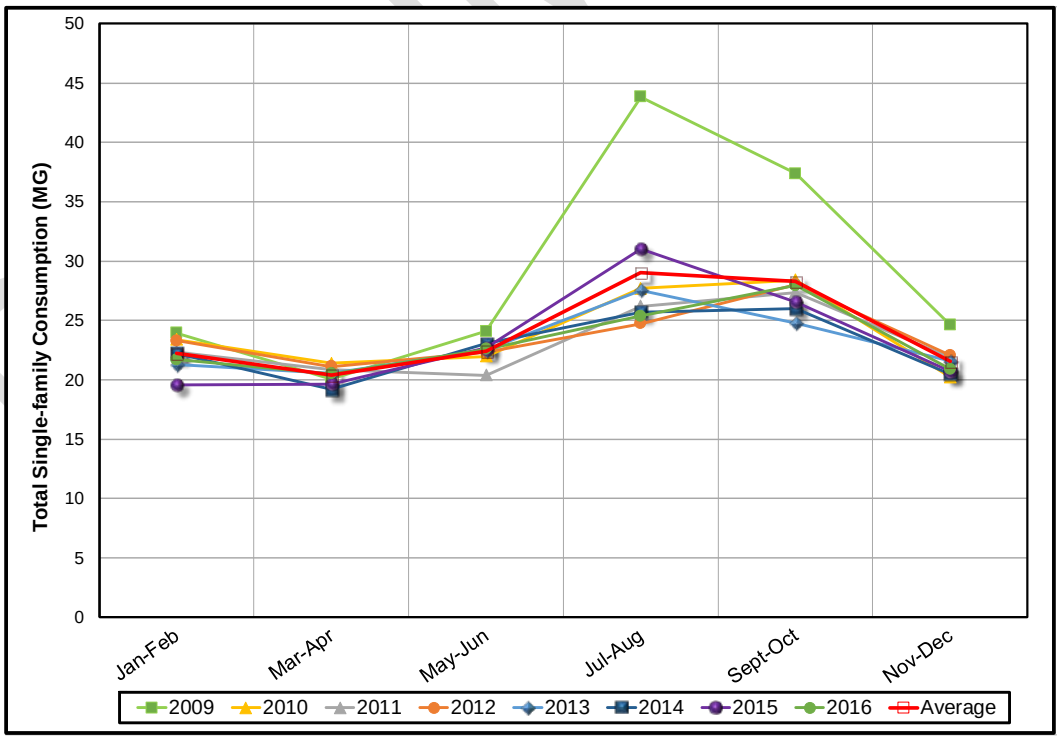


Chart 4-6a
Historical Bi-Monthly Multi-Family Consumption (Inside City Limits)

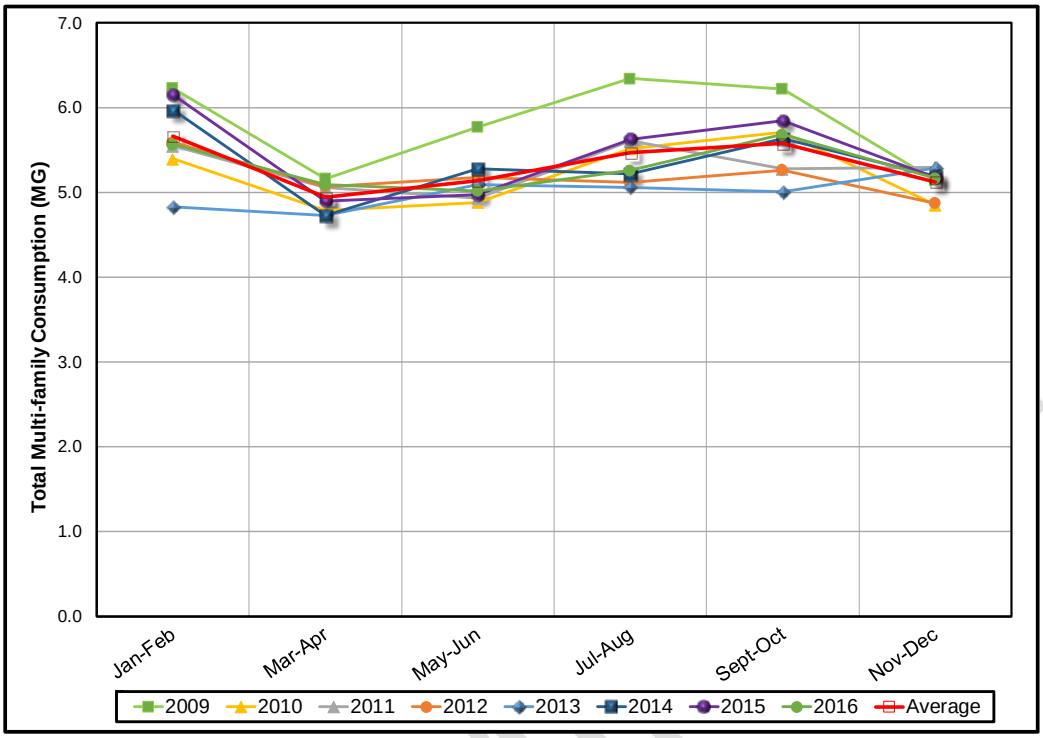


Chart 4-6b
Historical Bi-Monthly Multi-Family Consumption
(Outside City Limits, not including Transmission Main Customers)

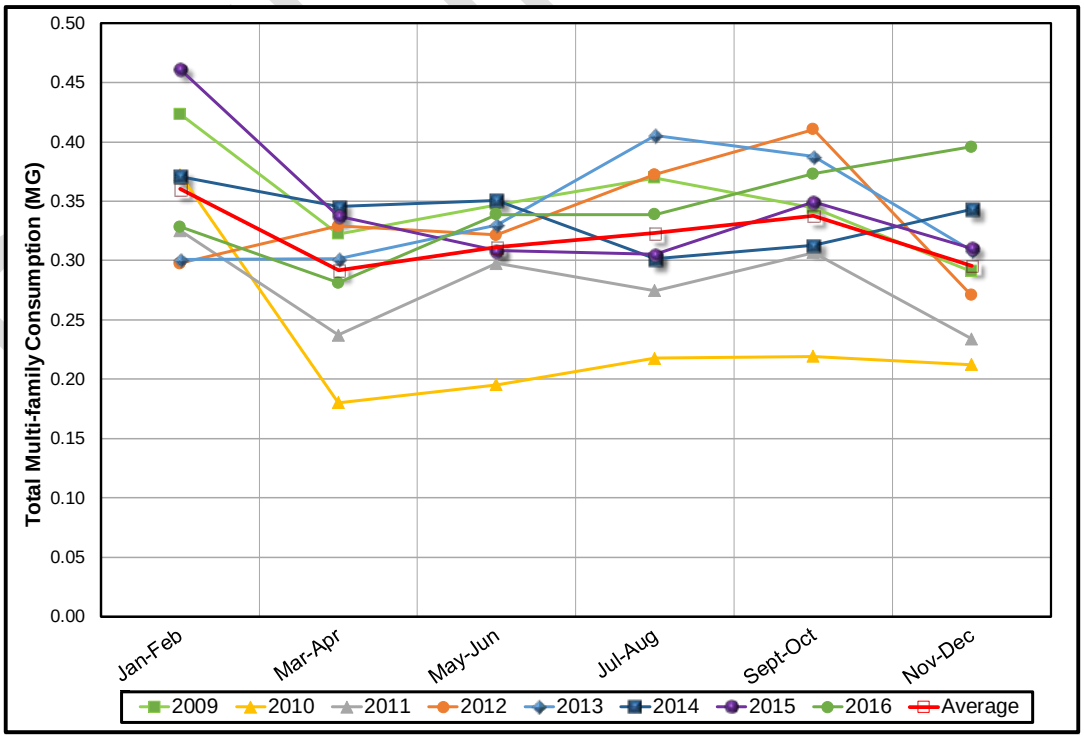


Chart 4-6c
Historical Bi-Monthly Multi-Family Consumption (Transmission Main)

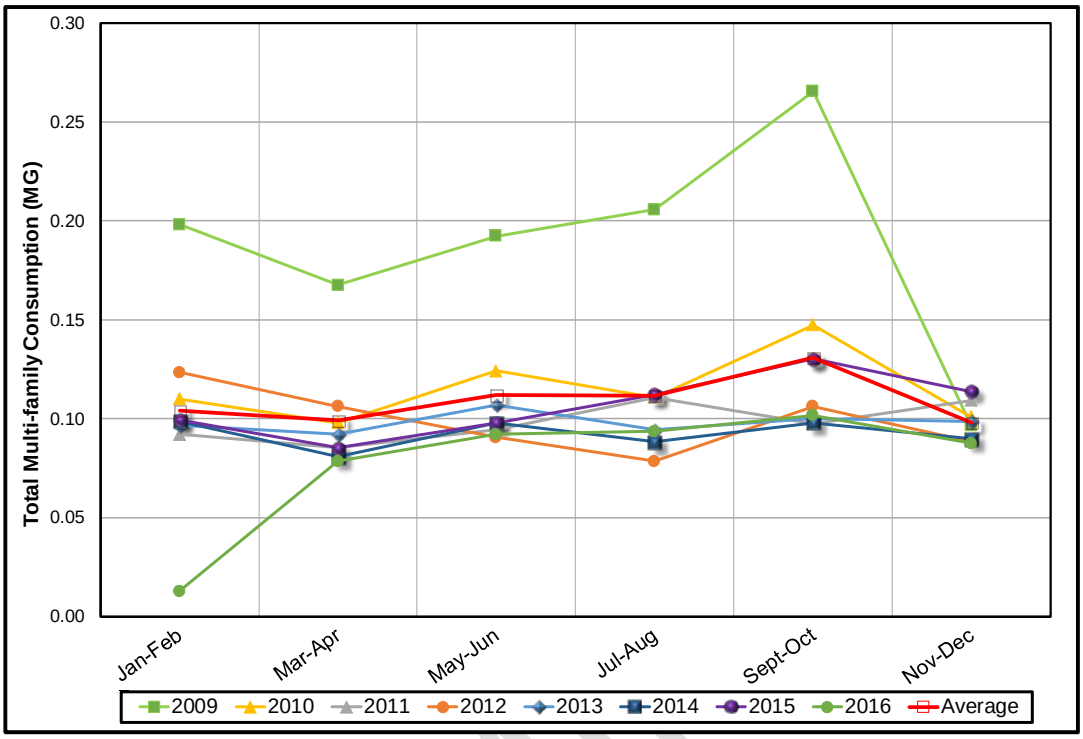


Chart 4-6d
Historical Bi-Monthly Multi-Family Consumption (Total System)

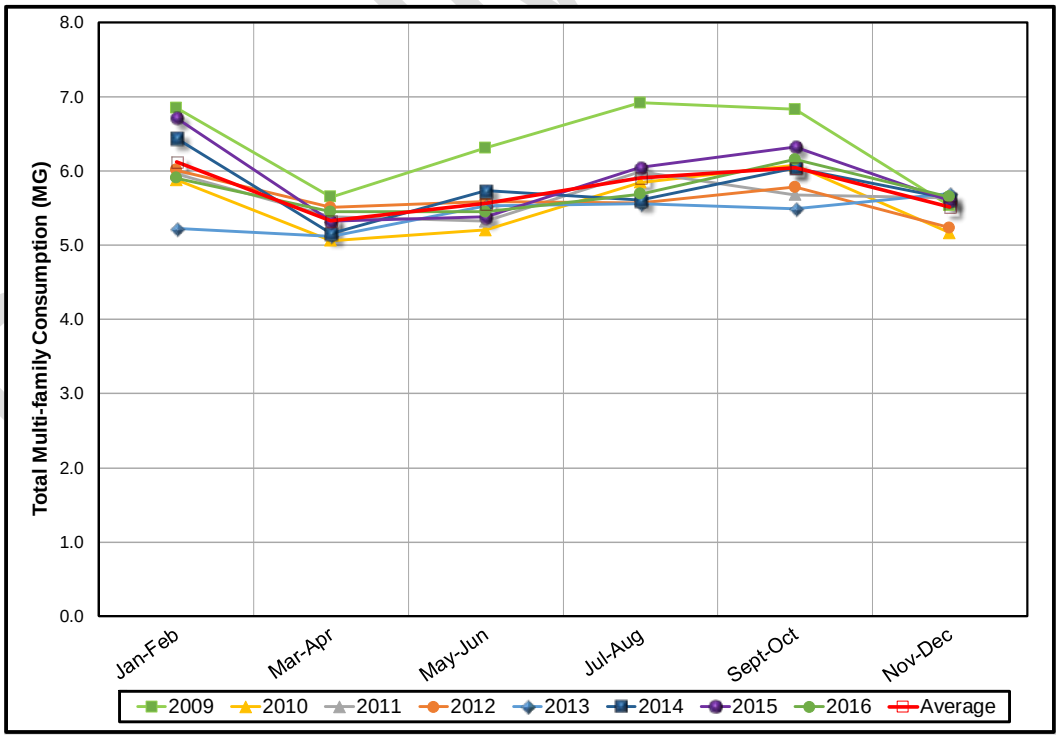


Chart 4-7a
Historical Bi-Monthly Mixed Use Consumption (Inside City Limits)

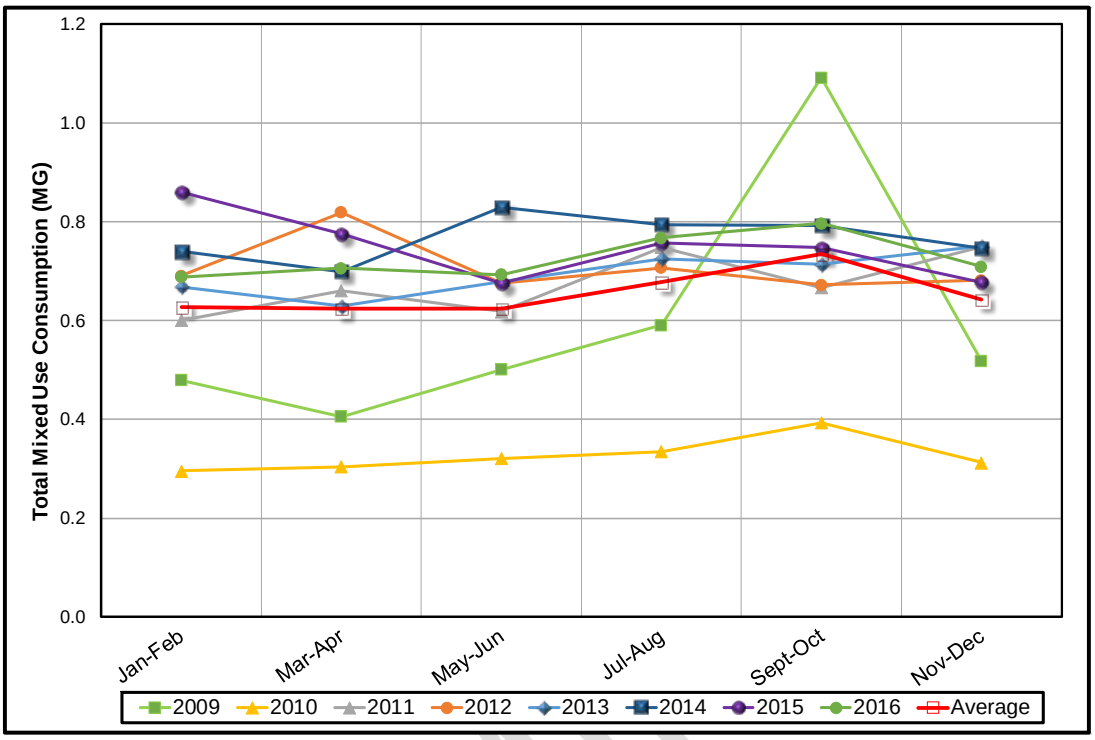


Chart 4-7b
Historical Bi-Monthly Mixed Use Consumption
(Outside City Limits, not including Transmission Main Customers)

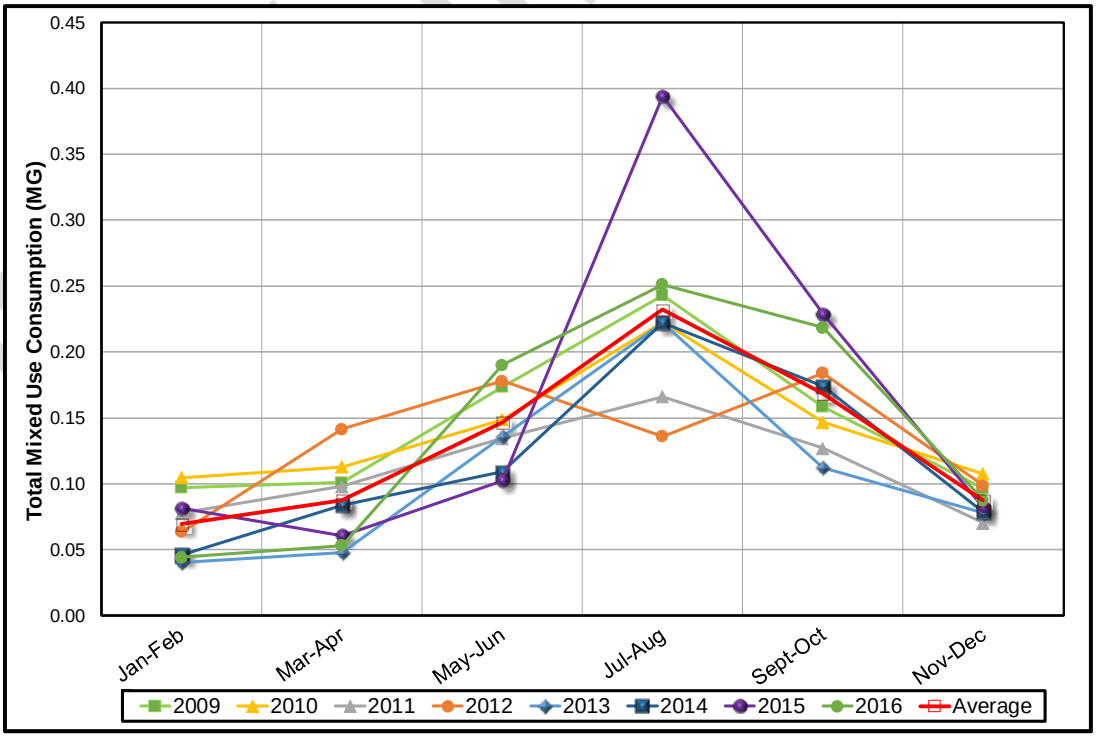


Chart 4-7c
Historical Bi-Monthly Mixed Use Consumption (Total System)

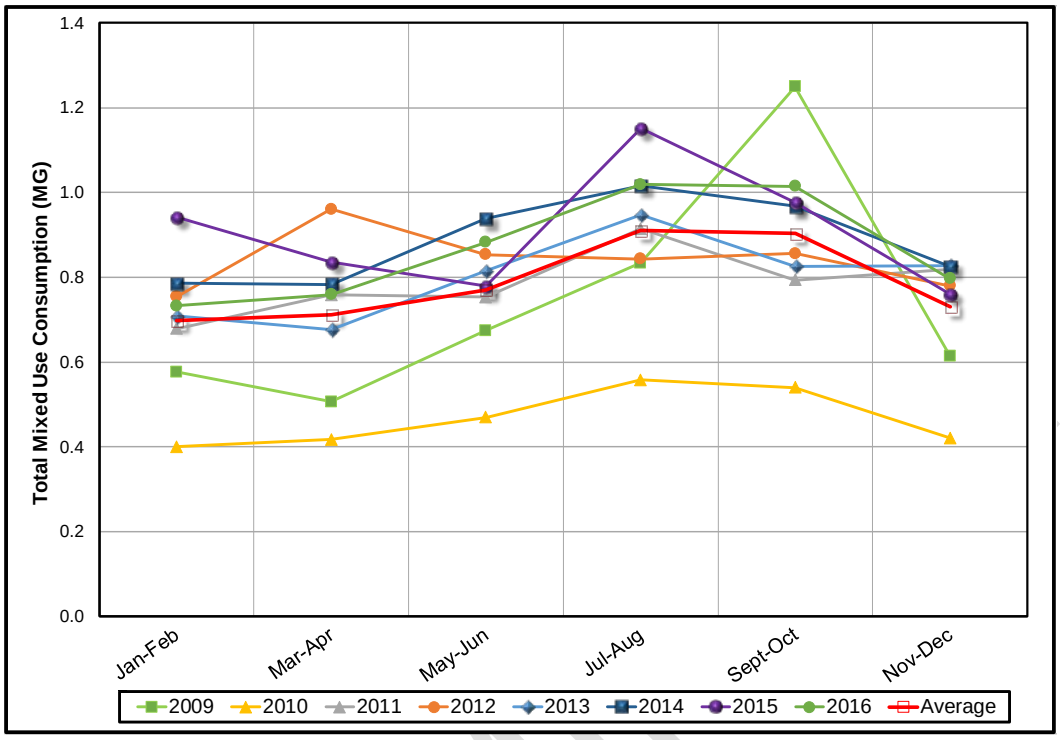


Chart 4-8a
Historical Bi-Monthly Commercial Consumption (Inside City Limits)

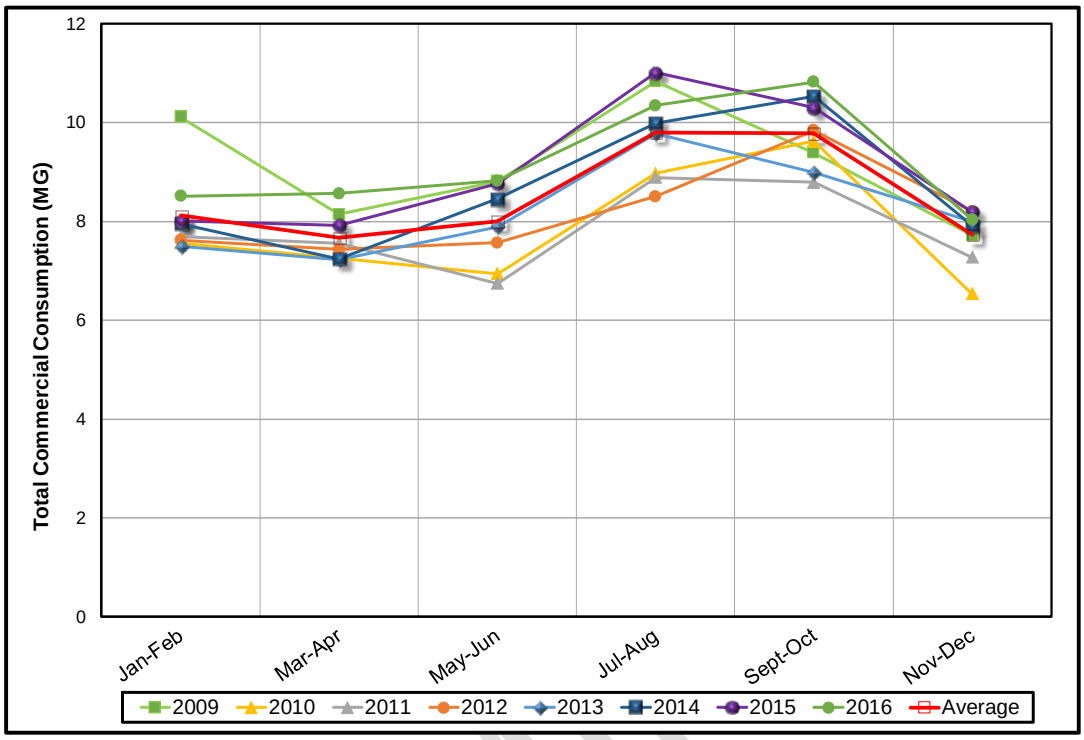


Chart 4-8b
Historical Bi-Monthly Commercial Consumption
(Outside City Limits, not including Transmission Main Customers)

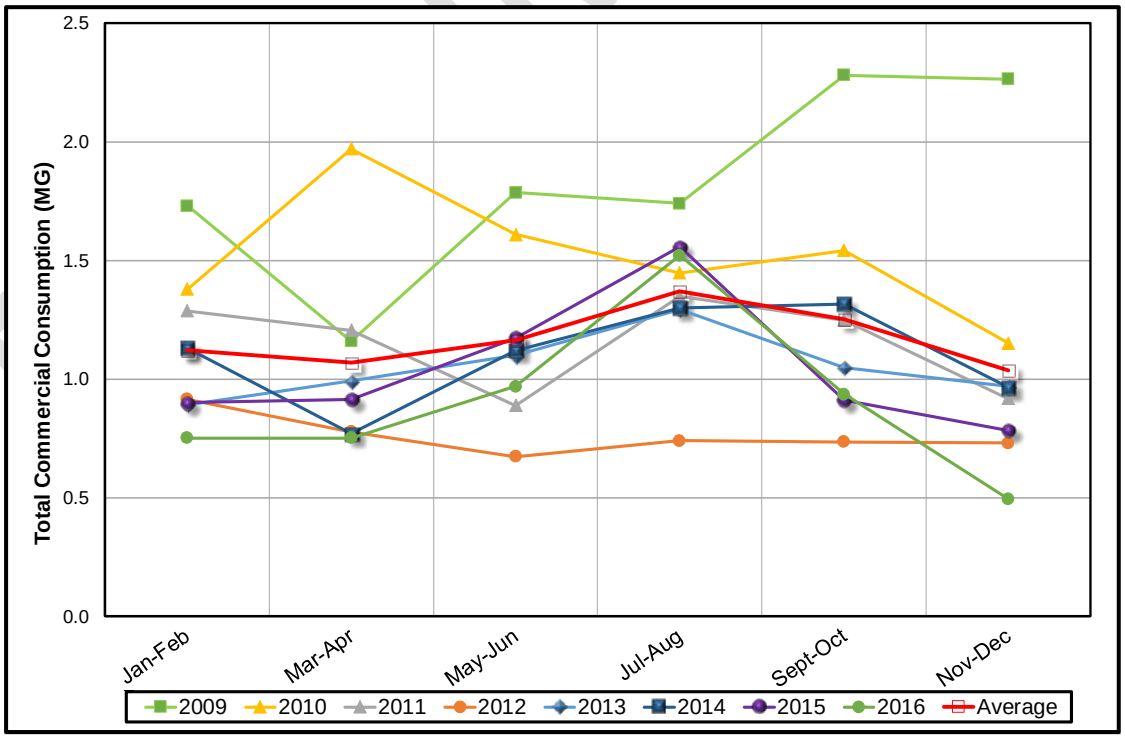


Chart 4-8c
Historical Bi-Monthly Commercial Consumption (Transmission Main)

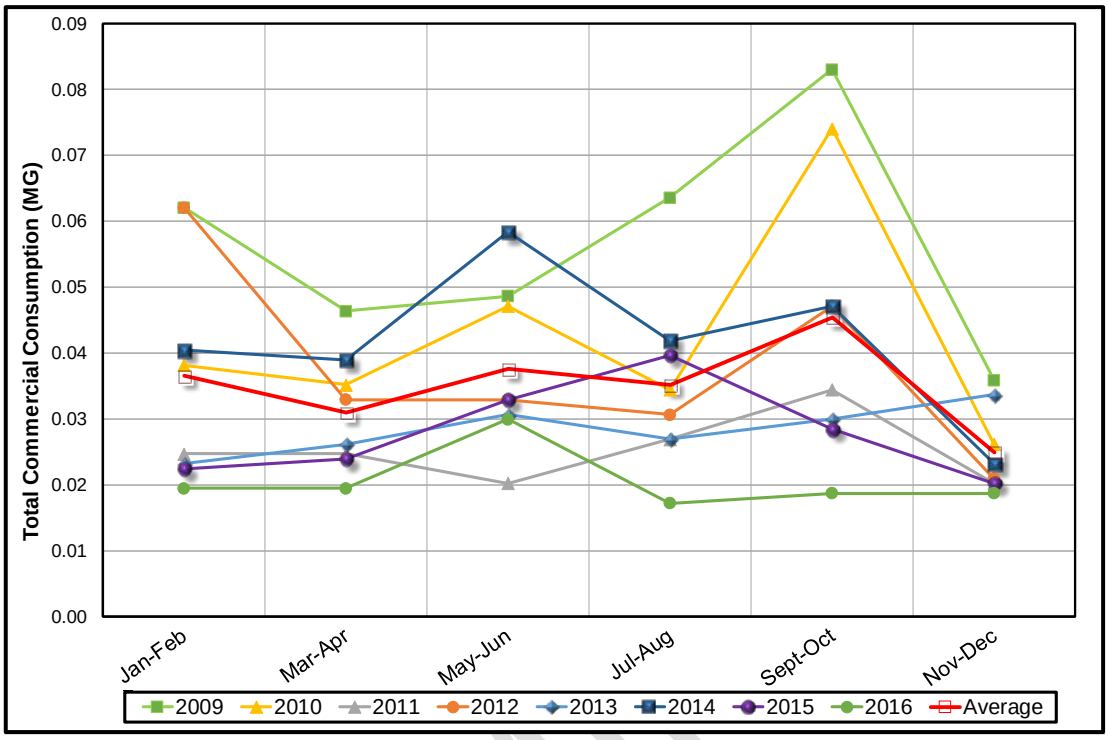


Chart 4-8d
Historical Bi-Monthly Commercial Consumption (Total System)

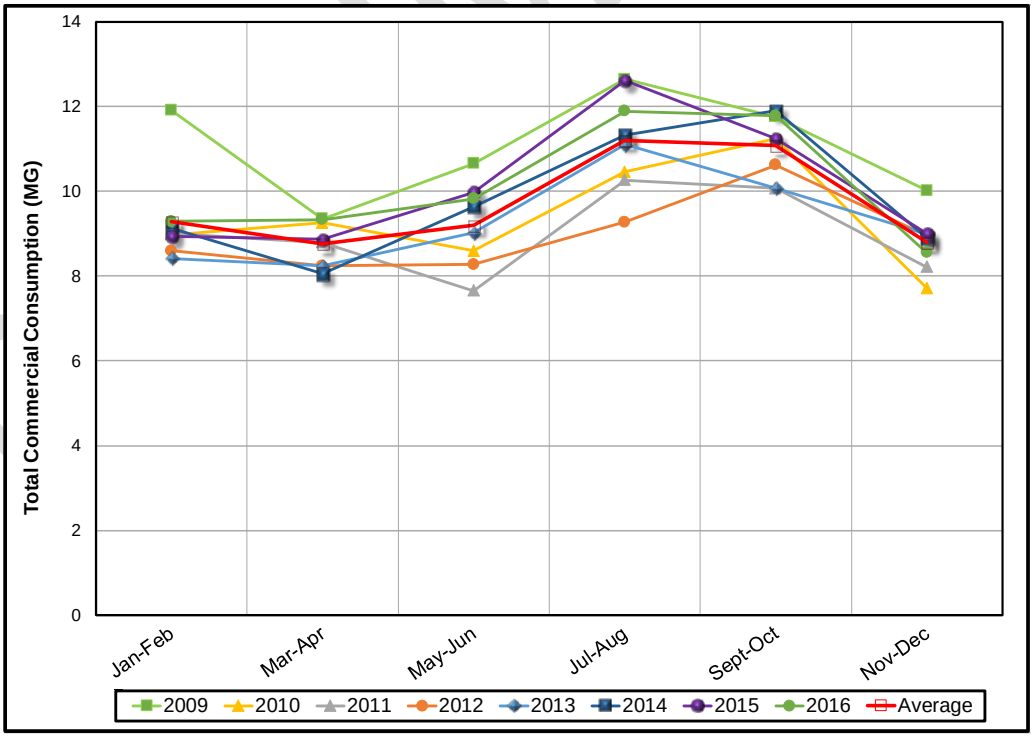


Chart 4-9a

Historical Bi-Monthly Wholesale Consumption
(Outside City Limits, not including Transmission Main Customers)

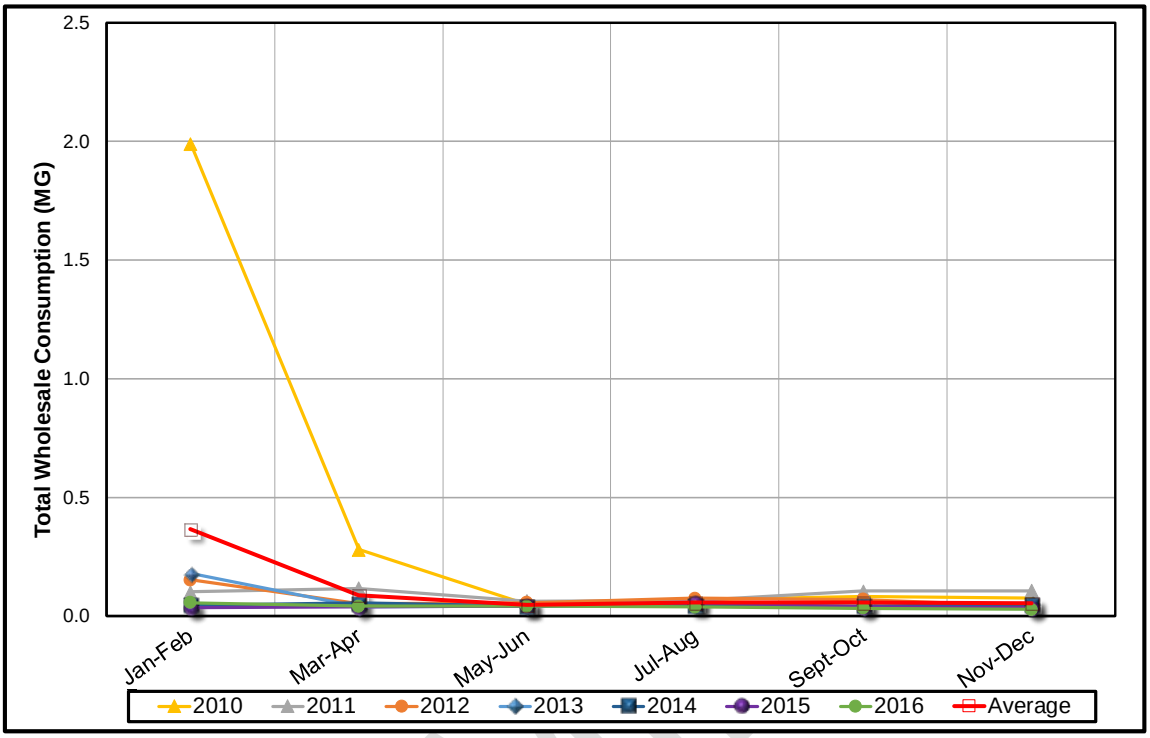


Chart 4-9b

Historical Bi-Monthly Wholesale Consumption (Transmission Main)

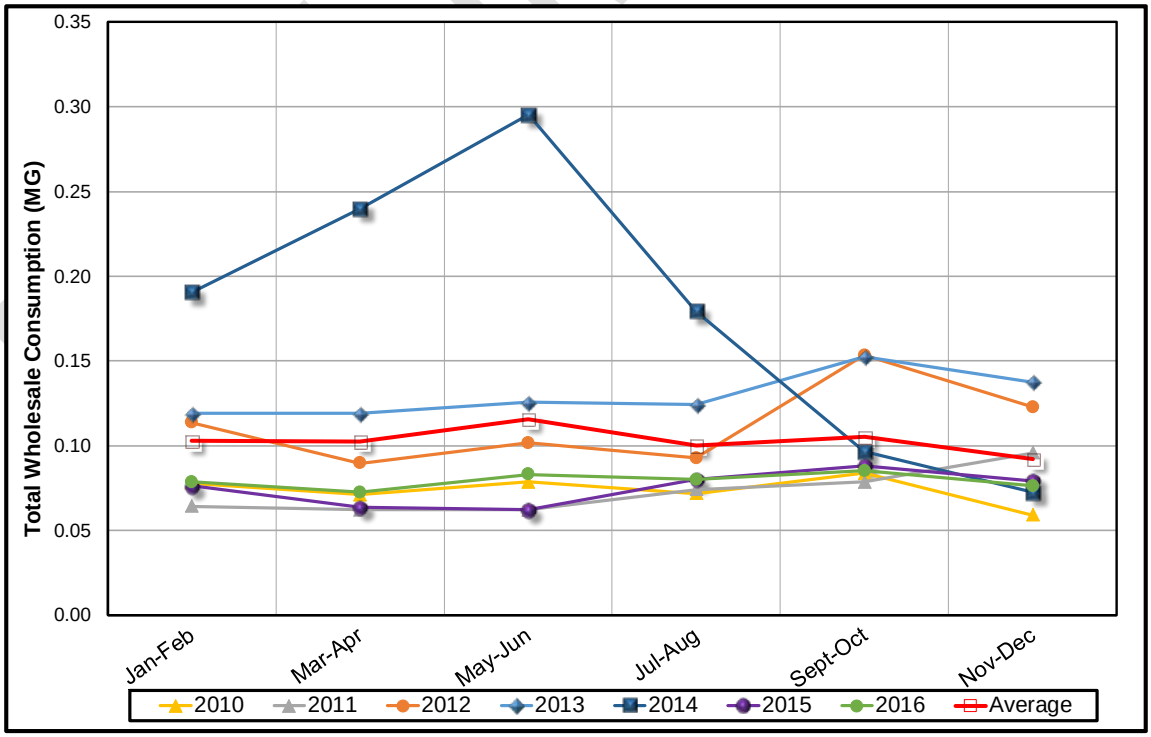


Chart 4-9c
Historical Bi-Monthly Wholesale Consumption (Total System)

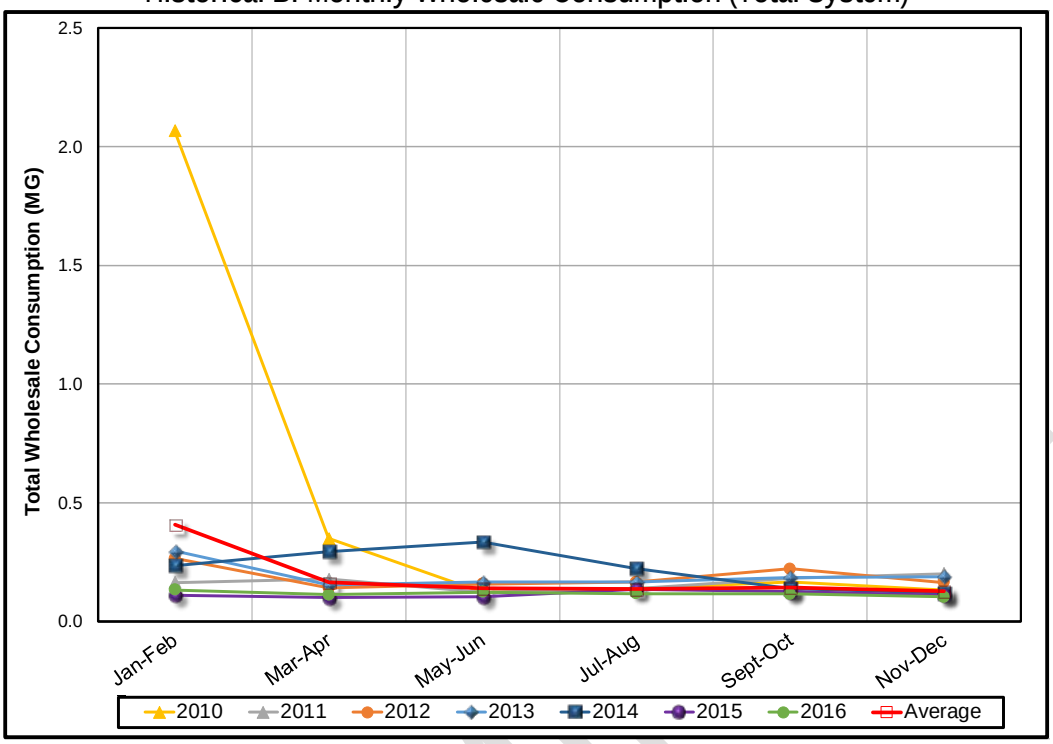


Chart 4-10

Historical Bi-Monthly Irrigation Consumption (Inside City Limits)

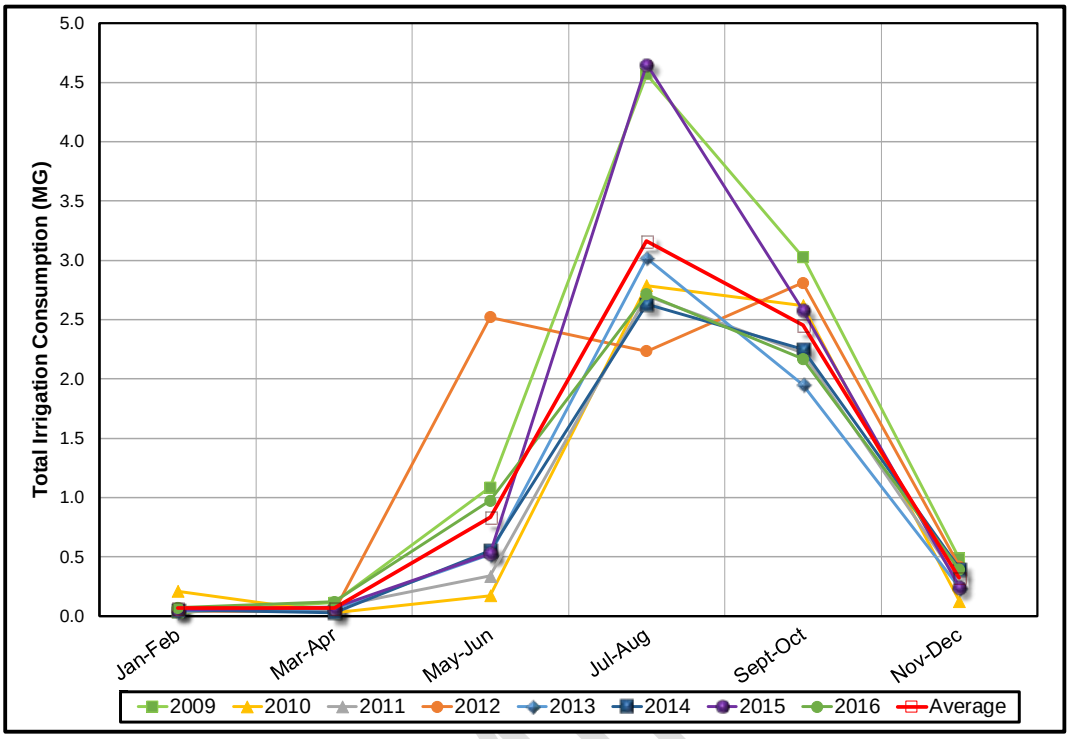


Chart 4-11a
Historical Bi-Monthly Other Consumption (Inside City Limits)

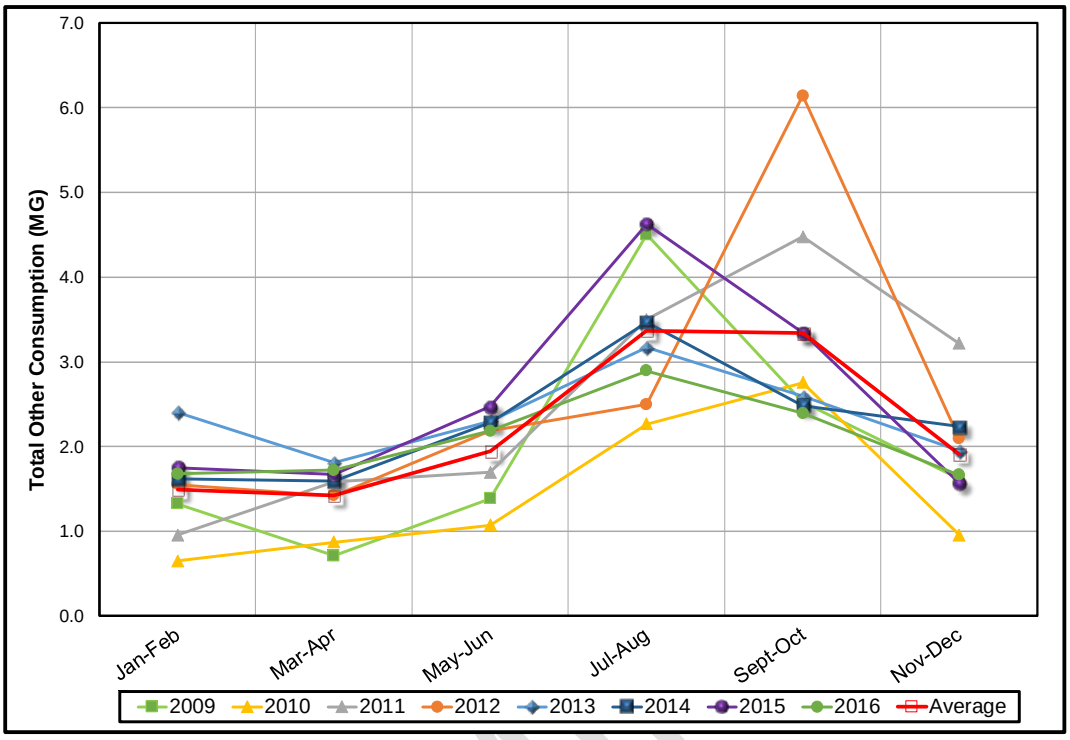


Chart 4-11b
Historical Bi-Monthly Other Consumption
(Outside City Limits, not including Transmission Main Customers)

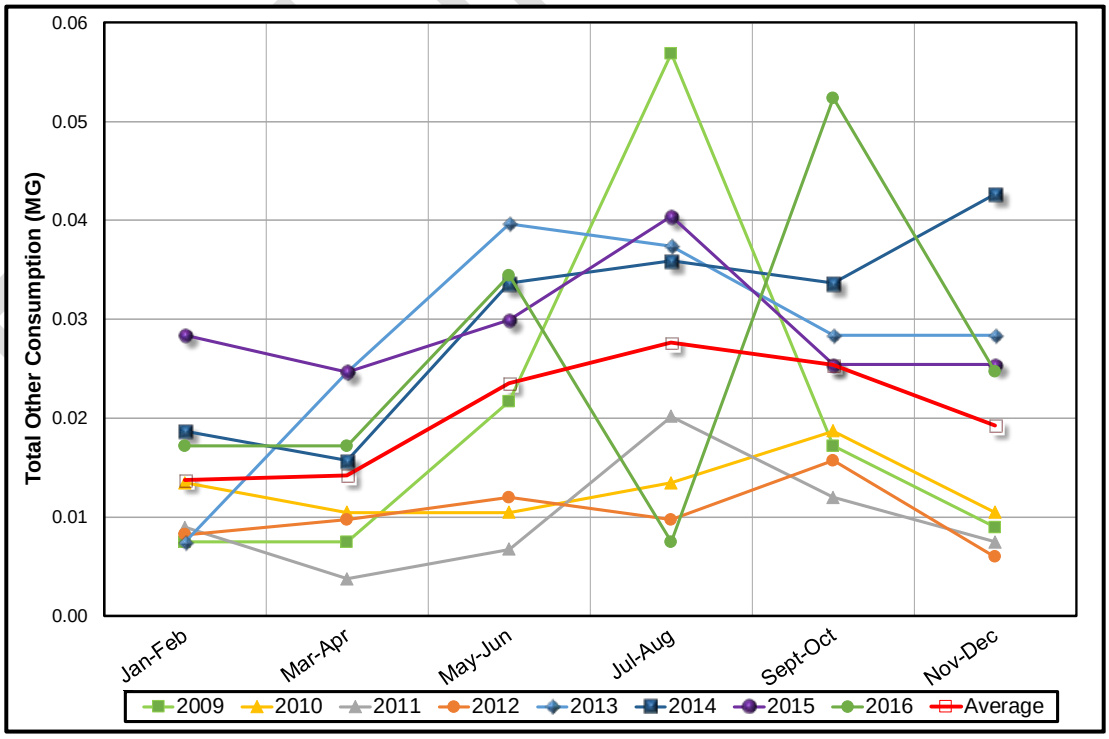


Chart 4-11c
Historical Bi-Monthly Other Consumption (Transmission Main)

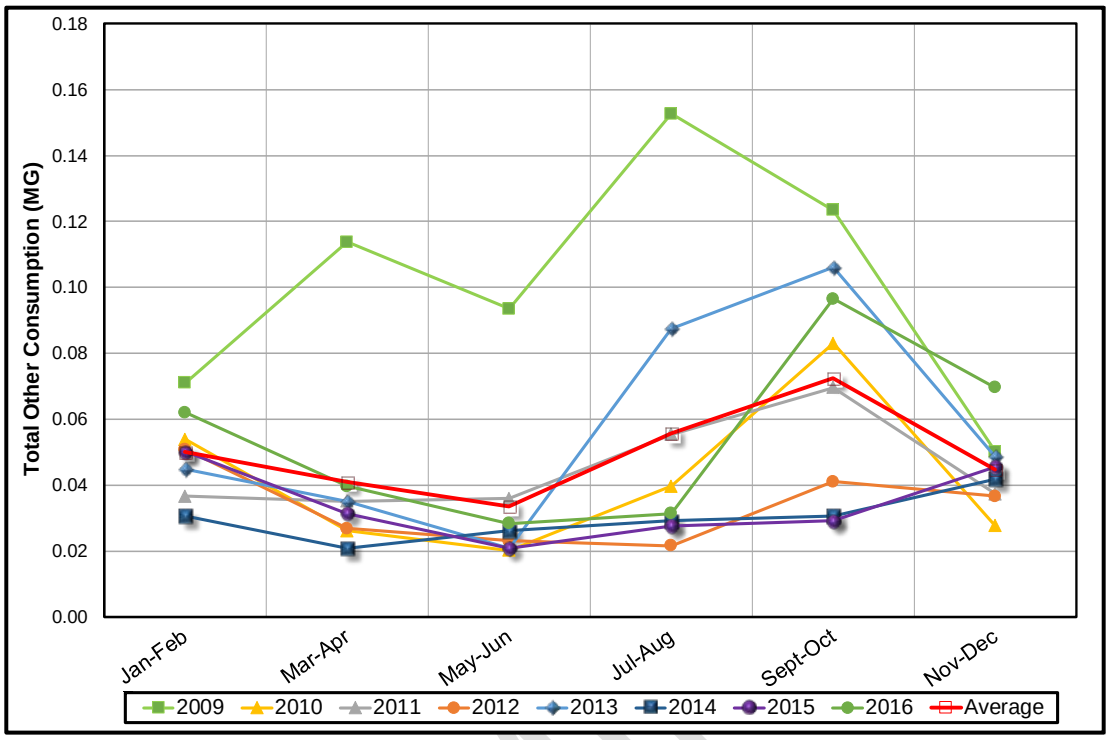


Chart 4-11d
Historical Bi-Monthly Other Consumption (Total System)

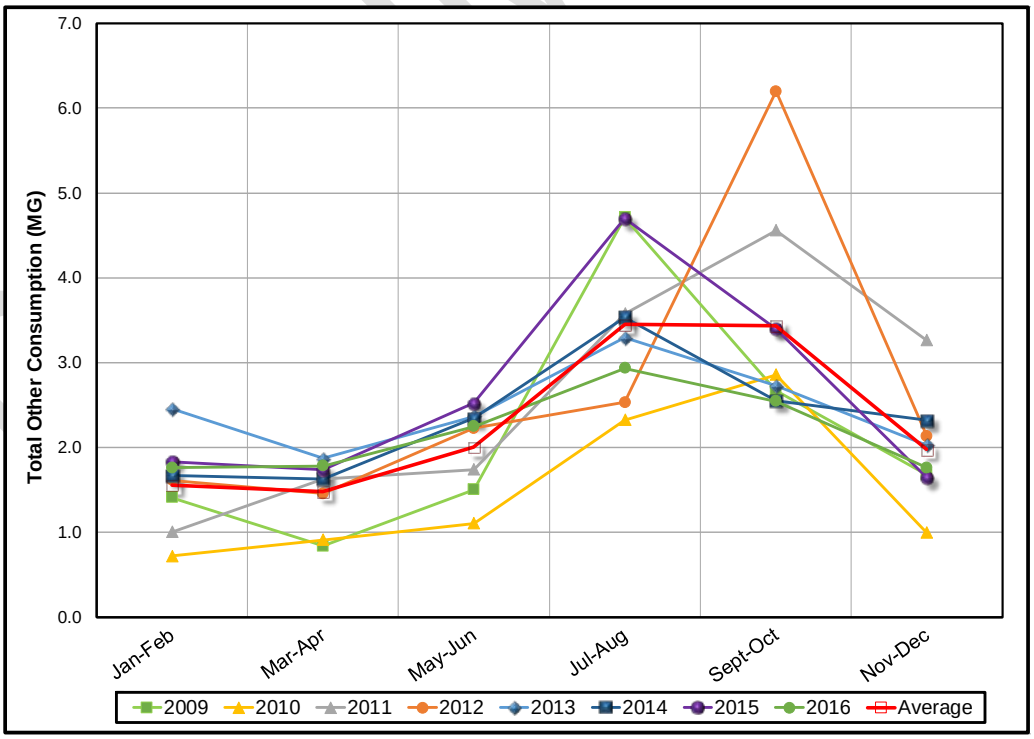
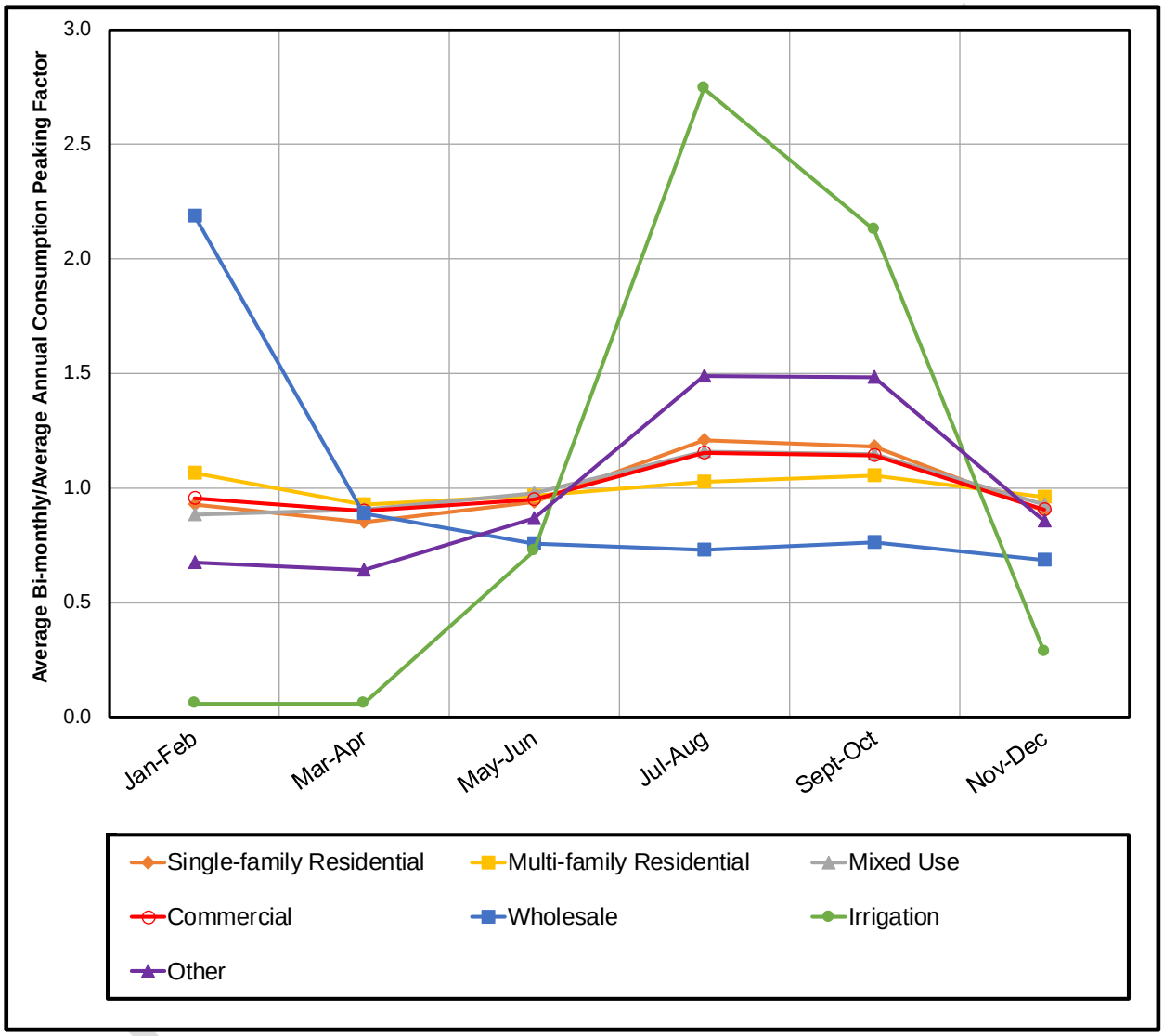


Chart 4-12 shows the ratio of bi-monthly consumption to average annual consumption for each of the seven customer classes. Most customer classes experience higher peaks in the summer months. Summer peaking is usually associated with irrigation and other residential summer water usage. As expected, the irrigation customer class shows the most significant summer peaks.

Chart 4-12
Average Bi-Monthly Peaking Factors by Customer Class



WATER SUPPLY

Water supply, or production, is the total amount of water supplied to the system, as measured by the meters at source of supply facilities. Water supply is different than water consumption in that water supply is the recorded amount of water put into the system, and water consumption is the recorded amount of water taken out of the system. The measured amount of water supply of any system is typically larger than the measured amount of water consumption due to non-metered water use and water loss (i.e., distribution system leakage), which will be described more in the

Distribution System Leakage section. **Table 4-4** summarizes the total amount of water supplied to the system from 2009 through 2016.

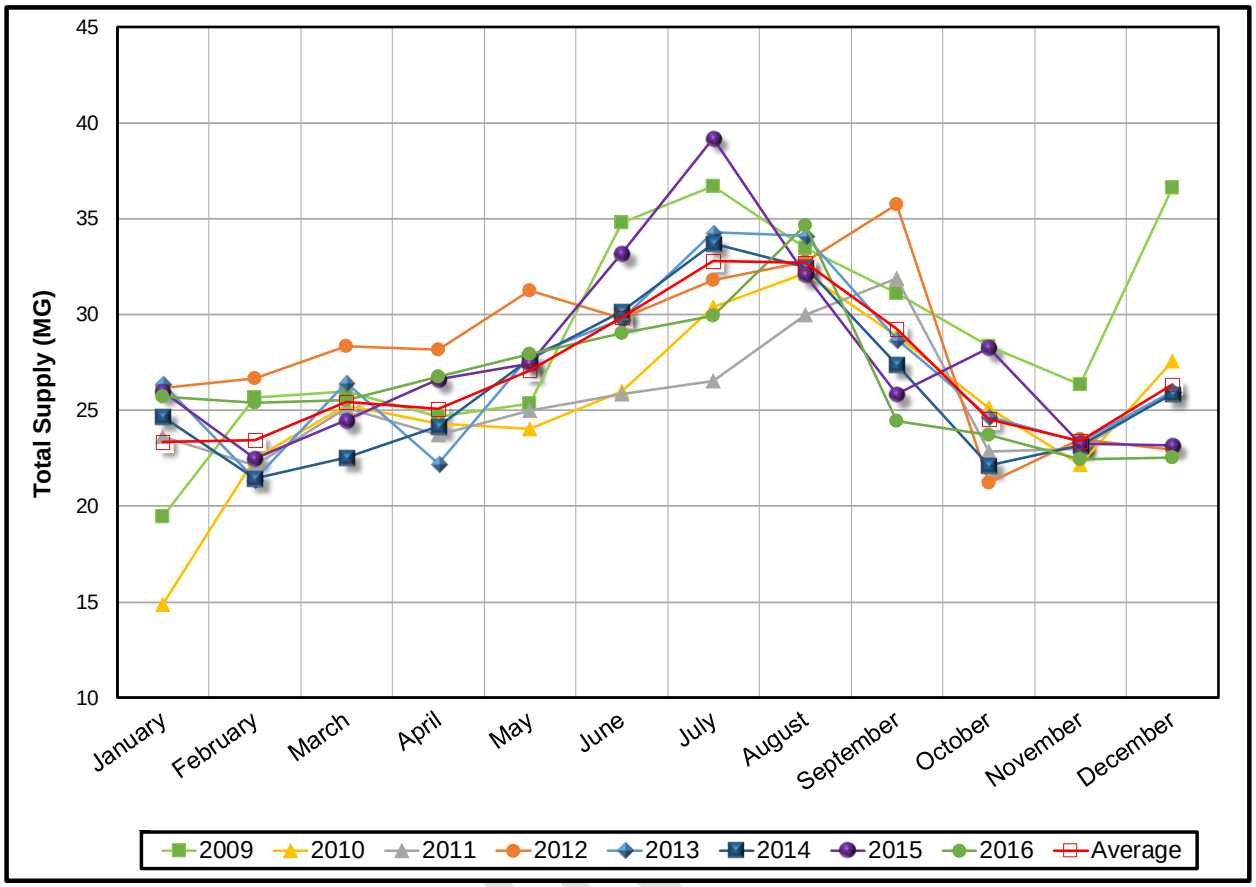
Table 4-4
Historical Water Supply

Year	Annual Supply (gallons)	Average Day Demand (gpm)	Average Day Demand (gpd)
2009	348,415,468	663	954,563
2010	303,160,628	577	830,577
2011	305,577,810	581	837,199
2012	338,265,004	642	924,221
2013	325,056,512	618	890,566
2014	315,325,076	600	863,904
2015	331,988,628	632	909,558
2016	318,045,008	603	868,975

In general, the amount of water consumed by the City's customers and other authorized uses remained relatively steady from 2009 until approximately 2016. This was most likely the result of water use efficiency practices, including new buildings with low flow plumbing fixtures, and the repair of water system leaks.

Like most other water systems, the City's water use varies seasonally. **Chart 4-13** shows the historical amount of water supplied to the City's system for each month from 2009 to 2016.

Chart 4-13
Historical Monthly Water Supply



As shown in **Chart 4-13**, water supply increases significantly during summer months, primarily due to irrigation and other residential summer water usage. The City's highest water use typically occurs in July and August. On average, the amount of water supplied during these 2 months is approximately 20 percent of the total supply for the entire year.

Chart 4-14 shows the monthly water supply by source for 2016. **Chart 4-15** shows the annual water supply by source from 2009 to 2016. In 2017, the City ceased operation of the water treatment plant; all water consumed by the City is now supplied from the City of Everett and the Snohomish PUD intertie.

Chart 4-14
2016 Monthly Water Supply by Source

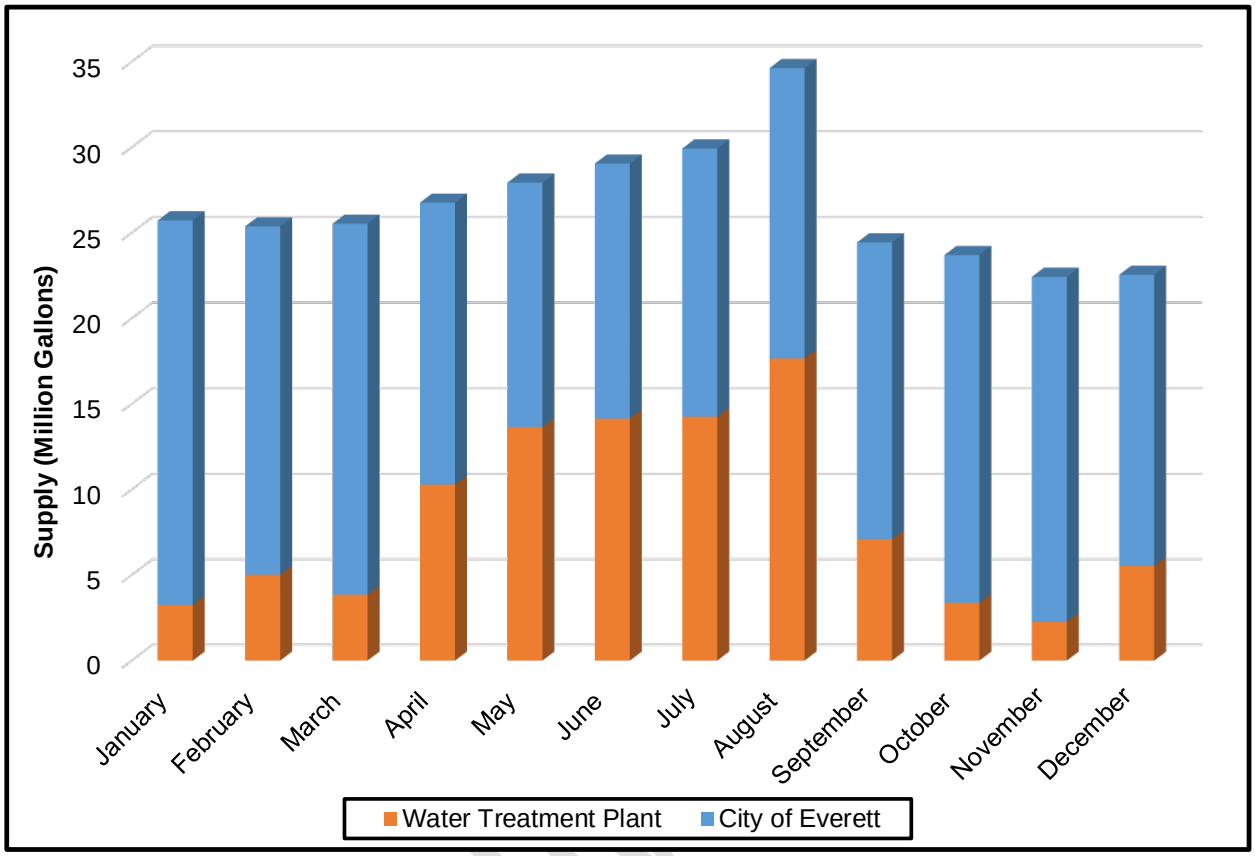
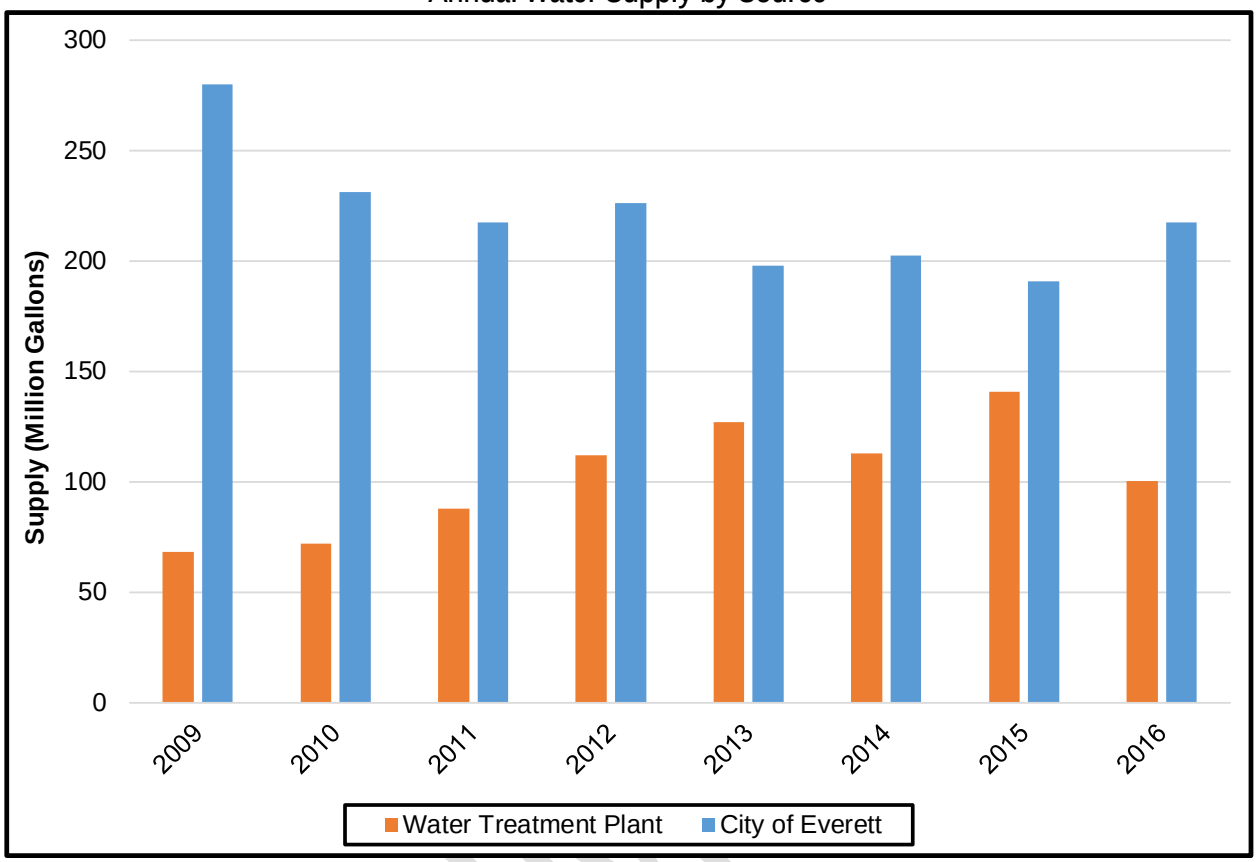


Chart 4-15
Annual Water Supply by Source



Distribution System Leakage

The difference between the amount of water supply and the amount of authorized water consumption is the amount of distribution system leakage (DSL). There are many sources of DSL in a typical water system, including water system leaks, inaccurate supply metering, inaccurate customer metering, illegal water system connections or water use, fire hydrant usage, water main flushing, and malfunctioning telemetry and control equipment resulting in reservoir overflows. Several of these types of usages, such as water main flushing and fire hydrant usage, may be considered authorized uses if they are tracked and estimated. Although real losses from the distribution system, such as reservoir overflows and leaking water mains, should be tracked for accounting purposes, these losses must be considered leakage. The Water Use Efficiency (WUE) Rule establishes a DSL standard of 10 percent or less based on a rolling 3-year average.

The City currently tracks authorized water usage from construction, flushing, and the fire department.

The amount of DSL in the City's system has fluctuated from 2009 to 2016, as shown in **Table 4-5**. However, the 3-year rolling average DSL has consistently been above the state standard of 10 percent.

Table 4-5
Distribution System Leakage

Description	Year 2009	2010	2011	2012	2013	2014	2015	2016
Authorized Consumption (AC)								
Metered Customer Use (MG)	304.9	253.2	254.1	259.6	253.3	256.9	266.4	259.4
Construction Usage (MG)	3.5	1.3	0.7	7.9	5.2	1.2	3.0	0.3
Flushing Usage (MG)	3.8	9.2	10.3	9.7	5.8	8.0	8.2	8.9
Fire Department Usage (MG)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Total Authorized Consumption (MG)	**315.3**	**266.9**	**268.2**	**267.5**	**258.4**	**258.1**	**269.3**	**271.7**
Total Production (TP)								
Total Production/Supply (MG)	**348.4**	**303.2**	**305.6**	**338.3**	**325.1**	**315.3**	**332.0**	**318.0**
Distribution System Leakage (TP - AC)								
Total Distribution System Leakage (MG)	**33.1**	**36.3**	**37.3**	**70.8**	**66.6**	**57.3**	**62.7**	**46.3**
Total Distribution System Leakage (%)	9.5%	12.0%	12.2%	20.9%	20.5%	18.2%	18.9%	14.6%
Rolling 3-Year Average DSL (%)	**---**	**---**	**11.2%**	**15.0%**	**17.9%**	**19.9%**	**19.2%**	**17.2%**

The City intends to continue to reduce the amount of DSL in the system to meet the DSL standard. The City will continue to record authorized water usage and improve the reporting of additional authorized water uses. It is known that there are leaks in the Transmission Main that are likely contributing to this high DSL rate. Since the Water Treatment Plant is no longer in service and the Transmission Main is no longer conveying primary water supply to the system, it is expected that the DSL will be greatly reduced in future years. The City will implement the WUE Program contained in **Appendix F** and continue to monitor DSL.

Table 4-6 presents the computation of the existing system per capita demand based on 2016 data. As shown in the upper portion of the table, the residential population served by the City's water system in 2016 was approximately 10,696. This population served, and the total annual supply in 2016, were used to arrive at the existing per capita demand of 81 gpd.

Table 4-6
Existing Per Capita Demand

2016 Residential Population Served	
Calculated 2016 Residential Population Served	10,696
2016 Total Annual Supply (gal)	
2016 Total Annual Supply (gal)	318,045,008
Existing Per Capita Demand (gal/day/capita)	**81**

Because the density and type of existing water users is generally consistent with expectations for the future development of the water system, no adjustments are necessary to the per capita demand figures for future customers. Often, future per capita demands are adjusted to account for large industrial customers that are not considered representative of future users. However, for the City, the existing 81 gpd capita demand was assumed to be representative of the future per

capita demand. This figure is used later in the chapter to forecast water demands in future years based on future population estimates.

Table 4-7 shows the estimated average demand of each of the City's six existing pressure zones, plus the demand of the transmission main customers. The City's two largest pressure zones, the 218 and 362 Zones, account for approximately 80 percent of the total system demand. The transmission main customers account for approximately 4 percent of total demand. **Figure 2-1** in **Chapter 2** displays the City's pressure zones.

Table 4-7
2016 Demands by Pressure Zone

Pressure Zone	2016 Annual Supply (gallons)	Average Daily Demand (gpm)	Average Daily Demand (gpd)	Percent of Total Demand (%)
218	166,143,465	315	453,944	52.2%
362	86,769,256	165	237,074	27.3%
384	28,726,306	55	78,487	9.0%
425	17,905,185	34	48,921	5.6%
438	4,838,669	9	13,220	1.5%
450	753,736	1	2,059	0.2%
Transmission Main	12,908,390	24	35,269	4.1%
Total	318,045,008	603	868,975	100%

Equivalent Residential Units

The demand of each customer class can be expressed in terms of equivalent residential units (ERUs) for demand forecasting and planning purposes. One ERU is equivalent to the amount of water used by a single-family residence. The number of ERUs represented by the demand of the other customer classes is determined from the total demand of the customer class and the unit demand per ERU from the single-family residential demand data.

Tables 4-8a, **4-8b**, and **4-8c** present the computed number of ERUs for each customer class from 2009 through 2016. The demands shown are based on the consumption totals of each customer class and the authorized non-revenue water consumption and DSL shown in **Table 4-5**. The average demand per ERU from 2012 through 2016 (5-year average) was 178 gpd. This is somewhat less than the average single-family demand in the Puget Sound area, which is typically between 200 and 300 gpd.

Table 4-8a
Equivalent Residential Units

Year	Average Number of Connections	Average Annual Demand (gallons)[1]	Demand per ERU (gal/day/ERU)	Total ERUs
Single-Family Residential (ERU Basis)				
2009	2,582	198,751,421	211	2,582
2010	2,623	171,311,277	179	2,623
2011	2,639	167,146,470	174	2,639
2012	2,647	184,434,010	190	2,647
2013	2,657	177,413,959	183	2,657
2014	2,668	167,791,901	172	2,668
2015	2,705	174,816,678	177	2,705
2016	2,773	170,487,064	168	2,773
Multi-Family Residential				
2009	103	43,539,005	211	566
2010	84	39,793,320	179	609
2011	84	40,867,541	174	645
2012	84	43,912,024	190	630
2013	84	41,876,779	183	627
2014	90	42,477,765	172	676
2015	90	44,116,479	177	683
2016	90	42,069,130	168	684
Mixed Use				
2009	33	5,091,916	211	66
2010	28	3,359,624	179	51
2011	32	5,672,324	174	90
2012	31	6,577,982	190	94
2013	31	6,164,534	183	92
2014	32	6,526,424	172	104
2015	33	6,784,354	177	105
2016	32	6,382,143	168	104

NOTES:
1. Average Annual Demand includes authorized non-revenue consumption and DSL.

Table 4-8b
Equivalent Residential Units – Continued

Year	Average Number of Connections	Average Annual Demand (gallons)[1]	Demand per ERU (gal/day/ERU)	Total ERUs
		Commercial		
2009	311	75,777,836	211	985
2010	311	67,341,163	179	1,031
2011	313	64,931,293	174	1,025
2012	313	70,320,456	190	1,009
2013	317	71,704,828	183	1,074
2014	318	72,363,609	172	1,151
2015	318	75,554,599	177	1,169
2016	320	74,378,846	168	1,210
		Wholesale		
2009	-	-	-	-
2010	2	3,569,209	179	55
2011	2	1,190,954	174	19
2012	2	1,457,333	190	21
2013	2	1,493,851	183	22
2014	2	1,655,479	172	26
2015	2	860,514	177	13
2016	2	868,625	168	14
		Irrigation		
2009	24	10,637,720	211	138
2010	29	7,123,191	179	109
2011	30	6,822,801	174	108
2012	30	10,513,268	190	151
2013	31	7,481,734	183	112
2014	34	7,269,232	172	116
2015	34	10,132,246	177	157
2016	34	7,893,752	168	128

NOTES:
1. Average Annual Demand includes authorized non-revenue consumption and DSL.

Table 4-8c
Equivalent Residential Units – Continued

Year	Average Number of Connections	Average Annual Demand (gallons)[1]	Demand per ERU (gal/day/ERU)	Total ERUs
		Other		
2009	76	14,617,570	211	190
2010	69	10,662,843	179	163
2011	69	18,946,427	174	299
2012	70	21,049,931	190	302
2013	70	18,920,827	183	283
2014	72	17,240,667	172	274
2015	73	19,723,758	177	305
2016	72	15,965,448	168	260
		Total System		
2009	3,128	348,415,468	211	4,527
2010	3,146	303,160,628	179	4,642
2011	3,168	305,577,810	174	4,824
2012	3,177	338,265,004	190	4,855
2013	3,192	325,056,512	183	4,868
2014	3,215	315,325,076	172	5,014
2015	3,255	331,988,628	177	5,138
2016	3,323	318,045,008	168	5,173

NOTES:
1. Average Annual Demand includes authorized non-revenue consumption and DSL.

The average demand per ERU from 2012 through 2016 of 178 gpd will be used later in this chapter to forecast ERUs in future years based on estimated future demands. This demand per ERU value also will be used to determine the capacity (in terms of ERUs) of the existing system in **Chapter 7**.

Average Day Demand

ADD is the total amount of water delivered to the system in a year divided by the number of days in the year. The ADD is determined from the historical water use patterns of the system and can be used to project future demands within the system. Typically, ADD data are used to determine standby storage requirements for water systems. Standby storage is the volume of a reservoir used to provide water supply under emergency conditions when supply facilities are out of service. Water production records from the City's water treatment plant and wholesale sources were reviewed to determine the system's ADD. The system's average day demand from 2009 through 2016 is shown in **Table 4-4**.

Maximum Day Demand

MDD is the maximum amount of water used throughout the system during a 24-hour time period of a given year. MDD typically occurs on a hot summer day when lawn watering is occurring throughout much of the system. In accordance with Washington Administrative Code (WAC) 246-290-230, the distribution system shall provide fire flow at a minimum pressure of 20 pounds per square inch (psi) during maximum day demand conditions. Supply facilities (wells, springs, pump stations, interties, etc.) are typically designed to supply water at a rate that is equal to or greater than the system's MDD.

MDD typically is determined from the combined flow of water into the system from all supply sources and reservoirs on the maximum day. While the City's daily reservoir flow data information is available, the MDD cannot be determined because daily wholesale supply records are not available from all interties. Therefore, the system's MDD could not be computed based on actual system data. Instead, a typical MDD/ADD factor for similar sized systems in the Puget Sound Region of 2.20 was applied to the system's actual ADD. This results in an estimated MDD of 1,328 gallons per minute (gpm) for 2016.

Table 4-9
Maximum Day Demands and Peaking Factors

Peak Demand Data			
Demand Type	**Date**	**Demand (gpm)**	**Demand (gpd)**
Average Day Demand (ADD)	2016	603	868,975
Maximum Day Demand (MDD)	Daily supply data unavailable Assumed MDD/ADD = 2.20	1,328	1,911,746
Peak Hour Demand (PHD)	Hourly data unavailable Assumed PHD/MDD = 1.80	2,390	3,441,143

Peaking Factors	
Maximum Day Demand/Average Day Demand (MDD/ADD)	2.20
Peak Hour Demand/Maximum Day Demand (PHD/MDD)	1.80
Peak Hour Demand/Average Day Demand (PHD/ADD)	3.96

Peak Hour Demand

PHD is the maximum amount of water used throughout the system, excluding fire flow, during a one-hour time period of a given year. In accordance with WAC 246-290-230 – Distribution Systems, new public water systems or additions to existing systems shall be designed to provide domestic water at a minimum pressure of 30 psi during PHD conditions. Equalizing storage requirements are typically based on PHD data.

The PHD, like the MDD, is typically determined from the combined flow of water into the system from all supply sources and reservoirs. Hourly water production records and chart recordings of reservoir levels are available for all of the City's storage facilities, but not for all of the City's supply facilities. Therefore, the system's PHD could not be computed based on actual system data. Instead, a PHD/MDD factor typically calculated in similar sized systems of 1.80 was applied to the system's estimated MDD. This resulted in an estimated PHD of 2,390 gpm for 2016.

Table 4-9 shows the peaking factors of the water system based on the average day, maximum day, and peak hour demand data presented above. The MDD/ADD ratio of 2.20 is within the typical range of 1.2 to 2.5 for most systems. The estimated PHD/MDD ratio of 1.8 is within the typical range of 1.3 to 2.0 for most systems. These peaking factors will be used later in this chapter, in conjunction with projected average day demands, to estimate the system's future maximum day and peak hour demands.

FIRE FLOW DEMAND

Fire flow demand is the amount of water required during firefighting as defined by applicable codes. Fire flow requirements are established for individual buildings and expressed in terms of flow rate (gpm) and flow duration (hours). Fighting fires imposes the greatest demand on the water system because a high rate of water must be supplied over a short period of time, requiring each component of the system to be properly sized and configured to operate at its optimal condition. Adequate storage and supply is useless if the transmission or distribution system cannot deliver water at the required rate and pressure necessary to extinguish a fire.

General planning-level fire flow requirements were established for the City's different land use categories to provide a target level of service for planning and sizing future water facilities in areas that are not fully developed. The general planning-level fire flow requirement for each land use category is shown in **Table 4-10**. The water system analyses presented in **Chapter 7** are based on an evaluation of the water system to provide sufficient fire flow in accordance with these general planning-level fire flow requirements. The fire flow requirements shown in **Table 4-10** do not necessarily equate to actual existing or future fire flow requirements for all buildings, since this is typically based on building size, construction type, and fire suppression systems provided. Improvements to increase the available fire flow to meet actual fire flow requirements greater than those shown in **Table 4-10** shall be the responsibility of the developer.

Table 4-10
General Planning-Level Fire Flow Requirements

Land Use Category	Fire Flow Requirement (gpm)	Flow Duration (hours)
Single Family Residential[1]	1,000	2
Low Density Residential[2]	1,000	2
Agricultural[3]	1,000	2
Medium Density Residential	1,750	2
High Density Residential	2,500	3
Historic Business District	2,500	3
Mixed Use[4]	2,500	3
Public Facilities[5]	3,000	3
Commercial[6]	3,500	3
Airport Industrial	4,000	4
Business Park	4,000	4
Industrial[7]	4,000	4
Schools	4,000	4
All Other Land Uses	3,000	3

NOTES: Land use types found in **Figure 3-1**.
1 = Includes SFR, SC-RR/5, and SC-ULDR land use types.
2 = Includes SC-UMDR land use type.
3 = Includes SC-RCF, SC-UHORT, and UH land use types.
4 = Includes PIL land use type.
5 = Includes OS, PP, and SC-P/I land use types.
6 = Includes SC-UCOM land use type.
7 = Includes SC-UI land use type.

FUTURE WATER DEMANDS

BASIS FOR PROJECTING DEMANDS

Future demands were calculated from the results of the existing per capita demand computations shown in **Table 4-6** and the projected population data from **Chapter 3**. Future demand projections were computed with and without water savings expected from implementing WUE measures contained in the City's WUE Program in **Appendix F**.

The calculated existing per capita demand of 81 gpd was used for all demand projections without savings from WUE measures. The per capita demand was reduced to reflect the WUE goals and used as the basis for future water demand projections with implementation of the WUE Program. The City's WUE Program presents a goal to save 17,493 gpd on an annual average basis at full implementation in 2019, and maintain this level of conservation for the remainder of the planning period. The City's WUE goal is tied to the City of Everett's regional WUE goal. In 2014, the City purchased 1.47% of Everett's total production, and adopted an equivalent percentage of the regional goal.

DEMAND FORECASTS AND CONSERVATION

Table 4-11 presents the projected water demand forecast for the City's water system. The actual demand data from 2016 is shown for comparison purposes. Future ADDs were projected based on population estimates for the given years and the estimated demand per capita values. The future MDDs and PHDs shown were computed from the projected ADDs and the existing system peaking factors shown in **Table 4-9**. The future demand projections are also shown with and without estimated reductions in water use from achieving WUE goals.

Table 4-11
Future Water Demand Projections

Description	Actual	Projected												
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028 (+10 years)	2038 (+20 years)
Population Data														
Water Service Area Population	10,696	11,114	11,359	11,527	11,695	11,862	12,030	12,198	12,366	12,533	12,673	12,814	12,954	14,355
Increase from Base Year 2016		418	663	831	998	1,166	1,334	1,501	1,669	1,837	1,977	2,117	2,257	3,659
Demand Basis Data (gal/day/capita)[1]														
ADD without WUE		81	81	81	81	81	81	81	81	81	81	81	81	81
Average Day Demand (gpm)														
Demand without WUE	603	643	656	666	675	685	694	704	713	723	731	739	746	825
Demand with WUE		634	646	654	663	673	682	692	701	711	718	726	734	813
Maximum Day Demand (gpm)														
Demand without WUE	1,328	1,414	1,444	1,465	1,486	1,507	1,527	1,548	1,569	1,590	1,607	1,625	1,642	1,816
Demand with WUE		1,395	1,421	1,438	1,459	1,480	1,501	1,522	1,542	1,563	1,581	1,598	1,615	1,789
Peak Hour Demand (gpm)														
Demand without WUE	2,390	2,545	2,600	2,637	2,674	2,712	2,749	2,787	2,824	2,862	2,893	2,924	2,956	3,269
Demand with WUE		2,510	2,558	2,589	2,626	2,664	2,701	2,739	2,776	2,814	2,845	2,876	2,908	3,221

NOTES:
1. Calculated for future population only.

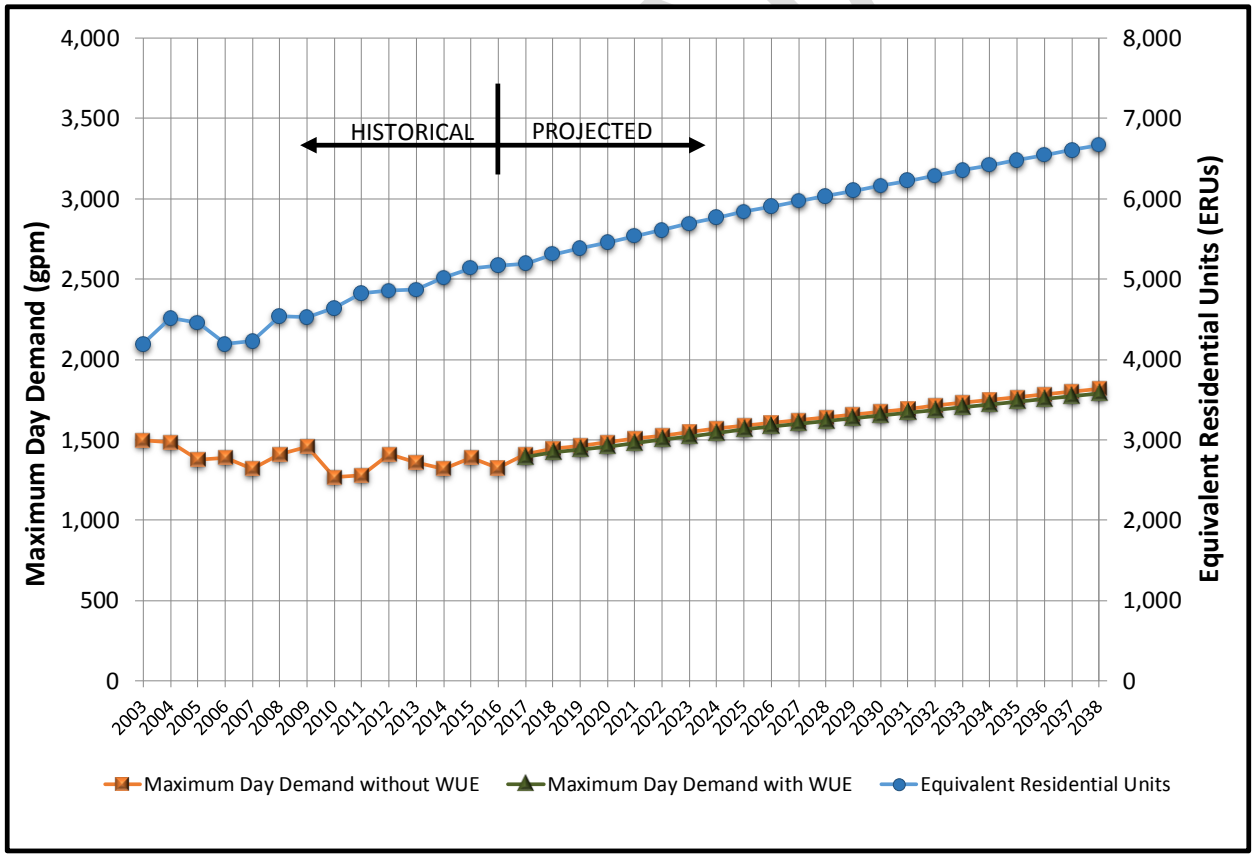
The analysis and evaluation of the existing water system with proposed improvements, as presented in **Chapters 7** and **9**, is based on the 2038 projected demand data without WUE reductions. This ensures that the future system will be sized properly to meet all requirements, whether or not additional water use reductions are achieved. However, the City will continue to pursue reductions in water use by implementing the WUE Program contained in **Appendix F** of this Water System Plan.

Table 4-12 presents the existing and projected ERUs of the system. The ERU forecasts are based on the projected water demands from **Table 4-11** and the 5-year rolling average demand per ERU that was computed from actual 2012 through 2016 data. The historical and projected water demand and ERU data from **Tables 4-11** and **4-12** also are shown graphically in **Chart 4-16**. **Chart 4-11** will be used in **Chapter 7** to compare demand projections with source of supply availability.

Table 4-12
Future ERU Projections

Description	Actual	Projected												
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028 (+10 years)	2038 (+20 years)
Demand Data (gpm)[1]														
ADD without WUE	603	643	656	666	675	685	694	704	713	723	731	739	746	825
ADD with WUE		634	646	654	663	673	682	692	701	711	718	726	734	813
ERU Basis Data (gal/day/ERU)														
Demand per ERU without WUE	168	178	178	178	178	178	178	178	178	178	178	178	178	178
Demand per ERU with WUE		176	175	175	175	175	175	175	175	175	175	175	175	175
Equivalent Residential Units (ERUs)														
Total System ERUs	5,173	5,195	5,307	5,384	5,460	5,537	5,613	5,690	5,766	5,843	5,907	5,971	6,035	6,674

Chart 4-16
Future Water Demand and ERU Projections



5 | POLICIES AND DESIGN CRITERIA

INTRODUCTION

The City of Snohomish (City) operates and plans water service for City residents and businesses according to the design criteria, laws, and policies that originate from the seven agencies shown in **Table 5-1**. The agencies are listed from those with the broadest to the narrowest authority.

Table 5-1

Regulatory Agencies

Agency	Design Criteria/Laws/Policies
U.S. Department of Health and Human Services	Federal Regulations
U.S. Environmental Protection Agency	Federal Regulations
Washington State Department of Health	State Regulations
Washington State Department of Ecology	State Regulations
Snohomish County Council	County Regulations
Snohomish City Council	Administrative Policies
American Water Works Association	Design Criteria

These laws, design criteria, and policies guide the City's operation and maintenance of the water system on a daily basis, and its planning for growth and improvements. The agencies' overall objective is to ensure that the City provides high quality water service at a fair and reasonable cost to its customers. The agencies also set the standards the City must meet to ensure the water supply is adequate to meet existing and future water demands. The system's ability to meet these demands is detailed in **Chapter 7**, and the recommended improvements are identified in **Chapter 9**.

The highest three governmental entities establishing policies and laws – the U.S. Government, Washington State, and the Snohomish County Council – establish requirements in statutes, regulations, or ordinances. The Snohomish City Council adopts regulations and policies that cannot be less stringent or in conflict with those established by governments above them. The City's policies take the form of by-laws, policies, standards, memoranda, and operational procedures, many of which are summarized in this chapter.

The policies associated with the following categories are presented in this chapter.

- Supply
- Customer Service
- Facilities
- Finance
- Organization

SUPPLY POLICIES

QUALITY PROTECTION

- The City will pursue steps to meet or exceed all water quality regulations and standards.
- The City will take all reasonable measures to protect its system and customers.

CROSS-CONNECTION CONTROL

- The City has a responsibility to protect the public water system from contamination due to cross-connections. Cross-connections that can be eliminated will be eliminated.
- The City has a cross-connection control program for eliminating cross-connections. A copy of the City's Cross-Connection Control Program is contained in **Appendix G**.
- The City has staff who are certified for backflow prevention and inspection.
- The City will comply with the backflow prevention assembly installation and testing requirements as indicated in Washington Administrative Code (WAC) 246-290-490, and as published in the Pacific Northwest Section, American Water Works Association (AWWA) manual *Cross-Connection Control Manual, Accepted Procedure and Practice*.

QUANTITY

- The City will plan for at least a 20-year projected use of its supply sources so that future water resource limitations can be handled effectively.
- The City will ensure the capacity of the system, including its supply facilities, storage and transmission mains, is sufficient to meet the maximum day demands of the system.

FIRE FLOW

The City will plan to provide the following minimum fire flows for future development for future planning-level design.

- Single-Family, Low Density Residential, and Agricultural: 1,000 gallons per minute (gpm) for a 2-hour duration.
- Medium Density Residential: 1,750 gpm for a 2-hour duration.
- High Density Residential, Historic Business District, and Mixed Use: 2,500 gpm for a 3-hour duration.
- Public Facilities: 3,000 gpm for a 3-hour duration.
- Commercial: 3,500 gpm for a 3-hour duration.
- Airport Industrial, Business Park, Industrial, and Schools: 4,000 gpm for a 4-hour duration.
- All other land uses: 3,000 gpm for a 3-hour duration.

Actual fire flow requirements, as determined by the local fire marshal, may differ from those shown based on such factors as proposed use and building size. Improvements to increase the

available fire flow to meet actual fire flow requirements greater than those shown shall be the responsibility of the developer. In areas where development can meet fire flow requirements by installing water mains sized per this Water System Plan (WSP), but the City desires larger pipes for fire flow in other areas, the City will endeavor to pay the cost difference associated with the increased pipe size.

WATER USE EFFICIENCY

- The City has and will continue to promote the efficient and responsible use of water and will conserve water.
- The City has established water use efficiency goals through a public process. Water use efficiency goals will be evaluated and reported annually and updated at least every 6 years as part of the WSP update.
- The City's Water Use Efficiency Program, which is contained in **Appendix F**, describes the City's current adopted program.

REGIONAL PARTICIPATION

- The City will continue to participate in regional supply management and planning activities to protect the environment, reduce cost of service, increase reliability, improve water quality, and secure needed quantity. The City is a current member of the Everett Water Utilities Committee. Participation includes attending meetings, funding assistance, group purchasing, inter-utility training, providing information for studies, and performing water quality monitoring tasks, as needed.

CUSTOMER SERVICE POLICIES

DUTY TO SERVE

The City has a duty to provide service to all new connections within the retail service area when the circumstances meet the following four threshold factors.

- The City has sufficient capacity to serve water in a safe and reliable manner.
- The service request is consistent with local plans and development regulations.
- The City has sufficient water rights to provide service.
- The City can provide service in a timely and reasonable manner.

The following section, **Water Service and Connection**, provides additional details regarding the City's duty to serve policies.

WATER SERVICE AND CONNECTION

- The City will strive to provide potable water service within the City's retail water service area, provided all policies related to service can be met.

- All proposed developments within the City's retail water service area shall connect directly to the City's water system, unless deemed unfeasible by the City at the time of the request.
- Water system extensions required to provide water service to proposed developments shall be approved by the City and must conform to the City's adopted design criteria and construction standards and specifications, as shown in the City's Construction Standards and Specifications, which are contained in **Appendix H**. All costs of the extension shall be borne by the developer or applicant.
- The City will not extend water service to properties outside its retail water service area unless a special agreement with an adjacent purveyor exists, due to topography or other limiting factors, and the following conditions are met.
    1. The designated water purveyor cannot provide such service in a timely and reasonable manner.
    2. The designated water purveyor agrees to transfer the retail water service area.
    3. The change complies with the requirements of the Snohomish County *Comprehensive Plan* and the *North Snohomish County Coordinated Water System Plan*.
    4. The extension is approved in a Water System Plan (WSP) amendment.
    5. Sufficient water rights and supply are available.
    6. The City has sufficient capacity to serve the water in a safe and reliable manner.
    7. The property to receive water service is annexed to the City.
    8. The City can provide such service in a timely and reasonable manner.
    9. The applicant is in compliance with all applicable local and state plans, regulations, and statutes.
- Properties located outside the City limits must be annexed to the City as a condition of receiving water service.
- The City will not provide new water service to customers along the City's Water Treatment Plant Transmission Main.
- Water service can be extended within the retail water service area if the project is in compliance with the City's utility standards and policies, WSP, water rights, Snohomish County's adopted land use plan, and zoning and development regulations.
- Service to existing customers located outside of City limits supplied by the Water Treatment Plant Transmission Main will be transferred to Snohomish County Public Utility District No. 1 (PUD) pending successful negotiations between the PUD and the City. To the maximum extent possible, the PUD will install and serve these customers from its own distribution system. All services served by the City currently will be disconnected from the Water Treatment Plant Transmission Main when service is transferred to the PUD.
- All applications for connection to or use of City water services shall be made on forms furnished by the City and shall be filed with the City. Such applications shall include the name of the property owner, property address, legal description of the property, the dimensions and locations of any buildings on the property, the purpose for which the

water service is to be used, a description of the course of the water line from the point of its connection with the water main to the building to be served, and any other information as requested by the City.

- Water system capacity, pressure, and fire flow will be evaluated at the time of the water service application. The City will use the capacity analysis contained in **Chapter 7** to evaluate sources of supply, treatment, storage, distribution system, and water rights capacity available to the applicant.
- Delays resulting from non-technical conditions that affect the City's ability to provide new water service are the responsibility of the applicant. These conditions include, but are not limited to, environmental assessments, local regulations, and annexation procedures. When extensions are denied, disputes can be brought to the City Council for discussion and resolution.
- Individual wells may be installed on existing lots of record within the City's retail water service area if the City determines it is unfeasible to provide direct connection to the City's water system at the time of the request. This option is strictly limited to individual cases where timely and reasonable service is not possible.

PERSONNEL AND STAFFING

- Personnel shall receive training and Washington State Department of Health (DOH) certification as specified in the job description for the position.
- Staffing levels shall be such that:
    1. Service is provided to customers in a timely and responsive manner;
    2. Operational and maintenance requirements are satisfied; and
    3. Response to emergency situations is timely and competent.

ANNEXATIONS

- Areas annexed without existing municipal supply will be served by the City. Properties in annexed areas will be required to connect to the City water system when:
    1. A City permit is issued for the addition of one or more rooms to an existing structure; or
    2. A City permit is issued for the creation of one or more new lots; or
    3. Five years have passed from the date of annexation and a building structure is within 200 linear feet of an existing sewer main, or within 500 feet of an existing water main.
- Areas annexed with existing municipal supply must meet the City's standards.
- The City will follow state guidelines in the assumption of facilities in annexation areas.
- Service to areas outside of the City limits without annexation will be evaluated on a case by case basis with consideration of City Code requirements by the City Council.

TEMPORARY SERVICES

- Temporary service is allowed only if there are plans for timely permanent water service that meet City standards and during construction as approved by the City Engineer.

EMERGENCY SERVICE

- Compliance with standards may be deferred temporarily for emergency water service.
- Policy criteria may be waived temporarily for emergency service.
- The City will endeavor to maintain normal water service to all customers when Transmission Line No. 5 is out of service. Should Transmission Line No. 5 be out of service, the City will endeavor to utilize existing storage and the intertie connection with the PUD.

PLANNING BOUNDARIES

- The City's retail water service area and existing and future water service areas will be designated in the current WSP and will be consistent with the *North Snohomish County Coordinated Water System Plan*.
- The City will follow State of Washington guidelines in assuming portions of adjacent water systems as a result of annexation.

SATELLITE SYSTEM MANAGEMENT

- The City will not consider providing satellite system management or ownership services within or adjacent to the City's retail water service area.

FACILITY POLICIES

This section describes the planning criteria and policies used to establish an acceptable hydraulic behavior level and a standard of quality for the water system. Additional criteria are contained in the City's construction standards, a copy of which is included in **Appendix H**.

MINIMUM STANDARDS

- All proposed developments within the City's existing and future retail water service area shall conform to the City's adopted design criteria, construction standards, and specifications, in addition to the requirements of governmental agencies.

PRESSURE

- The City will endeavor to maintain a maximum pressure of 100 pounds per square inch (psi) in the water mains during normal demand conditions, excluding pressure surges. Individual residences are responsible for reducing system pressures over 80 psi.

- The City will endeavor to maintain a minimum pressure of 40 psi at customer meters during normal demand conditions, excluding a fire or emergency.
- The City will endeavor to maintain a minimum pressure of 30 psi at customer meters during peak and all other demand conditions, excluding a fire or emergency.
- During fire conditions, the City will endeavor to maintain a minimum pressure of 20 psi at customer meters and throughout the remainder of the system.
- During a failure of any part of the system, the maximum pressure will not exceed 150 psi.

VELOCITIES

- During normal demand conditions, the City will ensure the velocity of water in a water main is less than 5 feet per second (fps).
- During emergency conditions such as a fire, and for design purposes, the City will endeavor to ensure the velocity of water in a water main does not exceed 8 fps.

STORAGE

- Storage within the distribution system must be of sufficient capacity to supplement supply when system demands are greater than the supply capacity (equalizing storage) and still maintain sufficient storage for proper pump operation (operational storage), fire suppression (fire flow storage), and other emergency conditions (standby storage).
- Gravity standby storage must be located above the elevation that yields a 20 psi service pressure to the highest service in the zone under peak hour demand conditions. The City will endeavor to maintain a minimum standby storage volume of 200 gallons per equivalent residential unit (ERU).
- Gravity fire flow storage must be located above an elevation that yields a 20 psi service pressure to all services in the zone under maximum day demand conditions.
- The City will provide sufficient standby storage for an emergency condition in which a major supply source is out of service. The volume of storage will be sufficient to maintain uninterrupted supply to the system during an emergency condition for a duration of at least 2 days.
- The City will provide sufficient storage for a fire condition equal to the system's maximum fire protection water demand and the required duration.
- The City will have high water level and low water level alarms for each storage facility at the City Shop. Alarms will be transmitted through the water system's Supervisory Control and Data Acquisition (SCADA) system located at the City Shop (Water SCADA System).
- A water level indicator for each storage facility will be transmitted to the Water SCADA System located at the City Shop.
- Storage facilities will be located in areas where they will satisfy the following requirements:
    - Minimize fluctuations in system pressure during normal demands;
    - Maximize the use of storage facilities during fires and peak demands;

- Improve the reliability of supply to the City; and
- Maintain water quality by usage cycling. Consideration may also be given to internal tank mixing devices.

TRANSMISSION AND DISTRIBUTION

- Unless deemed impractical by the City, transmission and distribution mains will be looped to increase reliability and fire flow capacity and to decrease head losses.
- New water main shall maintain at least 10 feet of horizontal separation and 18 inches of vertical separation from non-potable pipes.
- The City will enter into a franchise agreement and obtain all appropriate Snohomish County (County) permits prior to performing any proposed water utility improvements within County right-of-way.
- All mains will comply with the generally recognized design criteria from the American Water Works Association (AWWA) and DOH guidelines that follow.
- All new construction will be in accordance with the City's construction standards, a copy of which is included in **Appendix H**.
- Distribution system design assumes that adequately sized service lines will be used. All residential service lines will be ⅝-inch or larger. Service lines will be the same size as the meter or larger. All service lines from a ⅝-inch meter shall be 1-inch poly pipe.
- The minimum diameter of distribution mains will be 8 inches in all locations unless otherwise approved by the City. Water mains not required to carry fire flow, as determined by the City, may be a smaller diameter. All water mains will be ductile iron pipe, cement lined, and standard thickness Class 52. The City may consider other piping materials for specialized applications on a case by case basis.
- All new distribution mains will utilize a hydraulic analysis to assist in determining water main size.
- All new mains providing fire flow will be sized to provide the required fire flow at a minimum residual pressure of 20 psi during maximum day demand conditions, while maintaining a maximum pipeline velocity of less than 8 fps. New water mains in commercial, industrial, and school areas shall be a minimum of 12 inches in diameter and looped.
- Valve installations will satisfy the following criteria.
    1. Zone valves will be located at all pressure zone boundaries to allow future pressure zone realignment without the need for additional pipe construction.
    2. Isolation valves typically will be installed in the lines to allow individual pipelines to be shut down for repair or installation services. Unless it is impractical to do so, the distance between in-line isolation valves shall not exceed 600 feet. In residential areas, valve spacing will be such that isolation will limit the number of temporary out-of-service connections to less than 30. Maximum valve spacing in commercial, school, or multi-family residential areas will not exceed 400 feet. Isolation valves shall be installed near dead-end runs and at each end of water main runs on private easements. Four valves shall be provided per cross and three

valves per tee. The City may reduce the number of and distance between valves for new construction based on the system's configuration.

3. Air/vacuum release valves will be placed at all high points, or "crowns," in all pipelines and must have City approval prior to installation.
4. Blow-off assemblies shall be located at main dead ends where there is not a fire hydrant or as required by the City to allow flushing of distribution main lines. Locations of blow-off assemblies shall be determined based on ease of access and the ability to dispose of flushed water. The blow-off assembly shall be installed in the utility right-of-way except when an access and construction easement is provided for in writing for the City.
5. Individual check valves will be installed on all new or replacement customer service setters.

- Fire hydrant installations will satisfy the following criteria.
    1. Fire hydrants serving detached single-family dwellings or duplex dwellings on individual lots will be located not more than 600 feet on center, such that all single-family lots are within 300 feet of a fire hydrant, as measured along the path of vehicular access, but not closer than 50 feet unless approved by Fire Marshall.
    2. Fire hydrants serving any use other than detached single-family dwellings or duplex dwellings on individual lots will be located not more than 400 feet on center, and will be located so that at least one hydrant is located within 200 feet of all structures, but not closer than 50 feet, unless approved by the Fire Marshall.
    3. A minimum of one fire hydrant shall be installed per intersection unless deemed unnecessary by both the Fire Marshall and the City.
    4. Prior to fire hydrant installation, the Fire Marshall will review and approve all proposed fire hydrant locations to ensure the correct number and spacing of fire hydrants for each project.

SUPPLY AND BOOSTER PUMP STATIONS

- All future booster pump stations will be modified and constructed to comply with the following minimum standards.
    1. All structures will be designed to minimize combustibility, where practical.
    2. All buildings will have adequate heating, cooling, ventilation, insulation, lighting, and work spaces necessary for on-site operation and repair.
    3. Sites will be fenced to improve security, reduce vandalism, and reduce the potential for City liability.
    4. Each station will be equipped with a flow meter and all necessary instrumentation to assist personnel in operating and troubleshooting the facility.
    5. Emergency power capability will be provided to at least one supply or booster pump station per pressure zone.
- Pumps will be operated automatically, with flexibility in pump start/stop settings.
- Stations will be operated with the provision for at least two methods of control to minimize system vulnerability.

- Manual override of stations will be provided locally at stations and at the Water SCADA System.
- Stations will be monitored with alarms for the following conditions.
    1. Pump started automatically or manually.
    2. Power phase failure.
    3. Power outage/generator running.
    4. Communication failure.
    5. Flood in structure.
    6. Low suction pressure.
    7. High and low discharge pressure.
    8. Intrusion.
    9. Smoke detector.
    10. Heat detector.
- Stations will have the following indicators.
    1. Local flow indication and totalizing.
    2. Flow indication and totalizing at the Water SCADA System.
    3. Recording of combined supply flow to the system.
    4. Discharge pressure gauges.
    5. Motor amperage gauges.
    6. Alarm indicators for all items included under station monitoring.
    7. Appropriate hazardous material signage on exterior of buildings.
- Booster pump stations will be placed wherever necessary to fulfill the following criteria.
    1. Provide supply redundancy to a pressure zone.
    2. Improve the hydraulic characteristics of a pressure zone.
    3. Maximize storage availability and transmission capacity.
    4. Improve water quality (i.e., increase circulation) and quantity.

PRESSURE REDUCING STATIONS

- All pressure reducing valves will be placed in vaults that are large enough to provide ample workspace for field inspection and valve repair.
- Vaults will be provided with adequate drainage to prevent water accumulation and equipped with sump pumps to prevent vault flooding.
- Pressure relief valves may be provided on the low pressure side of the pressure reducing valves to prevent the system from over-pressurizing in case of a pressure reducing valve failure.

SUPERVISORY CONTROL

- The City's control system must be capable of efficiently operating the water system's components in accordance with this WSP and in response to reservoir levels, system pressures, and abnormal system conditions.

MAINTENANCE

- Facility and equipment breakdown is given the highest maintenance priority. Emergency repairs are to be made even if overtime labor is involved.
- Equipment will be scheduled for replacement when it becomes obsolete and as funding is available.
- Worn parts will be repaired, replaced, or rebuilt before they represent a high failure probability.
- Spare parts will be stocked for all equipment items whose failure will impact the ability to meet other policy standards.
- Equipment that is out of service will be returned to service as soon as possible.
- A preventive maintenance schedule will be established for all facilities, equipment, and processes.
- Tools will be obtained and maintained to repair all items whose failure will impact the ability to meet other policy standards.
- Dry, heated shop space will be available for maintenance personnel to maintain facilities.
- All maintenance personnel will be trained and certified to efficiently perform their job descriptions.
- Maintenance will be performed by the water maintenance staff or other approved sources and supervised by the Water Department Leador the Public Works Utilities Manager.
- Written records and reports showing the operation and maintenance history will be maintained for each facility and item of equipment.

RELIABILITY

- Supply to the service area will be pursued to meet maximum day demand during a reasonable worst-case supply system failure.
- System planning will determine whether connections with nearby systems will be reliable or available for use in emergency situations.
- System demand planning will use historical demand data and assume all available land will be developed at saturation.

VULNERABILITY

- Supply vulnerability analyses will determine a reasonable worst-case failure for the water system. The analyses will consider the following conditions.
    1. Failure of the single largest source of supply.

2. Reservoir out of service.

- Storage vulnerability analyses will determine a worst-case failure scenario for the water system. The analyses will consider:
    1. Maximum day demand with simultaneous fire; and
    2. Peak hour demand with the largest source of supply out of service.

JOINT USE

- All joint-use facilities (with other public water systems) must comply with City policy and design standards.
- All joint-use facilities will be maintained by the City.
- Joint-use facilities will be pursued only in those areas that improve reliability or reduce operating costs.

FINANCIAL POLICIES

GENERAL

- The City will set rates that comply with state regulations.
- Rates and additional charges established for the City should be:
    - Cost-based rates that recover current, historical, and future costs associated with the City's water system and services;
    - Equitable charges to recover costs from customers, commensurate with the benefits they receive; and
    - Adequate and stable source of funds to cover the current and future monetary needs of the City.
- Existing City customers pay the direct and indirect costs of operating and maintaining the facilities through water rates. In addition, the water rates will include debt service incurred to finance the City’s capital assets serving existing customers, if required.
- New customers seeking to connect to the water system will be required to pay connection fees and charges for an equitable share of the historical cost of the system and for the system's Capital Improvement Program (CIP). Connection charge revenues, in conjunction with rate revenue, will be used to fund the growth CIP and existing system CIP when designed to provide for growth.
- New and existing customers will be charged for extra services through separate ancillary charges based on the costs to provide the services. Ancillary charges can increase equitability, as well as operating efficiency, by discouraging unnecessary demand for services. The charges will be reviewed regularly and updated on an as-needed basis to reflect increases in operating or material costs. Revenue from ancillary charges will be used to finance annual operations and maintenance or existing system CIP requirements.
- The City will maintain information systems that provide sufficient financial and statistical information to ensure conformance with rate setting policies and objectives.

- User charges must be sufficient to provide cash for the expenses of operating and maintaining the system. To ensure the fiscal and physical integrity of the utility, an amount also should be set aside each year and retained for capital expenditures.
- A non-restricted contingency reserve amount will be maintained to cover unanticipated emergencies and fluctuations in cash flow.
- Water rates will strive to equitably charge customers with different service requirements based on the cost of providing the water service. Service requirements relate to the total volume of water used, peak rates of use, and other factors.
- Water rates will be tiered to encourage the efficient use of water.
- Fees and charges are calculated based on the service provided. Rates will be the same for all customers of the same class within the retail water service area.

CONNECTION CHARGES

Owners of properties that have not been assessed, charged, or borne an equitable share of the cost of the water system will pay one or more of the following connection charges prior to connection to a water main.

- Utility Connection Fee: A utility connection fee shall be assessed for each new water connection. The basis of the utility connection fee is to provide means by which water service customers bear an equitable share of the cost of construction and replacement of major water utility facilities and equipment.
- Utility Capital Facility Charge: A utility capital facility charge shall be assessed for each new water connection. The basis for the utility capital facility charge shall be the water service size and shall provide the City with funds to construct major water utility facilities and equipment.
- Project Development Fee: A project development fee will be assessed against all new connections established in a defined special development area. The basis for the project development fee shall be the water service size.

ORGANIZATIONAL POLICIES

STAFFING

- Personnel certifications will meet or exceed Washington State standards.
- The Water Department will promote staff training.

RELATIONSHIP WITH OTHER DEPARTMENTS

- The Finance Department is responsible for customer billing, payment collection, project cost accounting, and fund activity reporting.
- The Human Resources Department is responsible for personnel policies, employee records and salary schedules.
- The Police Department and/or the Water Department are responsible for enforcing violations of City water ordinances.

- The Fire District uses water utility facilities for fire protection and establishes fire flow requirements.
- The Fire District is responsible for emergency responses to hazardous events at water system facilities.
- The Water Department is responsible for hydrant fire flow testing.

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6 | WATER SOURCE AND QUALITY

INTRODUCTION

The two basic objectives of a water system are to provide a sufficient quantity of water to meet customer usage demands and to provide high quality water. **Chapter 7** discusses the City of Snohomish's (City) ability to supply a sufficient quantity of water and identifies future source requirements. This chapter discusses the City's existing water sources, its intent with its water rights, water quality regulations, and water quality monitoring results.

EXISTING WATER SOURCES AND TREATMENT

WATER SOURCES

In January 2017, the City stopped operations of its Pilchuck River source and water treatment plant and transitioned to purchasing water from the City of Everett (Everett) and Snohomish County Public Utility District No. 1 (PUD).

The City has four connections to Everett's Transmission Line No. 5 (one additional connection serves the NEPA Pallet Water System). Currently, Everett does not limit the amount of water that the City can withdraw from the connections on an annual or instantaneous basis.

The City also has a connection to the PUD that provides water to City customers connected directly to the transmission main leading from the City's historic Pilchuck River source to the City. Additional information on each of the City's existing sources is presented in **Chapter 2**.

The City also has teamed with the Tulalip Tribe to remove the Pilchuck River Dam. This dam removal will provide better access for salmonids to approximately 37 miles of spawning habitat upstream of the dam.

WATER TREATMENT

City of Everett water is supplied from the Spada Lake Reservoir. Pipelines and tunnels convey water to the Chaplain Reservoir, where Everett's surface water treatment facility is located. The raw water is then treated with coagulation, flocculation, filtration, fluoridation, and disinfection.

The PUD has two wells at its treatment facility located northeast of downtown Lake Stevens. Raw water is filtered to remove iron and manganese and is then chlorinated for disinfection. Fluoride also is added to match Everett's fluoride levels.

WATER RIGHTS

OVERVIEW

In contrast to prior water system plans for the City, the existing and future water demands will be fully met with water supplied by Everett and the PUD. Historically, all or a portion of the City's

demand was met by its own water rights that authorize diversion from the Pilchuck River many miles upstream of the City. For this reason, the water rights section of this Water System Plan (WSP) will describe the Pilchuck River water rights and focus on the City's plan to protect those water rights into the future, even though they will not be used to supply the City with municipal water.

EXISTING WATER RIGHTS AND CLAIMS

The City currently holds a surface water claim and a surface water certificate (SWC) for its Pilchuck River source. The Pilchuck River dam and associated diversion point are located in the SE ¼ NE ¼ of Section 9, Township 29 North, Range 7 East W.M. approximately ½ mile upstream of the Menzel Lake Road bridge. A summary of the water right information is presented below and in **Table 6-1**. The water right documents are contained in **Appendix I**.

Table 6-1

Existing Water Rights

Water Right	Priority Date	Instantaneous Rate (cfs)	Annual Volume (afy)	Purpose of Use	Period of Use
S1-043282CL	1890	2.5	NS	Municipal	Year Round
S1-00500C	12/9/1931	5	3,000	Municipal	Year Round
	Total	**7.5**	**3,000+**		

NS - Not Specified

Water Right Claim S1-043282CL

In response to the Water Right Registration Act of 1967, the City filed water right claim No. 43282 dated October 15, 1973, to document the historical instantaneous use of the Pilchuck River water right. The City claimed continuous use of 2.5 cubic feet per second (cfs) that had been put to beneficial use since 1890. A water right claim is a claim by a party (i.e., the City) that they have a valid vested water right that pre-dates the adoption of the surface water code in 1917 and that should, in effect, be grandfathered into the water rights records of the State. The Washington State Department of Ecology (Ecology) is not authorized to make a final determination of the validity or extent of a water right claim. Such a determination may be made only through what is known as a general adjudication of water rights and is conducted by the Superior Court of the county in which the waters are located. However, Ecology may make "tentative determinations" related to the extent and validity of any rights represented by a water right claim. After conducting research into the history of water use by the City, it appears that this claim represents a valid vested water right for a rate not to exceed the claimed rate of 2.5 cfs.

Surface Water Certificate S1-00500C

The Pilchuck River water right certificate was issued on February 28, 1974, with a priority date of December 9, 1931. This water right certificate was granted for the maximum use of 5.0 cfs and 3,000 acre-feet per year (afy) for municipal supply. The place of use on the City's water right certificate is defined as the "area served by the City of Snohomish."

The water right claim and certificate are included in **Appendix I**.

WATER RIGHT PRESERVATION

On June 21, 2016, the City passed Resolution 1347 (**Appendix I**) that solidified its plan to protect its Pilchuck River water rights from statutory forfeiture and common law abandonment for possible future use, if needed, since the City has decided to become a customer of both the City of Everett and Snohomish County PUD No. 1 for its water supply.

The City met with Ecology to discuss options for preserving its Pilchuck River water rights. The option that was chosen by the City was to temporarily place the water rights into the Washington State Trust Water Rights Program (Trust) for streamflow restoration. A water right that is held in Trust, even on a temporary basis, is not subject to statutory relinquishment during that period. During the meeting, Ecology indicated that only the historically perfected instantaneous rate and annual volume could be put into Trust, which could be less than the values identified on the face of the water right documents and in **Table 6-1**.

Following the Ecology meeting, the City performed an historic water use analysis, which estimated the peak instantaneous rate and annual volume beneficially used under the water rights. While the water rights have not yet been accepted by Ecology into temporary Trust through execution of a Trust Water Rights Agreement, it is the City's plan to proceed in this direction to protect the water rights for the City.

WATER SUPPLY PLANNING

EXISTING WATER SUPPLY

The City's water system currently has normal supply interties with Everett along Transmission Line No. 5. The City's 218, 362, 384, 425, 438, and 450 Zones currently are supplied with water from Transmission Line No. 5. Water supply to the City's customers along the Water Treatment Plant Transmission Main is currently provided by the PUD.

Everett's raw water supply originates in the Spada Reservoir created by the Culmback Dam on the Sultan River, approximately 25 miles east of Everett. The raw water passes through the Snohomish County PUD Power House prior to entering the Chaplain Reservoir. The water from the reservoir is delivered to the Everett Water Filtration Plant prior to delivery to the City of Everett and several other water systems. As a regional water provider, Everett provides water to over 400,000 people in Snohomish County.

LONG-TERM WATER SUPPLY

The City currently plans on being a customer of the City of Everett and Snohomish County PUD No. 1 for its water supply for the long-term.

DRINKING WATER REGULATIONS

OVERVIEW

The quality of drinking water in the United States is regulated by the Environmental Protection Agency (EPA). Under provisions of the Safe Drinking Water Act (SDWA), the EPA is allowed to delegate primary enforcement responsibility for water quality control to each state. In the State of Washington, the Department of Health (DOH) is the agency responsible for implementing and

enforcing the drinking water regulations. For the State of Washington to maintain primacy (delegated authority to implement requirements) under the SDWA, the State must adopt drinking water regulations that are at least as stringent as the federal regulations. In meeting these requirements, the State, in cooperation with the EPA, has published drinking water regulations that are contained in Chapter 246-290 of the Washington State Administrative Code (WAC).

EXISTING REGULATIONS

The Federal SDWA was enacted in 1974 as a result of public concern about water quality. The SDWA sets standards for the quality of drinking water and requires water treatment if these standards are not met. The SDWA also sets water testing schedules and methods that water systems must follow. In 1986, the SDWA was amended as a result of additional public concern and frequent contamination of groundwater from industrial solvents and pesticides. The 1986 Amendments require water systems to monitor and treat for a continuously increasing number of water contaminants identified in the new federal regulations. The EPA regulated approximately 20 contaminants between 1974 and 1986. The 1986 Amendments identified 83 contaminants that the EPA was required to regulate by 1989. Implementation of the new regulations has been marginally successful due to the complexity of the regulations and the associated high costs. To rectify the slow implementation of the new regulations, the SDWA was amended again and re-authorized in August of 1996.

In response to the 1986 SDWA Amendments, EPA established six rules, known as the Phase I Rule, the Phase II and IIb Rules, the Phase V Rule, the Surface Water Treatment Rule (SWTR), the Total Coliform Rule, and Lead and Copper Rule. The EPA regulates most chemical contaminants through the Phase I, II, IIb, and V Rules. The City's recently decommissioned surface water source was affected by these rules.

The EPA set two limits for each contaminant regulated under the rules. The first limit is a health goal, referred to as the Maximum Contaminant Level Goal (MCLG). The MCLG is zero for many contaminants, especially known cancer-causing agents (carcinogens). The second limit is a legal limit, referred to as the Maximum Contaminant Level (MCL). The MCLs are equal to or higher than the MCLGs; however, most MCLs and MCLGs are the same, except for contaminants that are regulated as carcinogens. The health goals (MCLGs) for carcinogens are typically zero because they cause cancer and it is assumed that any amount of exposure may pose some risk of cancer. A summary of each rule follows.

To fully understand the discussion that follows, a brief definition of several key terms is provided below.

- Organic Chemicals – Animal or plant produced substances containing carbon and other elements such as hydrogen and oxygen.
- Synthetic Organic Chemicals (SOCs) – Man-made organic substances, including herbicides, pesticides, and various industrial chemicals and solvents.
- Volatile Organic Chemicals (VOCs) – Chemicals, as liquids, that evaporate easily into the air.
- Inorganic Chemicals (IOCs) – Chemicals of mineral origin that are naturally occurring elements. These include metals such as lead and cadmium.

Phase I Rule

The Phase I Rule, which was the EPA's first response to the 1986 Amendments, provided limits for eight VOCs that may be present in drinking water. VOCs are used by industries in the manufacture of rubber, pesticides, deodorants, solvents, plastics, and other chemicals. VOCs are found in everyday items such as gasoline, paints, thinners, lighter fluid, mothballs, and glue, and are typically encountered at dry cleaners, automotive service stations, and elsewhere in industrial processes. The City currently complies with all contaminant monitoring requirements under this rule.

Phase II and IIb Rules

The Phase II and IIb Rules updates and creates limits for 38 contaminants (organics and inorganics). Some of the contaminants are frequently applied agricultural chemicals (nitrate), while others are more obscure industrial chemicals. The City currently complies with all contaminant monitoring requirements under these rules.

Phase V Rule

The Phase V Rule sets standards for 23 additional contaminants, of which 18 are organic chemicals (mostly pesticides and herbicides) and 5 are IOCs (such as cyanide). The City currently complies with all contaminant monitoring requirements under this rule.

Surface Water Treatment Rule

Surface water sources, such as rivers, lakes, and reservoirs (which are open to the atmosphere and subject to surface runoff), and groundwater sources that are under the direct influence of surface water (referred to as GWI sources), are governed by the SWTR. The SWTR seeks to prevent waterborne diseases caused by the microbes *Cryptosporidium, Legionella,* and *Giardia lamblia*, which are present in most surface waters. The rule requires disinfection of all surface water and GWI sources. All surface water and GWI sources also must be filtered, unless a filtration waiver is granted. A filtration waiver may be granted to systems with pristine sources that continuously meet stringent source water quality and protection requirements. The Pilchuck River source was classified as a surface water source, and was subject to the SWTR. However, since the treatment plant has been decommissioned, the rule is no longer applicable to the City.

Interim Enhanced Surface Water Treatment Rule

The Interim Enhanced Surface Water Treatment Rule (IESWTR) became effective concurrent with the Stage 1 Disinfectants/Disinfection Byproducts Rule. The rule primarily applies to public water systems that serve 10,000 or more people and use surface water or GWI sources. The rule also requires primacy agencies (i.e., DOH in Washington State) to conduct sanitary surveys of all surface water and GWI systems, regardless of size. The rule is the first to directly regulate the protozoan *Cryptosporidium* and has set the MCLG for *Cryptosporidium* at zero. The City no longer operates the treatment of its water supply, and is therefore not affected by this rule.

Long Term 1 Enhanced Surface Water Treatment Rule

The Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) addresses water systems using surface water or GWI sources serving fewer than 10,000 people. The rule extends protections against *Cryptosporidium* for smaller water systems. The City no longer operates the treatment of its water supply, and is therefore not affected by this rule.

Revised Total Coliform Rule

The Revised Total Coliform Rule sets an MCL for *Escherichia Coli (E. coli)* and specifies the frequency and testing of coliform based on population served, public water system type, and source water type. When total coliform is detected, it is a treatment technique trigger. The water system must conduct an assessment of their water system facilities and operations and fix any sanitary defects. For confirmed *E. coli* incidents, known as an *E. coli* MCL violation, the water system must perform a Level 2 assessment and provide public notice within 24 hours. If a positive sample is collected on a consecutive systems, the City will also need to collect source samples.

Coliform is a group of bacteria, some of which live in the digestive tract of humans and many animals, and are excreted in large numbers with feces. Coliform can be found in sewage, soils, surface waters, and vegetation. The presence of any coliform in drinking water indicates a potential health risk and potential waterborne disease outbreak, which may include gastroenteric infections, dysentery, hepatitis, typhoid fever, cholera, and other infectious diseases. *E. coli* is a member of the coliform group which is almost exclusively of fecal origin, and their presence can lead to increased health risks.

A copy of the City's Water Quality Monitoring Plan, including the Coliform Monitoring Plan and *E. coli* response plan, is contained in **Appendix J**.

Lead and Copper Rule

The Lead and Copper Rule identifies action levels for both lead and copper. An action level is different than an MCL. An MCL is a legal limit for a contaminant, and an action level is a trigger for additional prevention or removal steps. The action level for lead is greater than 0.015 milligrams per liter (mg/L). The action level for copper is greater than 1.3 mg/L. If the 90^{th} percentile concentration of either lead or copper from the group of samples exceeds these action levels, a corrosion control study must be undertaken to evaluate strategies and make recommendations for reducing the lead or copper concentration below the action levels. The rule requires systems that exceed the lead level to educate the affected public about reducing its lead intake. Systems that continue to exceed the lead action level after implementing corrosion control and source water treatment may be required to replace piping in the system that contains lead sources. Corrosion control typically is accomplished by increasing the pH of the water to make it less corrosive, which reduces its ability to break down water pipes and absorb lead or copper.

Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery, porcelain, pewter, brass, and water. Lead can pose a significant risk to health if too much of it enters the body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells, and kidneys. The greatest risk is to young children and pregnant women. Lead can slow normal mental and physical development of growing bodies.

Copper is a common, natural, and useful metal found in our environment. It is also a trace element needed in most human diets. The primary impact of elevated copper levels in water systems is stained plumbing fixtures. At certain levels (well above the action levels), copper may cause nausea, vomiting, and diarrhea. It can also lead to serious health problems in people with Wilson's disease. Long-term exposure to elevated levels of copper in drinking water also could increase the risk of liver and kidney damage. The City's current water quality monitoring

schedule dictates that 30 samples be taken every 3 years. The City currently complies with all contaminant monitoring and treatment requirements under this rule.

Radionuclides Rule

The EPA established interim drinking water regulations for radionuclides in 1976 under the SDWA. MCLs were established for alpha, beta, and photon emitters, and radium 226/228. Radionuclides are elements that undergo a process of natural decay and emit radiation in the form of alpha or beta particles and gamma photons. The radiation can cause various kinds of cancers, depending on the type of radionuclide exposure from drinking water. The regulations address both man-made and naturally occurring radionuclides in drinking water.

The 1986 Amendments to the SDWA finalized the regulations for radionuclides by eliminating the term "interim." The amendments also directed the EPA to promulgate health-based MCLGs, as well as MCLs. The EPA failed to meet the statutory schedules for promulgating the radionuclide regulations, which resulted in a lawsuit. In 1991, the EPA proposed revisions to the regulations, but a final regulation based on the proposal was never promulgated. The 1996 amendments to the SDWA directed the EPA to revise a portion of the earlier proposed revisions, adopt a schedule, and review and revise the regulations every 6 years, as appropriate, to maintain or improve public health protection. Subsequent to the 1996 Amendments, a 1996 court order required the EPA to either finalize the 1991 proposal for radionuclides or ratify the existing standards by November 2000.

The final rule was published in the Federal Register on December 7, 2000, and became effective on December 8, 2003. The rule established an MCLG of zero for the four regulated contaminates and MCLs of 5 picocuries per liter (pCi/L) for combined radium-226 and radium-228; 15 pCi/L for gross alpha (excluding radon and uranium); 4 millirems per year (mrem/year) for beta particle and photon radioactivity; and 30 micrograms per liter (µg/L) for uranium. The City currently complies with all contaminant monitoring requirements under this rule.

Watershed Control Program

The Washington State mandate for watershed protection and the required elements of a watershed control program are contained in WAC 246-290-135, Source Protection, which became effective in July of 1994. In Washington State, DOH is the lead agency for the development and administration of the State's Watershed Control Program.

A watershed control program is a proactive and ongoing effort of a water purveyor to exercise surveillance over the conditions and activities within the watershed affecting source water quality to protect the health of its customers as outlined in WAC 246-290-668, Watershed Control. All federally defined Group A public water systems that use surface water or groundwater as their source are required to develop and implement a watershed control program. All required elements of a watershed control program must be documented and included in the purveyor's Comprehensive Water System Plan or Small Water System Management Program at least every 6 years. The City no longer operates the treatment of its water supply, and is therefore not affected by this rule.

Consumer Confidence Report

The Consumer Confidence Report (CCR) is the centerpiece of the right-to-know provisions of the 1996 Amendments to the SDWA. The annual report must be updated and re-issued to all customers by July 1st of each year.

The CCR is a report on the quality of water that was delivered to the water users during the previous calendar year. The reports must contain certain specific elements, but may also contain other information that the purveyor deems appropriate for public education. Some, but not all, of the information that is required in the reports includes the source and type of drinking water, type of treatment, contaminants that have been detected in the water, potential health effects of the contaminants, identification of the likely source of contamination, violations of monitoring and reporting, and variances or exemptions to the drinking water regulations. A copy of the City's latest CCR is contained in **Appendix K**.

Stage 1 Disinfectants/Disinfection Byproducts Rule

Disinfection byproducts (DBPs) are formed when free chlorine reacts with organic substances, most of which occur naturally. These organic substances (called precursors) are a complex and variable mixture of compounds. The DBPs themselves may pose health risks. Trihalomethanes (THM) are a category of DBPs that had been regulated previous to this rule. However, systems with groundwater sources that serve a population of less than 10,000 were not previously required to monitor for THM.

The rule applies to the City and most other water systems, including systems serving fewer than 10,000 people that add a chemical disinfectant to the drinking water during any part of the treatment process. The rule reduced the MCL for total trihalomethanes (TTHMs), which are a composite measure of four individual trihalomethanes, from the previous interim level of 0.10 mg/L to 0.08 mg/L. The rule established MCLs and requires monitoring of three additional categories of DBPs (0.06 mg/L for five haloacetic acids (HAA5), 0.01 mg/L for bromate, and 1.0 mg/L for chlorite). The rule established maximum residual disinfectant levels (MRDLs) for chlorine (4.0 mg/L), chloramines (4.0 mg/L), and chlorine dioxide (0.8 mg/L). The rule also requires systems using surface water or groundwater directly influenced by surface water to implement enhanced coagulation or softening to remove DBP precursors, unless alternative criteria are met. The current water quality monitoring schedule dictates that the City collect four TTHM and HAA5 samples on a quarterly basis. The City currently complies with all contaminant monitoring requirements under this rule.

Unregulated Contaminant Monitoring Regulation

The EPA established the Unregulated Contaminant Monitoring Regulation (UCMR) to generate data on contaminants that are being considered for inclusion in new drinking water standards. The information collected by select public water systems will ensure that future regulations established by the EPA are based on sound science.

Three separate lists of unregulated contaminants are maintained under the UCMR: List 1, List 2, and List 3. Contaminants are organized on the tiered lists based on the availability of standard testing procedures and the known occurrence of each contaminant, with List 1 containing contaminants that have established standard testing procedures and some, but insufficient, information on their occurrence in drinking water. Monitoring for contaminants on the three lists is limited to a maximum of 30 contaminants within a 5-year monitoring cycle, and the EPA is required to publish new contaminant monitoring lists every 5 years. As new lists are published, contaminants will be moved up on the lists if adequate information is found to support additional monitoring. All public water systems serving more than 10,000 people and a randomly selected group of smaller water systems are required to monitor for contaminants. The City currently monitors for some unregulated contaminants.

Arsenic

Arsenic is highly toxic, affects the skin and nervous system, and may cause cancer. The Arsenic Rule sets the MCLG of arsenic at zero and reduces the MCL from the previous standard of 0.05 mg/L to 0.01 mg/L. Arsenic's monitoring requirements will be consistent with the existing requirements for other inorganic contaminants. The City no longer operates the treatment of its water supply, and is therefore not affected by this rule.

Filter Backwash Recycling Rule

Public water systems using surface water or groundwater under the direct influence of surface water that utilize filtration processes and recycling must comply with the Filter Backwash Recycling Rule. The rule aims to reduce risks associated with recycling contaminants removed during filtration.

The rule requires filter backwash water be returned to a location that allows complete treatment. In addition, filtration systems must provide detailed information regarding the treatment and recycling process to the State. The City no longer operates the treatment of its water supply, and is therefore not affected by this rule.

Stage 2 Disinfectants/Disinfection Byproducts Rule

The EPA implemented Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 D/DBPR) simultaneously with the Long Term 2 Enhanced Surface Water Treatment Rule.

Similar to the Stage 1 D/DBPR, this rule applies to most water systems that add a disinfectant to the drinking water other than ultraviolet light or those systems that deliver such water. The Stage 2 D/DBPR changes the calculation procedure requirement of the MCLs for two groups of disinfection byproducts, TTHM and HAA5. The rule requires each sampling location to determine compliance with MCLs based on their individual annual average DBP levels (termed the Locational Running Annual Average), rather than utilizing a system-wide annual average. The rule also proposes new MCLGs for chloroform (0.07 mg/L), trichloroacetic acid (0.02 mg/L), and monochloroacetic acid (0.03 mg/L).

Additionally, the rule requires systems to document peak DBP levels and prepare an Initial Distribution System Evaluation (IDSE) report to identify Stage 2 D/DBPR compliance monitoring sites. IDSEs require each water system to prepare a separate IDSE plan and report, with the exception of those systems who obtain a 40/30 Certification or a Very Small System Waiver. In order to qualify for the 40/30 Certification, all samples collected during Stage 1 monitoring must have TTHM and HAA5 levels less than or equal to 0.040 mg/L and 0.030 mg/L, respectively. The current water quality monitoring schedule dictates that the City collect four TTHM and HAA5 samples on a quarterly basis. The City currently complies with all contaminant monitoring requirements under this rule.

Long Term 2 Enhanced Surface Water Treatment Rule

Following the publishing of the IESWTR, the EPA introduced the LTIESWTR to supplement the preceding regulations. The second part of the regulations of the LT1ESWTR are mandated in the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The final rule was implemented simultaneously with the Stage 2 D/DBPR described in the previous section. This rule applies to all systems that use surface water or GWI sources.

This rule establishes treatment technique requirements for filtered systems based on their risk level for contamination, calculated from the system's average *Cryptosporidium* concentration. Requirements include up to 2.5-log *Cryptosporidium* treatment in addition to existing requirements under the IESWTR and LT1ESWTR. Filtered systems that demonstrate low levels of risk will not be required to provide additional treatment. Unfiltered systems under this rule must achieve at least a 2-log inactivation of *Cryptosporidium* if the mean level in the source water remains below 0.01 oocysts/L. If an unfiltered systems mean level of *Cryptosporidium* exceeds 0.01 oocysts/L, the LT2ESWTR requires the system to provide a minimum 3-log inactivation of *Cryptosporidium*. All unfiltered systems also are required to utilize a minimum of two disinfectants in their treatment process.

The LT2ESWTR also addresses systems with unfinished water storage facilities. Under this rule, systems must either cover their storage facilities or achieve inactivation and/or removal of 4-log virus, 3-log *Giardia lamblia,* and 2-log *Cryptosporidium* on a state-approved schedule. Lastly, the rule extends the requirement of the disinfection profiles mandated under the LT1ESWTR to the proposed Stage 2 D/DBPR. The City no longer operates the treatment of its water supply, and is therefore not affected by this rule.

Groundwater Rule

The EPA promulgated the Groundwater Rule (GWR) to reduce the risk of exposure to fecal contamination that may be present in public water systems that use groundwater sources. The GWR also specifies when corrective action (which may include disinfection) is required to protect consumers who receive water from groundwater systems from bacteria and viruses. The GWR applies to public water systems that use groundwater and to any system that mixes surface and ground waters if the groundwater is added directly to the distribution system and provided to consumers without treatment equivalent to surface water treatment.

The rule targets risks through an approach that relies on the four following major components.

1. Periodic sanitary surveys of groundwater systems that require the evaluation of eight critical elements and the identification of significant deficiencies (such as a well located near a leaking septic system). DOH conducted its most recent sanitary survey of the City's water system on December 8, 2016, under the state's existing sanitary survey program.
2. Source water monitoring to test for the presence of *E. coli*, enterococci, or coliphage in the sample. There are two monitoring provisions.
    - Triggered monitoring for systems that do not already provide treatment that achieves at least 99.99-percent (4-log) inactivation or removal of viruses and that have a total coliform positive routine sample under the Revised Total Coliform Rule sampling in the distribution system.
    - Assessment monitoring is a complement to triggered monitoring. A state has the option to require systems to conduct source water assessment monitoring at any time to help identify high risk systems.
3. Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following corrective action options: correct all significant deficiencies; eliminate the source of contamination; provide an alternate source of water; or provide treatment that reliably achieves 99.99-percent inactivation or removal of viruses.

4. Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99-percent inactivation or removal of viruses.

The City does not actively use any groundwater sources; therefore, it is not impacted by the Groundwater Rule.

Unregulated Contaminant Monitoring Regulation Revisions

In accordance with the original UCMR, the EPA is proposing an updated contaminant monitoring list for the next 5-year monitoring cycle, in addition to other minor revisions to the UCMR. The proposed rule was published December 20, 2016 in the Federal Register. The revisions include a list of 30 chemicals that will be monitored during the 2018 through 2020 monitoring cycle. For this cycle, all community water systems and non-transient non-community water systems serving more than 10,000 people will be required to monitor for contaminants. A large surface water and ground water under direct influence of surface water systems will monitor for 10 cyanotoxins and 20 additional contaminants (two metals, eight pesticides plus one pesticide manufacturing byproduct, three brominated haloacetic acid disinfection byproducts groups, three alcohols, and three semivolatile organic chemicals). All large ground water systems will monitor for the 20 additional contaminants. Small water systems serving 10,000 or fewer people will be selected at random to monitor for cyanotoxins or the 20 additional contaminants.

FUTURE REGULATIONS

Drinking water regulations are continuously changing in an effort to provide higher quality and safer drinking water. Modifications to the existing rules described above and implementation of new rules are planned for the near future. A summary of upcoming drinking water regulations that will most likely affect the City is presented below.

Per- and Polyfluoroalkyl Substances

In 2016, the US EPA established a health advisory level for per- and polyfluoroalkyl substances (PFAS) at 70 parts per trillion (ppt). The Washington State Board of Health proposed a regulation for PFAS in 2017, and this process will take about 2 years to complete. The primary source of PFAS contamination was historical use of PFAS-based firefighting foam used by the US military, local fire departments, and airports. It is not currently known when or what a PFAS regulation may require as adopted by the EPA or what will be the rule's implementation schedule. Since the final PFAS rule requirements are uncertain, the impact of this rule on the City is unknown at this time.

Radon

In July of 1991, the EPA proposed a regulation for radon, as well as three other radionuclides. The 1996 SDWA Amendments required the EPA to withdraw the 1991 proposal due to several concerns that were raised during the comment period. A new proposed regulation was published in the Federal Register on November 2, 1999. Comments on the proposed rule were due to the EPA by February 4, 2000. Final federal requirements for addressing radon were delayed until 2008, but have not yet been published. The rule proposes a 300 pCi/L MCL for community water systems that use groundwater or an alternative, less stringent MCL of 4,000 pCi/L for water systems where their state implements an EPA-approved program to reduce radon risks in household indoor air and tap water. It is not currently known when or what a radon regulation may require as adopted by the EPA or what will be the rule's implementation schedule. Because

the final radon rule requirements are uncertain, the impact of this rule on the City is unknown at this time.

SOURCE WATER QUALITY

This section presents the current water quality standards and the results of the City's recent source water quality monitoring efforts. A discussion of the water quality requirements and monitoring results for the City's distribution system is presented in the section that follows.

DRINKING WATER STANDARDS

Drinking water quality is regulated at the Federal level by the EPA and at the State level by DOH. Drinking water standards have been established to maintain high quality drinking water by limiting the levels of specific contaminants (i.e., regulated contaminants) that can adversely affect public health and are known or likely to occur in public water systems. Non-regulated contaminants do not have established water quality standards and are generally monitored at the discretion of the water purveyor and in the interest of customers.

The regulated contaminants are grouped into two categories of standards: primary and secondary. Primary standards are drinking water standards for contaminants that could affect health. Water purveyors are required by law to monitor and comply with these standards and notify the public if water quality does not meet any one of the standards. Secondary standards are drinking water standards for contaminants that have aesthetic effects, such as unpleasant taste, odor, or color (staining). The national secondary standards are unenforceable federal guidelines or goals where federal law does not require water systems to comply with them. However, states may adopt their own enforceable regulations governing these contaminants. The State of Washington has adopted regulations that require compliance with some of the secondary standards. Water purveyors are not required to notify the public if water quality does not meet secondary standards.

SOURCE MONITORING REQUIREMENTS AND WAIVERS

The City no longer operates an active drinking water source; therefore, it is no longer the responsible party for monitoring IOC and physical substances, organic substances, radionuclides, or any other requirements as specified in WAC 246-290-300.

SOURCE MONITORING RESULTS

The quality of the City's source has been good and meets or exceeds all drinking water standards, except for slightly higher than allowable levels of turbidity at the Pilchuck River source, which is apparent on a seasonal basis at the water treatment plant. Monitoring of IOCs and physical substances was last performed in June 2013 and is no longer required due to the decommissioning of the City's source and treatment plant. All primary standards were met; however, iron exceeded its secondary MCL. This could have been a laboratory error since iron never had any other historical exceedances. Nitrate monitoring was last performed in 2016 and has never exceeded its MCL. The results of the latest VOC monitoring in June 2012 for the City's source indicate that all primary and secondary standards were met. The results of radionuclide monitoring, which was done in August 2015, indicated that the City's source was in compliance with the regulations. The results of the latest herbicides monitoring in September

2016, and pesticides in June 2009, indicate that all primary and secondary standards were met. Since the City no longer operates the treatment of its drinking water, it will mainly be required to monitor for lead and copper and disinfection byproducts within distribution.

DISTRIBUTION SYSTEM WATER QUALITY

MONITORING REQUIREMENTS AND RESULTS

The City is required to perform water quality monitoring within the distribution system for coliform bacteria, disinfectant (chlorine) residual concentration, DBP, lead and copper, and asbestos in accordance with Chapter 246-290 WAC. A description of the distribution system water quality monitoring requirements and procedures are contained in the City's Water Quality Monitoring Plan that is included in **Appendix J**.

The City has been in compliance with all monitoring requirements for the past several years. A summary of the results of distribution system water quality monitoring within the City's system is presented below.

Coliform Monitoring

The City is required to collect a minimum of 10 coliform samples per month from different locations throughout the system, based on a population served of 12,382 in 2018. The results of coliform testing from the past 6 years were all satisfactory, except positive samples in August 2016 and November 2018. Follow-up repeat samples were negative; therefore, the positive samples were likely due to error from potential splash back. In addition, the City monitors for coliforms in the NEPA Pallet Water System by obtaining one sample per month at thesite.

Disinfectant Residual Concentration Monitoring

Disinfection requirements applicable to the City's Pilchuck River source are contained in WAC 246-290-662 for filtered systems, which states that a minimum 0.2 mg/L disinfectant residual concentration shall be maintained at the point the water enters the system, and that the disinfectant residual concentration in the distribution system is detectable in at least 95 percent of the samples taken each calendar month. In an effort to comply with these requirements, the City has established a chlorination target to maintain a positive disinfectant residual in the distribution system. The water samples collected by the City for coliform analysis also are tested for residual disinfectant concentration. As of April 1, 2009, the City has been collecting two samples daily in a north pressure zone and have been rotating zones weekly. The City also has been collecting two samples daily from the 218 Zone. The disinfection residual has fluctuated; however, they have all measured positive. The monthly average residual for the entire distribution system is 0.53 mg/L. Therefore, the City is in compliance with these regulations.

Lead and Copper Monitoring

The Lead and Copper Rule identifies the action level for lead as being greater than 0.015 mg/L, and the action level for copper as being greater than 1.3 mg/L. When it was in operation, the City's water treatment plant adjusted pH to reduce lead and copper levels. Although the City no longer operates its own treatment plant, it will still be required to monitor lead and copper concentrations. Every 3 years, the City must collect and report a minimum of 30 samples. All

previous samples indicate the City is in compliance with these regulations. In September 2018, 31 samples were collected and all samples were below the action level for both lead and copper.

The City has participated in Everett's Regional Monitoring Plan (RMP) since at least 1998 and plans to continue to participate until such time that the City no longer qualifies for the RMP. This would occur following construction of the proposed 362/425 Zone Booster Pump Station, identified as CIP F1 in **Chapter 9**. A copy of the City's RMP Participation Agreement is shown in **Appendix J**.

Asbestos

Asbestos monitoring is required if the sources are vulnerable to asbestos contamination or if the distribution system contains more than 10 percent of asbestos cement (AC) pipe. Although none of the City's sources are susceptible to asbestos contamination, AC pipe comprises approximately 10 percent of the City's distribution system. Therefore, the City must monitor for asbestos in the distribution system. The current MCL for asbestos is 7 million fibers per liter (MFL) and greater than 10 microns in length. Monitoring must be accomplished during the first 3-year compliance period of each 9-year compliance cycle. The water sample must be taken at a tap that is served by an asbestos cement pipe under conditions where asbestos contamination is most likely to occur. The City's most recent sample in 2009 detected asbestos at 1.4 MFL, which is under its MCL of 7 MFL. Asbestos monitoring is not required for the NEPA Pallet Water System. Currently, the City is not required to conduct any sampling for asbestos, as it received a 9-year waiver at the beginning of 2011. Therefore, no sampling is required until the beginning of 2020.

Disinfectants/Disinfection Byproducts Monitoring

TTHM and HAA5 are disinfection byproducts that are formed when free chlorine reacts with organic substances (i.e., precursors), most of which occur naturally. Formation of TTHM and HAA5 is dependent on such factors as amount and type of chlorine used, water temperature, concentration of precursors, pH, and chlorine contact time. TTHM and HAA5 have been found to cause cancer in laboratory animals and are suspected to be human carcinogens.

Although the City no longer operates its own treatment plant, TTHM and HAA5 concentrations still need to be monitored within the distribution system. The City must collect and report a minimum of four TTHM and four HAA5 samples on a quarterly basis. Within the past 6 years, the City detected exceedances of the TTHM MCL on the following occasions: three instances on the same day in October 2016; once in July 2016; once in October 2015; and once in October 2014. The MCLs for disinfection byproducts are based on locational running annual averages. Even though these individual samples exceeded their MCL, when averaged with other quarterly samples collected at the same location, the result is below the MCL; therefore, the City remains in compliance. No exceedances of the HAA5 MCL were recorded in the last 6 years.

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7 | WATER SYSTEM ANALYSIS

INTRODUCTION

This chapter presents the analysis of the City of Snohomish's (City) existing water system. Individual water system components were analyzed to determine their ability to meet policies and design criteria under both existing and future water demand conditions. The policies and design criteria are presented in **Chapter 5**, and the water demands are presented in **Chapter 4**. A description of the water system facilities and current operation is presented in **Chapter 2**. The last section of this chapter presents the existing and projected system capacity analyses that were performed to determine the maximum number of equivalent residential units (ERUs) that can be served by the City's existing water system.

PRESSURE ZONES

The ideal static pressure of water supplied to customers is between 40 and 80 pounds per square inch (psi). Pressures within a water system's distribution system are commonly as high as 120 psi, requiring pressure regulators on individual service lines to reduce the pressure to 80 psi or less. It is difficult for the City's water system, and most others, to maintain distribution pressures between 40 and 80 psi, primarily due to the topography of the water service area.

Table 7-1 lists the City's pressure zones, the highest and lowest elevation served in each zone, and the minimum and maximum distribution system pressures within each zone based on maximum static water conditions (full reservoirs and zero demands). While this table presents the results of the evaluation of pressures based on the adequacy of the pressure zones (under static conditions), the hydraulic analysis section later in this chapter presents the results of the evaluation of pressures based on the adequacy of the water mains (under dynamic conditions).

Table 7-1

	Highest Elevation Served		Lowest Elevation Served	
Pressure Zone	Elevation (ft)	Static Pressure (psi)	Elevation (ft)	Static Pressure (psi)
Distribution System				
218	159	26	8	91
362	243	52	78	123
384	241	62	114	117
425	290	59	205	95
438	261	77	161	120
450	238	92	194	111
Water Transmission Main				
286	72	93	38	108
338	115	97	93	106
494	389	45	143	152

NOTE: It is assumed that the PUD intertie PRV setpoint is 30 psi/494 feet HGL.

The City is currently providing water at pressures of at least 40 psi in the 362, 384, 425, 438, and 450 Zones. A small area of the 218 Zone near Emerson Elementary School does not meet the

Washington State Department of Health (DOH) minimum pressure requirement of 30 psi, as described in the **Distribution and Transmission System** section later in this chapter. Improvements recommended in **Chapter 9** will transfer these 218 Zone services to the adjacent 362 Zone. Planning for this project is currently underway.
All of the City's pressure zones have areas of pressure higher than 80 psi. The City recommends that individual services with pressures greater than 80 psi to install customer-owned pressure regulators to reduce the pressures to acceptable levels per the plumbing code. In **Table 7-1**, the listed pressures are calculated in the water main, and the actual service pressure is lower due to the required pressure regulators. The City has accepted these relatively high pressures in the system due to the pressure regulator requirement; therefore, pressure zone improvements will not be necessary in these areas. Where pressure zone improvements recommended in **Chapter 9** increase pressures to above 80 psi, pressure regulators will be recommended on the services, if none currently exist.

Table 7-2 lists the City's pressure zones after the pressure zone reconfiguration and other improvements listed in **Chapter 9** are completed. With these improvements, service pressures throughout the system will be above the DOH minimum pressure requirement of 30 psi.

Table 7-2
Minimum and Maximum Distribution System Static Pressures – Future

	Highest Elevation Served		Lowest Elevation Served	
Pressure Zone	Elevation (ft)	Static Pressure (psi)	Elevation (ft)	Static Pressure (psi)
Distribution System				
218	135	36	8	91
362	261	44	78	123
425	290	59	205	95

SOURCE CAPACITY EVALUATION

This section evaluates the combined capability of the City's existing sources (four existing interties supplying water from the City of Everett's Transmission Line No. 5 and one intertie supplying water from Snohomish County Public Utility District No. 1 [PUD]) to determine if they have sufficient capacity to meet the overall demands of the system, based on existing and future water demands. The section that follows will address the evaluation of the individual facilities to determine if they have sufficient capacity to meet the existing and future demands of the individual zone, or zones, that they supply. This section also identifies facility deficiencies that are not related to the capacity of the sources.

ANALYSIS CRITERIA

Supply facilities must be capable of adequately and reliably supplying high quality water to the system. In addition, supply facilities must provide a sufficient quantity of water at pressures that meet the requirements of 246-290-230 of the Washington Administrative Code (WAC). The evaluation of the combined capacity of the sources in this section is based on the criteria that they provide supply to the system at a rate that is equal to or greater than the maximum day demand (MDD) of the system.

SOURCE CAPACITY ANALYSIS RESULTS

Typically, the evaluation of the combined capacity of the sources is based on the criteria that they provide supply to the system at a rate that is equal to or greater than the MDD of the system. However, since the 384, 425, 438, and 450 Zones are supplied directly by Transmission Line No. 5, the City's system must be capable of supplying the maximum rate of fire flow and the peak hour flow to account for the lack of available storage in these zones. Based on these criteria, the capability of the City's active sources to meet existing demand requirements is presented in **Table 7-3**.

Table 7-3

Water Source Capacity Evaluation – Existing

Description	Existing 2016
Required Source Capacity (gpm)	
WTP Transmission Main Peak Hour Demand	97
384/425/438/450 Zones Peak Hour Demand	392
384/425/438/450 Zones Max Fire Flow Requirement	4,000
218/362 Zones Maximum Day Demand	1,056
Total Required Supply	5,545
Available Intertie Capacity (gpm)	
Bickford Intertie	4,900
King Charley's Intertie	1,600
Park Avenue Intertie	3,500
Terrace Avenue Intertie	6,400
PUD Intertie	95
Total Available Supply	16,495
Surplus or Deficient Source Capacity (gpm)	
Surplus or Deficient Amount	10,950

As shown in **Table 7-3**, the City's existing total source capacity is sufficient to meet the total system demands. However, as detailed in the supply analysis that follows, the required demands of each pressure zone cannot always be supplied under the existing system configuration due to isolation valves between zones.

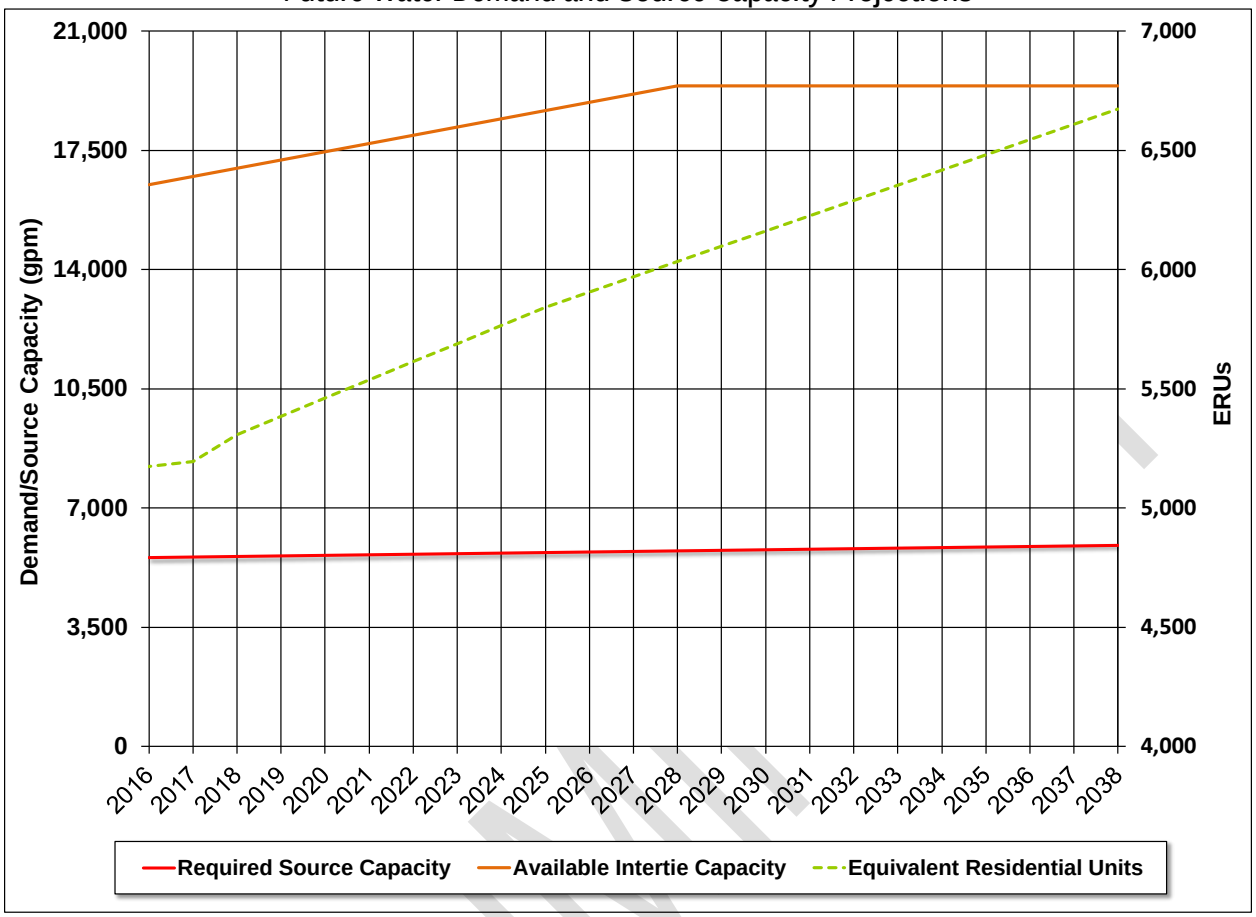
Table 7-4 shows the required source capacity and available intertie capacity in 2028 and 2038 based on the pressure zone reconfigurations and other improvements described in **Chapter 9**. Some intertie capacities increase due to lower discharge hydraulic grades. The demands used in the evaluation for 2028 and 2038 are future demand projections without reductions from water use efficiency efforts, as shown in **Table 4-11** of **Chapter 4**. Therefore, if additional reductions in water use are achieved in the future, the total source capacity required in the future will be less than that shown in the table. As shown in **Table 7-4**, it is anticipated that the Water Treatment Plant (WTP) Transmission Main customers will gradually be transferred off the City's system, with all customers disconnected by 2038.

Table 7-4
Water Source Capacity Evaluation – Future

Description	Future Projections	
	2028	2038
Required Source Capacity (gpm)		
WTP Transmission Main Peak Hour Demand	55	0
425 Zone Peak Hour Demand	170	192
425 Zone Max Fire Flow Requirement	4,000	4,000
218/362 Zones Maximum Day Demand	1,517	1,709
Total Required Supply	5,742	5,901
Available Intertie Capacity (gpm)		
Bickford Intertie	4,900	4,900
King Charley's Intertie	3,100	3,100
Park Avenue Intertie	4,900	4,900
Terrace Avenue Intertie	6,400	6,400
PUD Intertie	95	95
Total Available Supply	19,395	19,395
Surplus or Deficient Source Capacity (gpm)		
Surplus or Deficient Amount	13,653	13,494

The results of the analysis indicate that the City will have approximately 13,494 gallons per minute (gpm) of surplus source capacity at the end of the 20-year planning period. The City's required source capacity, available intertie capacity, and total number of ERUs throughout the 20-year planning period are shown graphically in **Chart 7-1**. Although available intertie capacity is shown as increasing at a steady rate from 2016 to 2028, increases in intertie capacity will actually occur in a punctuated fashion as the various aspects of the pressure zone reconfiguration detailed in **Chapter 9** are completed.

Chart 7-1
Future Water Demand and Source Capacity Projections



FACILITY DEFICIENCIES

The King Charley's intertie is in poor condition and in need of rebuild or retirement. As shown in **Table 7-4**, the City has sufficient source capacity to retire this intertie, if desired, after the pressure zone reconfiguration described in **Chapter 9** is completed. However, decommissioning this intertie will reduce redundancy and available fire flow in the vicinity of the intertie unless additional water main improvements are completed. It is recommended that additional analyses be performed before decommissioning the King Charley's intertie to evaluate the changes in level of service caused by taking the intertie offline, based on the actual system configuration at that time.

The pressure reducing stations at the Bickford, King Charley's, and Park Avenue interties do not have drains and commonly have standing water at the bottom of each vault. All of the City's pressure reducing stations are regularly maintained by GC Systems, Inc., and are pumped of standing water annually.

The 2-inch-diameter Wilkins pressure reducing valve (PRV) installed at the PUD intertie has a maximum flow rate of approximately 95 gpm; therefore, it is currently incapable of supplying the full peak hour demand (PHD) to the WTP Transmission Main customers. A March 31, 2017, RH2 Engineering, Inc., *PUD Intertie Analyses Technical Memorandum* recommended replacement of this valve with a 2-inch Cla-Val 90-01 PRV, which has a manufacturer's stated

maximum suggested flow of 210 gpm. However, as customers are transferred off the transmission main, it may no longer be necessary to supply a PHD of greater than 95 gpm.

WATER SUPPLY FACILITIES EVALUATION

This section evaluates the existing supply facilities to determine if they have sufficient capacity to provide water supply at a rate that meets the existing and future demands of the one or more zones that they supply.

ANALYSIS CRITERIA

The evaluation of supply facilities to determine if they have adequate capacity is based on one of two criteria, as follows. If the pressure zone that the facility provides supply into has water storage, then the amount of supply required is equal to the MDD. If the pressure zone that the facility provides supply into does not have water storage, then the amount of supply required is equal to the PHD and the maximum fire flow requirement of the zone. The higher supply requirement of the latter criteria is due to the lack of equalizing and fire flow storage that is typically utilized to provide short-term supply during times of peak system demands.

Existing and Future Water Supply Facilities Evaluation

The City's 218 and 362 Zones contain reservoirs; therefore, they are only subject to the MDD requirement. All other City zones lack storage and must meet the PHD and fire flow requirement. A summary of each zone's required and available capacities is provided in **Table 7-5**. Fire hydrants are located along the WTP Transmission Main, but the City does not provide these hydrants with the required fire flow, and the hydrants are currently bagged. Thus, fire flow is not included in the required supply for the transmission main.

Table 7-5
Existing Water Supply Facilities Evaluation

Description	2016 (Existing)
WTP Transmission Main	
Peak Hour Demand (gpm)	97
Available Supply Capacity (gpm)	95
Surplus or Deficient Supply Capacity (gpm)	(2)
450 Zone	
Peak Hour Demand (gpm)	6
Max Fire Flow Requirement (gpm)	4,000
Available Supply Capacity (gpm)	3,500
Surplus or Deficient Supply Capacity (gpm)	(506)
438 Zone	
Peak Hour Demand (gpm)	36
Max Fire Flow Requirement (gpm)	4,000
Available Supply Capacity (gpm)	1,600
Surplus or Deficient Supply Capacity (gpm)	(2,436)
425 Zone	
Peak Hour Demand (gpm)	135
Max Fire Flow Requirement (gpm)	4,000
Available Supply Capacity (gpm)	1,500
Surplus or Deficient Supply Capacity (gpm)	(2,635)
384 Zone	
Peak Hour Demand (gpm)	216
Max Fire Flow Requirement (gpm)	4,000
Available Supply Capacity (gpm)	4,900
Surplus or Deficient Supply Capacity (gpm)	684
218 and 362 Zones	
362 Zone Maximum Day Demand (gpm)	362
218 Zone Maximum Day Demand (gpm)	694
Available Supply Capacity (gpm)	4,900
Surplus or Deficient Supply Capacity (gpm)	3,844

The results of the existing supply analysis by zone, as shown in **Table 7-5**, indicate that there is sufficient supply into the City's two largest pressure zones (218 Zone and 362 Zone), each of which has a reservoir. Several of the City's closed pressure zones have supply deficiencies due to high fire flow requirements that exceed the capacity of the supplying interties. The pressure zone reconfiguration described in **Chapter 9**, which will consolidate the 384, 438, and 450 Zones into the 362 Zone, will address the supply capacity deficiencies in these zones by converting them from closed zones to zones with storage. Construction of the 362/425 Zone Booster Pump Station (BPS), also detailed in **Chapter 9**, will address the supply capacity deficiency in the 425 Zone by allowing the transfer of water from the 218 Zone to the 425 Zone. The gradual transfer of customers off the WTP Transmission Main will address the slight current deficiency in this operating area.

Table 7-6 shows the supply capacity availability and requirements in 2028 and 2038, taking into account the proposed pressure zone reconfiguration and other improvements. The analysis shows that with these improvements, all areas of the system will have sufficient supply at the end of the 20-year planning period.

Table 7-6
Future Water Supply Facilities Evaluation

Description	2028 (+ 10 years)	2038 (+ 20 years)
WTP Transmission Main		
Peak Hour Demand (gpm)	55	0
Available Supply Capacity (gpm)	95	95
Surplus or Deficient Supply Capacity (gpm)	40	95
425 Zone		
Peak Hour Demand (gpm)	170	192
Max Fire Flow Requirement (gpm)	4,000	4,000
Available Supply Capacity (gpm)[1]	4,500	4,500
Surplus or Deficient Supply Capacity (gpm)	330	308
362 and 218 Zones		
362 Max Day Demand (gpm)	640	721
218 Max Day Demand (gpm)	878	989
Available Supply Capacity (gpm)	4,900	4,900
Surplus/Deficient Capacity for 362/218 Zones (gpm)	3,383	3,191

1 = Includes proposed 3,000 gpm 362/425 Zone BPS.

The demands used in the existing and future supply evaluations do not include reductions from water use efficiency efforts. Therefore, if additional reductions in water use are achieved through water use efficiency (WUE) efforts, the total source capacity required in the future would be less than that shown in **Table 7-6**.

STORAGE FACILITIES

This section evaluates the City's existing reservoirs to determine if they have sufficient capacity to meet the existing and future storage requirements of the system. This section also identifies facility deficiencies that are not related to the capacity of the reservoirs.

ANALYSIS CRITERIA

Water storage is typically made up of the following components: operational storage; equalizing storage; standby storage; fire flow storage; and dead storage. Each storage component serves a different purpose and will vary from system to system. A definition of each storage component and the criteria used to evaluate the capacity of the City's reservoirs is provided below.

Operational Storage – Volume of the storage tank used to supply the water system under normal conditions when the source or sources of supply are not delivering water to the system (i.e., sources are in the off mode). Operational storage is essentially the average amount of draw down in the tank during normal operating conditions, which represents a volume of storage that will most likely not be available for equalizing storage, fire flow storage, or standby storage. The operational storage in the City's reservoirs is the amount of storage between the fill setpoint level and the overflow elevation of the reservoir.

Equalizing Storage – Volume of the storage tank used to supply the water system under peak demand conditions when the system demand exceeds the total rate of supply of the sources. DOH requires that equalizing storage be stored above an elevation that will provide a minimum pressure of 30 psi at all service connections throughout the system during PHD conditions. Because the City's supply sources primarily operate on a "call on demand" basis to fill the storage tanks, the equalizing storage requirements are determined using the standard DOH formula that considers the difference between the system PHD and the combined capacity of the supply sources.

ES = (PHD – Q_S)(150 minutes), but in no case less than zero

Where:

ES = Equalizing Storage, in gallons.

PHD = Peak Hour Demand, in gpm.

Q_S = Sum of all installed and active sources, except emergency supply, in gpm.

The capacity of the sources that supply each of the City's zones are sufficient to meet the peak hour demands of these operating areas. The equalizing storage analyses also considered the capacity of the PRVs that supply water to the 218 Zone; the capacity of these PRVs exceeds the supply capacity of the Terrace Avenue intertie.

Standby Storage – Volume of the storage tank used to supply the water system under emergency conditions when supply facilities are out of service due to equipment failures, power outages, loss of supply, transmission main breaks, and any other situation that disrupts the supply source. DOH requires that standby storage be stored above an elevation that will provide a minimum pressure of 20 psi at all service connections throughout the system. The criteria for determining the standby storage requirements for the City's system, which has multiple supply sources, is based on the standard DOH formula that requires that the amount is sufficient to supply the system for a 48-hour period when the primary supply facility is out of service and the system is experiencing demands that are close to average day demands (ADD).

$$SB = (2\ days)[(ADD)(N) - t_m\ (Q_S - Q_L)]$$

Where:

SB = Standby Storage, in gallons.

ADD = Average Day Demand per ERU, in gallons per day per ERU (gpd/ERU).

N = Number of ERUs.

Q_S = Sum of all installed and continuously available sources, except emergency supply, in gpm.

Q_L = The capacity of the largest source available to the system, in gpm.

t_m= Time the remaining sources are pumped on the day when the largest source is not available, in minutes. Unless otherwise restricted, this value is 1,440 minutes.

The standby storage analysis was completed for each reservoir operating area. For both operating areas, the largest capacity source that was assumed to be out of service was the Terrace Avenue Intertie.

DOH recommends that the minimum standby storage volume be no less than 200 gallons per ERU. For the future storage analyses, this calculation determined the standby storage volume required for the City's reservoir operating areas. However, for the existing storage analyses, the standard calculation described above determined the required standby storage volume.

Fire Flow Storage – Volume of the storage tank used to supply water to the system at the maximum rate and duration required to extinguish a fire at the building with the highest fire flow requirement. The magnitude of the fire flow storage is the product of the fire flow rate and duration of the system's maximum fire flow requirement established by the local fire authority. DOH requires that fire flow storage be stored above an elevation that will provide a minimum pressure of 20 psi at all points throughout the distribution system under MDD conditions. The fire flow storage requirements shown in the analyses that follow are based on a maximum fire flow requirement of 4,000 gpm for a 4-hour duration in all zones.

Dead Storage – Volume of the storage tank that cannot be used because it is stored at an elevation that does not provide system pressures that meet the minimum pressure requirements established by DOH without pumping. This unusable storage occupies the lower portion of most ground-level reservoirs. Water that is stored below an elevation that cannot provide a minimum pressure of 20 psi is considered dead storage for the analyses that follow.

STORAGE ANALYSIS RESULTS

Existing Storage Analysis

As shown in **Table 7-7**, the maximum combined storage capacity of the City's reservoirs is approximately 7.52 million gallons (MG). The Reservoir No. 3 operating area currently has sufficient available storage to meet the zone's operational, equalizing, standby, and fire flow storage requirements. However, a storage deficiency exists in the Reservoir No. 2 operating area, primarily due to the large amount of dead storage in this zone. This dead storage is caused by the high elevation fire hydrant at the Emerson Elementary School. Improvements detailed in **Chapter 9** will transfer this hydrant to the 362 Zone, eliminating the 218 Zone dead storage.

Storage is not provided, and is not being considered, for the customers along the WTP Transmission Main, who will be transferred to other sources of supply in the future.

Table 7-7

Description	Operating Area		
	Reservoir No. 2 (218 Zone)	Reservoir No. 3 (362 Zone)	Totals
Available/Usable Storage (MG)			
Maximum Storage Capacity	5.00	2.52	7.52
Dead (Non-usable Storage)	-1.63	0.00	-1.63
Total Available Storage	3.37	2.52	5.90
Required Storage (MG)			
Operational Storage	2.23	0.60	2.83
Equalizing Storage	0.00	0.00	0.00
Standby Storage	0.91	0.47	1.38
Fire Flow Storage	0.96	0.96	1.92
Totals	4.10	2.03	6.13
Surplus or Deficient Storage (MG)			
Surplus or Deficient Amount	(0.73)	0.49	(0.23)

Future Storage Analysis

Future storage analyses were performed based on the 2028 and 2038 demand projections shown in **Chapter 4**, and the improvements to the system shown in **Chapter 9**.

The results of the analyses are shown in **Table 7-8** and **Table 7-9**. Due to the elimination of dead storage in the Reservoir No. 2 operating area, there is a storage surplus of approximately 1.08 MG in this operating area at the end of the 20-year planning period. The pressure zone reconfiguration described in **Chapter 9** introduces a dead storage component to the Reservoir No. 3 operating area, as higher-elevation services from the existing closed zones are transferred to the 362 Zone. In 2038, the required storage in the Reservoir No. 3 operating area will essentially match the required storage in this operating area. However, the construction of the 362/425 Zone Booster Pump Station will allow the transfer of surplus storage from the Reservoir No. 2 operating area to the Reservoir No. 3 operating area, which will increase the storage available in the 362 Zone. The required storage in the Reservoir No. 3 operating area also could be reduced by minimizing the operational storage in Reservoir No. 3, which is currently approximately 15 feet of the reservoir height.

Table 7-8
2028 Storage Evaluation with Improvements

Description	Operating Area		Totals
	Reservoir No. 2 (218 Zone)	Reservoir No. 3 (362 Zone)	
Available/Usable Storage (MG)			
Maximum Storage Capacity	5.00	2.52	7.52
Dead (Non-usable Storage)	0.00	-0.44	-0.44
Total Available Storage	5.00	2.08	7.08
Required Storage (MG)			
Operational Storage	2.23	0.60	2.83
Equalizing Storage	0.00	0.00	0.00
Standby Storage	0.65	0.47	1.12
Fire Flow Storage	0.96	0.96	1.92
Totals	3.84	2.03	5.86
Surplus or Deficient Storage (MG)			
Surplus or Deficient Amount	1.16	0.06	1.22

Table 7-9
2038 Storage Evaluation with Improvements

Description	Operating Area		Totals
	Reservoir No. 2 (218 Zone)	Reservoir No. 3 (362 Zone)	
Available/Usable Storage (MG)			
Maximum Storage Capacity	5.00	2.52	7.52
Dead (Non-usable Storage)	0.00	-0.44	-0.44
Total Available Storage	5.00	2.08	7.08
Required Storage (MG)			
Operational Storage	2.23	0.60	2.83
Equalizing Storage	0.00	0.00	0.00
Standby Storage	0.73	0.53	1.26
Fire Flow Storage	0.96	0.96	1.92
Totals	3.92	2.09	6.00
Surplus or Deficient Storage (MG)			
Surplus or Deficient Amount	1.08	0.00	1.08

FACILITY DEFICIENCIES

The City's storage facilities are in good overall condition. Aquavision performs regular interior cleaning of the reservoirs every 2 years. Other proposed maintenance tasks are identified in the Capital Improvements Program in **Chapter 9**.

DISTRIBUTION AND TRANSMISSION SYSTEM

This section evaluates the City's existing distribution and transmission system (i.e., water mains) to determine if they are adequately sized and looped to provide the necessary flow rates and pressures to meet the system's existing and future requirements. This section also identifies deficiencies that are not related to the capacity of the water mains.

ANALYSIS CRITERIA

Distribution and transmission mains must be capable of adequately and reliably conveying water throughout the system at acceptable flow rates and pressures. The criteria used to evaluate the City's distribution and transmission system is the state mandated requirements for Group A water systems contained in WAC 246-290-230, Distribution Systems. The pressure analysis criteria states that the distribution system "…shall be designed with the capacity to deliver the design PHD quantity of water at 30 psi (210 kPa) under PHD flow conditions measured at all existing and proposed service water meters…" It also states that if fire flow is to be provided, "…the distribution system shall also provide maximum day demand (MDD) plus the required fire flow at a pressure of at least 20 psi (140 kPa) at all points throughout the distribution system…"

Hydraulic analyses of the existing system were performed under existing PHD conditions to evaluate its current pressure capabilities and identify existing system deficiencies. The existing system also was analyzed under existing MDD conditions to evaluate the current fire flow capabilities and identify additional existing system deficiencies. Additional hydraulic analyses were then performed with the same hydraulic model under future MDD conditions, and with the proposed improvements, to demonstrate that the identified improvements will eliminate the deficiencies and meet the requirements far into the future. The following is a description of the hydraulic model, the operational conditions, and facility settings used in the analyses.

HYDRAULIC MODEL

Description

A computer-based hydraulic model of the existing water system was updated to version 10.0 of the WaterCAD® program, developed by Bentley Systems, Inc. All water mains in the City's water system, including dead-end mains, were included in the model and were based on geographic information system (GIS) water system mapping and as-built records provided by the City. The junction node elevation data was extracted from a topographic map that was generated from 2014 and 2017 LiDAR data sets from the Washington Department of Natural Resources. A hydraulic model node diagram that provides a graphical representation of the model of the water system is contained in **Appendix L**.

Demand Data

The demands used in the hydraulic model of the existing system were based on 2016 ADD data. Consumption data from metered billing records were distributed based on the recorded usage for each parcel to the closest representative junction node of the model. The peaking factors calculated in **Chapter 4** were used to analyze the system under MDD and PHD conditions.

The hydraulic model of the proposed system contains 10-year demand levels that are projected for 2028, and 20-year demand levels that are projected for 2038. The distribution is based on the City's estimated future demand levels in each pressure zone.

Facilities

The hydraulic model of the existing system contains all active existing system facilities. For the proposed system analyses in 2028 and 2038, the hydraulic model contains all active existing system facilities and proposed system improvements identified in **Chapter 9** for the 10- and 20-year planning periods, respectively.

The facility settings for the pressure analyses corresponded to a PHD event in the water system. All sources of supply that are currently available to the system, or will be available in the future for the 2028 and 2038 analyses, during a peak period were operating at their normal summertime pumping rates. The reservoir levels were modeled to reflect full utilization of operational and equalizing storage. The operational conditions for the pressure analyses are summarized in **Table 7-10**.

Table 7-10

Hydraulic Analyses Operational Conditions

Description	PHD Pressure Analysis			Fire Flow Analysis		
	2016	2028	2038	2016	2028	2038
Demand	2016 PHD	2028 PHD	2038 PHD	2016 MDD	2028 MDD	2038 MDD
Reservoir No. 2 HGL (ft)	210.9	210.9	210.9	207.0	207.0	207.0
Reservoir No. 3 HGL (ft)	345.5	345.5	345.5	320.6	320.6	320.6
Bickford Avenue Intertie HGL (ft)	363	362	362	363	362	362
King Charley's Intertie HGL (ft)	402	362	362	402	362	362
Park Avenue Intertie HGL (ft)	390	362	362	390	362	362
Terrace Avenue Intertie 425 Zone HGL (ft)	401	401	401	401	401	401
Terrace Avenue Intertie 362 Zone HGL (ft)	361	362	362	361	362	362
9th Street and Avenue A PRV HGL (ft)	208	208	208	208	208	208
10th Street and Avenue D PRV HGL (ft)	215	215	215	215	215	215
Reservoir No. 2 PRV HGL (ft)	220	220	220	220	220	220
PUD Intertie HGL (ft)	494	494	494	494	494	494
WTP Transmission Main PRV No. 1 HGL (ft)	286	286	286	286	286	286
WTP Transmission Main PRV No. 2 HGL (ft)	338	338	338	338	338	338
Proposed 362/425 Zone Booster Pump Station	N/A	ON	ON	N/A	ON	ON

HGL = Hydraulic Grade Line

Separate fire flow analyses were performed on the system to size distribution system improvements and calculate fire flow availability. The hydraulic model for the fire flow analyses contains settings that correspond to MDD events. All sources of supply that are currently available to the system during a peak period were operating at their normal pumping rates, and the reservoir levels were modeled to reflect full utilization of operational, equalizing, and fire flow storage based on the maximum planning-level fire flow requirement. **Table 7-10** summarizes the operational conditions for the fire flow analyses for the existing, 2028, and 2038 systems.

Calibration

Hydraulic model calibration is the process of adjusting hydraulic model data so the model closely reflects actual system pressures and flows under similar demand and operating conditions. Initial Darcy-Weisbach roughness coefficients were entered into the model based on computed estimates of the coefficients from available pipe age and material data. For example, assuming that the internal surface of water pipes becomes rougher as it gets older, older water

mains were assigned higher roughness coefficients than new water mains. Additional calibration of the model was achieved using field fire flow and pressure data, which was collected throughout the system for this purpose. Extensive analyses were performed to adjust the hydraulic model to reflect the results of the field fire flow and pressure data. However, approximately 15 percent of the City's field fire flow results were found to be inconsistent with the hydraulic model results after adjusting pipe roughness coefficients within typical ranges. These inconsistent testing results are located in the 362 Zone and are likely due to closed or partially closed valves, incorrect water main diameters, or other differences between the modeled system configuration and field conditions. It is recommended that the City continue to investigate potential water main diameter and system configuration discrepancies in this area.

HYDRAULIC ANALYSES RESULTS

Several hydraulic analyses were performed to determine the capability of the system to meet the pressure and flow requirements identified in **Chapter 5** and contained in WAC 246-290-230. The first analysis was performed to determine the pressures throughout the system under existing (i.e., 2016) PHD conditions. The results of this analysis were used to identify locations of low and high pressures. To satisfy the minimum pressure requirements, the pressure at all water service locations must be at least 30 psi during PHD conditions. In addition, the system should not have widespread areas with high pressures, generally considered to be more than 120 psi. A summary of the pressure deficiencies identified from the results of this analysis is shown on **Figure 7-1**.

The second set of analyses was performed to determine the capability of the existing water system to provide fire flow throughout the system under MDD conditions. A separate fire flow analysis was performed for each node in the model to determine the available fire flow at a minimum residual pressure of 20 psi at all points throughout the distribution system and a maximum allowable water main velocity of 8 feet per second (fps). Approximately 700 fire flow analyses were performed to comprehensively evaluate the water system. For each node analyzed, the resulting fire flow was compared to its general planning-level fire flow requirement, which was assigned according to its land use classification. As is typical of most water systems, the City's distribution system was constructed to meet fire flow requirements that were in place at the time of construction. Land use classification changes and/or increase in fire flow requirements over time may create deficiencies. A summary of the results of the analyses for representative system nodes is shown on **Figure 7-2**.

Table 4-10 in **Chapter 4** lists the general planning-level fire flow requirements for each land use classification. Since the fire flow requirement varies for buildings within each land use classification, the land use based fire flow requirements are used only as a general target for the primary purpose of the system-wide analyses that were performed for this Water System Plan. Additional improvements may be needed in areas where actual fire flow requirements exceed the planning-level targets and shall be the responsibility of the developer. The results of the fire flow analyses were used to identify undersized water mains and proposed water main improvements.

Once all deficiencies were identified, proposed water main improvements were included in the model, and pressure and fire flow analyses were performed throughout the system to demonstrate that the improvements will eliminate the deficiencies and meet the future flow and pressure requirements. These analyses were modeled under projected year 2028 and 2038 MDD conditions to ensure that the improvements are sized sufficiently to meet the future systems' needs. The results of the fire flow analyses indicate that all fire flow and low pressure

deficiencies are resolved by 2038 with the proposed improvements. A description of these improvements and a figure showing their locations are presented in **Chapter 9**.

DEFICIENCIES

There are two areas in the system where pressures drop below 30 psi under PHD conditions: (1) near the intersection of 10th Street and Pine Avenue, and (2) along Carpenter Road along the WTP Transmission Main. These areas will be remedied by CIP Project PZ3 and CIP Project TM2, respectively, as detailed in **Chapter 9**.

While some areas of the system can currently provide planning-level fire flow while maintaining pressures above 20 psi and velocities below 8 fps, many areas of the system are not capable of providing planning-level fire flow within these parameters. Operating the system with high water velocities can potentially damage the system due to the high surge pressures that commonly occur with high water velocities, and allowing system pressures to drop below 20 psi can lead to unacceptably low service pressures and the possibility of backflow into the distribution system. Water main and other improvements identified in **Chapter 9** have been sized to maintain system pressures above 20 psi and prevent water velocities from exceeding 8 fps.

Some areas of the system have water mains that are more than 50 years old, which is beyond the average life expectancy of water mains. The City is planning to replace many of these in the future, as shown in the schedule of planned improvements in **Chapter 9**. All new water main installations are required to use cement mortar lined ductile iron water main, in accordance with the City's Construction Standards and Specifications, which are contained in **Appendix H**.

PRESSURE REDUCING STATIONS

This section evaluates the City's existing pressure reducing stations to identify deficiencies related to their current condition and operation capability.

EVALUATION AND DEFICIENCIES

The City has a total of 12 operational pressure reducing stations, including 2 PRVs along the Water Treatment Plant Transmission Line, 5 PRVs at Transmission Line No. 5 interties, 1 PRV at the PUD intertie, and 1 PRV at the Transmission Line No. 5 intertie for the NEPA Pallet Water System. All 12 pressure reducing stations are functioning properly. Some of the stations have drainage problems, which interferes with access to the valves and piping.

Proposed improvements for additional pressure reducing stations and pressure setting changes to existing PRVs are addressed in **Chapter 9**.

TELEMETRY AND SUPERVISORY CONTROL SYSTEM

This section evaluates the City's existing telemetry and supervisory control system to identify deficiencies related to its condition and current operational capability.

EVALUATION AND DEFICIENCIES

As described in **Chapter 2**, the City's supervisory control and data acquisition system has recently undergone a number of significant upgrades. Future improvements include implementing telemetry at all of the City's Everett interties to provide additional information

about system operation. Proposed improvements to the telemetry system are addressed in **Chapter 9**.

SYSTEM CAPACITY

This section evaluates the capacity of the City's existing and future water system components (supply, storage, transmission, and water rights) to determine the maximum number of ERUs it can serve. Once established, system capacity becomes useful in determining how much capacity is available in the water system to support new customers that apply for water service through the building permit process. The system capacity information, together with the projected growth of the system expressed in ERUs, as shown in **Chart 4-16** of **Chapter 4**, also provides the City with a schedule of when additional system capacity is needed.

ANALYSIS CRITERIA

The capacity of the City's system was determined from the limiting capacity of the source, storage, and transmission facilities. The source capacity analysis was based on the limiting capacity of the supply facilities in terms of treatment, water rights, and intertie capacity, and the system's estimated MDD per ERU, with the exception of the annual water right capacity, which was based on the system's ADD per ERU. The treatment capacity was determined from the capacity of the WTP Transmission Main and the transmission mains that convey water from the interties to the distribution system.

The storage capacity analysis was based on the storage capacity for equalizing and standby storage and the computed storage requirement per ERU. Operational, dead, and fire flow storage capacities were excluded from the storage analysis because these components are not directly determined by water demand or ERUs. For the analyses, a reserve amount equivalent to the existing operational, dead, and fire flow storage requirements was deducted from the total available storage capacity to determine the storage capacity available for equalizing and standby storage. This storage capacity available for equalizing and standby storage was divided by the existing number of ERUs presented in **Chapter 4** to determine the storage requirement per ERU.

The ERU-based demand data was derived from the ADD of the system and demand peaking factors from **Chapter 4**.

EXISTING CAPACITY ANALYSIS RESULTS

A summary of the results of the existing system capacity analysis is shown in **Table 7-11**.

The results of the existing system capacity analysis indicate that the limiting capacity of the system is storage, which can currently support up to a maximum of approximately 4,303 ERUs. The existing water system has a deficit of approximately 871 ERUs. All other water system components have sufficient capacity to support existing water system customers.

Table 7-11
Existing System Capacity Analysis

ERU-Based Demands	
Average Day Demand Per ERU (gpd)	168
Maximum Day Demand Per ERU (gpd)	370
Peak Hour Demand Per ERU (gpd)	665
Source Capacity - Intertie Supply[1]	
Intertie Supply Capacities (gpd)	23,752,800
Maximum Day Demand Per ERU (gpd)	370
Maximum Supply Capacity (ERUs)	64,277
Storage Capacity	
Maximum Equalizing and Standby Storage Capacity (gal)	1,149,395
Equalizing and Standby Storage Requirement Per ERU (gal)	267
Maximum Storage Capacity (ERUs)	4,303
Transmission Capacity	
Transmission Capacity (gpd)	22,560,600
Maximum Day Demand Per ERU (gpd)	370
Maximum Transmission Capacity (ERUs)	61,051
Maximum System Capacity	
Based on Limiting Facility - Storage	4,303
Unused Available System Capacity	
Maximum System Capacity (ERUs)	4,303
Existing (2016) ERUs	5,173
Surplus or Deficient Capacity (ERUs)	(871)

1 - Although the existing water system has a surplus of source capacity systemwide, the 425, 438, and 450 Zones have supply deficiencies, as shown in **Table 7-5**. New connections in these zones are restricted until improvements to increase the supply capacity in these zones are completed.

FUTURE CAPACITY ANALYSIS RESULTS

A summary of the results of the 10-year projected system capacity analysis is shown in **Table 7-12**. The 10-year projected system capacity analysis includes improvements that are planned to be completed within the 10-year planning period, as described in **Chapter 9**. These improvements include the pressure zone reconfiguration and other improvements that increase the amount of available storage and reduce the amount of required storage. The results of the 2028 system capacity analysis indicate that the proposed improvements will increase the system capacity to approximately 12,645 ERUs, based on the limiting component of the City's storage system. The 2028 water system will have a surplus of approximately 6,610 ERUs.

Table 7-12
2028 System Capacity Analysis

ERU-Based Demands	
Average Day Demand Per ERU (gpd)	178
Maximum Day Demand Per ERU (gpd)	392
Peak Hour Demand Per ERU (gpd)	705
Source Capacity - Intertie Supply	
Intertie Supply Capacities (gpd)	27,928,800
Maximum Day Demand Per ERU (gpd)	392
Maximum Supply Capacity (ERUs)	71,274
Storage Capacity	
Maximum Equalizing and Standby Storage Capacity (gal)	2,336,642
Equalizing and Standby Storage Requirement Per ERU (gal)	185
Maximum Storage Capacity (ERUs)	12,645
Transmission Capacity	
Transmission Capacity (gpd)	22,560,600
Maximum Day Demand Per ERU (gpd)	392
Maximum Transmission Capacity (ERUs)	57,575
Maximum System Capacity	
Based on Limiting Facility - Storage	12,645
Unused Available System Capacity	
Maximum System Capacity (ERUs)	12,645
Future (2028) ERUs	6,035
Surplus Capacity (ERUs)	6,610

A summary of the results of the 20-year projected system capacity analysis is shown in **Table 7-13**. The 20-year projected system capacity analysis includes improvements that are planned to be completed within the 20-year planning period, as described in **Chapter 9**. The results of the 2038 system capacity analysis indicate that the system capacity will be approximately 12,412 ERUs, based on the limiting component of the City's storage system. The 2038 water system will have a surplus of approximately 5,738 ERUs.

Table 7-13
2038 System Capacity Analysis

ERU-Based Demands	
Average Day Demand Per ERU (gpd)	178
Maximum Day Demand Per ERU (gpd)	392
Peak Hour Demand Per ERU (gpd)	705
Source Capacity - Intertie Supply	
Intertie Supply Capacities (gpd)	27,928,800
Maximum Day Demand Per ERU (gpd)	392
Maximum Supply Capacity (ERUs)	71,274
Storage Capacity	
Maximum Equalizing and Standby Storage Capacity (gal)	2,336,642
Equalizing and Standby Storage Requirement Per ERU (gal)	188
Maximum Storage Capacity (ERUs)	12,412
Transmission Capacity	
Transmission Capacity (gpd)	22,560,600
Maximum Day Demand Per ERU (gpd)	392
Maximum Transmission Capacity (ERUs)	57,575
Maximum System Capacity	
Based on Limiting Facility - Storage	12,412
Unused Available System Capacity	
Maximum System Capacity (ERUs)	12,412
Future (2038) ERUs	6,674
Surplus Capacity (ERUs)	5,738

8 | OPERATIONS AND MAINTENANCE

INTRODUCTION

The City of Snohomish's (City) water operations and maintenance program consists of the following elements.

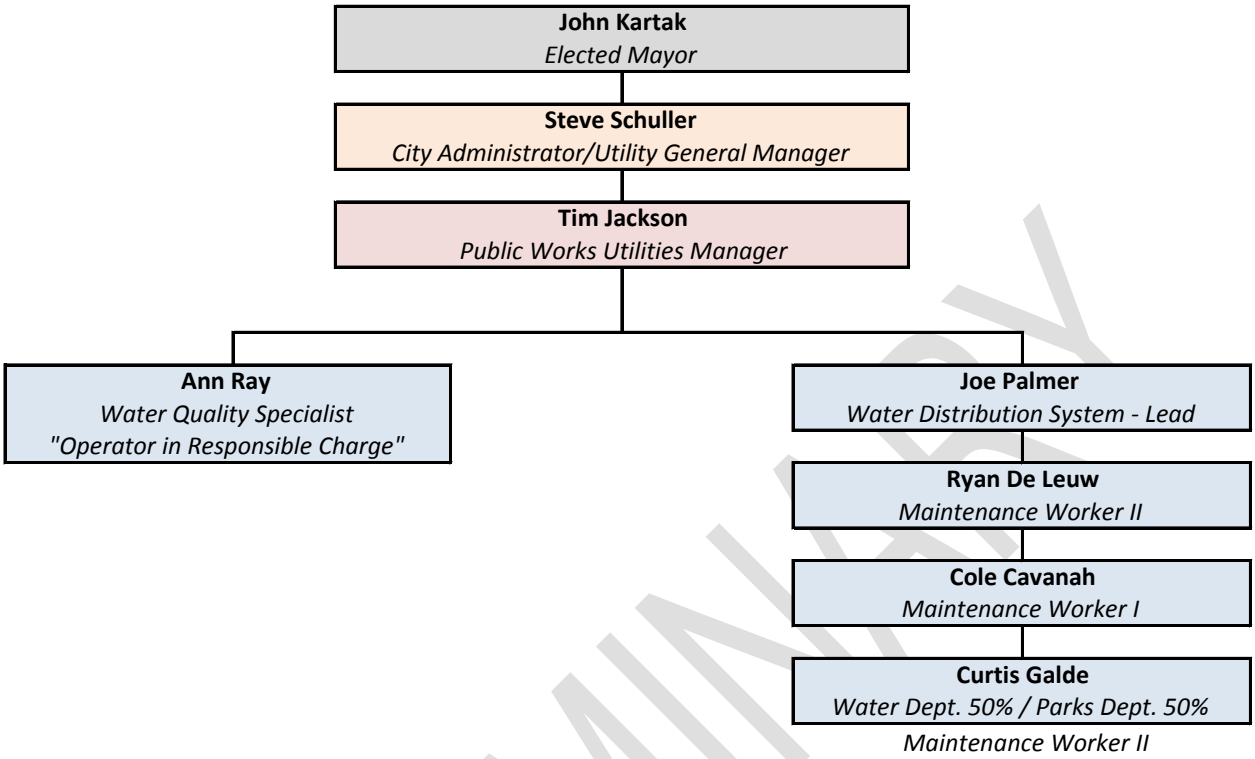
- Normal operation of the water supply and distribution systems.
- Emergency operation of the water system when one or more of the components is not available for normal use due to natural or man-made events.
- A preventive maintenance program to ensure the water system is receiving maintenance in accordance with generally accepted standards.
- A cross-connection control program, as required by law, to ensure that there is no compromise of the water system's integrity due to contamination introduced from a customer's operation.

NORMAL OPERATIONS

CITY PERSONNEL

The City's water division is part of the Public Works Department. The Public Works Utilities Manager reports to the Public Works Director. The Water Quality Control Specialist and Water Distribution System – Lead report to the Public Works Utilities Manager. Additional technical and support staff include administrative support, water resources, and a geographic information system (GIS) specialist. The department's organizational chart is shown in **Figure 8-1**. The essential functions of the various positions and groups are discussed later in this chapter.

Figure 8-1
Public Works Functional Organization Chart



PERSONNEL RESPONSIBILITIES

The key responsibilities of the water operations and maintenance management and staff are summarized below.

City Administrator/Utilities General Manager – Provides overall direction and guidance to the division; approves priorities and activities.

Public Works Utilities Manager – Under administrative direction, directs, manages, supervises, and coordinates the activities and operations of the Public Works Utilities Division within the Public Works Department, including , water distribution, stormwater and wastewater collections, and wastewater treatment services and activities.

Coordinates assigned activities with other divisions, departments, and outside agencies, and provides highly responsible and complex administrative support to the City Administrator/Utilities General Manager.

Water Distribution System – Lead – In charge of operating the water system, performing inspections and maintenance, sampling and relaying critical information, assessing facilities, and providing recommendations to the Utilities Manager. Under direction, leads, oversees, assigns, reviews, and participates in the more complex and difficult work of staff responsible for semi-skilled and skilled tasks involved in the construction, maintenance and repair of water utility systems. Ensures adherence to safe work practices and procedures; provides training to lower level personnel; and inspects potential job sites to determine the resources necessary for project completion.

Maintenance Worker – Under supervision (Maintenance Worker I) or general supervision (Maintenance Worker II), performs a variety of semi-skilled and skilled maintenance and repair tasks to the City's water system and other City-owned facilities, and operates maintenance and construction tools and equipment. This is a broad classification with individual positions assigned to specific functional areas; duties and assignments may overlap depending on the operational needs of the department and staffing levels.

Water Quality Specialist – Under direction of Public Works Utility Manager, performs a variety of duties involved in the prevention of water supply contamination by inspecting water systems and wastewater pre-treatment devices for conformance with standards and regulations; ensures the protection of publicly owned treatment works and the receiving waters. Reviews construction plans and specifications; administers the City's cross-connection control, pre-treatment, water use efficiencies, and water quality compliance programs; and performs a variety of routine and non-routine chemical field testing of water. Responds to water quality complaints and inquiries; provides information and assistance to other departments, contractors, engineers, and the general public in person, by telephone, or in the field; and maintains a variety of records and logs.

CERTIFICATION OF PERSONNEL

Washington State law (Chapter 246-292 Washington Administrative Code (WAC)) requires that the City's water system be operated under the direct supervision of a certified operator, or Water Distribution Manager. In addition, specialty certification is required for backflow device testing and cross-connection control program activities and management. **Table 8-1** shows the current certifications of the City's water operations and maintenance staff. It is City policy to maintain a well-qualified, technically trained staff. The City annually allocates funds for personnel training, certification, and membership in professional organizations such as the American Water Works Association (AWWA). The City believes that the time and money invested in training, certification, and professional organizations are repaid many times in improved safety, skills and confidence.

Table 8-1
Personnel Certification

Name	Position	Certification
Tim Jackson	Public Works Utilities Manager	WDM-1, CCS
Ann Ray	Water Quality Specialist	WDM-2, CCS
Joe Palmer	Water Distribution System - Lead	WDM-2, CCS
Ryan De Leuw	Maintenance Worker II	WDM-2, CCS
Curtis Galde	Maintenance Worker I	CCS

Certification Definitions

CCS - Cross-Connection Control Specialist
WDM - Water Distribution Manager

AVAILABLE EQUIPMENT

The water division has several types of equipment available for daily routine operation and maintenance of the water system. The equipment is stored at the City Shop. If additional equipment is required for specific projects, the City will rent or contract with a local contractor for the services needed. A stock of supplies in sufficient quantities for normal system operation and maintenance and short-term emergencies is stored at the City Shop. A list of major equipment used in the normal operation of the water system is shown in **Table 8-2**. In addition, equipment from other City divisions, such as street, collections, and parks, is available if needed.

Table 8-2
Water Department Equipment List

Quantity	Description	Size/Special Features
	Equipment Inventory	
1	Pickup	1/2 Ton
2	Pickup	3/4 Ton
1	Van	1 Ton
1	Truck	Utility Body
1	Flat Bed Truck	
1	Dump Truck	
1	Cement Mixer	
1	Trailer	
3	Backhoe	
1	Tractor	
3	Lawn Mower	
1	Lawn Mower	Flail
1	Compactor	Jumping Jack
2	Generator	Portable
5	Weed Eater	
3	Pipe Saw	
3	Chain Saw	
Varies	Miscellaneous Equipment	

SERVICE, EQUIPMENT, AND SUPPLY VENDORS

The list in **Table 8-3** identifies the typical vendors for service, materials, supplies, and chemicals. The City maintains adequate supplies and materials for normal operation. The suppliers are local and maintain adequate materials for unusual needs.

Table 8-3
Service, Equipment, and Supply Vendors List

Name	Address	Phone	Products
Laboratory and Analytical Services			
City of Everett	11525 Knudson Road Burlington, WA 98233	425-257-8230	Water Quality Testing
AMTest	13600 NE 136th Place, Suite C Kirkland, WA 98034	425-885-1664	Water Quality Testing
Materials and Supplies			
United Pipe and Supply	13019 41st Avenue NE Marysville, WA 98271	360-653-1671 877-832-5192	Pipes, Valves, Fittings
HD Fowler	6016 29th Drive NE Marysville, WA 98271	360-651-2400 800-659-6199	Pipes, Valves, Fittings
HB Jaeger Company, LLC	10105 Airport Way, Suite A Snohomish, WA 98296	360-568-5958 425-486-5958	Pipes, Valves, Fittings
Ferguson Enterprises, Inc.	1012 132nd SW Everett, WA 98204	425-742-4748	Pipes, Valves, Fittings
GC Systems, Inc.	2310 Inter Avenue Puyallup, WA 98372	253-939-8322 800-525-9425	Valve Maintenance
Equipment and Service			
Service Electric Co., Inc.	1615 First Street Snohomish, WA 98290	800-577-4779 360-568-6966	Electrical Services
Snohomish County PUD No. 1	2320 California Street Everett, WA 98206	425-783-1000	Electrical Services
Northern Systems, LLC Art Larson	9009 W Mall Drive, APT 2108 Everett, WA 98208	425-210-2381 425-745-5466	System and Control Integration
RH2 Engineering, Inc. James Swanson	22722 29th Drive SE, Suite 210 Bothell, WA 98021	425-951-5400 425-951-5386	System and Control Integration
Water and Wastewater Automation, LLC	7220 52nd Street NE Marysville, WA 98270	360-657-0300 425-739-0005	Water and Wastewater Support
PumpTech, Inc.	13251 Northup Way Bellevue, WA 98005	888-644-6686 425-644-8501	Pumps and Service
D & G Backhoe, Inc.	2808 Old Hartford Road Lake Stevens, WA 98258	425-355-0348 425-334-3918	Excavation
Ace Equipment Rentals	702 2nd Street Snohomish, WA 98290	360-568-1300	Machinery Rentals
Top Food and Drug	1301 Avenue D Snohomish, WA 98290	360-568-1395	Bottled Water

ROUTINE OPERATIONS

Routine operations involve the analysis, formulation, and implementation of procedures to ensure the facilities are functioning efficiently and meeting pressure and water quality requirements and other system demands.

The utility's maintenance procedures should be updated to meet current standards as time allows. Emergency repairs are made promptly so customers receive high-quality water service. The City plans to use this chapter as the water division’s established preventive maintenance program and schedule.

CONTINUITY OF SERVICE

As a municipality, the City has the structure, stability, authority, and responsibility to ensure that water service will be continuous. For example, changes in the City government or staff would not have a pronounced effect on the City's customers or quality of service.

ROUTINE WATER QUALITY SAMPLING

The Washington State Department of Health (DOH) has adopted federal regulations that specify minimum monitoring requirements for water systems. The sampling requirements depend on the population served, source type, and treatment provided. The specific requirements are contained in WAC 246-290-300. The City currently performs all routine coliform sampling throughout the distribution system, taking a total of ten samples each month. A further discussion of the water quality monitoring program is contained in **Chapter 6** and **Appendix J** of this Water System Plan (WSP).

CROSS-CONNECTION CONTROL

The City drafted a cross-connection control program in 1999 to comply with WAC 246-290-490, pertaining to contamination of potable water due to cross-connections. Currently, the City's water division is working closely with the City's building division to arrive at mutual agreement on cross-connection control requirements. Backflow prevention devices are required at service connections where a potential for contamination exists. The Cross-Connection Control Plan was updated with this WSP and is included in **Appendix G**, along with a list of cross-connection control devices under City control. The staff members with Cross-Connection Control Specialist certifications are shown in **Table 8-1**.

RECORDKEEPING AND REPORTING

DOH has enacted regulations for recordkeeping and reporting procedures for operations and water quality testing that may be found in WAC 246-290-480.

Recordkeeping

Records shall be kept for chlorine residual and other information as specified by DOH. DOH requires retention of critical records dealing with facilities and water quality issues as summarized below.

- Bacteriological analysis results: 5 years.
- Chemical analysis results: for as long as the system is in operation.
- Daily source meter readings: 10 years.
- Water treatment plant records: 10 years.
- Other records of operation and analyses as may be required by DOH: 3 years.
- Documentation of actions to correct violations of primary drinking water standards: 3 years after last corrective action.

- Records of sanitary surveys: 10 years.
- Project reports, construction documents and drawings, inspection reports, and approvals: life of the facility.
- Where applicable, daily records of chlorine residual, fluoride level, water treatment plant performance, and turbidity: 3 years.

The City's recordkeeping procedure is as follows.

1. Water quality records, including all sampling results, are filed at the City Shop and are backed up electronically to a local server on an annual basis.
2. Cross-connection records and all customer letters are filed at the City Shop and are backed up electronically to a local server. Customer letters also are filed at City Shop in the property files for each individual address.
3. Backflow assembly tester certifications and test reports are filed at the City Shop.

Reporting

The City's 24-hour notice procedures are consistent with DOH and U.S. Environmental Protection Agency guidelines and are described in the City's Emergency Response Plan. The City utilizes standard DOH notices as applicable. Mr. Steve Schuller, City Administrator/Utilities General Manager, is the person identified to speak on the City's behalf as these situations dictate.

The City must report the following to DOH:

- Within 48 hours: A failure to comply with the primary standards or treatment technique requirements specified in Chapter 246-290 WAC.
- Within 48 hours: A failure to comply with the monitoring requirements specified in Chapter 246-290 WAC.
- Within 48 hours: A violation of a primary maximum contaminant level (MCL).
- Within 1 business day: A backflow incident per WAC 246-290-490(8)f.
- As soon as possible, but no later than 24 hours after the violation is known: National Primary Drinking Water Regulation (NPDWR) violations and situations with significant potential to have serious adverse effect on human health as a result of short-term exposure, which require Tier 1 public notices per 40 Code of Federal Regulations (CFR) 141.202.

The City must submit all applicable reports to DOH as required by Chapter 246-290 WAC. Monthly reports are due by the tenth day of the following month, unless otherwise specified. Daily and annual source meter readings must be made available to DOH on request. Records regarding the status of monitoring waivers must be submitted during each monitoring cycle. Waiver information is updated annually by DOH, and the utility is provided with a testing schedule.

A water facilities inventory and report form (WFI) must be submitted to DOH within 30 days of any change in name, category, ownership, or responsibility for management of the water system.

The City must notify DOH of the presence of:

- Coliform in a sample within 10 days of notification by the testing laboratory; and

- Fecal coliform or *E. coli* in a sample by the end of the business day in which the City is notified by the testing laboratory.

When a coliform MCL violation is determined, the City must:

- Notify DOH within 24 hours of determining acute coliform MCL violations;
- Notify DOH before the end of the next business day when a non-acute coliform MCL is determined; and
- Notify water customers in accordance with WAC 246-290-71001 through 71007 and the U.S. Environmental Protection Agency's (EPA) Public Notification Rule.

If volatile organic compound monitoring is required, a copy of the results of the monitoring and any public notice must be sent to DOH within 30 days of receipt of the test results.

Other Reports

Several other reports are required for Washington State agencies, including the Department of Revenue, Department of Labor and Industries, Department of Social and Health Services, Department of Ecology, and the Employment Security Department. All these reports are completed according to their instructions.

OPERATIONS AND MAINTENANCE RECORDS

Records are stored at the City Shop or in the City's computer database for the following items.

- Backflow and cross-connections
- Confined spaces
- Hydrant repairs
- Hydrant meter forms
- Hydrant databases
- Precipitation
- Water usage
- Water used for construction
- Water consumable inventory
- Water maintenance
- Water main notes
- Water worksheets
- Water main flushing
- Bacteriological tests
- Inorganic chemical tests
- Volatile organic compound tests
- Synthetic organic compound tests
- Water samples from new developments and Capital Improvement Program projects

- Lead and copper tests
- Chlorination levels
- Customer complaints
- Vandalism forms

SAFETY PROCEDURES AND EQUIPMENT

Safety is the concern and responsibility of all water operations and maintenance staff. To maintain the highest level of safety, the City has taken steps toward educating its staff and providing resources to ensure a safe working environment. The City continuously improves its safety program as the requirements and affected operations change. AWWA publishes a manual entitled *Safety Practices for Water Utilities* (M3) that describes safety programs and provides guidelines for safe work practices and techniques for a variety of water utility work situations.

The following procedures should be followed for operations and maintenance tasks that involve the most common potential workplace hazards in the City's water system.

Use of Chlorine and Chlorine Products

Standard Procedure – Handle with care, provide adequate ventilation, and wear safety glasses and rubber gloves.

Working in Confined Spaces

Standard Procedure – Follow state requirements for confined space entry.

Working around Heavy Equipment

Standard Procedure – Obtain proper training and follow all safety procedures. Use noise protection equipment.

Working in Traffic Areas

Standard Procedure – Wear proper clothing and provide adequate signage and flagging for work area. Certified flaggers are used when traffic management requires flagging around a work site.

Working on or around Water Reservoirs

Standard Procedure – Follow proper safety harness procedures for working on tall structures. Entry of a reservoir is a confined space work area and those regulations and procedures apply.

Working on Asbestos Cement Water Main

Standard Procedure – Obtain proper training and follow all safety procedures for working with asbestos materials.

The water utility personnel are required to take training courses on the following topics.

- Asbestos Cement Pipe Handling
- Confined Space Entry
- Hazardous Waste

- Fall Protection
- Hearing Protection
- Competent Persons
- Laboratory Safety
- Electrical Hazards
- Heavy Equipment Operation
- CPR and First Aid
- Blood-Borne Pathogens
- Traffic Flagging
- Lockout-Tagout
- Water Distribution
- Cross-Connection Control

The City's facilities are equipped with confined space entry equipment, oxygen-gas meters, and lockout-tagout equipment where appropriate. Each City vehicle is equipped with first aid and blood-borne handling kits. The City also owns flagging signs and equipment for safe handling of traffic.

The Public Works Department follows all appropriate Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations in its day to day operations and complies with the following State requirements.

- WAC 296-809-500 to 800: Entry into confined spaces.
- WAC 296-155-650 to 66411 Part N: Shoring of open ditches.
- WAC 296-155-429: Lockout-tagout for work on energized or de-energized equipment or circuits.
- Chapter 296-155 WAC Part C1: Fall restraint for access to the top of the City's water reservoirs.
- U.S. Department of Transportation Federal Highway Administration *Manual on Uniform Traffic Control Devices*: Traffic control for work in the public right-of-way.

EMERGENCY OPERATIONS

CAPABILITIES

The City is equipped to accommodate short-term system failures and abnormalities. The general water system emergency response capabilities are as follows.

Multiple Supply Capability

The City could lose operation of an intertie along Transmission Line No. 5 without adversely impacting its ability to meet the normal demands of customers by opening zone valves and

supplying water to the impacted zone(s) from other areas of the distribution system. Service to customers along the Water Treatment Plant Transmission Main is provided solely through an intertie with the Snohomish County Public Utility District No. 1 (PUD) described in **Chapter 2**. These customers do not have a redundant source of supply.

The City has signed interlocal agreements with adjacent utilities connected to the City of Everett's (Everett) transmission lines to supplement the distribution system in the event of an emergency.

Reservoirs

Water storage is provided by two active reservoirs that are located at two different sites. Reservoir No. 3, located in the 362 Zone, is filled from the Everett supply and can serve the 218 Zone through pressure reducing stations. Reservoir No. 2, located in the 218 Zone, is filled through PRVs from the 362 Zone, and can also be filled with water from the PUD via the Water Treatment Plant Transmission Main. The 384, 425, 438, and 450 Zones are directly served by Everett's Transmission Line No. 5 and do not have storage facilities currently.

Distribution System

The City has attempted to loop water mains wherever possible to improve water circulation (i.e., water quality) and minimize impacts to the system in the event that a portion of the distribution system must be taken out of service for maintenance or repairs. Additionally, the zone valves between the 362, 384, 425, 438, and 450 Zones can be opened to allow Reservoir No. 3 to supply all of the northern zones.

Emergency Equipment

The City is equipped with the necessary tools to deal with common emergencies. If a more serious emergency should develop, the City will hire a local contractor to make repairs to alleviate the emergency condition.

Emergency Telephone

The water division has an established emergency procedure for the public to contact water division personnel through the City Hall phone system (360-568-3115) or 911. The police or answering service can reach the water division on-call personnel. Emergency contact information, including cell phone, and home phone numbers, is provided to each City department.

On-Call Personnel

The on-call person is required to respond to a call within 60 minutes, but can often respond to a call within 30 minutes. A list of emergency telephone numbers is provided to each on-call employee. New employees are not placed on call until they are familiar with the water system and maintenance procedures and are properly certified by the State of Washington.

CONTACTS

The City maintains a list of adjacent utility contacts for routine and emergency use, shown in **Table 8-4**.

Table 8-4
Utility and Agency Contacts

Agency	Contact	Phone	Address
Utility Contacts			
City of Everett	Water Division	425-257-8800	3200 Cedar Street Everett, WA 98201
Snohomish County PUD No. 1	Water Division	425-738-8450	2320 California Street Everett, WA 98206
Cross Valley Water District	Mike Johnson	360-668-6766 425-339-7742	8802 180th Street SE Snohomish, WA 98296
Schluter Water System	Ted and Laura Stonebridge	360-794-6758	13402 247th Avenue SW Monroe, WA 98272
Agency Contacts			
Washington State Department of Health	Erika Lindsay	253-395-6771	20435 72nd Avenue S, Suite 200 K17-12 Kent, WA 98032

Material Readiness

Some critical repair parts, tools, and equipment are kept on-hand and in fully operational condition. As repair parts are used, they are re-ordered. Inventories are kept current and are adequate for most common emergencies that reasonably can be anticipated. The City has ready access to an inventory of repair parts, including parts required for repair of each type and size of pipe within the service area.

EMERGENCY RESPONSE PLAN

In 2004, the City prepared an *Emergency Response Plan* (ERP) to assist in preparing for emergency events related to the City's water supply and distribution system. The ERP should be updated in accordance with the requirements of the Bio-Terrorism Act of 2002 amendments to the Safe Drinking Water Act.

The updated ERP should contain a vulnerability assessment of the City's water system facilities, a contingency operation plan for responding to emergency events, a list of water personnel responsible for making decisions in emergency situations, and other elements. The ERP will contain confidential and/or sensitive information and is exempt from the Public Disclosure Act. However, it will be available to City staff and can be reviewed by regulatory agencies on a need to know basis.

PUBLIC NOTIFICATION

The Federal Safe Drinking Water Act (SDWA), WAC 246-290-71001 through 71007, and the EPA's Public Notification Rule require purveyors to notify their customers if any of the following conditions occur.

- NPDWR violations.
- Failure to comply with a primary MCL described under WAC 246-290-310.
- Failure to comply with a surface water treatment technique.
- Failure to comply with monitoring requirements under Chapter 246-290 WAC.

- Operation under a variance or exemption.
- Failure to comply with the requirements of any schedule that has been set under a variance or exemption.
- Failure to comply with testing procedures as prescribed by drinking water regulations.
- Occurrence of a water-borne disease outbreak or other water-borne emergency.
- Exceedance of the secondary maximum contaminant level (SMCL) for fluoride.
- Availability of unregulated contaminant monitoring data.
- Issuance of a departmental order.
- Failure to comply with a departmental order.
- Issuance of a category red operating permit by DOH.

Public notice requirements for each type of violation or situation are organized into three tiers per 40 CFR 141.201 through 208 and are based on the seriousness of the violation and the potential for adverse health effects. Tier 1 public notices are required for NPDWR violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure. Public notices in this tier must be provided as soon as possible (no later than 24 hours after the violation is known). DOH must also be notified within this timeframe, and it may require repeat or additional notices.

Tier 2 public notices are required for all other NPDWR violations and situations not covered in Tier 1 with the potential to have serious adverse effects on human health. Public notices under Tier 2 requirements, with the exception of turbidity violations, must be provided as soon as possible, but no later than 30 days after the violation is known. Turbidity violations must be reported to DOH as soon as possible, but no later than 24 hours after the violation is known, to determine whether a Tier 1 public notice will be necessary. Repeat notices must be issued for as long as the violation persists.

All other NPDWR violations and situations not included in Tier 1 and Tier 2 are grouped within Tier 3. Tier 3 public notices must be provided within 1 year of the City learning of the violation or beginning operations under a variance or exemption. The notice must be repeated annually for as long as the violation, variance, exemption, or other situation persists.

PREVENTIVE MAINTENANCE

Maintenance schedules that meet or exceed manufacturers' recommendations have been established for all critical components in the water system. The following schedule is used as a minimum for preventive maintenance, and manufacturers' recommendations should be followed where conflict exists.

STORAGE FACILITIES

Daily	Visual and audio inspections. Check security and inspect facilities for proper operation.
Twice Yearly	Check interior condition, vents, hatches, etc. on tanks.

As Needed	Clean and/or repaint interior and exterior as needed on tanks (estimated 10- to 20-year frequency).

DISTRIBUTION SYSTEM

Annually or As Needed	Leak survey.
Annually	Flushing.

ENGINE GENERATOR SETS

Weekly	Operate to achieve normal operating temperatures; observe output.
Semi-Annually	Routine maintenance in accordance with manufacturers' recommendations.
As Needed	Replace fluids and filters in accordance with manufacturers' recommendations (or more frequently depending on amount of use).
As Needed	Perform tune-up; replace parts as necessary.

PRESSURE REDUCING STATIONS

Annually	Flush and check all valves and screens; check pressure settings; rebuild and paint every 5 years or as necessary.

ISOLATION VALVES

Annually	Operate fully opened/closed; uncover where buried; clean out valve boxes and repair as necessary. Repair and/or install valve marker posts as necessary.

HYDRANTS

Annually	Check for leakage and visual damage. Operate and flush; check drain rate; lubricate as necessary; measure pressure; paint as necessary. Check nozzle and cap threads, and clean and lubricate per manufacturers' recommendations. Replace lost and damaged gaskets. Check and operate the auxiliary valve in accordance with the valve maintenance schedule. Leave in open position. Inspect drain system to ensure proper drainage and protection from freezing weather.

METERS

2- to 20-Year Intervals	Time and measure volume of meter-delivered flow; dismantle, clean, and inspect all parts; replace worn or defective parts; retest meter for accuracy. Frequency varies based on meter size. Customer meters shall be replaced when reading problems are encountered.

AIR AND VACUUM RELEASE VALVE ASSEMBLIES

Annually	Flush and inspect; repair as needed.

BLOWOFF ASSEMBLIES

Annually	Flush and inspect; repair as needed.

TELEMETRY AND CONTROL SYSTEM

Daily	Backup program and data.
Monthly	Inspect cabinets and panels for damage, dust, and debris.
Semi-Annually	Inspect inside of cabinets and panels for damage, dust, and debris. Vacuum clean all modules. Test alarm indicator units. Clean and flush all pressure sensitive devices. Visually inspect all meters to coordinate remote stations.
Annually	Check master and remote telemetry units for proper operation; repair as necessary.

TOOLS AND EQUIPMENT

Rolling Stock	
Weekly	Check all fluid levels and brakes. Fluid levels and brakes are checked each time the equipment is used if less than weekly.
As Needed	Replace fluids and filters in accordance with manufacturers' recommendations (or more frequently depending on type of use); preventive maintenance per manufacturers' recommendation.

Tools	
As Needed	Clean after each use; lubricate and maintain as necessary; inspect for damage and wear before each use; preventive maintenance performed per manufacturers' recommendation.

STAFFING

The preventive maintenance procedures, as well as the normal and emergency operations of the utility, are described in the previous sections. The hours of labor and supervisory activity required to effectively execute the ongoing maintenance and operations schedules form the basis for determining adequate staffing levels.

OPERATIONS AND MAINTENANCE IMPROVEMENTS

The City is in the process of completing preliminary telemetry and supervisory control improvements that will greatly enhance the routine operation of the water system and fulfill the City's recordkeeping needs. These improvements allow the existing operations staff to concentrate on preventive maintenance, equipment repair, and other specialized needs of the organization, while eliminating the "human factor" from routine tasks and increasing system efficiency and reliability.

Additional telemetry and supervisory control improvements have been proposed and are addressed in **Chapter 9** as part of the City's Capital Improvement Program.

ASSET MANAGEMENT

The City utilizes a web-based application (accessible on desktop computers and tablets in the field) for asset management. The application is similar to a GIS system, and shows all City water system structures, pipes, and other facilities. Facility attributes can be marked for update in the field by City staff as necessary to improve accuracy. Results of maintenance and other inspections are also stored in the application and can be reviewed easily by field and office staff.

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9 | WATER SYSTEM IMPROVEMENTS

INTRODUCTION

This chapter presents proposed improvements to the City of Snohomish's (City) water system that are necessary to resolve existing system deficiencies and accommodate the projected growth of water customers. The water system improvements were identified from an evaluation of the results of the water system analyses presented in **Chapter 7**. The water system improvements have been sized to meet both the existing and future demand conditions of the system.

A Capital Improvement Program (CIP) number has been assigned to each proposed improvement. Numbers assigned to the improvements start at the south end of the system and generally increase incrementally to the north, as shown in **Figure 9-1**. The improvements also are illustrated in the hydraulic profile of the future water system (**Figure 9-2**). The improvements are organized and presented in this chapter according to the following categories:

- Recent Water System Improvements
- Water Main Improvements
- Pressure Zone Improvements
- Water Treatment Plant (WTP) Transmission Main Improvements
- Facility Improvements
- Miscellaneous Improvements

The remainder of this chapter presents a brief description of each group of improvements, the criteria for prioritization, the basis for the cost estimates, and the schedule for implementation.

DESCRIPTION OF IMPROVEMENTS

This section provides a general description of each group of improvements and an overview of the deficiencies they will resolve. Most of the improvements are necessary to resolve existing system deficiencies.

RECENT WATER SYSTEM IMPROVEMENTS

The water system has undergone several changes since the CIP was last updated. The City has implemented many of the recommended projects as scheduled in its previous CIP, as well as several others. **Table 9-1** lists the projects that have been completed. In addition to these major projects, the City has implemented many smaller projects, including water main replacements and extensions.

Table 9-1
Improvements Completed Since Previous CIP

Project Description	Year Completed
SCADA System Upgrades	2019, 2018, 2012
WTP Decommissioning/Transition to Everett Supply Only	2017
Reservoir No. 2 PRV	2016
Reservoir No. 1 Decommissioning	2014
Riverview Subdivision Water Main	2014
Shadowood Subdivision Water Main	2014
Snohomish PUD Intertie	2010

WATER MAIN IMPROVEMENTS

The following water main improvements were identified based on the results of the distribution and transmission system analyses discussed in **Chapter 7**. Most of the water main improvements will replace existing distribution water main and are grouped in the "Annual Water Main Replacement Program" project (CIP WM1). The individual water main improvement projects within this group are numbered 1 through 159, as shown in **Figure 9-1**. The other water main improvements, identified as individual projects (CIP WM2 through WM7) are mostly larger diameter water mains, new alignments, or other unique projects that do not entail the replacement and/or upsizing of existing water main.

Future Water Main Extensions and Replacements

All new water main extensions and replacements shall be installed in accordance with the City's Construction Standards and Specifications, which are contained in **Appendix H**. All new water main shall be cement-mortar lined ductile iron pipe and sized by hydraulic analysis to ensure that all pressure, flow, and velocity requirements, as stated in **Chapter 5**, are met. In general, new water mains that will carry fire flow in residential areas shall be a minimum of 8 inches in diameter and looped for multi-family residential developments and single-family transmission purposes. New water mains in commercial, business park, industrial, school, and airport areas shall be a minimum of 12 inches in diameter and looped. New water main extensions or replacements within Snohomish County (County) right-of-way require the appropriate County permits prior to construction of the improvements.

CIP WM1: Annual Water Main Replacement Program

Deficiency: Most of the water main improvements shown in **Figure 9-1** are required to resolve existing system fire flow deficiencies primarily caused by older, undersized water mains installed prior to the local government adoption of fire flow requirements.

Improvement: Replace existing water main with new ductile iron water main in accordance with the City's Construction Standards and Specifications, which are contained in **Appendix H**. The individual water main improvements grouped under this project are numbered 1, 2, 3, etc., as shown in **Figure 9-1**. The selection of specific projects will be accomplished bi-annually

during the City's budget development process and will be guided by the prioritization presented later in this chapter. This provides the City with the flexibility to coordinate these projects with other projects that may occur within the same area. An allowance of $100,000 per year has been established for the annual replacement of the water mains.

CIP WM2: State Route 9 Crossing at 30th Street

Deficiency: The northwest portion of the water system (Bickford Avenue corridor) currently is connected to the rest of the system at only one point (near the intersection of Bickford Avenue and Highway 9). The lack of a second connection point limits redundancy and the ability to provide water from the Bickford Avenue intertie to other parts of the system under fire flow conditions.

Improvement: Install approximately 2,700 linear feet (LF) of new 16-inch water main in 30th Street from King Charley's to Bickford Avenue, crossing under State Route (SR) 9. Construction of this project will improve system redundancy and, after CIP PZ1 is completed, allow the Business Park zoned areas of the system around King Charley's to be supplied water from the Bickford Avenue intertie under fire flow conditions.

CIP WM3: Loop 425 Zone Water Main between Terrace Avenue and Suncrest Drive

Deficiency: The distribution mains in the southern end of the 425 Zone currently are not looped due to a missing section between Terrace Avenue and Suncrest Drive (i.e., 15th and 16th Street). This limits redundancy and available fire flow in the southern end of the 425 Zone.

Improvement: Install approximately 500 LF of new 12-inch water main between Terrace Avenue and Suncrest Drive. Construction of this project will improve system redundancy and available fire flow in this area.

CIP WM4: Loop 362 Zone Water Main in 13th Street/Avenue A Intersection

Deficiency: There are adjacent 362 Zone water mains in the intersection of 13th Street and Avenue A that are not connected, limiting the available fire flow in this area.

Improvement: Install a short length of 12-inch-diameter water main in the intersection to connect the adjacent water mains. Completion of this project will improve the available fire flow in this area. CIP WM4 should be completed simultaneously with CIP WM1 Project 110, which upsizes adjacent existing water mains.

CIP WM5: St. Michael's Catholic School Water Main Improvement

Deficiency: The hydrants at St. Michael's Catholic School are currently connected to the 425 Zone, which currently is not capable of providing the required planning-level fire flow of 4,000 gallons per minute (gpm) to the school.

Improvement: Install approximately 300 LF of new 362 Zone 16-inch water main from the intersection of Pine Avenue and 15th Street to St. Michael's Catholic School. Connect the existing on-site hydrant piping to the new 362 Zone water main, which is capable of providing the planning-level fire flow. CIP WM5 should be completed simultaneously with CIP WM1 Project 130, which upsizes on-site water mains.

CIP WM6: Abandon Cast Iron Water Mains in 1st Street and Avenue E

Deficiency: The 8-inch cast iron water main from 1930 in 2nd Street from Avenue D to Avenue E, and the 6-inch cast iron water main from 1936 in Avenue E from 1st Street to 2nd Street have parallel 12-inch ductile iron water main from 1981. The 1930s water mains are no longer needed to provide fire flow and can be removed from service.

Improvement: Transition all services and hydrants along this alignment to the 12-inch water main and abandon the 1930s water mains.

CIP WM7: Investigation and Potential Replacement of Terrace Avenue Water Main North of Stone Ridge Drive

Deficiency: Hydrant flow testing conducted as part of the Water System Plan (WSP) effort indicated that there are potentially high friction losses in the 8-inch water main between the 425 Zone Terrace Avenue intertie and Stone Ridge Drive. Investigating and addressing this condition will improve the available pressure and fire flow in the 425 Zone.

Improvement: Investigate this section of water main to determine if the high friction loss is caused at the intertie or in the water main. Address any partially closed or malfunctioning valves. If the cause is determined to be due to tuberculation or other deterioration of the water main, replace the section with approximately 480 LF of new 8-inch-diameter water main.

PRESSURE ZONE IMPROVEMENTS

The following pressure zone improvements will improve low and high pressure problems, available fire flow, and system redundancy. A brief description of the existing deficiencies and proposed improvements is provided below.

CIP PZ1: Conversion of 384, 438, and 450 Zones to 362 Zone

Deficiency: The 384, 438, and 450 Zones currently are closed zones (i.e., do not have water storage) and are supplied with water directly from Transmission Line No. 5 through three interties. These zones do not have any supply redundancy, other than manual opening of zone valves to connect them to the 362 Zone under emergency conditions.

Improvement: Convert the 384 Zone to the 362 Zone by opening the closed zone valve at Bonneville Avenue and 16th Street. Convert the 438 and 450 Zones to the 362 Zone by opening the closed zone valves at Park Avenue and 22nd Street, Park Avenue and 20th Street, and Pine Avenue and 20th Street. Completion of this project will improve overall system redundancy.

CIP PZ2: Re-Open Closed Valve to Re-Establish 362 Zone Looping

Deficiency: There is currently a closed valve in the 362 Zone on Pine Avenue between 15th Street and 16th Street that limits the available pressure and fire flow throughout the zone.

Improvement: Open the closed valve to re-establish the water main loop in the northern portion of the 362 Zone. Completion of this project will improve the available pressure and fire flow throughout the zone.

CIP PZ3: Conversion of 218 Zone Services at 10th Street and Pine Avenue to 362 Zone

Deficiency: A fire hydrant located in the parking lot at Emerson Elementary School and service connections at 10th Street and Pine Avenue currently are supplied water from the 218 Zone.

These locations currently have pressures less than 30 pounds per square inch (psi) under peak hour demand conditions.

Improvement: Connect these services to the adjacent 362 Zone water main in 10th Street and Pine Avenue. Completion of this project will improve the available pressure at these services. Planning for this project is underway..

WTP TRANSMISSION MAIN IMPROVEMENTS

The following WTP Transmission Main improvements will improve reliability and redundancy for the transmission main customers. A brief description of the existing deficiencies and proposed improvements is provided below.

CIP TM1: WTP Transmission Main Maintenance and Repair

Deficiency: The WTP Transmission Main is aging and requires frequent maintenance and repair. The costs associated with maintaining and repairing the transmission main are to be borne by the customers served by the transmission main.

Improvement: Include $100,000 annually in the CIP for maintenance and repair of the WTP Transmission Main.

CIP TM2: Upsize PUD Intertie at Robe-Menzel Road

Deficiency: The existing Snohomish County Public Utility District No. 1 (PUD) intertie at the Robe-Menzel Road does not have sufficient capacity to supply the peak hour demand to the WTP Transmission Main customers. Setpoint adjustments for this intertie have also been recommended per the 2017 *PUD Intertie Analyses Technical Memorandum* prepared by RH2 Engineering, Inc.

Improvement: Upsize the PUD intertie at the Robe-Menzel Road and adjust setpoints per the recommendations in the 2017 *PUD Intertie Analyses Technical Memorandum*.

CIP TM3: Additional PUD Intertie at Machias

Deficiency: The WTP Transmission Main is supplied by one intertie with the PUD on Robe-Menzel Road. During repair or maintenance of the transmission main, customers connected to the transmission main downstream of the repair/maintenance location may not have service.

Improvement: Install a second intertie with the PUD in Machias. This will improve redundancy for the transmission main customers and allow for repairs and maintenance along the transmission main with less impact to customers.

CIP TM4: OK Mill Road Transmission Main Sliplining

Deficiency: The 3.7-mile section of the WTP Transmission Main along OK Mill Road, from Creswell Road to South Machias Road, has a history of breaks and other maintenance issues.

Improvement: Slipline the existing 18-inch-diameter AC transmission main with 12-inch diameter high-density polyethylene (HDPE) pipe.

FACILITY IMPROVEMENTS

The following water system facility improvements were identified from the results of the water system analyses that are discussed in **Chapter 7**. The improvements are primarily necessary to resolve existing system deficiencies, but have been sized to accommodate projected growth.

CIP F1: 362/425 Zone Booster Pump Station

Deficiency: The City has a future storage deficiency in the Reservoir No. 3 operating area and requires an additional source of supply to provide planning-level fire flow to the 425 Zone.

Improvement: Install a new booster pump station (BPS) that will have the capability to pump water to both the 362 Zone and the 425 Zone. This BPS will allow the surplus storage in the 218 Zone to be utilized in the 362 Zone, which has a storage deficiency at the end of the 20-year planning period. The BPS also will provide fire flow to the 425 Zone, which is currently limited by the 1,500 gpm capacity of the 425 Zone Terrace Avenue intertie. For cost estimating purposes, a BPS capacity of 5,000 gpm has been assumed. The sizing and location of the pump station should be reviewed and revised as necessary during the predesign effort prior to construction of the BPS.

CIP F2: WTP Decommissioning Study

Deficiency: The City has taken the Pilchuck River WTP offline and has no future plans to use this source. The WTP building and site needs to be properly decommissioned.

Improvement: Conduct an engineering study and recommend the necessary actions to properly decommission the Pilchuck River WTP and transition the site for its future intended use.

MISCELLANEOUS IMPROVEMENTS

The following miscellaneous improvements are planning efforts and program elements that are required to comply with various water regulations or are improvements that do not fit into one of the previous categories.

CIP M1: Telemetry at All Interties

Deficiency: The City's supervisory control and data acquisition (SCADA) system does not currently monitor the flow rate at each City of Everett intertie. Thus, there is insufficient information to determine the peaking factors of the system, which has a significant impact on future system planning and design.

Improvement: Install flow meters and telemetry systems as needed to improve quality and quantity of available information from the City of Everett interties.

CIP M2: In-Line Isolation Valve Installation Program

Deficiency: Areas of the water system have in-line isolation valves spaced at distances greater than the City standard of 600 feet.

Improvement: Install approximately one in-line isolation valve per year. This is an ongoing program to ensure the distance between in-line isolation valves is no greater than 700 feet.

CIP M3: Storz Hydrant Fitting Installation Program

Deficiency: Many of the older hydrants within the City's water system are not equipped with Storz hydrant fittings that allow firefighters to quickly connect to a hydrant.

Improvement: Install approximately 15 Storz hydrant fittings a year. This is an ongoing program to ensure all hydrants within the City's water system have Storz hydrant fittings.

CIP M4: Water Use Efficiency Program

Deficiency/Requirement: Several water use efficiency measures must be carried out on an ongoing basis to comply with State water use efficiency requirements.

Improvement: The City will continue to implement its water use efficiency measures on an ongoing basis.

CIP M5: WSP Update

Deficiency/Requirement: WAC 246-290-100 requires that the City's WSP be updated every 10 years and submitted to the Washington State Department of Health for approval.

Improvement: Update the WSP every 10 years to meet the requirements that are in effect at the time of the update.

CIP M6: Update Emergency Response Plan and Risk and Resilience Assessment

Deficiency/Requirement: America's Water Infrastructure Act of 2018 requires the City to develop or update its Risk and Resilience Assessment by June 30, 2021, and its Emergency Response Plan by December 30, 2021.

Improvement: Develop or update these documents by the required deadline.

ESTIMATING COSTS OF IMPROVEMENTS

Project costs for the proposed improvements were estimated based on costs of similar, recently constructed water projects in the City and around the Puget Sound area and are presented in 2019 dollars. The project cost estimates include the estimated construction cost of the improvement, as well as indirect costs estimated at 35 percent of the construction cost for engineering preliminary design, final design, and construction management services, permitting, legal, and administrative services. The project cost estimates include a 20-percent contingency and sales tax of 9.2 percent.

Project cost estimates for water main projects were determined from the water main unit costs (i.e., cost per foot length) shown in **Table 9-2** and the proposed diameter and approximate length of each improvement.

Table 9-2
Water Main Unit Costs

Water Main Diameter (inches)	Project Cost Per Foot Length (2019 $/LF)
8	$314
12	$347
16	$380
18	$414

The unit costs for each water main size are based on estimates of construction-related improvements, such as materials and labor for the water main installation, water services, fire hydrants, fittings, valves, connections to the existing system, trench restoration, asphalt surface restoration, other work necessary for a complete installation, indirect costs, contingency, and sales tax. Additional costs were added to some water main improvements to cover anticipated, increased costs related to the project location and degree of difficulty.

PRIORITIZING IMPROVEMENTS

The water system improvements were evaluated against established criteria to schedule projects that will correct the most deficiencies and meet the greatest need for improvement prior to projects correcting fewer deficiencies. A description of the criteria and method for prioritizing each category of improvements is provided below.

WATER MAIN IMPROVEMENTS

Table 9-3 lists criteria that were established for prioritizing the water main improvements. The criteria are based on the underlying deficiencies of the existing water main that will be replaced by the proposed water main improvements. The criteria are arranged in five different categories with a weight factor assigned to each category. The criteria given the most weight are the Existing Water Main Maintenance/Breaks and the Existing Water Main Fire Flow Capability categories.

Table 9-3
Water Main Improvements Priority Ranking Criteria

Points	Category	Weight Factor	Weighted Points
	Existing Water Main Maintenance/Breaks		
3	High Maintenance Requirements/High Frequency of Breaks	4	12
2	Annual Maintenance/Low Frequency of Breaks	4	8
1	No Maintenance and No History of Problems	4	4
	Existing Water Main Fire Flow Capability		
3	Available Fire Flow is 74% or Less of Required Fire Flow	4	12
2	Available Fire Flow is 75-89% of Required Fire Flow	4	8
1	Available Fire Flow is 90% or Greater of Required Fire Flow	4	4
	Existing Water Main Year of Installation		
3	Unknown or Before 1970	3	9
2	1970 - 1990	3	6
1	After 1990	3	3
	Existing Water Main Material		
3	Asbestos Cement or Unknown	3	9
2	Galvanized Iron, Steel, or Cast Iron	3	6
1	Ductile Iron or PVC	3	3
	Existing Water Main Benefit Area		
3	Large Benefit Area (i.e. transmission main)	2	6
2	Medium Benefit Area	2	4
1	Small Benefit Area (i.e. localized area)	2	2

The Existing Water Main Maintenance/Breaks category ranks the water main improvements based on the number of reported leaks or breaks that the City currently has on record. The Existing Water Main Fire Flow Capability category ranks the water main improvements based on the ability of the existing water mains to provide the required fire flow, as determined from the results of the hydraulic analyses in **Chapter 7**. The Existing Water Main Year of Installation category ranks the water main improvements based on the age of the existing water mains. The Existing Water Main Material category ranks the water main improvements based on the material of the existing water main. The Existing Water Main Benefit Area category ranks the water main improvements based on the size of the area that will benefit from the replacement.

The water main priority ranking criteria were applied to the annual water main replacement projects, which are grouped under CIP WM1. CIP WM1 Projects 1 through 159, as shown in **Figure 9-1**, are presented in **Table 9-4** and sorted by CIP number with their priority ranking. The CIP projects that received a ranking of "high" based on the criteria shown in **Table 9-3** are presented in **Table 9-5**.

Table 9-4
Prioritized Annual Water Main Replacement Projects (Sorted by Number)

CIP No.	Priority		Estimated Cost	Size		Description		
	Rank	Points		Length (ft)	Diam (in)	In	From	To
1	M	30	$319,000	1,012	8	Lincoln Ave	Center St	100th St SE
2	M	33	$97,000	306	8	Lincoln Ave	1st St	Center St
3	M	33	$215,000	684	8	Pine Ave/Center St	1st St	Lincoln Ave
4	M	33	$98,000	309	8	1st St	Pine Ave	Lincoln Ave
5	M	35	$111,000	353	8	1st St	Willow Ave	Lincoln Ave
6	M	33	$136,000	432	8	Alder Ave	1st St	Lincoln Ave
7	M	33	$703,000	1,633	8	Pine Ave	Grove St	2nd St
				544	12		2nd St	3rd St
8	H	41	$265,000	176	8	Willow Ave	Lincoln Ave	Rainier St
				336	12		Rainier St	Pearl St
				295	8		Pearl St	1st St
9	M	35	$316,000	907	12	1st St	Maple Ave	Alder Ave
10	M	30	$209,000	601	12	Pearl St	Maple Ave	Willow Ave
11	M	33	$213,000	611	12	Rainier St	Maple Ave	Willow Ave
12	M	33	$110,000	349	8	Wood St	Lincoln Ave	Pine Ave
13	M	33	$598,000	652	12	Wood St, Cypress Ave, Pilchuck Park Rd	Pine Ave	Pilchuck Park Rd
				1,180	8		Cypress Ave	End of WM
14	M	30	$167,000	480	12	Bowen St	Maple Ave	Lincoln Ave
15	M	33	$63,000	181	12	Maple Ave	2nd St	End of WM
16	M	33	$60,000	171	12	Maple Ave	2nd St	Bowen Ave
17	M	33	$197,000	626	8	Maple Ave	Rainier St	1st St
18	M	33	$129,000	371	12	Maple Ave	1st St	Dead End
19	M	35	$174,000	553	8	1st St	Union Ave	Maple Ave
20	H	36	$392,000	1,128	12	Cedar Ave	2nd St	Dead End
21	M	27	$104,000	297	12	Pearl St	Cedar Ave	Glen Ave
22	M	33	$199,000	572	12	Union Ave	2nd St	1st St
23	M	33	$586,000	1,687	12	2nd St	Union Ave	Pine Ave
24	M	33	$296,000	274	12	2nd St	Pine Ave	Cypress Ave
25	H	36	$1,725,000	5,488	8	2nd St, 92nd Ave SE, 113th Dr SE, 115th Dr SE	Cypress Ave	Dead Ends
26	M	35	$465,000	1,337	12	1st St	Ave D	Union Ave
27	M	33	$86,000	247	12	Ave A	1st St	Dead End
28	M	33	$544,000	787	12	Union Ave	2nd St	Central Elementary School
				859	8		Central Elementary School	5th St
29	M	30	$119,000	342	12	Central Elementary School	Union Ave	Glen St
30	L	25	$297,000	855	12	Glen St	5th St	Central Elementary School
31	M	33	$96,000	252	16	Glen St	Central Elementary School	End of WM
32	M	27	$341,000	1,084	8	Cedar Ave	3rd St	5th St
33	M	33	$118,000	375	8	3rd St	Cedar Ave	Maple Ave
34	M	33	$361,000	1,038	12	3rd St	Maple Ave	Cypress Ave
35	H	36	$199,000	522	16	Easement	3rd St	4th St
36	M	33	$590,000	1,041	8	Lincoln Ave	3rd St	5th St
				754	12		5th St	Maple Ave
37	M	35	$541,000	538	8	Pine Ave	3rd St	4th St
				1,068	12		4th St	6th St
38	M	33	$390,000	1,120	12	4th St, Cypress Ave	Pine Ave	End of WM
39	M	33	$709,000	543	12	Ave A	1st St	2nd St
				1,653	8		2nd St	5th St
40	M	33	$708,000	548	12	Ave B	1st St	2nd St
				1,645	8		2nd St	5th St
41	M	35	$526,000	1,671	8	5th St	Union Ave	Ave B
42	M	33	$192,000	550	12	Ave C	1st St	2nd St
43	M	33	$708,000	544	12	Ave D	1st St	2nd St
				1,651	8		2nd St	5th St
44	M	29	$462,000	687	16	Airport Way	1st St	Railroad Tracks
45	H	36	$2,311,000	4,760	16	Airport Way	Railroad Tracks	10520 Airport Way
46	M	33	$1,247,000	2,376	8	Airport Way, Marsh Road	10520 Airport Way	End of WM
47	H	36	$2,763,000	2,488	16	Lowell Snohomish Road	Airport Way	Highway 9
				5,777	8		Highway 9	End of WM
48	M	33	$519,000	8	12	Ave E	2nd St	2nd St
				1,642	8		2nd St	5th St
49	L	25	$516,000	1,640	8	Ave F	2nd St	5th St
50	M	33	$512,000	1,628	8	Ave G	2nd St	5th St

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size		Description		
	Rank	Points		Length (ft)	Diam (in)	In	From	To
51	M	33	$495,000	33	12	Ave H	2nd St	2nd St
				1,536	8		2nd St	5th St
52	M	33	$457,000	13	12	Ave I	2nd St	2nd St
				1,437	8		2nd St	5th St
53	M	27	$355,000	138	8	1st St	1st St	1st St
				896	12		1st St	1st St
54	L	24	$1,216,000	3,195	16	Easement	1st St	WWTP
55	M	35	$110,000	350	8	2nd St	Ave I	Ave J
56	L	25	$411,000	1,306	8	Ave J	2nd St	5th St
57	H	36	$160,000	362	12	4th St, Riverview Ln	Ave J	Riverview Ln
				108	8		4th St	Dead End
58	M	30	$232,000	666	12	5th St	Ave F	Ave H
59	M	33	$400,000	575	12	6th St	Pine Ave	6th St Bridge
60	M	33	$1,199,000	3,813	8	6th St, 86th St SE, 113th Ave SE, 85th St SE, Sexton Rd	6th St Bridge	End of WM
61	M	33	$265,000	761	12	Pine Ave	6th St	Maple Ave
62	L	24	$218,000	625	12	Garden Ct	Pine Ave	Dead End
63	M	33	$247,000	229	12	7th St	Pine Ave	Marquette Ave
				531	8		Marquette Ave	Mill Ave
64	H	36	$38,000	119	8	8th St	Victor Ave	Centennial Trail
65	L	25	$303,000	962	8	Ave J	5th St	7th St
66	M	33	$226,000	717	8	7th St, Ave K	Ave J	End of WM
67	L	25	$339,000	974	12	Ave H	5th St	7th St
68	M	30	$289,000	830	12	7th St	Ave H	1410 7th St
69	M	33	$104,000	330	8	91st Ave SE	Ludwig Rd	End of WM
70	M	33	$411,000	1,305	8	89th Ave SE	Ludwig Rd	End of WM
71	M	33	$114,000	326	12	6th St	Ave D	Ave C
72	H	37	$411,000	1,080	16	Ave D	PRV	7th St
73	L	24	$163,000	467	12	Easement	Ave D	Ave C East
74	M	33	$185,000	588	8	Ave B	6th St	7th St
75	H	36	$78,000	222	12	Easement	Ave A	End of WM
76	H	36	$140,000	401	12	Easement	Ave A	End of WM
77	H	36	$67,000	192	12	Easement	Ave A	End of WM
78	L	22	$311,000	987	8	9th St	Ave A	Root Ave
79	M	33	$87,000	275	8	Root Ave	9th St	Holiday St
80	M	30	$173,000	496	12	Root Ave	Holiday St	Interurban Trail
81	H	36	$177,000	561	8	Holiday St	Root Ave	Lincoln Ave
82	M	33	$295,000	937	8	Lincoln Ave	Holiday St	Maple Ave
83	M	33	$235,000	747	8	Pine Ave	9th St	Maple Ave
84	H	36	$65,000	187	12	Easement	9th St	End of WM
85	L	24	$111,000	319	12	Cleveland Ave	9th St	End of WM
86	M	33	$193,000	614	8	Harrison Ave	9th St	10th St
87	M	33	$91,000	288	8	Long St	Mill Ave	Pilchuck Ave
88	M	27	$139,000	399	12	McDonald Ave	10th St	End of WM
89	M	33	$104,000	328	8	Short St	Mill Ave	Pilchuck Ave
90	M	33	$148,000	468	8	10th St, Bluff Ave	Pilchuck Ave	End of WM
91	L	19	$94,000	296	8	11th St	Maple Ave	Railroad Ave
92	M	27	$29,000	92	8	E 11th St	Railroad Ave	W Orchard Ave
93	M	33	$419,000	1,332	8	Maple Ave	11th St	End of WM
94	M	27	$168,000	533	8	E 11th St	Orchard Ave	End of WM
95	M	33	$558,000	1,773	8	Orchard Ave	Gem St	End of WM
96	M	35	$470,000	539	12	Pine Ave	13th St	Pacifica Senior Living
				743	16		Pacifica Senior Living	10th St
97	M	33	$148,000	469	8	Emerson St	Pine Ave	End of WM
98	H	37	$38,000	108	12	Pine Ave	13th St	13th St
99	M	30	$97,000	308	8	Root Ave	10th St	Van Jan Ave
100	M	30	$140,000	401	12	Ryan Ct	Ave A	Dead End
101	H	36	$84,000	241	12	Apartments	10th St	End of WM
102	L	24	$81,000	232	12	11th St	Ave A	Dead End
103	H	36	$65,000	169	16	Driveway	10th St	Dead End
104	H	37	$75,000	196	16	Ave D	10th St	PRV

Table 9-4
Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size		Description		
	Rank	Points		Length (ft)	Diam (in)	In	From	To
105	H	36	$250,000	656	16	Easement	Bonneville Ave	End of WM
106	M	35	$412,000	1,186	12	Ave D	13th St	10th St
107	M	30	$481,000	1,383	12	Easement	10th St	10th St
108	M	33	$14,000	43	8	Hillcrest Dr	Madrona Dr	End of WM
109	M	33	$121,000	384	8	Summit St	Madrona Dr	End of WM
110	M	30	$30,000	85	12	Ave A	13th St	13th St
111	H	36	$43,000	122	12	Ave A	13th St	End of WM
112	H	36	$339,000	974	12	13th St, Easement	13th St	End of WM
113	H	36	$93,000	265	12	Easement	13th St	End of WM
114	M	33	$399,000	1,148	12	13th St, Easement	13th St	Ferguson Park Road
115	M	33	$124,000	324	16	Easement	Easement Loop	End of WM
116	M	30	$454,000	476	12	Ferguson Park Rd/Ferguson Park/Lakemount Dr	Ferguson Park Entrance	Ferguson Park Rd Gate
				916	8		Ferguson Park Rd Gate	Lakemount Dr/WM Loop Intersection
117	M	27	$232,000	608	16	Lakemount Dr	Ferguson Park WM Loop	End of WM
118	M	30	$23,000	59	16	Easement	Ave D	End of WM
119	L	24	$163,000	427	16	Easement	Ave D	End of WM
120	L	24	$167,000	437	16	Ave D	14th St	End of WM
121	H	36	$187,000	491	16	Ridge Ave	14th St	End of WM
122	L	24	$118,000	309	16	Easement	Bonneville Ave	End of WM
123	L	24	$67,000	174	16	Bonneville Ave	S of 14th St	S of 14th St
124	M	30	$701,000	1,382	12	Easement Loop	Bonneville Ave	Bonneville Ave
				580	16		Easement Loop	End of WM
125	H	36	$189,000	495	16	Easement	Bonneville Ave	End of WM
126	M	32	$159,000	417	16	Bonneville Ave	16th St	S of 15th St
127	M	33	$377,000	1,197	8	Lake View Ave	13th St	End of WM
128	M	35	$827,000	2,631	8	Park Ave	13th St	19th St
129	M	30	$47,000	147	8	18th Pl	Park Ave	Dead End
130	H	36	$206,000	539	16	St. Michael's Catholic Church	Easement	Easement
131	M	35	$227,000	652	12	Pine Ave	19th St	Meadow Pl
132	H	36	$132,000	419	8	19th St	Park Ave	End of WM
133	M	29	$100,000	287	12	Park Ave, 20th St	Park Ave	Lakewood Dr
134	M	32	$364,000	955	16	Park Ave	Cascade View Elementary	22nd St
135	M	32	$1,056,000	1,459	16	Bickford Ave, Bonneville Ave	19th St	16th St
136	M	30	$62,000	162	16	Easement	Bickford Ave	End of WM
137	H	36	$221,000	580	16	Easement	Bickford Ave	End of WM
138	H	36	$1,429,000	3,755	16	19th St/Business Park	Bickford Ave	End of WM
139	L	24	$229,000	658	12	Weaver Way	Seneca Ave	Dead End
140	L	24	$190,000	546	12	23rd St	Seneca Ave	Dead End
141	L	24	$194,000	509	16	Weaver Rd	W of Bickford Ave	W of Bickford Ave
142	H	36	$255,000	734	12	Business Park	Weaver Rd	Business Park
143	H	36	$44,000	114	16	Business Park	Bickford Ave	Business Park
144	L	18	$296,000	715	18	Bickford Ave	Snohomish Station	62nd Pl SE
145	L	24	$83,000	216	16	Snohomish Station	Snohomish Station	Snohomish Station
146	L	24	$32,000	83	16	Snohomish Station	Snohomish Station	Snohomish Station
147	L	24	$229,000	657	12	Snohomish Station	Snohomish Station	Snohomish Station
148	L	16	$4,000	10	16	Snohomish Station	Snohomish Station	Snohomish Station
149	L	24	$290,000	833	12	Snohomish Station	Snohomish Station	Snohomish Station
150	L	16	$30,000	78	16	Snohomish Station	Snohomish Station	Snohomish Station
151	L	24	$172,000	451	16	Snohomish Station	Snohomish Station	Snohomish Station
152	L	24	$818,000	1,244	12	Easement	Easement	Easement
				1,012	16		Bickford Ave	Easement Loop
153	L	16	$386,000	932	18	Bickford Ave	N of 30th St	Snohomish Station
154	H	36	$80,000	210	16	Easement	Bickford Ave	End of WM
155	M	29	$162,000	424	16	30th St	King Charley's Intertie	Highway 9
156	M	29	$275,000	721	16	99th Ave SE	King Charley's Intertie	South of 30th St
157	H	36	$79,000	251	8	Easement	99th Ave SE	End of WM
158	M	30	$149,000	471	8	15th St	Pine Ave	Dead End
159	H	36	$43,000	136	8	Easement	Suncrest Dr	End of WM
Total			**$49,884,000**					

Table 9-5

Prioritized Annual Water Main Replacement Projects (Sorted by Priority)

CIP No.	Priority		Estimated Cost	Size		Description		
	Rank	Points		Length (ft)	Diam (in)	In	From	To
8	H	41	$265,000	176	8	Willow Ave	Lincoln Ave	Rainier St
				336	12		Rainier St	Pearl St
				295	8		Pearl St	1st St
20	H	36	$392,000	1,128	12	Cedar Ave	2nd St	Dead End
25	H	36	$1,725,000	5,488	8	2nd St, 92nd Ave SE, 113th Dr SE, 115th Dr SE	Cypress Ave	Dead Ends
35	H	36	$199,000	522	16	Easement	3rd St	4th St
45	H	36	$2,311,000	4,760	16	Airport Way	Railroad Tracks	10520 Airport Way
47	H	36	$2,763,000	2,488	16	Lowell Snohomish Road	Airport Way	Highway 9
				5,777	8		Highway 9	End of WM
57	H	36	$160,000	362	12	4th St, Riverview Ln	Ave J	Riverview Ln
				108	8		4th St	Dead End
64	H	36	$38,000	119	8	8th St	Victor Ave	Centennial Trail
72	H	37	$411,000	1,080	16	Ave D	PRV	7th St
75	H	36	$78,000	222	12	Easement	Ave A	End of WM
76	H	36	$140,000	401	12	Easement	Ave A	End of WM
77	H	36	$67,000	192	12	Easement	Ave A	End of WM
81	H	36	$177,000	561	8	Holiday St	Root Ave	Lincoln Ave
84	H	36	$65,000	187	12	Easement	9th St	End of WM
98	H	37	$38,000	108	12	Pine Ave	13th St	13th St
101	H	36	$84,000	241	12	Apartments	10th St	End of WM
103	H	36	$65,000	169	16	Driveway	10th St	Dead End
104	H	37	$75,000	196	16	Ave D	10th St	PRV
105	H	36	$250,000	656	16	Easement	Bonneville Ave	End of WM
111	H	36	$43,000	122	12	Ave A	13th St	End of WM
112	H	36	$339,000	974	12	13th St, Easement	13th St	End of WM
113	H	36	$93,000	265	12	Easement	13th St	End of WM
121	H	36	$187,000	491	16	Ridge Ave	14th St	End of WM
125	H	36	$189,000	495	16	Easement	Bonneville Ave	End of WM
130	H	36	$206,000	539	16	St. Michael's Catholic Church	Easement	Easement
132	H	36	$132,000	419	8	19th St	Park Ave	End of WM
137	H	36	$221,000	580	16	Easement	Bickford Ave	End of WM
138	H	36	$1,429,000	3,755	16	19th St/Business Park	Bickford Ave	End of WM
142	H	36	$255,000	734	12	Business Park	Weaver Rd	Business Park
143	H	36	$44,000	114	16	Business Park	Bickford Ave	Business Park
154	H	36	$80,000	210	16	Easement	Bickford Ave	End of WM
157	H	36	$79,000	251	8	Easement	99th Ave SE	End of WM
159	H	36	$43,000	136	8	Easement	Suncrest Dr	End of WM
Total			**$12,643,000**					

OTHER IMPROVEMENTS

The additional water main, pressure zone, WTP Transmission Main, and facility improvements were prioritized based on existing deficiencies, safety concerns, maintenance requirements, and capacity requirements. The miscellaneous improvements were prioritized based on regulatory requirements and assessment of the water system needs. The priority order of these improvements is reflected in the schedule of improvements, which is presented in the next section.

SCHEDULE OF IMPROVEMENTS

The improvement prioritization results were used to assist in establishing an implementation schedule that can be used by the City for preparing its 10-year CIP and yearly Water Department budget. The implementation schedule for the proposed improvements is shown in **Table 9-6**. An allowance of $100,000 per year has been established for the annual replacement of water mains. The City will identify and schedule the replacement of these water mains during its annual budget process. This provides the City with the flexibility to coordinate these projects with road or other projects within the same area.

Table 9-6
Proposed Improvements Implementation Schedule

No.	Description	Estimated Cost (2019 $)	20-Year Schedule of Improvements Planned Year of Project and Estimated Cost in 2019 $											
			2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029-2038	2039+
Water Main Improvements														
WM1	Annual Water Main Replacement Program[1]	$49,890,000	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$1,000K	$47,890K
WM2	State Route 9 Crossing at 30th Street	$1,530,000		$765K	$765K									
WM3	Loop 425 Zone Water Main between Terrace Avenue and Suncrest Drive	$159,000				$159K								
WM4	Loop 362 Zone Water Main in 13th Street/Avenue A Intersection	$10,000		$10K										
WM5	St. Michael's Catholic School Water Main Improvement	$115,000				$115K								
WM6	Abandon Cast Iron Water Mains in 1st Street and Avenue E	$10,000		$10K										
WM7	Investigation and Potential Replacement of Terrace Avenue WM North of Stone Ridge Drive	$150,000					$150K							
Pressure Zone Improvements														
PZ1	Conversion of 384, 438, and 450 Zones to 362 Zone	$20,000				$20K								
PZ2	Re-Open Closed Valve to Re-Establish 362 Zone Looping[2]	$1,000	$1K											
PZ3	Conversion of 218 Zone Services at 10th Street and Pine Avenue to 362 Zone[3]	$110,000	$110K											
WTP Transmission Main Improvements														
TM1	WTP Transmission Main Maintenance and Repair	$2,000,000	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$1,000K	
TM2	Upsize PUD Intertie at Robe-Menzel Road	$20,000		$20K										
TM3	Additional PUD Intertie at Machias	$180,000					$180K							
TM4	OK Mill Road Transmission Main Sliplining	$6,200,000											$6,200K	
Facility Improvements														
F1	362/425 Zone Booster Pump Station[4]	$2,400,000								$1,200K	$1,200K			
F2	WTP Decommissioning Study	$20,000		$20K										
Miscellaneous Improvements														
M1	Telemetry at All Interties	$400,000			$100K	$100K	$100K	$100K						
M2	In-line Isolation Valve Installation Program	$250,000	$13K	$13K	$13K	$13K	$13K	$13K	$13K	$13K	$13K	$13K	$125K	
M3	Storz Hydrant Fitting Installation Program	$60,000	$3K	$3K	$3K	$3K	$3K	$3K	$3K	$3K	$3K	$3K	$30K	
M4	Water Use Efficiency Program	$90,000	$5K	$5K	$5K	$5K	$5K	$5K	$5K	$5K	$5K	$5K	$45K	
M5	WSP Update	$400,000										$200K	$200K	
M6	Update Emergency Response Plan and Risk and Resilience Assessment[5]	$80,000			$80K									
Total Estimated Costs of City Funded Impr.		**$64,095,000**	**$331K**	**$1,045K**	**$1,165K**	**$614K**	**$650K**	**$320K**	**$220K**	**$1,420K**	**$1,420K**	**$420K**	**$8,600K**	**$47,890K**

1 = Annual project cost can be adjusted to meet City budget goals. Remainder of project costs can be shifted to the 2039+ horizon.

2 = Project should be completed in the short-term due to significant impact on available fire flow.

3 = Project should be completed in the short-term due to pressures below 30 psi.

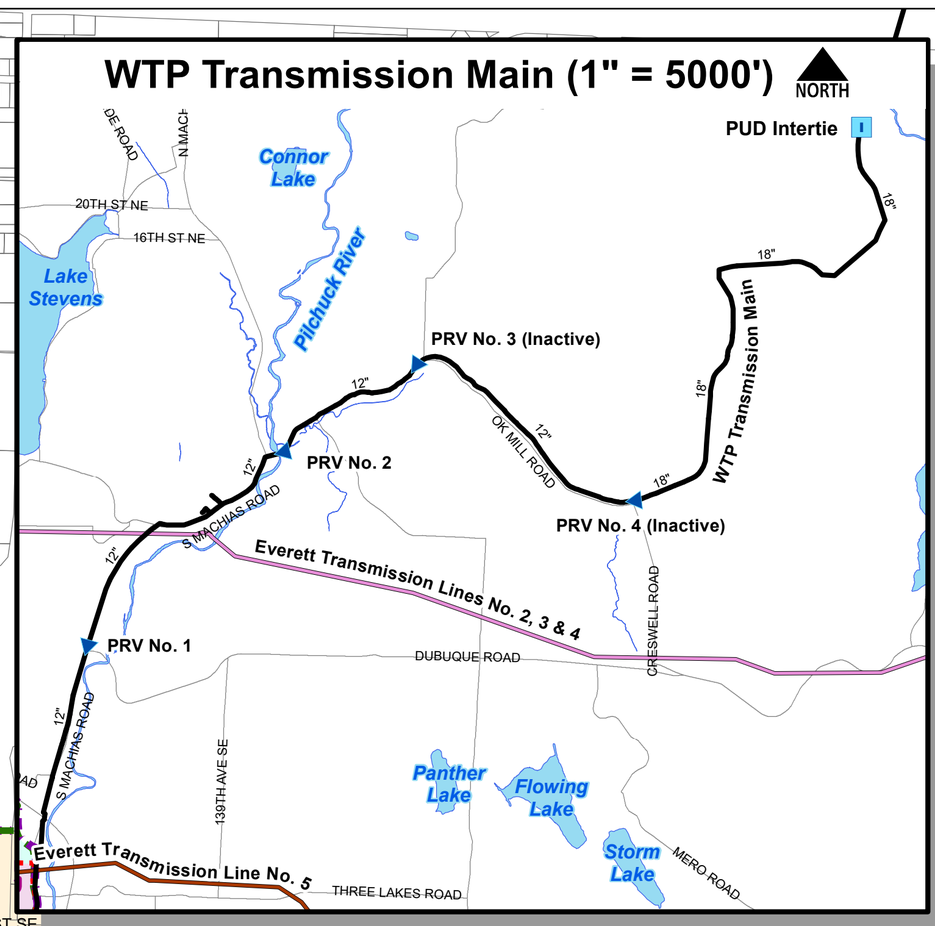
4 = BPS construction required by end of 10-year planning period to resolve supply capacity deficiency in 425 Zone.

5 = America's Water Infrastructure Act of 2018 requires development or update of the Risk and Resilience Assessment by June 30, 2021, and the Emergency Response Plan by December 30, 2021.

FUTURE PROJECT COST ADJUSTMENTS

All cost estimates shown in the tables are presented in year 2019 dollars. These cost estimates will need to be adjusted to account for the effects of inflation and changing construction market conditions to determine future costs at the actual time of project implementation. Future costs can be estimated using the Engineering News Record Construction Cost Index for the Seattle area or by applying an estimated rate of inflation that reflects the current and anticipated future market conditions.

Table of Contents



1 inch = 800 feet

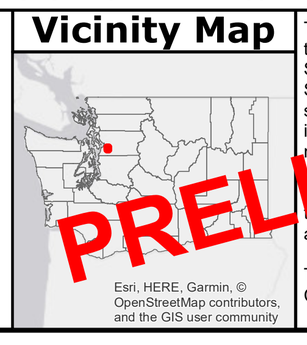
0 400 800 1,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

SNOHOMISH WASHINGTON

Figure 2-1
Existing Water System
City of Snohomish
2018 Water System Plan

Vicinity Map



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J:\DATA\SNH\117-123\GIS\MAPS\FIGURE 2-1.MXD BY: ZSCHREMPP PLOT DATE: JUL 12, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- City Limits
- UGA Boundary
- Retail Water Service
- Future Water Service
- Cross Valley / Snohomish Overlap

Adjacent Water Systems

- Aldercrest Water Users
- Blackmans Lake Water District
- Bunk Foss System
- City of Monroe Water System
- Cross Valley Water District
- Fobes Water District
- NEPA Pallet
- North Ridge Water Corporation
- Pilchuck 26 Tracts
- Schluter Water
- Snohomish PUD (Integrated)
- Twin Roads Water
- Wilkshire Lane Water District, Inc.

Fobes Water District
Bunk Foss System
Twin Roads Water Association
Everett Transmission Line No. 5
Snohomish PUD (Integrated)
Schluter Water Association
Wilkshire Lane Water District, Inc.
Blackmans Lake Water District
North Ridge Water Corporation
Pilchuck 26 Tracts
NEPA Pallet
Aldercrest Water Users
Cross Valley Water District
Cross Valley/ Snohomish Overlap
Blackmans Lake
City of Snohomish Water Service Area
Cross Valley/ Snohomish Overlap
Cross Valley Water District
City of Monroe Water System

US HWY 2
SR 9
BICKFORD AVE
87TH AVE SE
SKIPLEY ROAD
BUNK FOSS ROAD
S MACHIAS
RITCHEY ROAD
56TH ST SE
83RD AVE SE
60TH ST SE
99TH AVE SE
107TH AVE SE
22ND ST
72ND ST SE
BONNEVILLE AVE
10TH ST
13TH ST
PARK AVE
Pilchuck River
PINE AVE
MAPLE AVE
88TH ST SE
92ND ST SE
RIVERVIEW ROAD
LUDWIG RD
LOWELL-SNOHOMISH RIVER ROAD
4TH ST
AVE D
1ST ST
2ND ST
Snohomish River
LINCOLN AVE
AIRPORT WAY
MARSH ROAD

J:\DATA\SNH\117-123\GIS\MAPS\FIGURE 2-2.MXD BY: ZSCHREMPP PLOT DATE: JUL 2, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2 NORTH

1 inch = 800 feet

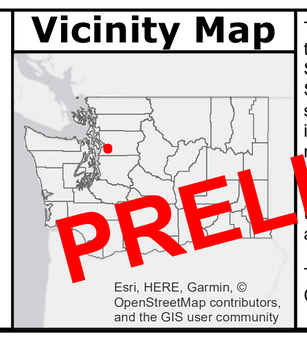
0 400 800 1,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

SNOHOMISH WASHINGTON

Figure 2-2
Service Area and Adjacent Systems
City of Snohomish 2018 Water System Plan

Vicinity Map



PRELIMINARY

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WEST ⟷ EAST

PUD (Available HGL 772')

PUD Intertie (95 gpm)

Everett Transmission Line No. 5 (Hydraulic Grade Varies)

500' — 500'

400' — 400'

300' — 300'

200' — 200'

Bickford Ave. Intertie (4,900 gpm)

King Charley's Intertie (1,600 gpm)

Park Ave. Intertie (3,500 gpm)

Terrace Ave. 362 Zone Intertie (4,900 gpm)

Terrace Ave. 425 Zone Intertie (1,500 gpm)

NEPA Intertie (1,200 gpm)

Serves NEPA Pallet Company and one residential customer

Water Treatment Plant Transmission Main

450 Zone

438 Zone

Zone Valve

425 Zone

Multiple Zone Valves Between 450 and 362 Zones

Multiple Zone Valves Between 425 and 362 Zones

384 Zone

Zone Valve

362 Zone

PRV #2

PRV #1

10th Street and Avenue D PRV

9th Street and Avenue A PRV

Multiple Zone Valves Between 362 and 218 Zones

Reservoir No. 2 PRV

Reservoir No. 3
2.7 MG
Base Elev: 296.5'
Overflow Elev: 362'
Diameter: 81'
38,544 gal/ft

218 Zone

Reservoir No. 2
5.0 MG
Base Elev: 197.4'
Overflow Elev: 218.2'
Volume per Foot Varies

Legend

- 218 Zone
- 286 Zone
- 338 Zone
- 362 Zone
- 384 Zone
- 425 Zone
- 438 Zone
- 450 Zone
- 471 Zone
- Everett Transmission Line No. 5
- PUD
- Meter
- Equipment in same facility
- Pressure Reducing Station/Valve
- Zone Valve

RH2 ENGINEERING 40 YEARS SINCE 1978

SNOHOMISH WASHINGTON

Figure 2-3
Existing System Hydraulic Profile

City of Snohomish
2018 Water System Plan

Date: JUL 11, 2019 Filename: SNH\117-123\CAD\SNHWCP-HP.DWG

Legend

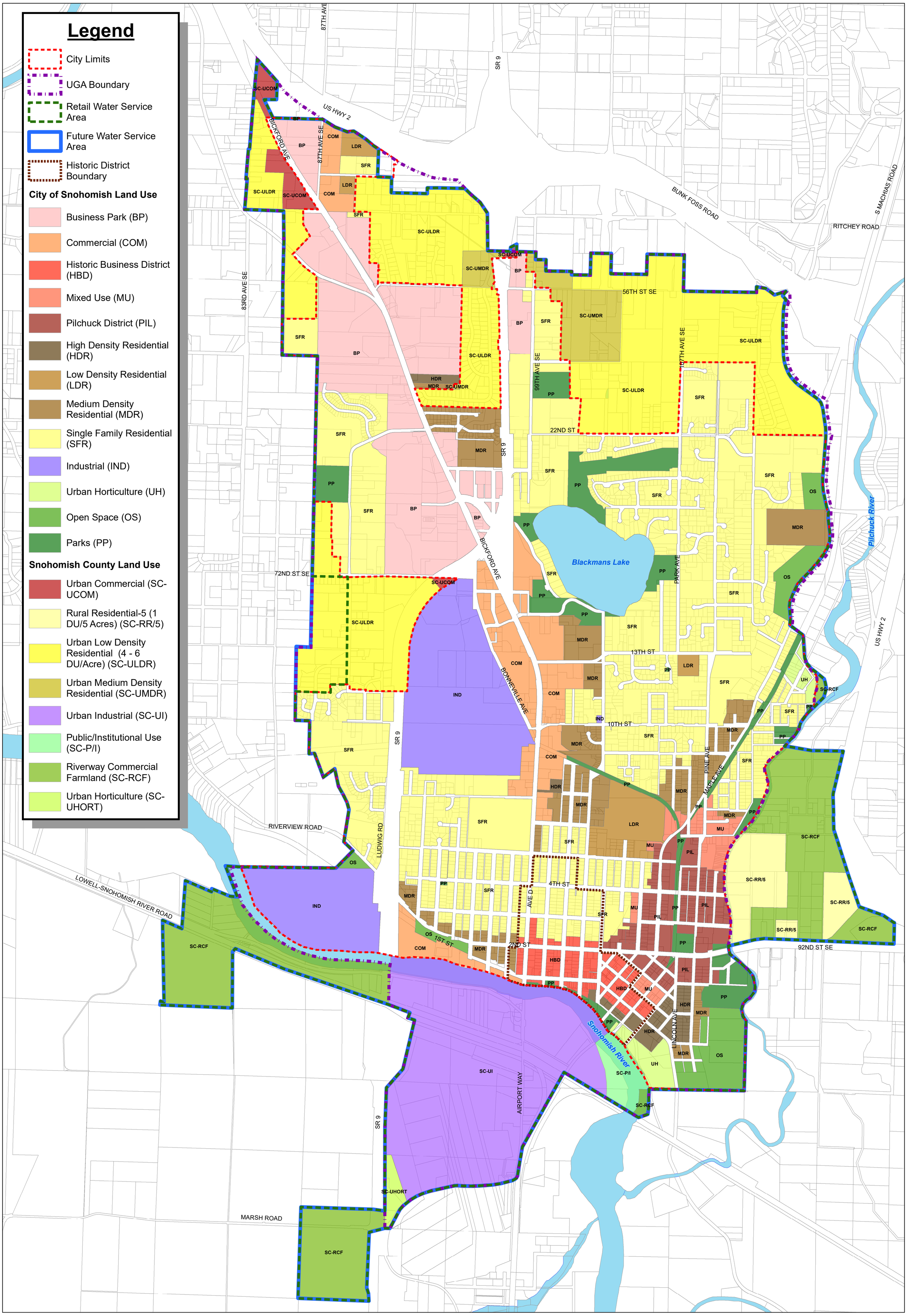
- City Limits
- UGA Boundary
- Retail Water Service Area
- Future Water Service Area
- Historic District Boundary

City of Snohomish Land Use

- Business Park (BP)
- Commercial (COM)
- Historic Business District (HBD)
- Mixed Use (MU)
- Pilchuck District (PIL)
- High Density Residential (HDR)
- Low Density Residential (LDR)
- Medium Density Residential (MDR)
- Single Family Residential (SFR)
- Industrial (IND)
- Urban Horticulture (UH)
- Open Space (OS)
- Parks (PP)

Snohomish County Land Use

- Urban Commercial (SC-UCOM)
- Rural Residential-5 (1 DU/5 Acres) (SC-RR/5)
- Urban Low Density Residential (4 - 6 DU/Acre) (SC-ULDR)
- Urban Medium Density Residential (SC-UMDR)
- Urban Industrial (SC-UI)
- Public/Institutional Use (SC-P/I)
- Riverway Commercial Farmland (SC-RCF)
- Urban Horticulture (SC-UHORT)



J:\DATA\SNH\117-123\GIS\MAPS\FIGURE 3-1.MXD BY: ZSCHREMPP PLOT DATE: MAR 22, 2018 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2 ENGINEERING 40 YEARS SINCE 1978

NORTH

1 inch = 800 feet

0 400 800 1,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

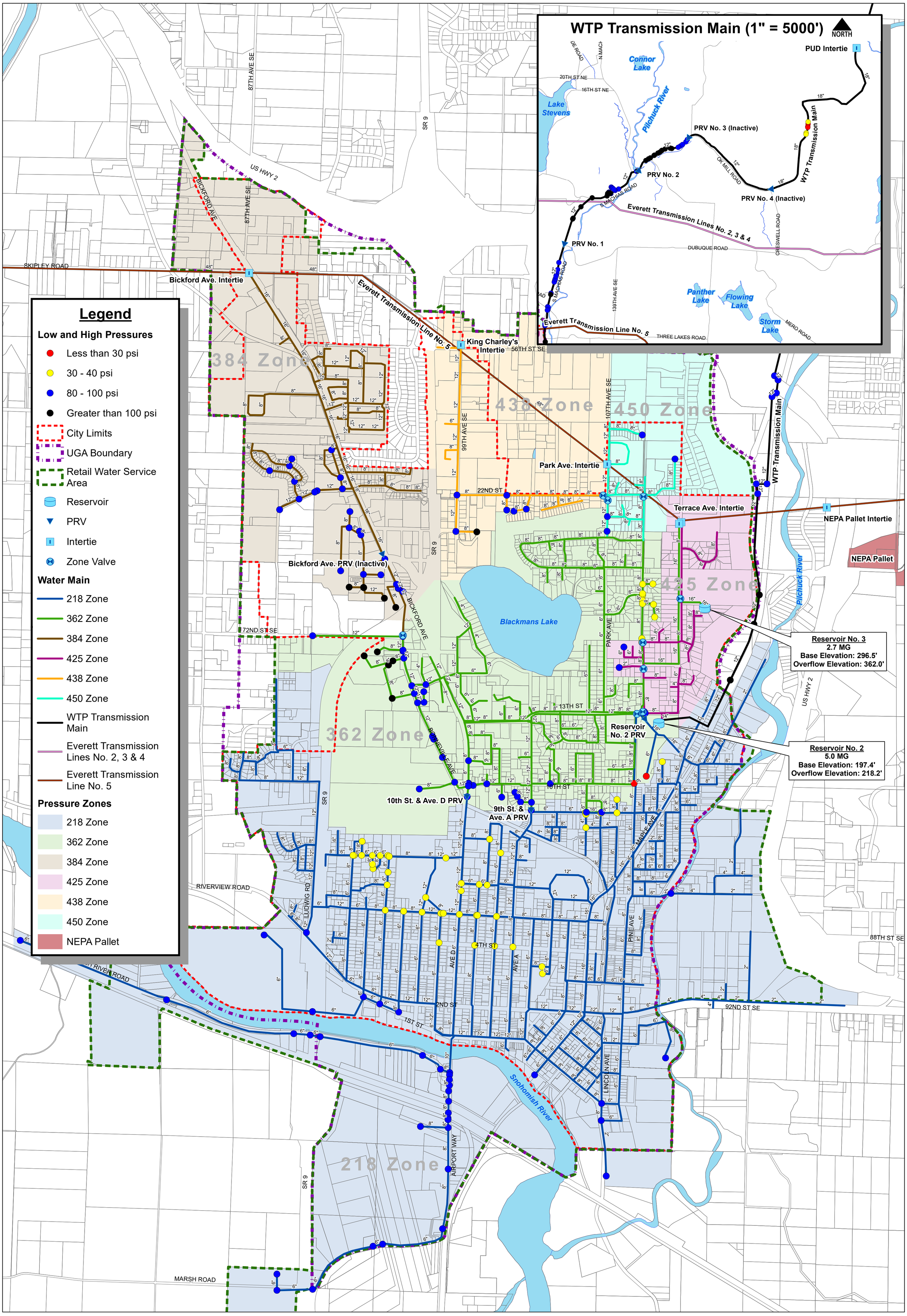
SNOHOMISH WASHINGTON

Figure 3-1
Land Use
City of Snohomish 2018 Water System Plan

Vicinity Map

PRELIMINARY

Figure 7-1
Existing High and Low Pressure Areas
City of Snohomish 2018 Water System Plan



Legend

Low and High Pressures

- Less than 30 psi
- 30 - 40 psi
- 80 - 100 psi
- Greater than 100 psi
- City Limits
- UGA Boundary
- Retail Water Service Area
- Reservoir
- PRV
- Intertie
- Zone Valve

Water Main

- 218 Zone
- 362 Zone
- 384 Zone
- 425 Zone
- 438 Zone
- 450 Zone
- WTP Transmission Main
- Everett Transmission Lines No. 2, 3 & 4
- Everett Transmission Line No. 5

Pressure Zones

- 218 Zone
- 362 Zone
- 384 Zone
- 425 Zone
- 438 Zone
- 450 Zone
- NEPA Pallet

J:\DATA\SNH\117-123\GIS\MAPS\FIGURE 7-1.MXD BY: ZSCHREMPP PLOT DATE: JUL 11, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 800 feet

0 400 800 1,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

SNOHOMISH WASHINGTON

Vicinity Map

PRELIMINARY

Legend

Available Fire Flow (% of Required)

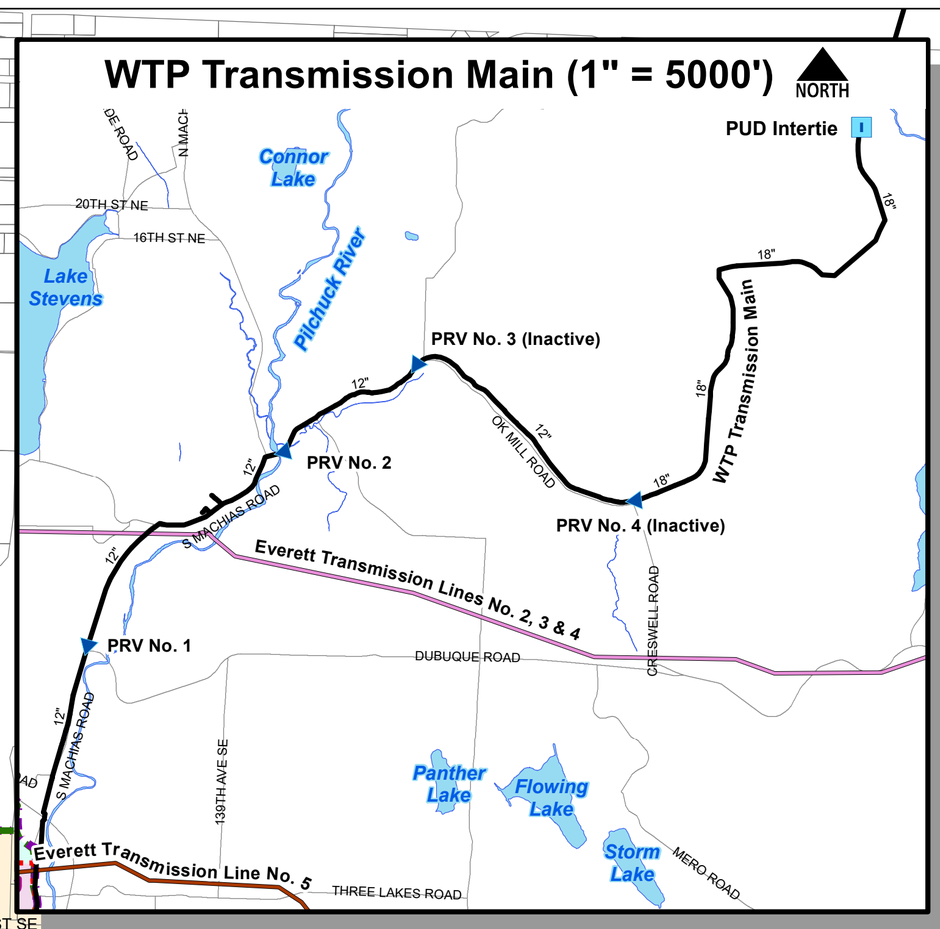
- Less than 40%
- 40% - 70%
- 70% - 90%
- 90% - 100%
- 100% - 120%
- Greater than 120%
- City Limits
- UGA Boundary
- Retail Water Service Area
- Reservoir
- PRV
- Intertie
- Zone Valve

Water Main

- 218 Zone
- 362 Zone
- 384 Zone
- 425 Zone
- 438 Zone
- 450 Zone
- WTP Transmission Main
- Everett Transmission Lines No. 2, 3 & 4
- Everett Transmission Line No. 5

Pressure Zones

- 218 Zone
- 362 Zone
- 384 Zone
- 425 Zone
- 438 Zone
- 450 Zone
- NEPA Pallet



J:\DATA\SNH\117-123\GIS\MAPS\FIGURE 7-2.MXD BY: ZSCHREMPP PLOT DATE: JUL 11, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 800 feet

0 400 800 1,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

SNOHOMISH WASHINGTON

Figure 7-2
Existing Available Fire Flow
City of Snohomish
2018 Water System Plan

Vicinity Map

PRELIMINARY

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WTP Transmission Main (1" = 5000')

NORTH

PUD Intertie
PRV No. 3 (Inactive)
PRV No. 2
PRV No. 4 (Inactive)
PRV No. 1
WTP Transmission Main
Everett Transmission Lines No. 2, 3 & 4
Everett Transmission Line No. 5
Connor Lake
Lake Stevens
Pilchuck River
Panther Lake
Flowing Lake
Storm Lake
20TH ST NE
16TH ST NE
S MACHIAS ROAD
OK MILL ROAD
CRESWELL ROAD
DUBUQUE ROAD
139TH AVE SE
THREE LAKES ROAD
MERO ROAD

Legend

- City Limits
- UGA Boundary
- Retail Water Service Area
- Reservoir
- PRV
- Intertie
- Zone Valve

Water Main

- 218 Zone
- 362 Zone
- 425 Zone
- WTP Transmission Main
- Everett Transmission Lines No. 2, 3 & 4
- Everett Transmission Line No. 5

Pressure Zones

- 218 Zone
- 362 Zone
- 425 Zone

SKIPLEY ROAD
US HWY 2
87TH AVE SE
BICKFORD AVE
Bickford Ave. Intertie
Bickford Ave. PRV (Inactive)
King Charley's Intertie
56TH ST SE
Park Ave. Intertie
Terrace Ave. Intertie
22ND ST
72ND ST SE
99TH AVE SE
107TH AVE SE
SR 9
BLACKFORD AVE
PARK AVE
WTP Transmission Main
Blackmans Lake
Pilchuck River
13TH ST
RONNEVILLE AVE
10TH ST
10th St. & Ave. D PRV
9th St. & Ave. A PRV
Reservoir No. 2 PRV
MAPLE AVE
PINE AVE
AVE D
AVE A
4TH ST
2ND ST
1ST ST
88TH ST SE
92ND ST SE
LINCOLN AVE
RIVERVIEW ROAD
LUDWIG RD
LOWELL-SNOHOMISH RIVER ROAD
MARSH ROAD
AIRPORT WAY
Snohomish River

362 Zone
425 Zone
218 Zone

Reservoir No. 3
2.7 MG
Base Elevation: 296.5'
Overflow Elevation: 362.0'

Reservoir No. 2
5.0 MG
Base Elevation: 197.4'
Overflow Elevation: 218.2'

J:\DATA\SNH\117-123\GIS\MAPS\FIGURE 9-1.MXD BY: ZSCHREMPP PLOT DATE: JUL 11, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 800 feet

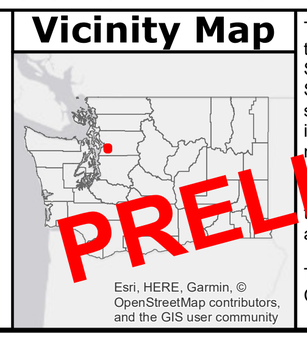
0 400 800 1,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

SNOHOMISH WASHINGTON

Figure 9-1
Capital Improvement Projects
City of Snohomish
2018 Water System Plan

Vicinity Map



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PRELIMINARY

WEST ⟷ EAST

PUD (Available HGL 772')

PUD Intertie (210 gpm)

Everett Transmission Line No. 5 (Hydraulic Grade Varies)

PUD (Available HGL 505')

500'

400'

300'

200'

Bickford Ave. Intertie (4,900 gpm)

King Charley's Intertie (3,100 gpm)

Park Ave. Intertie (4,900 gpm)

Terrace Ave. 362 Zone Intertie (4,900 gpm)

Terrace Ave. 425 Zone Intertie (1,500 gpm)

425 Zone

Multiple Zone Valves Between 425 and 362 Zones

362 Zone

Water Treatment Plant Transmission Main

Future Machias Intertie (210 gpm)

Water Treatment Plant Transmission Main

PRV #2

PRV #1

9th Street and Avenue A PRV

10th Street and Avenue D PRV

Multiple Zone Valves Between 362 and 218 Zones

Reservoir No. 2 PRV

Future 362/425 Zone Booster Pump Station (5,000 gpm)

Reservoir No. 3
2.7 MG
Base Elev: 296.5'
Overflow Elev: 362'
Diameter: 81'
38,544 gal/ft

218 Zone

Reservoir No. 2
5.0 MG
Base Elev: 197.4'
Overflow Elev: 218.2'
Volume per Foot Varies

Legend

- 218 Zone
- 286 Zone
- 338 Zone
- 362 Zone
- 425 Zone
- 494 Zone
- PUD
- Everett Transmission Line No. 5
- Future Improvement
- Meter
- Equipment in same facility
- Pressure Reducing Station/Valve
- Zone Valve

RH2 ENGINEERING 40 YEARS SINCE 1978

SNOHOMISH WASHINGTON

Figure 9-2
Proposed System Hydraulic Profile

City of Snohomish
2018 Water System Plan

Date: JUL 11, 2019 Filename: SNH\117-123\CAD\SNHWCP-HPP.DWG

Snohomish County Water Purveyors

North Snohomish County Coordinated Water System Plan

Plan Adopted By Washington State Department of Health: January 5, 2011
(UNOFFICIAL VERSION - Map Revision Dates: 1/26/2018)

NOTICE: Carpenter-Fisher Subbasin. As of June 27, 2011, the Washington State Department of Ecology (Ecology) has closed the Carpenter-Fisher Subbasin to all new, unmitigated water uses including permit-exempt wells. For additional information, please contact staff at the Ecology Water Resources Program, Northwest Regional Office. Phone: 425-649-7270.

The area outside designated water purveyor boundaries is known as the Satellite System Management Area. See the North Snohomish Coordinated Water System Plan and Washington Department of Health requirements regarding Satellite System Management Agencies.

Critical Water Supply Area Within Snohomish County

LEGEND

- Critical Water Supply Service Area Boundary**
- Expanding Water System Boundary
- Carpenter-Fisher Subbasin Boundary
- Service Overlaps Between Water Purveyors
- Service Gaps Between Water Purveyors

EXPANDING MUNICIPAL WATER SYSTEMS (WITH MORE THAN 50 RESIDENTIAL CONNECTIONS)

- Municipal Water System, Incorporated Portion
- Municipal Water System, Unincorporated Portion

EXPANDING SPECIAL PURPOSE WATER SYSTEMS (WITH MORE THAN 50 RESIDENTIAL CONNECTIONS)

- Alderwood Water and Wastewater District
- Cross Valley Water District
- Highland Water District
- Mukilteo Water and Wastewater District
- Olympic View Water and Sewer District
- Silver Lake Water and Sewer District
- Snohomish County Public Utility District No. 1 (P.U.D.)

EXPANDING PRIVATE WATER SYSTEMS (WITH MORE THAN 50 RESIDENTIAL CONNECTIONS)

- Roosevelt Water Association
- Seven Lakes Water Association
- Three Lakes Water Association
- Warm Beach Water Association
- Wilderness Ridge Community Club Water System

EXPANDING TRIBAL WATER SYSTEMS (WITH MORE THAN 50 RESIDENTIAL CONNECTIONS)

- Tulalip Water System

NONEXPANDING WATER SYSTEMS

- 50 Or More Connections
- 15-49 Connections
- 1- 14 Connections
- Stillaguamish Tribe of Indians
- Nonexpanding System Absorbed by Highland

GENERAL MAP SYMBOLS

- Incorporated City Boundary
- Urban Growth Area Boundary
- Public Land Survey Section Boundary
- Public Land Survey Township Boundary
- Mount Baker - Snoqualmie National Forest

This map is intended to provide general information only. No regular data sharing program exists between water purveyors and the county; therefore it is important to always contact the individual purveyors for the most current and accurate information for both district boundaries and water line locations.

New water hookups are dependant upon proximity to existing water lines. It should not be assumed that new hookups are possible at locations within a water service and/or planning area where water lines do not already exist.

Water systems labeled as "nonexpanding" do not offer water extensions outside of their water service boundary. The number of water hookups within a nonexpanding water system are determined by the Washington State Department of Health.

*Group A water systems come under the jurisdiction of the Washington State Department of Health. Rules, regulations, and definitions for Group A water districts may be found in the Washington Administrative Code (WAC), Chapter 246-290. All Group A water systems (both expanding and nonexpanding) are shown on this map. Group B water systems have not been mapped.

**The Critical Water Supply Service Area is that portion of the county where water supply problems related to uncoordinated planning, inadequate water supply, or unreliable service may exist. No new public water system may be approved within the area unless an existing water purveyor is unable to provide water service. Refer to State RCW 70.116 for more information.

Boundary data for special purpose water districts (those which elect commissioners via public elections) is maintained by the Snohomish County Auditor's Office. All other district boundary data was initially collected by the consulting firm of Economic and Engineering Services in the early 1990's. Over the years, PDS has relied upon annexation notices, comprehensive water plans, and website postings by the individual districts to keep our boundary data sets current. No regular data sharing program exists between the districts and the County.

Data:
Expanding Water System Boundary, updated 1-2014
Expanding Municipal Water Systems Boundary, updated 1-2014
Snohomish County PUD No. 1, updated 1-2014
Urban Growth Area Boundaries, PSE 11-2013
City Boundaries, Assessor 1-2014
All other data derived from the Snohomish County Group A Water Purveyors, January 2012 map

Document Path: W:\pln\gcar\utilities\water\cwsp\projects\2018\ARCMAPS\CWSP_North_Snohomish_County_2018update.mxd Date Saved: 1/26/2018 9:58:44 AM

Snohomish County

Produced by Snohomish County Planning and Development Services, Cartography/GIS, 3000 Rockefeller Ave., Everett, WA 98201

0 5 Miles

N

Camano Island

Whidbey Island

Mount Baker - Snoqualmie

EXHIBIT A
AMENDMENT NO. 1 TO
WHOLESALE WATER AGREEMENT

THIS AMENDMENT NO. 1 TO WHOLESALE WATER AGREEMENT (the "First Amendment") is made and entered into this 19TH day of April, 2017, by and between Public Utility District No.1 of Snohomish County, a municipal corporation of the State of Washington, (the "District"), and the City of Snohomish, herein referred to as "the City."

WHEREAS, the District and the City executed an agreement entitled "Wholesale Water Agreement" (the "Original Agreement") on April 17, 2012; and

WHEREAS, the City is in the process of decommissioning its Water Treatment Plant Facility which is an integral part of its water supply infrastructure that provides service to approximately 100 customers along its transmission main. Therefore, the City has determined that it needs to use the District water supply full-time, in excess of the eight (8) times per year allowed by the Temporary/Seasonal Reoccurring Use and one (1) time per year allowed by the Emergency Only Use definitions in the Original Agreement; and

WHEREAS, subject to Section 1 l) and Section 2 c) of the Original Agreement that requires amendment to effectuate the intent of the District and the City, the District and the City have entered into good faith negotiations to promptly establish an amendment to the Original Agreement to provide for such additional water supply; and

WHEREAS, the District and the City upon execution of this First Amendment anticipate entering into good-faith negotiations prior to the termination or expiration of this amendment to establish a new agreement for permanent full-time water supply;

NOW THEREFORE, for and in consideration of the mutual benefits conferred on both parties, the parties agree as follows:

Section 1. Subsection b) of Section 2 – Delivery and Use of Water, of the Original Agreement is amended to read as follows:

b) The City agrees to receive supply from the District under the *Emergency Only Use* provision up to one (1) time per year for no more than ten (10) consecutive days, or under the *Temporary/Seasonal Reoccurring Use* option, up to eight (8) times per year, for no more than ten (10) consecutive days each time.

In the alternative, the City agrees to receive supply from the District full-time from the 2" intertie.

Section 2. Subsection c) of Section 3 – Wholesale Water Rate and Billing, of the Original Agreement is amended to read as follows:

c) Period for Billing. The Master Meter shall be read by the District and the results recorded at the end of each month following commencement of full-time use of the intertie. The Master Meter shall be read by the District and the results recorded at the end of the month following the end of the Emergency Only Use or the Temporary/Seasonal Reoccurring Use. Billing to the City will be issued on or before the 10th day of the month following the use and the final reading of the Master Meter as recorded by District crews. Payment to the District shall be due within thirty (30) days of issuance of the billing invoice. A payment shall be deemed delinquent if more than ten (10) days past due. Delinquent wholesale water charge amounts shall accrue interest on the unpaid balance, from the date of delinquency until paid, at the rate of one percent (1%) per month, or twelve percent (12%) per year.

Section 3. Subsection b) of Section 4 – General Facilities Charge of the Original Agreement is amended to read as follows:

b) If the City chooses to use the Master Meter more than one (1) time per year as allowed by Emergency Only Use status, a onetime only General Facilities Charge to the City will be imposed and the City will enter into the *Temporary/Seasonal Reoccurring Use* status as defined in Section 1. The General Facilities Charge will be due no later than sixty (60) days after the City requests that the status of the agreement change from Emergency Use Only to Temporary Seasonal use or other mutually agreeable payment arrangements as described in Section 5 below.

Upon commencement of the full-time water use authorized by Section 1 b) after First Amendment, the District agrees to defer receipt of payment of any applicable General Facilities Charge until a new agreement for permanent full-time water supply can be executed, or this Agreement expires, whichever comes first.

Section 4. Section 11- Term, of the Original Agreement is amended to read as follows:

This Agreement shall be effective from the date of execution by authorized representatives of both parties hereto and shall continue in effect through 2018 and thereafter with an option to extend the term for one year by mutual agreement. This Agreement may be terminated with one (1) year written notice by either party.

This Agreement may be amended at any time upon mutual written agreement of the parties. Any Notices required by this Agreement shall be given by certified mail to the official mailing address of each party.

Section 5. All other terms and conditions of the Original Agreement shall remain in full force and effect except as expressly modified by this First Amendment.

Section 6. In the event any provisions of this First Amendment conflict with the Original Agreement the provisions of this First Amendment shall control.

Section 7. This Amendment may be executed in two or more counterparts, each of which shall constitute an original and all of which shall constitutes one and the same agreement.

IN WITNESS WHEREOF, the parties hereto have executed this First Amendment as of the day and year first written above.

PUBLIC UTILITY DISTRICT NO. 1
OF SNOHOMISH COUNTY

By: _____
Craig Collar
CEO/General Manager

CITY OF SNOHOMISH

By: _____
Larry Bauman
City Manager

Approved as to Form:

_____
Assistant General Counsel

Approved as to Form:

_____
Grant Weed, City Attorney

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: City of Snohomish PWS ID: 809158

Planning/Engineering Document Title: Water System Plan Plan Date: _____

Local Government with Jurisdiction Conducting Review: City of Snohomish

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Figure 3-1	
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Table 3-3	
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	Chapter 5	
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Page 3-1 through 3-4	
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Page 3-1 through 3-4	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

_____ _____

Signature Date

_____

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents,** a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.

b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*

d) All **service area policies** for how new water service will be provided to new customers.

e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: City of Snohomish PWS ID: 809158

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e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Page 3-1 through 3-4	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

_____ _____

Signature Date

_____

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

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CITY OF SNOHOMISH

116 UNION AVENUE · SNOHOMISH, WASHINGTON 98290 · (360) 568-3115 · WWW.SNOHOMISHWA.GOV

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST

PURPOSE OF CHECKLIST

The State Environmental Policy Act (SEPA), Chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

INSTRUCTIONS FOR APPLICANTS [help]

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

USE OF CHECKLIST FOR NONPROJECT PROPOSALS [help]

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements - that do not contribute meaningfully to the analysis of the proposal.

Project #:	
Date:	**Staff Intake:**

A. BACKGROUND [help]

ADMINISTRATION COMMENTS ONLY

1. Name of proposed project, if applicable:

2. Name of applicant:

3. Address and phone number of applicant and contact person:

4. Date checklist prepared:

5. Agency requesting checklist:

6. Proposed timing or schedule (including phasing, if applicable):

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

10. List any government approvals or permits that will be needed for your proposal, if known.

ADMINISTRATION COMMENTS ONLY

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

B. ENVIRONMENTAL ELEMENTS

1. Earth [help]

a. General description of the site (circle one):
Flat, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

ADMINISTRATION COMMENTS ONLY

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

3. Water [help]

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

ADMINISTRATION COMMENTS ONLY

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

ADMINISTRATION COMMENTS ONLY

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

2) Could waste materials enter ground or surface waters? If so, generally describe.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

4. **Plants** [help]

a. Check the types of vegetation found on the site:

- ☐ deciduous tree: alder, maple, aspen, other
- ☐ evergreen tree: fir, cedar, pine, other
- ☐ shrubs
- ☐ grass
- ☐ pasture
- ☐ crop or grain
- ☐ Orchards, vineyards or other permanent crops.
- ☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

c. List threatened and endangered species known to be on or near the site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

ADMINISTRATION COMMENTS ONLY

e. List all noxious weeds and invasive species known to be on or near the site.

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site.

c. Is the site part of a migration route? If so, explain.

d. Proposed measures to preserve or enhance wildlife, if any:

e. List any invasive animal species known to be on or near the site.

6. Energy and natural resources [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

ADMINISTRATION COMMENTS ONLY

c. What kinds of energy conservation features are included in the plans of this proposal?List other proposed measures to reduce or control energy impacts, if any:

7. Environmental health [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

1) Describe any known or possible contamination at the site from present or past uses.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

4) Describe special emergency services that might be required.

5) Proposed measures to reduce or control environmental health hazards, if any:

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

ADMINISTRATION COMMENTS ONLY

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

3) Proposed measures to reduce or control noise impacts, if any:

8. Land and shoreline use [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

c. Describe any structures on the site.

d. Will any structures be demolished? If so, what?

e. What is the current zoning classification of the site?

ADMINISTRATION COMMENTS ONLY

f. What is the current comprehensive plan designation of the site?

g. If applicable, what is the current shoreline master program designation of the site?

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

i. Approximately how many people would reside or work in the completed project?

j. Approximately how many people would the completed project displace?

k. Proposed measures to avoid or reduce displacement impacts, if any:

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

ADMINISTRATION COMMENTS ONLY

c. Proposed measures to reduce or control housing impacts, if any:

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

b. What views in the immediate vicinity would be altered or obstructed?

c. Proposed measures to reduce or control aesthetic impacts, if any:

11. Light and glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

b. Could light or glare from the finished project be a safety hazard or interfere with views?

c. What existing off-site sources of light or glare may affect your proposal?

d. Proposed measures to reduce or control light and glare impacts, if any:

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity?

ADMINISTRATION COMMENTS ONLY

b. Would the proposed project displace any existing recreational uses? If so, describe.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

ADMINISTRATION COMMENTS ONLY

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

h. Proposed measures to reduce or control transportation impacts, if any:

15. Public services [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

b. Proposed measures to reduce or control direct impacts on public services, if any.

ADMINISTRATION COMMENTS ONLY

16. Utilities [help]

a. Circle utilities currently available at the site:

electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

C. Signature [help]

The information and answers provided in this Environmental Checklist (including Supplement for Non-project Actions, if applicable) are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: **Click here to print form, then sign and date** _____

Date Submitted: _____

Agency Evaluation completed by: _____ Date: _____

Signature: _____

D. supplemental sheet for nonproject actions [help]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

ADMINISTRATION COMMENTS ONLY

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

   Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

ADMINISTRATION COMMENTS ONLY

Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

WATER USE EFFICIENCY PROGRAM

INTRODUCTION

The City of Snohomish (City) recognizes that water is a valuable and essential natural resource that needs to be used wisely. This Water Use Efficiency (WUE) Program provides an approach to increase water use efficiency within the City's water service area and to support the regional goals developed by the City of Everett's (Everett) Conservation Program.

BACKGROUND

THE WATER USE EFFICIENCY RULE

In September 2003, the Washington State Legislature passed the Municipal Water Supply – Efficiency Requirements Act, also known as the Municipal Water Law. The Municipal Water Law required the state to implement the WUE Rule. The intent of this rule is to help reduce the demand that growing communities, agriculture, and industry have placed on our State's water resources, and to better manage these resources for fish and other wildlife. Municipal water suppliers are obligated under the WUE Rule to enhance the efficient use of water by the system and/or its consumers.

The WUE Rule applies to all municipal water suppliers and requires suppliers to:

- Develop WUE goals through a public process and report annually on their performance;
- Maintain distribution system leakage (DSL) at or below 10 percent of production;
- Meter all existing and new service connections;
- Collect production and consumption data, calculate DSL, and forecast demands;
- Evaluate WUE measures; and
- Implement a WUE program.

WATER USE EFFICIENCY PROGRAM REQUIREMENTS

The *Water Use Efficiency Guidebook,* originally published by the Washington State Department of Health (DOH) in July 2007 and revised in January 2009, January 2011, and January 2017, identifies the water use reporting, forecasting, and efficiency program requirements for public water systems. A WUE program meeting these requirements is a necessary element of a water system plan (WSP) as required by DOH and is necessary to obtain water right permits from the Washington State Department of Ecology (Ecology). The *Water Use Efficiency Guidebook* defines the necessary components of a WUE program as the following four fundamental elements.

1. Planning requirements that include collecting data, forecasting demand, evaluating WUE measures, calculating DSL, and implementing a WUE program to meet goals.
2. A DSL standard of 10 percent or less based on a 3-year rolling average for systems with more than 500 connections.

3. Goal setting to provide a benchmark for achievement and to help define the success of the WUE program.
4. Annual performance reporting on progress towards meeting WUE goals.

EVERETT WATER UTILITIES COMMITTEE

The City is a wholesale water customer of Everett and a member of the Everett Water Utilities Committee (EWUC). The EWUC and Everett develop a regional water conservation program that is documented in Everett's WSP and updated on a 6-year cycle (it is anticipated that this will change to a 10-year cycle after the next update). The last update to the program was in 2014. Historically, the City's WUE Program has been based on the regional goals and efforts of the EWUC.

WATER USE EFFICIENCY PROGRAM

As previously described, the fundamental elements of a WUE program include planning requirements and DSL standards, as well as goal setting and performance reporting. The City's water use data, demand forecasts, and other planning requirements are contained in **Chapter 4** of its WSP. The City is committed to continue collecting water use data beyond that presented in **Chapter 4** for evaluation of its WUE Program and water use patterns, and for forecasting demands for future facility requirements. The City's WUE Program that follows includes a statement of its goals and objectives, the evaluation and selection of alternative efficiency measures, the schedule and budget, and the method of program monitoring.

WATER USE EFFICIENCY GOALS AND THE PUBLIC PROCESS

Per Washington Administrative Code (WAC) 246-290-830, WUE goals must be set through a public process and shall be evaluated and re-established as part of developing or updating a WSP. In compliance with the WUE Rule, public hearings were held on November 21, 2014 to present and discuss goals. Background on the City's WUE Program, water supply characteristics, water demand forecasts, and other elements were made available 2 weeks prior to the public forum date. All comments received at the forum were reviewed and considered by the City. The City's current WUE goals were adopted by the City in 2014. WUE goals will be evaluated and re-established when Everett's updated conservation program is made available.

In 2014, the City purchased 1.47 percent of Everett's total production, and adopted an equivalent percentage of the regional goal. The City's goal is thus to save 17,493 gallons per day (gpd) on an annual basis at full implementation of the 6-year program (2019).

The City will achieve these goals and objectives through the implementation of the WUE Program that follows.

EVALUATION AND SELECTION OF WATER USE EFFICIENCY MEASURES

The City's evaluation of WUE measures and selected levels of implementation are presented within this section. The measures fall within three categories of implementation: 1) mandatory measures that must be implemented; 2) measures that must be evaluated; and 3) additional measures selected by the City that must be either evaluated or implemented.

The City served an average of 3,323 water service connections in 2016. Based on the number of connections, at least six WUE measures must be evaluated or implemented. Measures that are mandatory cannot be credited towards the system's WUE measures. Since the City implements the minimum number of required measures, a cost-effective evaluation is not required.

Mandatory Measures

Source Meters

The volume of water produced by the system's sources must be measured using a source meter or other meter installed upstream of the distribution system. Source meters currently are installed and operating at each intertie along Everett's Transmission Line No. 5. If any new interties are installed or activated in the future, they will be equipped with a source meter.

Service Meters

All public water systems that supply water for municipal purposes must install individual service meters for all water users. Service meters are currently installed and operating at all connections throughout the distribution system. All future connections that are installed or activated will be equipped with a service meter.

Meter Calibration

The City must calibrate and maintain meters based on generally accepted industry standards and manufacturer information. Compliance will be maintained by the City by performing maintenance on the source and service meters every 5 to 10 years at a minimum. Meter calibration verification testing is performed on an as-needed basis, typically annually.

Water Loss Control Action Plan

To control leakage, systems that do not meet the DSL standard must implement a Water Loss Control Action Plan (WLCAP). The City must implement a WLCAP since the rolling 3-year average DSL was 14.6 percent in 2016. It is known that there are leaks in the Water Treatment Plant (WTP) Transmission Main that are likely contributing to this high DSL rate. Since the Water Treatment Plant is no longer in service as of 2017, and the transmission main is no longer conveying primary water supply to the system, it is expected that DSL will be greatly reduced in future years.

In addition, the City will increase recordkeeping and estimating of authorized water consumption, such as construction, water main flushing, and firefighting activities, to minimize DSL. The system's oldest water mains and those with a history of continued maintenance or breaks have been identified for replacement as part of the City's Capital Improvement Program, shown in **Chapter 9** of the WSP. It is anticipated that the 2016 DSL of 14.6 percent can be reduced to less than 10 percent through these improved recordkeeping practices and replacement of the City's aging water main.

Customer Education

Annual customer education regarding the importance of using water efficiently is a required element of all WUE programs. Customer education is provided in the City's annual Consumer

Confidence Report (CCR) to customers and includes information on the system's DSL, progress towards meeting WUE goals, and tips for customers on using water more efficiently. A copy of the City's 2017 CCR is contained in **Appendix K**.

Measures That Must Be Evaluated

Rate Structure

A rate structure that encourages WUE and provides economic incentives to conserve water must be evaluated, but is not required to be implemented. The City's current utility rates are designed to encourage water conservation through uniform block rates. The water rates are set so that customers that use over 400 cubic feet in a 2 month billing cycle are billed an additional $4.89 for every 100 cubic feet of water consumed in excess of 400 cubic feet. Additionally, all customers are charged an increased sewer rate for water consumption beyond 400 cubic feet. The City will consider implementing inclining block rates or seasonal rates to further encourage WUE.

Reclamation Opportunities

The City has evaluated reclamation opportunities but has determined that reuse opportunities will not be beneficial because the cost to construct improvements to the existing wastewater treatment plant and separate conveyance systems is much more than the financial savings resulting from the potential water savings.

The City's wastewater treatment plant does not treat wastewater to a level that can be used for reclaimed purposes. Significant upgrades to the wastewater treatment plant and the installation of purple pipe would be necessary to provide reclaimed water to customers. The City's highest water users consist of businesses such as a rehabilitation center, a mill, food processing plants, and grocery stores that rely on potable water and likely would not purchase reclaimed water. Customers that could utilize reclaimed water include large irrigators such as parks, schools, and cemeteries.

Selected Measures

The City has chosen to implement four different WUE measures, many of which are existing measures. For the purposes of water system planning in this WSP, the City's billing classes have been combined into seven different groups: single-family residential; multi-family residential; mixed use; commercial; wholesale; irrigation; and other. The "other" user group consists of City accounts, the school district, and accounts serving parks/open space. If a single WUE measure is implemented for different customer classes, it counts as multiple WUE measures. Multiplying the four different WUE measures across the customer classes in which they will be implemented, the City will implement a total of 23 WUE measures. This exceeds the requirement of six WUE measures based on the number of service connections.

Additional Customer Education/Outreach

Customer education is provided through school outreach activities involving classroom presentations, teacher workshops, and classroom educational materials. Additional education is provided on the City's website and in educational brochures that are available at City Hall and local events such as the Kla Ha Ya Days Festival and seasonal farmers markets. The City will

continue to educate customers throughout each year as described in this program. Additional advertising efforts will be made throughout the retail water service area to promote the water conservation workshops sponsored by the EWUC. Since this measure will continue to be implemented for all customer classes, it counts as seven WUE measures for the City's program.

Meter Reading Notification

The City will continue to notify customers in all customer classes of meter readings that are inconsistent with the customer's consumption history. Since this measure will continue to be implemented for all customer classes, it counts as seven WUE measures for the City's program.

Indoor and Outdoor Conservation Kits

The City will continue to offer free indoor and outdoor conservation kits to all customers within the retail water service area. These kits include a water efficient shower head, two faucet aerators (bathroom), a dual spray swivel faucet aerator (kitchen), Teflon tape, an outdoor hose nozzle, a moisture meter, and a lawn watering timer. Additional advertising efforts will be made to promote the availability of these kits, including placing notices in utility bills, adding links on the City website, and displaying the kits at public events. Since this measure will continue to be implemented for all customer classes, it counts as seven WUE measures for the City's program.

Lawn Watering Calendars

The City will continue to distribute voluntary lawn watering calendars annually. Since this measure will continue to be implemented for single- and multi-family residential customer classes, it counts as two WUE measures for the City's program.

WATER USE EFFICIENCY PROGRAM SCHEDULE AND BUDGET

The WUE measures described previously and selected for implementation by the City are summarized in **Table 1** with their corresponding schedule and budget. The successful implementation of this WUE Program is expected to meet the goals and objectives of this program, as shown in **Chart 1**.

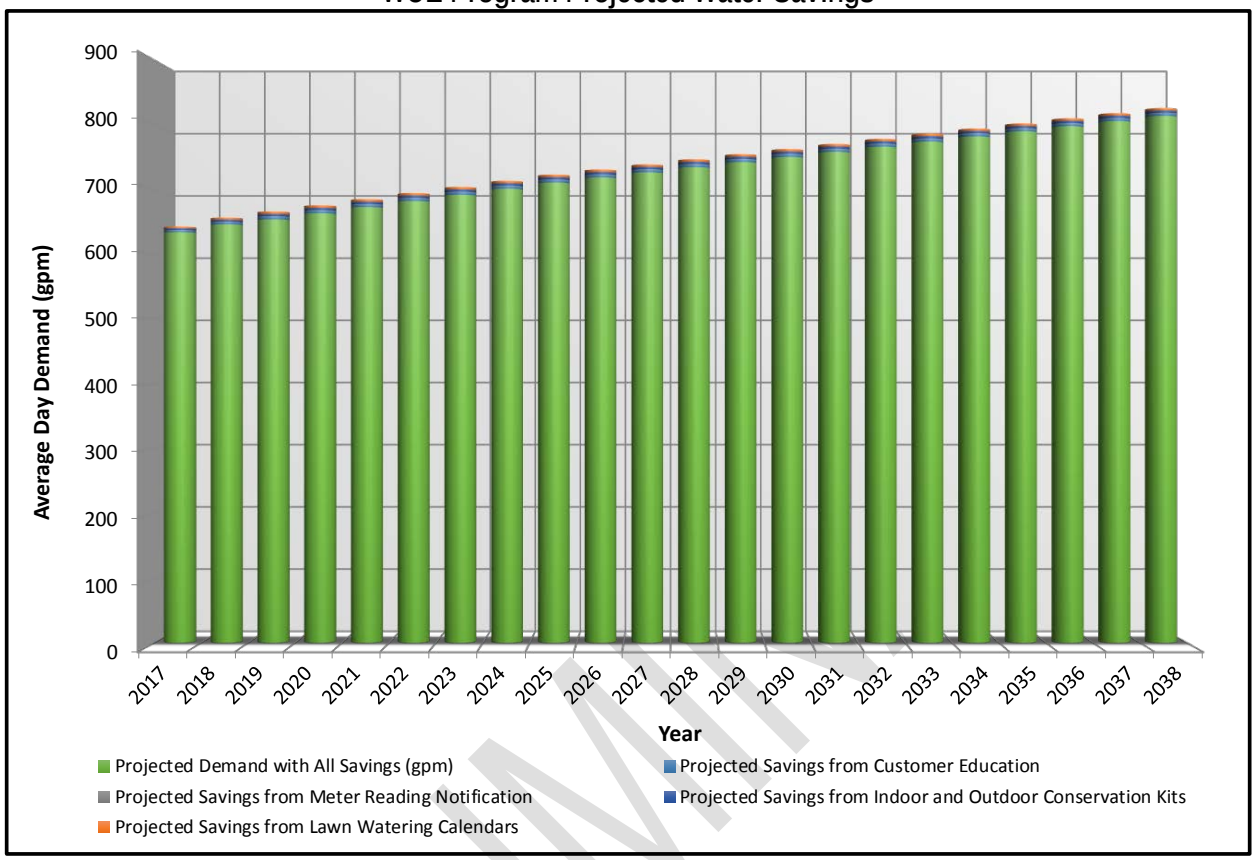
Table 1
WUE Program Schedule and Budget

WUE Measure	Schedule	Budget Amount
Mandatory Measures		
Source Meters	Ongoing	O&M Funded
Service Meters	Ongoing	O&M Funded
Meter Calibration	Ongoing	O&M Funded
Water Loss Control Action Plan	Ongoing	Annual Water Main Replacement Program (WSP Chapter 9)
Customer Education	Ongoing	$1,000/yr
Measures That Must Be Evaluated		
Rate Structure	Ongoing	In Place
Reclamation Opportunities	N/A	N/A
Selected Measures		
Additional Customer Education/Outreach	Ongoing	In Place/Regional Program
Meter Reading Notification	Ongoing	In Place
Indoor and Outdoor Conservation Kits	Ongoing	$2,000/yr
Lawn Watering Calendars	Ongoing	$500/yr

O&M = Operations and Maintenance

Chart 1

WUE Program Projected Water Savings



WATER USE EFFICIENCY PROGRAM EVALUATION AND REPORTING

The City will continue to evaluate overall demand, per capita and per equivalent residential unit water use, and the amount of DSL on an annual basis. The City will evaluate the performance of its WUE Program and implemented measures by analyzing demand data and determining the long-term trend towards reducing water usage and meeting WUE goals. Source meter records will be reviewed on an annual basis to determine the effectiveness of each of the implemented WUE measures and to determine if the estimated water savings are being met. If the program monitoring shows that progress towards meeting the WUE goals is not being accomplished, more rigorous program implementation or additional program items will be considered, along with a cost-effective evaluation of measures.

The City will continue to provide annual WUE performance reports to its consumers in the CCR, and will detail the results of water use monitoring and progress towards achieving the system's WUE goals. A copy of the City's current CCR is included in **Appendix K** of the City's WSP.

CITY OF SNOHOMISH
CROSS-CONNECTION CONTROL

TABLE OF CONTENTS

Appendix A

1. Definitions
2. City of Snohomish Cross-Connection Control Program

Definitions relating to cross-connections

"Approved air gap" means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or nonpressurized receiving vessel. To be an air gap approved by the department, the separation must be at least:

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

"Approved atmospheric vacuum breaker" means an AVB of make, model, and size that is approved by the department. AVBs that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, or UL) acceptable to the local administrative authority are considered approved by the department.

Approved backflow preventer" means an approved air gap, an approved backflow prevention assembly, or an approved AVB. The terms "approved backflow preventer," "approved air gap," or "approved backflow prevention assembly' refer only to those approved backflow preventers relied upon by the purveyor for the protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventer installed for other purposes.

"Approved backflow prevention assembly" means an RPBA, RPDA, DCVA, DCDA, PVBA, or SVBA of make, model, and size that is approved by the department. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or other entity acceptable to the department are considered approved by the department.

"Backflow" means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer's potable water system.

"Backflow assembly tester" means a person holding a valid BAT certificate issued in accordance with chapter 246-292 WAC.

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

"Human consumption" means the use of water for drinking, bathing or showering, hand washing, food preparation, cooking, or oral hygiene.

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

"Local administrative authority" means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under chapter 19.27 RCW.

"Low health cross-connection hazard" means a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

"Potable" means water suitable for drinking by the public.

"Premises isolation" means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor to isolate the consumer's water system from the purveyor's distribution system.

"Public water system" means the water supply source, including all water treatment, storage, transmission, and distribution facilities, to the point of delivery to the consumer.

"Purveyor" means an agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or person or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

"Reclaimed water" means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur, and it is no longer considered wastewater.

"Service connection" means a connection to a public water system designed to provide potable water to a single family residence, or other residential or nonresidential population.

"Backpressure" means backflow due to a reduction in system pressure in the purveyor's distribution system and/ or consumer's side of the service connection that is grater than the pressure provided by the public water system and which may cause backflow.

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

"Consumer" means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, "consumer" means the owner or operator of a water system connected to a public water system through a service connection.

"Consumer's water system," as used in WAC 246-290-490, means any potable and/or industrial water system that begins at the point of delivery from the public water system and is located on the consumer's premises. The consumer's water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

"Contaminant" means a substance present in drinking water that may adversely affect the health of the consumer or the aesthetic qualities of the water.

"Cross-connection" means any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow.

"Cross-connection control program" means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.

"Cross-connection control specialist" means a person holding a valid CCS certificate issued in accordance with chapter 246-292 WAC.

"Cross-connection control summary report" means the annual report that describes the status of the purveyor's cross-connection control program.

"DOH" means the Washington State department of health or health officer as identified in a joint plan of operation in accordance with WAC 246-290-030(1)

"Flow-through fire protection system" means a fire sprinkler system that:

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

"Surface water" means a body of water open to the atmosphere and subject to surface runoff.

"Unapproved auxiliary water supply" means a water supply (other than the purveyor's water supply) on or available to the consumer's premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

"Uniform Plumbing Code" means the code adopted under RCW 19.27.031(4) and amended under chapter 51-46 WAC. This code establishes state-wide minimum plumbing standards applicable within the property lines of the consumer's premises.

"Used water" means water which has left the control of the purveyor.

CITY OF SNOHOMISH

Founded 1859, Incorporated 1890

116 UNION AVENUE ▫ SNOHOMISH, WASHINGTON 98290 ▫ TEL (360) 568-3115 FAX (360) 568-1375

Cross-Connection Control Program
For CITY OF SNOHOMISH WATER SYSTEM

I. Purpose:

1. To protect the public water system and the consumers water system as required per Washington Administrative Code (WAC) 246-290-490 and the Uniform Plumbing Code (UPC) from contamination through Cross-Connection Control (CCC) and by assuring the inspection and regulation of plumbing in existing and proposed plumbing networks and the proper installation and surveillance of backflow prevention assemblies when actual or potential cross-connections exist and cannot be eliminated.

II. Responsibility:

1. The City of Snohomish public water system I.D. No. 809158 will be responsible for Cross-Connection Control beginning at the water supply source, and including the treatment plant, the distribution system and the consumers water system which begins at the point of delivery to the consumers water system which would be on the downstream connection of there water meter.

2. The Local Administrative Authority (LAA) and the Water Division will coordinate with the local water purveyor where applicable in all matters concerning cross-connection control within the property lines of the premises.

3. The LAA will be the authority duly appointed to enforce the code, appoint assistance, and deputize inspectors or other employees to carry out the functions of the department and the code.

4. The City of Snohomish and The LAA will have joint responsibilities in both premise and in-premise isolation matters concerning cross-connection control thus describing this as a **Combination or Joint Program**.

III. Requirements:

1. The City of Snohomish will ensure that cross-connections between the public water supply and the consumers' water system are eliminated or controlled by the means of

plumbing retrofit, education, air-gap or the installation of an approved backflow assembly commensurate with the degree of hazard.

2. When the Cross Connection Control Specialist (CCCS) denies or discontinues water service to a consumer's premises because of a cross-connection he will notify the LAA prior to taking such action except in the event of an emergency.

IV. The Program:

1. It is the intent of the City of Snohomish and the LAA to implement and carry out the elements for proper procedures and acceptable to the Department of Health (DOH) WAC 246-290-490 C C C.

Element 1: The purveyor will adopt a local ordinance, resolution, code, bylaw, or other written legal instruments that:

(i) Establishes the purveyor's legal authority to implement a cross-connection control program:

(ii) Describes the operating policies and technical provisions of the purveyor's cross-connection control program: and

(iii) Describes the corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements.

1.i The City of Snohomish adopted Ordinance 1909 on September 15, 1999 creating SMC Chapter 15.10 Cross Connection Control Program Regulations.

1.ii SMC 15.10 CCCP regulations, Group A Public Water System adopted under Ordinance 1909 in September 1999. Under this title the Group A Public Water System WAC 246-290-490 and 246-290-010 is hereby adopted by reference. (see appendix c)

1.iii SMC 15.10.200, failure on the part of any customer to discontinue the use of all cross-connections except in accordance with this ordinance, is sufficient cause for the immediate discontinuance of public water service to the premises.

Element 2: The purveyor will develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system and notifying the consumer within a reasonable time of the hazard evaluation results. At a minimum, the program shall meet the following:

(i) For new connections made on or after the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted before service is provided;

(ii) For existing connections made prior to the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted in accordance with a schedule acceptable to the department; and

(iii) For all service connections, once an initial evaluation has been conducted, procedures shall ensure that periodic reevaluations are conducted in accordance with a schedule acceptable to the department and whenever there is a change in the use of the premises.

2.i All new connections will comply with to SMC 15.10.160 Plan Review – New Construction, Remodel and Additions, and SMC 15.10.150 Paragraph B Facility Survey Inspection (existing facilities).

I. New Construction

(a) The city will review the permit application for CCC requirements (Air-Gap, BPA or elimination of the cross-connection.

(b) The city will inform the owner or contractor that final approval shall not be granted or water service restored until CCC requirements have been met (proper installation of a BPA, inspection and testing is complete)

(c) The city may conduct periodic inspections or at least yearly.

II. Existing Facility

(a) Upon learning of a potential or an actual cross-connection a "Survey Letter" will be sent out requesting a scheduled appointment within five (5) working days to conduct a survey.

(b) A survey of the facility with the owner or a person familiar with the building will be conducted.

(c) A "Survey Results" letter will be sent out indicating the required compliance for protection. If a high health hazard cross connection is found the correction shall be by elimination, installing a Backflow Prevention Assembly (BPA) or an Air Gap. (AG) and completed in 90 days. If a low health hazard cross connection is found the correction shall be by elimination, installing a Backflow Prevention Assembly (BPA) and to be completed in 120 days. A variance may be granted upon a written request with a valid justification. If a BPA is required it must be tested by a certified Washington State Department of Health (DOH) Backflow Assembly Tester (BAT) and the test results sent to the city within five (5) working days of the test.

(d) The city may send either a second letter or a phone call if compliance has not been made. Compliance shall be completed within fifteen (15) working days or water service may be terminated.

(e) If compliance have not been made within the fifteen (15) days the city will send a certified letter notifying the consumer to comply within ten (10) working days of the letter to have corrections, inspections and testing completed and the City's intention to deny or discontinue water service on a specified date if compliance has not been met or other arrangements with

the city have been made. (See III Enforcement below). The local LAA will be notified of this.

(f) Upon notification of the corrections inspections will be required.

(g) The city may conduct periodic inspections or at least yearly.

III. Enforcement

(a) Per SMC 15.10.200 Termination of Service: The city will send a final letter (certified letter) specifying a date for the discontinuance of public water service to the premises. The CCS shall notify the City and the local LAA of this. On the date of the specified termination the LAA will coordinate termination of water service to the premises.

Initial Survey

2.ii Initial Assessment Task

	Schedule
For all existing facility (low health hazard)	Twenty months
For new construction, remodels or additions	At time of application of water service
Identification and assessment of high hazard premises which are listed on Table 9	Fifteen months
Identification of residential connections with special plumbing facilities.	At time of Backflow Prevention Requirements Form is returned

Re - Survey

2.iii Type of Service

	Frequency of Re-Evaluation
Air-gap (residential, commercial)	Each year
All other assembly's for either residential or Commercial premises or in-premises	At the time the assembly is tested (by the tester), plumbing retrofit or at the discretion of the CCCS

2.iv The CCCS and the LAA will mutually or individually perform facility surveys for existing and new construction at the expense of the consumer.

Element 3: The purveyor will develop and implement procedures and schedules for ensuring that:

(i) Cross-connections are eliminated whenever possible;

(ii) When cross-connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard; and

(iii) Approved backflow preventers are installed in accordance with the requirements of subsection (6) of this section.

3.i Cross-connections will be eliminated pursuant to SMC 15.10.090 Cross Connection Protection.

3.ii When cross-connections cannot be eliminated they will be controlled by the installation of an approved backflow prevention assembly or device, commensurate with the degree of hazard pursuant to SMC 15.10.090 Cross Connection Protection.

3.iii Approved backflow prevention assemblies or devices will be installed pursuant to WAC 246-290-490 subsection six (6).

3.a After a site survey for an existing facility and reviewing new construction plans with the building official (joint agreement) reference will be made to tables eight and nine of WAC 246-290-490 for the appropriate methods of backflow protection. Because of our joint agreement the location of (table nine, high hazard requirements) the assembly will be in-premises, premises or both depending on the high health facility such as a Dentist, Medical clinic.

3.b Installation of Backflow Preventers Schedule

Letter of Site Survey Notice	Letter of Site Survey Results
This letter describes the Cross-Connection Control Program (CCC) program, purpose of the survey and gives notice for a scheduled contact time.	This letter describes the CCC program, results of the survey, time frame for installations, inspections, testing and includes supporting material.

3.c The city may require backflow protection for single family residential users based upon a facility survey, a cross connection incident or the issuance of a plumbing permit where backflow prevention assemblies are required.

3.d After the LAA and the Purveyor has reviewed and approved the applicants plans (drawings) for construction of a new fire protection system the appropriate Backflow Prevention (detector) Assembly (BPA) for the degree of hazard shall be installed, inspected and tested. The test will be conducted upon completion of construction.

3.e For all existing fire protection systems a survey will be conducted for backflow protection. If the survey finds no chemicals are needed and the purveyor's water is used a Double Check Detector Assembly (DCDA) will be permitted and a time frame specified by the purveyor for the installation, inspection and testing.

3.f Where existing fire protection systems that pose an immediate health hazard because of chemicals or auxiliary water the installation of a Reduced Pressure Detector Assembly (RPDA) shall be installed within ninety (90) days of the facility inspection or we shall take legal action. Where an immediate health hazard exists on a required fire protection system the purveyor may take abatement action. The purveyor will immediately contact the LAA the Snohomish Health District (SHD) DOH and the city attorney. The purveyor may install the appropriate BPA at the Rights Away line to protect the public water

system and all costs of abating the immediate health hazard shall be in accordance with SMC 15.10.190. Costs of compliance borne on the water user.

Element 4: The purveyor will ensure that personnel, including at least one person certified as a Cross Connection Control Specialist (CCCS), are provided to develop and implement the cross-connection control program.

4.i The City of Snohomish will employ at all times, or contract, at least one person certified as a CCCS to develop and implement the cross-connection control program CCC program.

4.ii Current CCCS for the City of Snohomish is:

Name	Karen Latimer
Address	116 Union Ave.
City, State, Zip	Snohomish, WA 98290
Phone	(360) 568-3229
Classification and Number	CCS

4.iii Presently the current CCCS is administering the Cross-Connection Control program that includes:

- Writing and recommending changes to the Cross-Connection Control program. Review at least yearly.
- Working closely with the LAA. See appendix (joint agreement)
- Reviewing all hazard evaluations.
- Conducting site survey's (hazard, protection, enforcement, education, follow-up, etc.)
- Reviewing and recording backflow preventer test reports.
- Review and record Backflow Assembly Tester's certifications.
- Performing water quality control issues.
- Preparing the Annual Summary Report (ASR) for DOH.
- Preparing and sending out annual test letters.
- Keeping proactive by attending seminars, conferences, workshops to keep the "saw sharpened"
- Administering a database

4.iv Minimum listed forms needed for the Cross-Connection Control program (see appendix d)

Element 5: The purveyor will develop and implement procedures to ensure that approved backflow prevention assemblies or devices are inspected and/or tested (as applicable) in accordance with subsection (7) of this section.

5.i The (CCCS) will review and prepare annual testing reminder letters for all existing backflow prevention assemblies or devices that require annual testing.

5.ii All approved atmospheric vacuum breakers for irrigation shall be inspected at

installation, after a backflow incident and after a repair, reinstallation or relocation.

5.iii All approved, and accepted backflow assemblies (including inspecting air-gaps) must be tested annually. The consumer shall pay for all testing and repairs. The city will have available a list of Certified Testers with this letter.

5.iv The purveyor requires BPA's tested:

(a) At the time of installation, annually, after a backflow incident, after an assembly is repaired or replaced and any time an assembly is reinstalled or relocated.

(b) The city will send annual letters to consumers requiring their assemblies be tested and to submit their test results to the city within thirty (30) working days from the time they receive their letter.

(c) The city will send a second letter (or phone call) if no test results are forwarded to the CCS for review and data entry. This letter will inform them to submit their test results within five (15) days or water service may be terminated.

(d) The City will send a certified letter notifying the consumer to comply within five (5) working days of the letter to have the test results submitted to the city or water service may be terminated.

Enforcement

(a) Per SMC 15.10.200 Termination of Service the city will send a final letter (certified letter) specifying a date for the discontinuance of public water service to the premises. The CCS shall notify the City and the local LAA of this.

5.v Upon receiving the test report, review carefully the results, the tester (being state approved) then file.

Element: 6: The purveyor will develop and implement a backflow prevention assembly testing quality control assurance program, including, but not limited to, documentation of tester certification and test kit calibration, test report contents, and time frames for submitting completed test reports.

6.i Documentation of tester certification is presently obtained by contacting the Department of Health (DOH) and requesting an updated list of qualified Backflow Assembly Testers (BAT). The city will maintain a list of all BAT's that includes a current copy of their validation card and current copy of their instrument calibration certificate.

6.ii Annually upon request the testers must submit to the (CCCS) a copy of their test kit calibration and or verification results.

6.iii Test report contents are forwarded to the (CCCS) within the thirty (30) day testing period.

6.iv Testing procedures will conform to WAC 246-290-490 (7((d) that have been adopted by USC, and the CCCS will understand and be familiar with the assembly testing procedures as outlined in the Cross-Connection Control Manual Accepted Procedure and Practice 6th edition.

6.v BAT's requesting to be on the City's contact list must submit their current certified BAT number, current copy of their calibration accuracy report for their test kit, proof of liability insurance, their address, name of business and phone number.

6.vi BAT's must use the City's test report form or an acceptable form recognized by the Cross-Connection Control Manual Accepted Procedure and Practice Sixth Edition.

Element 7: The purveyor will develop and implement (when appropriate) procedures for responding to backflow incidents.

7.i The purveyor will notify the Washington State Department of Health (DOH), (LAA) and the local health jurisdiction as soon as possible, but no later then the end of the next business day, when a backflow incident is known by the purveyor to have contaminated the public water system; or occurred within the premises of a consumer served by the purveyor.

7.ii The purveyor will; document details of backflow incidents on a form acceptable to the (DOH) such as the backflow incident report form included in the most recent edition of the Cross-Connection Control Manual Accepted Procedure and Practice and

7.iii The purveyor will include all backflow incident report(s) in the annual cross-connection control program summary report.

7.iv The City's Water Division submits to the CCS a monthly Coliform Report for review and to keep on file the sampling results. The CCS currently receives all other water quality complaints such as dirty, foul smelling water, etc. with a follow up and keeps a report on each incident.

7.v The CCS is notified of any foreseen or unforeseen disruption of water service to the consumer.

7.vi We currently have on file the reference "Backflow Incident Investigation Procedures" published by PNWS-AWWA.

Element 8: The purveyor will include information on cross-connection control in the purveyor's existing program for educating consumers about water system operation. Such a program may include periodic bill inserts, public service announcements, pamphlet distribution, notification of new consumers and consumer confidence reports.

8.i The City of Snohomish CCC will make available a supply of handouts at the city hall counter explaining the intent and the responsibility of CCC with a name and phone number for contact.

8.ii With every new water service application a "Backflow Prevention Requirements" form is attached asking the applicant to respond and return to the city. The survey asks to check off any of the health hazards they may have.

Element 9: The purveyor will develop and maintain cross-connection control records including, but not limited to, the following.

9.i A master list of service connections and/or consumer's premises where the purveyor relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow presenter's.

9.ii Inventory information on:

a. Approved air gaps installed in lieu of approved assemblies including exact air gap location, assessed degree of hazard, installation date, history of inspections, inspection results, and person conducting inspections.

b. Approved backflow assemblies including exact assembly location, assembly description (type, manufacturer , model, size, and serial number), assessed degree of hazard, installation date, history of inspections, tests and repairs, test results, and person performing tests; and

c. Approved AVBs is used for irrigation system applications including location, description (manufacturer, model, and size), installation date, history of inspection(s), and person performing inspection(s).

9.iii Cross-connection program summary reports and backflow incident reports required under subsection (8) of this section (WAC) 246-290-490.

9.iv Records: Records and reports must be kept as referenced under WAC 246-290-490 subsection (8) (ii) (iii).

a. The minimum listed correspondence must be kept in a common database either in printed form or computerized file.
   1. Copy of the cross-connection control ordinance
   2. Copy of the cross-connection control program

3. Copy of the master list for service connections (location, hazard level, service address, protection type, make, size, model, date of installation, date of inspection, date of testing, date of next test)
4. Copy of tester's maintenance report's
5. Copy of all correspondence with the customers
6. Copy of the annual summary report
7. Copy of tester's name, certification number and equipment certification number and date certified
8. Copy of all public education correspondence
9. Copy of all correspondence with State and Local Health Authority's
10. Copy of all correspondence with the (LAA)
11. Copy of (or access to) drawings and diagrams of assembly installations

9.v Currently all information for the cross connection control program is stored on a self generated database which is cumbersome but nonetheless workable. The city is currently using a commercial database program which has records for all departments of the city entered on it. They are in the process of creating fields for the cross connection control program.

Element 10: Purveyors who distribute and/or have facilities that receive reclaimed water within their water service area will meet any additional cross-connection control requirements imposed by the department under a permit issued in accordance with chapter 90.46 RC.

10.i At this time the City of Snohomish Public Water System does not receive or distribute reclaimed water. In the event that reclaimed water use is proposed within the Water System service area, all cross-connection control requirements mandated by the Permitting Authority in accordance with Chapter 90.46 RCW shall be made part of the Cross-Connection Control program and be complied with.

V. Other CCC Program Requirements and Recommendations:

1. Prohibition of Return of Used Water.

1.i Any known used water such as make water and cooling water will have installed a backflow assembly commensurate with the degree of hazard at each point of connection, per WAC 246-290-490 (2)(l).

II. Unapproved Auxiliary Supplies.

2.i The city will require the installation of an RPBA for premises isolation if a known auxiliary supply has a connection to the city's water system or not.

III. Tanker Trucks.

3.i All trucks and equipment that are constructed with holding tanks for water and have requested to fill there holding tanks with the city's potable water are required to draw water from a designated water source (fire hydrant) at the city's corporation yard with the city's approved RPBA under the direction of the CCCS.

IV. Temporary water connections (such as construction sites).

4.i The city will inspect and monitor all temporary water connections for those used for water main construction. This inspection will be for proper disinfection, sampling and backflow application. The city will provide their own approved RPBA for all such water main connections. This assembly will be tested, inspected and monitored for such temporary water construction projects.

V. Wholesale water customers (such as for mobile home parks).

5.i The purveyor and the LAA will assess all Mobile Homes and Recreational Vehicle Parks for the degree of hazard found and require the proper prevention assembly.

5.ii Premise isolation and or fixture protection will be dependent on the site survey results and the agreement between the LAA and the purveyor.

5.iii The purveyor will coordinate with the wholesale administrator to administer a cross connection control program. This will include describing the purpose of a cross connection control program per WAC 246-290-490.

VI. The purveyor will practice all safety requirements as outlined in the (CCCM).

VI. Cross-Connection Control Enforcement.

7.i The (CCCS) will discontinue water service to consumers who fails to install, maintain, (testing, repair) or refuse a facility survey inspection pursuant to (WAC 246-290-490) and (SMC 15.10.200).

7.ii The (CCCS) will give appropriate notice to the purveyor and to the (LAA) prior to discontinuing or denying water service.

VII. Education.

8.i The (CCCS) will keep abreast of all new instructions and material for cross-connection control by attending classes, workshops, seminars and retaining the certificates needed for this position.

VIII. Summary.

9.i The (CCCS) will incorporate good engineering, public health practices and other polices to ensure a sound (CCCP) for the City of Snohomish.

X. DECISION TABLE

DECISION TABLE

Decision Item	Decision
1. **Type of Program**	
a. Premises Isolation Only	
b. Premises Isolation and In-Premises protection (Combination Program)	X
2. Extent of Coordination with Local Administrative Authority	
a. Information Exchange	
b. Interaction	
c. Joint Program	X
3. Enforcement of Corrective Action	
a. Rely upon shut-off of water service	X
b. Rely upon purveyor installed premises isolation	
4. Relationship with Customer	
a. Signed service agreement or contract	
b. Ordinance/Resolution; implied service agreement	X
5. Location and Ownership of Premises Isolation Assembly	
a. On purveyor's service line	
b. On customer's service line	X
6. CCS Option – Purveyor's Program Management	
a. Purveyor's staff member certified	X
b. Inter – agency agreement of use other agency's CCS	
c. Contract with consultant CCS	
7. Assessment and Re – Assessment of Hazard	
a. By purveyor's staff or equivalent	X
b. By CCS employed by customer, report reviewed by purveyor's CCS	
8. Testing of Assemblies	
a. By purveyor's staff or purveyor employed BAT	
b. By customer employed (Contractor) BAT	X
9. Cost Recovery	
a. Borne by all customers (general water rates)	X
b. Assessed to specific class (commercial meters)	
c. Each customer directly bears cost	

Appendix B
JOINT AGREEMENT

1. Cross-Connection Control/Local Administrative Authority

2. Cross-Connection Control/Uniform Plumbing Code Authority (deputization)

3. Cross-Connection Control/Green Velvet Water District Agreement

CITY OF SNOHOMISH

Founded 1859, Incorporated 1890

116 UNION AVENUE ▯ SNOHOMISH, WASHINGTON 98290 ▯ TEL (360) 568-3115 FAX (360) 568-1375

JOINT AGREEMENT

Cross-Connection Control/Local Administrative Authority

I. **Purpose:** To establish an agreement identifying the duties and procedures between the City of Snohomish Cross-Connection Control Specialist and the Local Administrative Authority-Snohomish Building Department.

II. Policy: **It is the policy of the City of Snohomish cross-connection and the local administrative authority to implement a joint agreement to control and or eliminate the actual or potential cross-connection that would pose a health hazard to both the public water system and to the consumers water system per WAC 246-290-490, SMC (Snohomish Municipal Code) and the UPC.**

III. **Responsibilities:**

1. The Cross-connection control specialist will have the responsibility of protecting the public water system for cross-connection control beginning at the water treatment plant, storage and distribution facilities and ending at the point of delivery to the consumers water system, or at the meter, which includes the following; survey inspections, (new and existing) plan review, assembly inspections, customer interaction, educating, compliance and notification issues, records management, investigate and remedy customer complaints regarding water quality, put in place enforcement policies and prepare written summary reports.

2. The local administrative authority's responsibility for cross-connection begins at the consumers water system (down side of the water meter) including all plumbing lines to the building and within the building.

IV. Procedures:

1. The Cross-connection control specialist and the local administrative authority will mutually agree upon the degrees of hazard associated with the joint inspections and evaluation from cross-connections and mutually agree on the type of protection needed, (air-gap, backflow assembly or avb) or recommend a plumbing correction that would eliminate the cross-connection.

2. The Cross-connection specialist and the local administrative authority will mutually agree on the enforcement action for non-compliance.

3. The Cross-Connection Control specialist and the local administrative authority will communicate on a regular basis with any water quality issues and to review construction drawings, site plans, and any other applicable improvements that could effect the public water system.

4. Information obtained during site surveys (new and existing) shall be shared with the local administrative authority.

5. The Cross-Connection Control Specialist and the local administrative authority shall provide a method for good record keeping.

6. The Cross-Connection Control Specialist will be responsible for issuing renewal notices for testing of backflow preventers, entering results of annual testing and all enforcement related to the testing.

7. The Cross-Connection Control Specialist will notify the Local Administrative Authority of any potential or existing cross-connections in writing.

8. The Local Administrative Authority will notify the Cross-Connection Control Specialist of any cross-connections found.

V. **Conclusions:**

The cross-connection control specialist and the local administrative authority face many challenges with the advent of growth and other duties (pre-treatment/building functions) for the City of Snohomish, but with full cooperation, committed time and loyalty to each other and to the program this JOINT AGGREEMENT can work very effectively

Sincerely,

Dan Miller,Cross-Connection Control Specialist

Sharon Pettit, Building/Fire Official

CITY OF SNOHOMISH

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Building Department

TO: Dan Miller, Cross Control Specialist 1
Lead, Water Division

FR: Sharon Pettit, Building/Fire Official

DT: December 3, 1998

RE: Uniform Plumbing Code Authority
Cross Connection Control

Purpose:

To enable and unify the City Water Division and Building Department to promulgate an active inspection and enforcement program relative to Cross Connection Control.

Authority:

Pursuant to the 1997 Uniform Plumbing Code, the Building Official is the Administrative Authority. The Building Official may deputize employees, as necessary, to carry out administrative, inspection and enforcement functions. In order to provide effective Cross Connection Control, cooperative enforcement as the Water Purveyor and Administrative Authority is essential.

Scope:

As the Building Official and Administrative Authority, I hereby authorize and deputize, Dan Miller, Cross Connection Control Specialist 1 to cooperatively enforce the provisions of the 1997 Uniform Plumbing Code as amended and adopted by the State of Washington, and the City of Snohomish relative to Cross Connection Control.

Cc: Bill McDonald, City Manager
Mark Beardslee, Director, Community Development
Mick Monken, City Engineer
Pat Adams, Human Resources

CITY OF SNOHOMISH

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CROSS-CONNECTION CONTROL AGREEMENT BETWEEN THE CITY OF SNOHOMISH AND GREEN VELVET WATER DISTRICT

I. **Purpose:** To establish an agreement identifying the duties and procedures between the City of Snohomish Cross-Connection Control (CCC) and the Green Velvet Water District. This agreement will also allow the City of Snohomish Cross-Connection Control Specialist (CCCS) to give aid toward the implementation of a Cross-Connection Control .Program (CCCP)

II. **Policy:** It is the policy of the City of Snohomish (seller) and the Green Velvet Water District (purchaser) to implement a joint agreement to control and eliminate the actual or potential cross-connection that would pose a health hazard to both the City of Snohomish water system and the Green Velvet water system. per WAC 246-290-490

III. **Responsibilities:**

1. The City of Snohomish Cross-Connection Control Specialist (CCCS) will have the responsibility of protecting the public water system for CCC beginning at the water treatment plant, transmission line and ending at the point of delivery or to the water meter of the Green Velvet Water system. This includes assessing whether a cross-connection hazard exists, the degree of hazard, and whether backflow prevention will be necessary.

2. The Green Velvet Water District's responsibility for CCC begins at their water meter including the pump system, service lines and the water use for each residence. This also includes assessing whether a cross-connection hazard exist, the degree of hazard, and whether backflow prevention will be necessary.

IV. Procedures:

1. The City of Snohomish CCCS and the Green Velvet Water District will work closely and mutually agree:
   a. Upon the degrees of hazard associated with joint inspections and evaluation
   b. On the recommended protection or the elimination of the cross-connection.
   c. On the enforcement action and compliance.

d. To communicate on a regular basis with any water quality and cross-connection issues (such as any actual or potential cross-connections and or incidents) that would effect the water system and the users.

e. To provide good record keeping and to share and review this with the City of Snohomish CCCS.

I understand and agree to the above agreement.

Mike Greenhalgh, Green Velvet Water District: _____

Date: _____

Appendix C
ORDINANCE

1. Cross-Connection Control Ordinance 1909

CITY OF SNOHOMISH
Snohomish, Washington

ORDINANCE 1909

AN ORDINANCE OF THE CITY OF SNOHOMISH ENACTING A NEW CHAPTER 15.10 OF THE SNOHOMISH MUNICIPAL CODE RELATING TO THE ESTABLISHMENT OF A WATER SYSTEM CROSS-CONNECTION PROGRAM.

WHEREAS, it is the policy of the City of Snohomish to protect the public water system as defined in WAC 246-290-010, from contamination via cross-connections; and

WHEREAS, Group A Public Water Systems WAC 246-290-490 mandates that water purveyors adopt ordinances that establish and implement a Cross-Connection Control program;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SNOHOMISH DO ORDAIN AS FOLLOWS:

Section 1. Chapter 15.10. A new Chapter 15.10 is hereby added to the Snohomish Municipal Code, which shall read as follows:

Chapter 15.10

Cross-Connection Control Program Regulations

Sections:

15.10.211 Severability.
15.10.212 Repealer.

15.10.010 Title. This chapter shall be known as the City of Snohomish, Cross-Connection Control Program Regulations.

15.10.020 Group A Public Water Systems Adopted. The Group A Public Water Systems WAC 246-290, is hereby adopted by reference. For the purposes of adoption, the word "purveyor" shall mean the City of Snohomish.

15.10.030 Cross-Connection Control Manual Adopted. The Cross-Connection Control Manual, Accepted Procedure and Practice, Sixth edition, published by the Pacific Northwest Section of the American Water Works Association, is hereby adopted by reference with amendments.

AMEND Table 4-2 titled Mandatory Service Isolation - column "Minimum Protection Recommended at Meter" to read "**Minimum Protection Determined At Meter**".

AMEND Table 4-3 titled Recommended Service Isolation - column "Minimum Protection Recommended at Meter" to read "**Minimum Protection Determined At Meter**".

AMEND Table 4-4 titled "Recommended Protection at Fixtures and Equipment" to read "**Required Protection at Fixtures and Equipment" and ADD language that reads "As Determined by Degree of Hazard**".

15.10.040 Uniform Plumbing Code and Standards Adopted with Amendments, WAC 51-46 and 51-47. The current edition, as adopted by Washington State, of the Uniform Plumbing Code and Standards published by the International Association of Plumbing and Mechanical Officials, as amended and adopted under Snohomish Municipal Code 19.04.050.

15.10.050 Scope. All community water systems must comply with the cross-connection control requirements of WAC 246-290-490. The City's authority over cross-connection control shall begin at the water supply source and includes the entire public water treatment, storage, and distribution facilities. The City's authority ends at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter located on the public right-of-way or utility easement.

15.10.060 Local Administrative Authority. Where provisions relative to cross-connection control are regulated under other codes adopted by City ordinance, or, where service connections are located outside of the City of Snohomish boundaries, the City may enter into a cooperative agreement for administration, inspection and enforcement of cross-connection control when applicable.

15.10.070 Definitions:

WAC Section 246-290-010 Definitions are hereby amended to include the following:

"Compliance Inspection" is an inspection performed by the Cross-Connection Control Specialist to ensure that the approved backflow prevention assembly(s) commensurate with the degree of hazard have been installed, and that the cross-connection to the purveyor's water system no longer exists.

"Degree of Hazard" means the potential risk to public health and the adverse effect of the hazard upon the potable water system, depending on the type of cross-connection that could occur.

"Facility Survey Inspection" means the consumer's premises has been inspected by the Cross-Connection Specialist for the purposes of evaluating and identifying potential and/or existing cross-connections, and determining by degree of hazard the required backflow protection necessary to protect the water supply of the consumer's water system.

"Hydrant Use Inspection" means the inspection, monitoring and controlled use of a purveyor's hydrant to ensure that equipment or vehicles have an approved backflow prevention device or assembly in place prior to receiving water from the purveyor's water system.

"Potable Water Supply" means any water supply system intended or used for human consumption or other domestic uses and which must meet Washington State Department of Health Water System Rules and Regulations.

"Premises" means any piece of land to which water is provided, including all structures, occupied spaces, leased or tenant spaces, and any improvements made on and/or to.

15.10.080 Cross-Connections Regulated. No cross-connections shall be created, installed, used or maintained within the water utility boundaries serviced by the City of Snohomish. Any water district, municipal organization, or other organization, which is connected to the City water supply and/or which is furnished to people within said district or organization, shall cause all people or members to comply with the rules and regulation contained in this chapter.

15.10.090 Cross-Connection Protection. The City shall ensure that cross-connections between the distribution system and a consumer's water system be eliminated or controlled by the installation of an approved backflow prevention assembly or device commensurate with the degree of hazard.

Depending on the degree of hazard, and the required backflow prevention assembly or device, the City may, at its discretion, rely on in-premise protection as adequately protecting the public water system. Where the degree of hazard requires more stringent isolation, the City may require both premise and in-premise isolation.

15.10.100 Expense to User/Consumer Borne. Pursuant to Section 15.10.080, cross-connections that exist, or which have the potential to create or cause conditions that require protection of the public water system, by the installation of approved backflow prevention assemblies or devices, providing premise isolation and/or in-premise isolation, shall be installed, tested, and maintained at the user/consumer's expense.

15.10.110 Provisions for Water Service - New Construction. All new connections where backflow prevention is required in accordance with this chapter will not have water service provided until the Cross-Connection Control Specialists receives a copy of the initial Backflow Assembly Test report, which indicates the assembly or device is approved and passed all required testing. The testing and report must be prepared and conducted by an approved, certified Backflow Assembly Tester.

15.10.120 Access to Premises. Authorized employees of the City of Snohomish, with proper identification, shall have access during reasonable hours and with reasonable notification to all premises to which water is supplied.

15.10.130 Failure to Comply. In the event any water user refuses access to premises for inspection by the Cross-Connection Control Specialist, or fails to comply with any requirements of this chapter, the City may at its sole discretion require the user/consumer to immediately install premise isolation, terminate the water service, and the user/consumer may be cited with a misdemeanor infraction pursuant to Snohomish Municipal Code Title 19, Building and Construction Codes.

15.10.140 Notification of Cross-Connection Incident. In the event of any cross-connection incident, where the purveyor's water system has been or may be contaminated, the Cross-Connection Control Specialist and the local administrative authority shall be notified immediately. Failing to notify an incident has occurred shall subject the property owner, user/consumer to the provisions of Section 15.10.130, Failure to Comply. All costs incurred enforcing this provision shall be borne by the person(s) that caused the cross-connection to occur.

15.10.150 Facility Survey Inspection. The facility survey inspection is an on-site inspection to determine the degree of hazards present if any, the appropriate backflow prevention assembly to control the hazard, and to verify the proper installation and function of existing backflow prevention assemblies or devices.

A. If a cross-connection exists without protection, the user/consumer will be given a written correction notice that outlines the corrective action required. Based on the degree of hazard found, a compliance date will be determined, and a compliance inspection will be required. Facility surveys may also be conducted from time to time to ensure compliance with this section. The City will notify the local administrative authority of all actions taken.

B. For existing facilities, the City will notify the property owner and/or occupant, (user/consumer) in writing to request an inspection appointment. If there is no response, the City will send a second request certified mail (return receipt requested), notifying them that an inspection of the facility will be conducted within five (5) working days from the date the City receives proof that the letter was received. Pursuant to Section 15.10.130, the City may take action for failure to comply.

C. For new construction, remodels or additions, a facility survey will be completed at final inspection in conjunction with the local administrative authority.

15.10.160 Plan Review - New Construction, Remodel and Additions

A. When the proposed scope of work requires installation of, connection to, or use of the City's water system, the user/consumer shall provide the purveyor with a detailed plumbing diagram of all plumbing fixture types and locations. Plans shall provide cross-connection protection, type of backflow assemblies and installation requirements. No construction or use of water system service, whether permanent or temporary, will be permitted until the City has reviewed and approved the plans for compliance. The local administrative authority and the City will coordinate and conduct a cooperative plan review.

B. When the scope of work is within an existing building, facility, use or parcel and involves new construction or remodeling, the consumer shall provide the City with the detailed drawings and plumbing diagrams proposed for review and approval. The plans shall provide cross-connection protection, type of backflow assemblies and installation requirements. In multi-tenant facilities, a complete plumbing diagram which details existing conditions, including protection methods, are required to be submitted to ensure that no potential cross-connection exists or may cause a hazard to be created which would affect the City's water system. The local administrative authority and the City will coordinate and conduct a cooperative plan review.

15.10.170 Installation Requirements and Instructions. To ensure proper operation and accessibility of all backflow prevention assemblies, the following requirements shall apply:

A. No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. If a backflow prevention assembly is installed in a vault or basement, adequate drainage shall be provided. Reduced Pressure Principle Assemblies shall be installed above ground.

B. Assemblies must be installed at the point of use. Alternate locations must be requested in writing and approved by the City of Snohomish prior to installation.

C. The assembly must be protected from freezing and other severe weather conditions.

D. All backflow prevention assemblies to be installed shall be of a type and model pre-approved by the Washington State Department of Health and the City of Snohomish.

E. The assembly shall be readily accessible with adequate room for maintenance and testing. All devices shall have a minimum of twelve inches clearance on all sides of the device.

F. If written permission is granted to install the backflow assembly inside a building, the assembly shall be readily accessible during regular working hours of 8:00 a.m. to 4:30 p.m., Monday through Friday.

G. If an assembly is approved for installation inside of the premises, and it is installed five feet above the floor, it must be equipped with rigid and permanently installed scaffolding or platforms acceptable to the City of Snohomish. The installation must also meet the

requirements set out by the U.S. Occupational Safety and Health Administration and the State of Washington Occupational Safety and Health Codes.

H. Reduced Pressure Principle Assemblies shall be installed above ground level only if a relief valve discharge can be drained to daylight through a "boresight" type drain. The drain shall be of adequate capacity to carry the full rated flow of the device and shall be screened on both ends.

I. An approved air gap shall be at least twice the inside diameter of the incoming supply line as measured vertically above the top rim of the drain and in no case less than one inch.

J. Where a backflow device is deemed necessary, the model of the assembly and installation plans shall be submitted to the City of Snohomish for approval prior to installation.

K. Upon backflow device installation, the City of Snohomish shall be notified and all devices shall be inspected and tested. All backflow devices must be registered with the City of Snohomish by means of the initial test report.

L. Prior to installation, any variances from these installation requirements shall be requested in writing by the owner and approved by the City of Snohomish.

M. The City shall be notified within twenty-four (24) hours of the installation of a backflow assembly, and an inspection scheduled with the Cross-Connection Control Specialist and the local administrative authority to ensure compliance. All backflow assemblies shall be tested upon installation and annually thereafter, and following any retrofit, by a Certified Backflow Assembly Tester, and a copy of all test reports submitted to the purveyor for approval within five (5) working days of the test.

15.10.180 Initial and Annual Testing, Repairs. All backflow assemblies installed within the water service boundaries served by the City of Snohomish water utility shall be tested immediately upon installation and on an annual basis thereafter, and following each assembly retrofit. A Washington State Certified Backflow Assembly Tester shall perform the testing. All devices not functioning properly at the time of testing shall be promptly repaired or replaced. Any device not promptly repaired or replaced may cause the City of Snohomish to deny or discontinue water to the premises. All testing and repairs are the financial responsibility of the water user. A copy of the approved test report shall be provided to the Cross-Connection Control Specialist within five (5) working days of the test.

15.10.190 Costs of Compliance. All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow device are the financial responsibility of the water user. In the event the City must initiate action to enforce compliance with this chapter, all costs incurred enforcing the action shall be borne by the water user, and the City may use whatever means necessary to recover the costs of enforcement.

15.10.200 Termination of Service. Failure on the part of any customer to discontinue the use of all cross-connections except in accordance with this ordinance, is sufficient cause for the immediate discontinuance of public water service to the premises.

15.10.210 No Special Duty Created. It is the purpose of this chapter to provide for the health, welfare and safety of the general public, and not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this chapter.

It is the specific intent of this chapter to place the obligation of complying with its requirements upon the permit applicant and any person owning, operating or controlling any premises, building or structure within the scope of this chapter; that no provision nor term used in this chapter is intended to impose any duty whatsoever upon the City or any of its officers, agents or employees for whom the implementation or enforcement of this chapter shall be discretionary and not mandatory.

Nothing contained in this chapter is intended to be, nor shall be, construed to create or form the basis for any liability on the part of the City or its officers, agents and employees for any injury or damage resulting from the failure of any premises or building to comply with the provisions of this chapter or be reason or a consequence of any inspector, notice, order, certificate, permission or approval authorized or issued or done in connection with the implementation or enforcement of this chapter or by reason of any action of the City related in any manner to the enforcement of this chapter by its officers, agents or employees.

15.10.211 Severability. The provisions of this chapter are declared to be separate and severable. The invalidity of any clause, sentence, paragraph, subdivision, section or. portion of this chapter or the invalidity of the application thereof to any person or circumstances shall not affect the validity of the remainder of this chapter, or the validity of its application to other persons or circumstances.

15.10.212 Repealer. All provisions of the Snohomish Municipal Code, which are inconsistent with this ordinance, are hereby repeated.

PASSED by the City Council and APPROVED by the Mayor this 7th day of September, 1999.

CITY OF SNOHOMISH

By _____
Jeff Soth, Mayor

ATTEST:

By _____
Molly Linville, City Clerk

APPROVED AS TO FORM:

By _____
Grant Weed, City Attorney

Date of Publication: 9/10/99

Effective Date (5 days after publication): 9/15/99

Appendix D
SNOHOMISH MUNICIPAL CODE

1. Chapter 15.10 Cross-Connection Control Program Regulations

2. Chapter 15.10.200 Cross-Connection Control Termination of Service

Chapter 15.10

Cross-Connection Control Program Regulations

Sections:

15.10.010 Title. This chapter shall be known as the City of Snohomish, Cross-Connection Control Program Regulations. (Ord. 1909, 1999)

15.10.020 Group A Public Water Systems Adopted. The Group A Public Water Systems WAC 246-290, is hereby adopted by reference. For the purposes of adoption, the word "purveyor" shall mean the City of Snohomish.

15.10.030 Cross-Connection Control Manual Adopted The Cross-Connection Control Manual, Accepted Procedure and Practice, Sixth edition, published by the Pacific Northwest Section of the American Water Works Association, is hereby adopted by reference with amendments.

AMEND Table 4-2 titled Mandatory Service Isolation - column "Minimum Protection Recommended at Meter" to read "**Minimum Protection Determined At Meter**".

AMEND Table 4-3 titled Recommended Service Isolation - column "Minimum Protection Recommended at Meter" to read "**Minimum Protection Determined At Meter**".

AMEND Table 4-4 titled "Recommended Protection at Fixtures and Equipment" to read "**Required Protection at Fixtures and Equipment**" **and ADD language that reads "As Determined by Degree of Hazard**".

15.10.040 Uniform Plumbing Code and Standards Adopted with Amendments, WAC 51-46 and 51-47. The current edition, as adopted by Washington State, of the Uniform Plumbing Code and Standards published by the International Association of Plumbing and Mechanical Officials, as amended and adopted under Snohomish Municipal Code 19.04.050.

15.10.050 Scope. All community water systems must comply with the cross-connection control requirements of WAC 246-290-490. The City's authority over cross-connection control shall begin at the water supply source and includes the entire public water treatment, storage, and distribution facilities. The City's authority ends at the point of delivery to the consumer's water system, which begins at the downstream end of the service

connection or water meter located on the public right-of-way or utility easement.

15.10.060 Local Administrative Authority. Where provisions relative to cross-connection control are regulated under other codes adopted by City ordinance, or, where service connections are located outside of the City of Snohomish boundaries, the City may enter into a cooperative agreement for administration, inspection and enforcement of cross-connection control when applicable.

15.10.070 Definitions:

WAC Section 246-290-010 Definitions are hereby amended to include the following:

"Compliance Inspection" is an inspection performed by the Cross-Connection Control Specialist to ensure that the approved backflow prevention assembly(s) commensurate with the degree of hazard have been installed, and that the cross-connection to the purveyor's water system no longer exists.

"Degree of Hazard" means the potential risk to public health and the adverse effect of the hazard upon the potable water system, depending on the type of cross-connection that could occur.

"Facility Survey Inspection" means the consumer's premises has been inspected by the Cross-Connection Specialist for the purposes of evaluating and identifying potential and/or existing cross-connections, and determining by degree of hazard the required backflow protection necessary to protect the water supply of the consumer's water system.

"Hydrant Use Inspection" means the inspection, monitoring and controlled use of a purveyor's hydrant to ensure that equipment or vehicles have an approved backflow prevention device or assembly in place prior to receiving water from the purveyor's water system.

"Potable Water Supply" means any water supply system intended or used for human consumption or other domestic uses and which must meet Washington State Department of Health Water System Rules and Regulations.

"Premises" means any piece of land to which water is provided, including all structures, occupied spaces, leased or tenant spaces, and any improvements made on and/or to.

15.10.080 Cross-Connections Regulated No cross-connections shall be created, installed, used or maintained within the water utility boundaries serviced by the City of Snohomish. Any water district, municipal organization, or other organization, which is connected to the City water supply and/or which is furnished to people within said district or organization, shall cause all people or members to comply with the rules and regulation contained in this chapter.

15.10.090 Cross-Connection Protection The City shall ensure that cross-connections between the distribution system and a consumer's water system be eliminated or controlled by the installation of an approved backflow prevention assembly or device commensurate with the degree of hazard.

Depending on the degree of hazard, and the required backflow prevention assembly or device, the City may, at its discretion, rely on in-premise protection as adequately protecting the public water system. Where the degree of hazard requires more stringent isolation, the City may require both premise and in-premise isolation.

15.10.100 Expense to User/Consumer Borne. Pursuant to Section 15.10.080, cross-connections that exist, or which have

the potential to create or cause conditions that require protection of the public water system, by the installation of approved backflow prevention assemblies or devices, providing premise isolation and/or in-premise isolation, shall be installed, tested, and maintained at the user/consumer's expense.

15.10.110 Provisions for Water Service - New Construction All new connections where backflow prevention is required in accordance with this chapter will not have water service provided until the Cross-Connection Control Specialists receives a copy of the initial Backflow Assembly Test report, which indicates the assembly or device is approved and passed all required testing. The testing and report must be prepared and conducted by an approved, certified Backflow Assembly Tester.

15.10.120 Access to Premises. Authorized employees of the City of Snohomish, with proper identification, shall have access during reasonable hours and with reasonable notification to all premises to which water is supplied.

15.10.130 Failure to Comply. In the event any water user refuses access to premises for inspection by the Cross-Connection Control Specialist, or fails to comply with any requirements of this chapter, the City may at its sole discretion require the user/consumer to immediately install premise isolation, terminate the water service, and the user/consumer may be cited with a misdemeanor infraction pursuant to Snohomish Municipal Code Title 19, Building and Construction Codes.

15.10.140 Notification of Cross-Connection Incident. In the event of any cross-connection incident, where the purveyor's water system has been or may be contaminated, the Cross-Connection Control Specialist and the local administrative authority shall be notified immediately. Failing to notify an incident has occurred shall subject the property owner, user/consumer to the provisions of Section 15.10.130, Failure to Comply. All costs incurred enforcing this provision shall be borne by the person(s) that caused the cross-connection to occur.

15.10.150 Facility Survey Inspection The facility survey inspection is an on-site inspection to determine the degree of hazards present if any, the appropriate backflow prevention assembly to control the hazard, and to verify the proper installation and function of existing backflow prevention assemblies or devices.

A. If a cross-connection exists without protection, the user/consumer will be given a written correction notice that outlines the corrective action required. Based on the degree of hazard found, a compliance date will be determined, and a compliance inspection will be required. Facility surveys may also be conducted from time to time to ensure compliance with this section. The City will notify the local administrative authority of all actions taken.

B. For existing facilities, the City will notify the property owner and/or occupant, (user/consumer) in writing to request an inspection appointment. If there is no response, the City will send a second request certified mail (return receipt requested), notifying them that an inspection of the facility will be conducted within five (5) working days from the date the City receives proof that the letter was received. Pursuant to Section 15.10.130, the City may take action for failure to comply.

C. For new construction, remodels or additions, a facility survey will be completed at final inspection in conjunction with the local administrative authority.

15.10.160 Plan Review - New Construction, Remodel and Additions

A. When the proposed scope of work requires installation of, connection to, or use of the City's water system, the user/consumer shall provide the purveyor with a detailed plumbing diagram of all plumbing fixture types and locations. Plans shall provide cross-connection protection, type of backflow assemblies and installation requirements. No construction or use of water system service, whether permanent or temporary, will be permitted until the City has reviewed and approved the plans for compliance. The local administrative authority and the City will coordinate and conduct a cooperative plan review.

B. When the scope of work is within an existing building, facility, use or parcel and involves new construction or remodeling, the consumer shall provide the City with the detailed drawings and plumbing diagrams proposed for review and approval. The plans shall provide cross-connection protection, type of backflow assemblies and installation requirements. In multi-tenant facilities, a complete plumbing diagram which details existing conditions, including protection methods, are required to be submitted to ensure that no potential cross-connection exists or may cause a hazard to be created which would affect the City's water system. The local administrative authority and the City will coordinate and conduct a cooperative plan review.

15.10.170 Installation Requirements and Instructions. To ensure proper operation and accessibility of all backflow prevention assemblies, the following requirements shall apply:

A. No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. If a backflow prevention assembly is installed in a vault or basement, adequate drainage shall be provided. Reduced Pressure Principle Assemblies shall be installed above ground.

B. Assemblies must be installed at the point of use. Alternate locations must be requested in writing and approved by the City of Snohomish prior to installation.

C. The assembly must be protected from freezing and other severe weather conditions.

D. All backflow prevention assemblies to be installed shall be of a type and model pre-approved by the Washington State Department of Health and the City of Snohomish.

E. The assembly shall be readily accessible with adequate room for maintenance and testing. All devices shall have a minimum of twelve inches clearance on all sides of the device.

F. If written permission is granted to install the backflow assembly inside a building, the assembly shall be readily accessible during regular working hours of 8:00 a.m. to 4:30 p.m., Monday through Friday.

G. If an assembly is approved for installation inside of the premises, and it is installed five feet above the floor, it must be equipped with rigid and permanently installed scaffolding or platforms acceptable to the City of Snohomish. The installation must also meet the requirements set out by the U.S. Occupational Safety and Health Administration and the State of

Washington Occupational Safety and Health Codes.

H. Reduced Pressure Principle Assemblies shall be installed above ground level only if a relief valve discharge can be drained to daylight through a "boresight" type drain. The drain shall be of adequate capacity to carry the full rated flow of the device and shall be screened on both ends.

I. An approved air gap shall be at least twice the inside diameter of the incoming supply line as measured vertically above the top rim of the drain and in no case less than one inch.

J. Where a backflow device is deemed necessary, the model of the assembly and installation plans shall be submitted to the City of Snohomish for approval prior to installation.

K. Upon backflow device installation, the City of Snohomish shall be notified and all devices shall be inspected and tested. All backflow devices must be registered with the City of Snohomish by means of the initial test report.

L. Prior to installation, any variances from these installation requirements shall be requested in writing by the owner and approved by the City of Snohomish.

M. The City shall be notified within twenty-four (24) hours of the installation of a backflow assembly, and an inspection scheduled with the Cross-Connection Control Specialist and the local administrative authority to ensure compliance. All backflow assemblies shall be tested upon installation and annually thereafter, and following any retrofit, by a Certified Backflow Assembly Tester, and a copy of all test reports submitted to the purveyor for approval within five (5) working days of the test.

15.10.180 Initial and Annual Testing, Repairs. All backflow assemblies installed within the water service boundaries served by the City of Snohomish water utility shall be tested immediately upon installation and on an annual basis thereafter, and following each assembly retrofit. A Washington State Certified Backflow Assembly Tester shall perform the testing. All devices not functioning properly at the time of testing shall be promptly repaired or replaced. Any device not promptly repaired or replaced may cause the City of Snohomish to deny or discontinue water to the premises. All testing and repairs are the financial responsibility of the water user. A copy of the approved test report shall be provided to the Cross-Connection Control Specialist within five (5) working days of the test.

15.10.190 Costs of Compliance. All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow device are the financial responsibility of the water user. In the event the City must initiate action to enforce compliance with this chapter, all costs incurred enforcing the action shall be borne by the water user, and the City may use whatever means necessary to recover the costs of enforcement.

15.10.200 Termination of Service. Failure on the part of any customer to discontinue the use of all cross-connections except in accordance with this ordinance, is sufficient cause for the immediate discontinuance of public water service to the premises.

15.10.210 No Special Duty Created It is the purpose of this chapter to provide for the health, welfare and safety of the general public, and not to create or otherwise establish or designate any particular class or group of persons who will or should be

especially protected or benefited by the terms of this chapter.

It is the specific intent of this chapter to place the obligation of complying with its requirements upon the permit applicant and any person owning, operating or controlling any premises, building or structure within the scope of this chapter; that no provision nor term used in this chapter is intended to impose any duty whatsoever upon the City or any of its officers, agents or employees for whom the implementation or enforcement of this chapter shall be discretionary and not mandatory.

Nothing contained in this chapter is intended to be, nor shall be, construed to create or form the basis for any liability on the part of the City or its officers, agents and employees for any injury or damage resulting from the failure of any premises or building to comply with the provisions of this chapter or be reason or a consequence of any inspector, notice, order, certificate, permission or approval authorized or issued or done in connection with the implementation or enforcement of this chapter or by reason of any action of the City related in any manner to the enforcement of this chapter by its officers, agents or employees.

15.10.211 Severability. The provisions of this chapter are declared to be separate and severable. The invalidity of any clause, sentence, paragraph, subdivision, section or. portion of this chapter or the invalidity of the application thereof to any person or circumstances shall not affect the validity of the remainder of this chapter, or the validity of its application to other persons or circumstances.

15.10.212 Repealer: All provisions of the Snohomish Municipal Code, which are inconsistent with this ordinance, are hereby repeated. (Ord.1909, 1999)

Appendix E

MINIMUM LISTED FORMS

1. Backflow Prevention Requirement (for water application)
2. Site Survey Letter Form
3. Facility Survey Form
4. Site Survey Results Form
5. Backflow Prevention Device Testing letter #1
6. Backflow Prevention Device Testing letter #2
7. Backflow Test Report
8. Termination Notice
9. Backflow Incident Report
10. Annual Summary Report

City of Snohomish

Founded 1859, Incorporated 1890
116 Union Avenue • Snohomish, Washington 98290 • Tel (360) 568-3115 Fax (360) 568-1375

BACKFLOW PREVENTION REQUIREMENTS FORM

DATE: _____

APPLICANTS NAME: _____ **PHONE:** _____

SERVICE ADDRESS: _____ **FACILITY:** _____

OWNER: _____ **PHONE:** _____

MAILING ADDRESS: _____ **PHONE:** _____

CONTACT: _____ **PHONE:** _____

CROSS-CONNECTION: Any actual or potential connection between a potable water supply and any pipe, vessel, or equipment containing anything other than potable water. If a cross-connection exists, then backflow prevention requirements must be met.

WARNING: **WATER SERVICES WILL NOT BE ACTIVATED UNTIL BACKFLOW PREVENTION REQUIREMENTS ARE MET.**

Please indicate the type of plumbing provided:

- ☐ Irrigation
- ☐ Fire system
- ☐ Building over thirty feet (30)
- ☐ Water supplied to heating, air conditioning
- ☐ Home Dialysis equipment
- ☐ Hose bibs
- ☐ Hot tubs
- ☐ Hydronic Boilers/Heating Systems
- ☐ Other

NOTE: Please contact Dan Miller Cross-Connection Specialist if any of the above applies for an inspection prior to installation. 360/568-3115

City of Snohomish

Founded 1859, Incorporated 1890
116 Union Avenue • Snohomish, Washington 98290 • Tel (360) 568-3115 Fax (360) 568-1375

Cross-Connection Control

<date>:

<name>:
<name of business>:
<address>:
<city, state, zip

Re: SITE SURVEY

Dear: < >

The City of Snohomish has implemented a Cross-Connection Control Program (CCCP), Ordinance # 1909 required by the Washington State Department of Health (DOH) for Group A Water Systems. This program protects the public water system from an actual or a potential health hazard via a cross-connection.

As the Cross-Connection Control Specialist (CCCS) for the City of Snohomish, I will be contacting you by phone within the next five (5) working day's to schedule an appointed date and time for Sharon Pettit, Building/Fire Official and I to conduct a site survey of your potable plumbing system to determine the appropriate protection for your water system and the public water system.

As part of this survey I will inform you about Cross-Connection Control (CCC) and how it effects your current plumbing system, retrofit your plumbing to eliminate the cross-connection or how you can install a Backflow Assembly (BFA) either inside your building (in-premise isolation) or at the property line (premise isolation) or both to control any actual or potential hazards that not only affect the public water system, or anyone that drinks or uses water from your plumbing system.

Non residential consumers pose a special concern because of the greater complexity of their plumbing system, special use of water (e.g., manufacturing), fire protection systems, etc.

You may already have a protection device or assembly on your plumbing system or at the property line now. If so this will give us an opportunity to see and evaluate whether the device is commensurate with the degree of hazard, needs to be tested or installed properly.

I would request that you provide a plumbing plan of your water system and or a knowledgeable person such as your self or a maintenance employee that knows, understands and can walk us through your plumbing system. This may take some time to complete.

If you have any questions, related to this letter please contact me at 360-568-3115. Thank you for your cooperation.

CITY OF SNOHOMISH

Founded 1859, Incorporated 1890

116 UNION AVENUE • SNOHOMISH, WASHINGTON 98290 • TEL (360) 568-3115 FAX (360) 568-1375

Facility Survey Form

NEW SERVICE:______ CHANGE OF USE:______ EXISTING FACILITY:______

INITIAL SURVEY DATE:__________ COMPLIANCE SURVEY DATE:____________

Name of Premise:________________________________ Report Date:____________

Address of Premise:____

Contact Person:________________________________ Phone:______________

Type of Business:____

Owner Name:________________________________ Title:______________

Mail Address:________________________________ City:______________

State:____________________ Zip Code:____________ Phone:______________

Degree of Hazard Found:____________________________ Location:____________
Required Protection:____________ Isolated: Yes__ No__ Tested: Yes___ No___
Type of Assembly:_________ Size_____ Make_____ Model_____ Serial #_____

Degree of Hazard Found:____________________________ Location:____________
Required Protection:____________ Isolated: Yes__ No__ Tested: Yes___ No___
Type of Assembly:_________ Size_____ Make_____ Model_____ Serial #_____

Degree of Hazard Found:____________________________ Location:____________
Required Protection:____________ Isolated: Yes__ No__ Tested: Yes___ No___
Type of Assembly:_________ Size_____ Make_____ Model_____ Serial #_____

Degree of Hazard Found:____________________________ Location:____________
Required Protection:____________ Isolated: Yes__ No__ Tested: Yes___ No___
Type of Assembly:_________ Size_____ Make_____ Model_____ Serial #_____

Degree of Hazard Found:____________________________ Location:____________
Required Protection:____________ Isolated: Yes__ No__ Tested: Yes___ No___
Type of Assembly:_________ Size_____ Make_____ Model_____ Serial #_____

Degree of Hazard Found:____________________________ Location:____________
Required Protection:____________ Isolated: Yes__ No__ Tested: Yes___ No___
Type of Assembly:_________ Size_____ Make_____ Model_____ Serial #_____

City of Snohomish

Founded 1859, Incorporated 1890

116 Union Avenue • Snohomish, Washington 98290 • Tel (360) 568-3115 Fax (360) 568-1375

Cross-Connection Control

<date>

<Name>
<Business Name>
<address>
<city, state, zip>

Re: **Site Survey Results**

Dear <first name>,

The City of Snohomish has implemented a Cross-Connection Control Program, (CCCP) Ordinance # 1909 required by the Washington State Department of Health (DOH) for Group A Water Systems. This program protects the public water system and the consumer's water system from an actual or a potential health hazard via a Cross-connection.

After the site survey inspection of the <point of use> on <date>I have found that a <type of assembly> is needed on the <fixture> (in premise), <premises> ,<eliminated> <or air gap>.

I realize that this expense was not anticipated. Please have the <assembly> <or retrofit> installed and tested within <10 30 60 90 120> days of this letter. Final approval will not be granted until corrections, inspections and testing have been made.

Please have the assembly tested by a Washington State Department of Health (DOH) certified Backflow Assembly tester (BAT) (supporting material included). Please have the test reports sent to me within five-(5) working days of the letter. You will need to have your assembly tested yearly (or after any plumbing retrofit or moving of the assemblies) Per. WAC 246-290-490

The Cross-Connection Control Specialist (CCCS) may conduct periodic inspections.

Your cooperation in this matter is most appreciated. If you have any questions, related to this letter please call me at 360-568-3115

Sincerely,

City of Snohomish

Founded 1859, Incorporated 1890

116 Union Avenue • Snohomish, Washington 98290 • Tel (360) 568-3115 Fax (360) 568-1375

Cross-Connection Control

<certified letter article number>

<date>

<mailing name>
<business name>
<city, state, zip>

RE: **CROSS-CONNECTION CONTROL COMPLIANCE NOTICE**

Dear <name>,

The purpose of this letter is to notify you that the <ninety (90) or one hundred (120) day's> for the required compliance has expired pursuant to the site survey conducted on **<date>** and to notify you that the City of Snohomish will take action to terminate your water service for failure to eliminate or control the outlined cross-connection hazards identified in our **"Site Survey Results"** letter of **<date>.**

Listed are the required corrections and preventions:
<Corrections and preventions>
< " " " >
A copy of the **"Site Survey Results"** letter is attached for your review.

You must complete these requirements by <u><date (10) days></u>. Final approval will not be granted until corrections, inspections and testing has been made. Your cooperation and prompt attention is needed to avoid the next step of terminating your water service.

If you have any questions, please contact me at (360) 568-3115

Sincerely,

Dan Miller
Cross-Connection Control/Pretreatment Specialist

Cc: Sharon Pettit, Building/Fire Official
Brad Nelson, Support Services Director
Grant Weed, City Attorney
File: <site address>

City of Snohomish

Founded 1859, Incorporated 1890
116 Union Avenue • Snohomish, Washington 98290 • Tel (360) 568-3115 Fax (360) 568-137

Cross-Connection Control

1st letter

<date>

<name>
<business name>
<address>
<City, State, Zip>

Re: **Backflow Prevention Assembly Testing**

Dear <first name>,

The Washington State Department of Health (DOH) regulations (WAC 246-290-490) requires the water purveyors to administer a Cross-Connection Control Program (CCCP) to protect the public water system from pollution and or contamination. As part of this program, you have <#.>, <backflow assembly (s)> (BPA's) for the <fixture, or premises > installed in your water supply system at **<address>**, that are due for annual testing, as required by DOH. This test is scheduled for <month, year> ☆

Please have the testing performed by a DOH certified Backflow Assembly Tester (BAT). Supporting material enclosed.

If the assembly (s) installed in your water system fails it's test, please make the necessary repairs. Upon completion of a satisfactory test, have the tester fill out the enclosed Test and Maintenance Report form, (T&MR) with your signature and return it to this office within **five (5)** working days of the acceptable test.

Additional information or questions related to this letter may be obtained by contacting Dan Miller at 360/568-3115.

Thank you, in advance for your prompt attention to this matter.

Sincerely,

Dan Miller,
Cross-Connection Control Specialist

☆ Thirty (30) Days

CITY OF SNOHOMISH

Founded 1859, Incorporated 1890

116 UNION AVENUE ▯ SNOHOMISH, WASHINGTON 98290 ▯ TEL (360) 568-3115 FAX (360) 568-1375

Cross-Connection Control

2nd letter

<date>

<name>
<business name>
<address>
<city, state, zip>

Re: **Backflow Prevention Assembly Testing**

Dear <Name>,

According to the Washington Administrative Code (WAC 246-290-490), each year you are required to have your <assembly (s) type> (BPA (s) tested by a Washington State Department of Health (DOH) certified Backflow Assembly Tester (BAT). The intent is to insure that the protection assembly (s) in your water system is functioning properly to protect the public water system from pollution or contaminates.

On **<date>**, the city sent you a letter, with supporting material, regarding the BPA's, at **<service address>**, to be tested. As of this date, the City has not received the test results.

It is your responsibility, as the property owner to insure this required testing is completed. Please have the BPA's tested, with the completed testers report returned to me within **fifteen (15) day's** → * of this letter. Supporting material enclosed. If this test has been performed, please forward a copy of the test results to the City so that the record is complete and can be closed. **Failure to comply with this required annual backflow testing could result in the termination of water service to your premises.**

Addition information or questions related to this letter may be obtained by contacting Dan Miller at 360/568-3115. Thank you, for your cooperation in this matter.

Sincerely,

Dan Miller
Cross-Connection Control Specialist

Enclosures

* Phone Call 10 Days

City of Snohomish

Founded 1859, Incorporated 1890

116 Union Avenue • Snohomish, Washington 98290 • Tel (360) 568-3115 Fax (360) 568-1375

Cross-Connection Control

<Via certified mail with return receipt requested>

<date>

3rd letter

<name>
<business name>
<address>
<city, state, zip>

RE: **NOTICE AND ORDER OF WATER SERVICE TERMINATION**

Dear <first name,>

On <date> (copy of letter enclosed) you were notified to have your backflow assembly tested and return the completed test results to this office. You were also notified that failure to comply with this required annual backflow testing could result in the termination of water service to your premises.

Your failure to comply with this "Notice and Order" shall cause your water service to be terminated on <date> unless written notification is received by the City within five (5) working days that your backflow assembly have been tested and approved pursuant to SMC 15.10.130. All costs to enforce this action shall be borne by the consumer, in addition to being cited with a misdemeanor infraction pursuant to SMC Title 19 Building and Construction Codes.

Your prompt attention is required.

If you have any questions, please contact me at (360)568-3115

Sincerely,

Dan Miller
Cross-Connection Control Specialist

Cc: Sharon Pettit, Building/Fire Official
<name>, DE & S Manager

Backflow Incident Report Form

There are many backflow incidents which occur that are not reported. This is usually because they are of short duration and are not detected, the customer is not aware they should be reported, or it may not be known to whom they should be reported. The PNWS-AWWA Cross Connection Control Committee is making an effort to bring these incidents to the attention of water purveyors and the public. If you have any knowledge regarding incidents, please fill out a copy of this form and return it to the committee, c/o the individual named on the reverse side. In addition, the state or provincial health agency should be notified.

Reporting Agency: _____ Report Date: _____

Reported By: _____ Title: _____

Mail Address: _____ City: _____

State: _____ Zip Code: _____ Telephone: _____

Date of Incident: _____ Time of Occurrence: _____

General Location (Street, etc.): _____

Backflow Originated From:

Name of Premise: _____

Street Address: _____ City _____

Contact Person: _____ Telephone: _____

Type of Business: _____

Description of Contaminants:
(Attach Chemical Analysis or MSDS if available)

_____

_____

Distribution of Contaminants:

Contained within customer's premise: Yes: _____ No: _____

Number of persons affected: _____

Effect of Contamination:

Illness Reported: _____

Physical irritation reported: _____

_____

City of Snohomish
BACKFLOW PREVENTION ASSEMBLY TEST REPORT

ACCOUNT #_____ PURVEYOR #_____

NAME OF PREMISE _____ Commercial ☐ Residential ☐

SERVICE ADDRESS _____ CITY _____ ZIP ____

CONTACT PERSON _____ PHONE ( ) _____ FAX ( ) _____

LOCATION OF ASSEMBLY _____

DOWNSTREAM PROCESS _____ DCVA ☐ RPBA ☐ PVBA ☐ OTHER _____

NEW INSTALLATION ☐ EXISTING ☐ REPLACEMENT ☐ OLD ASSEMBLY SERIAL NUMBER _____

MAKE OF ASSEMBLY_____ MODEL _____ SERIAL NO. _____ SIZE _____

	DCVA / RPBA CHECK VALVE NO.1	DCVA / RPBA CHECK VALVE NO.2	RPBA	PVBA/SVBA AIR INLET
INITIAL TEST PASSED ☐ FAILED ☐	LEAKED ☐ CLOSED TIGHT ☐ _____ PSID	LEAKED ☐ CLOSED TIGHT ☐ _____ PSID	OPENED AT ____ PSID #1 CHECK _____ PSID AIR GAP OK? _____	OPENED AT _____ PSID DID NOT OPEN ☐
NEW PARTS AND REPAIRS	CLEAN REPLACE PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CLEAN REPLACE PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CLEAN REPLACE PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CHECK VALVE HELD AT _____ PSID LEAKED ☐ _____ CLEANED ☐ REPAIRED ☐
TEST AFTER REPAIRS	CLOSED TIGHT ☐ _____ PSID	CLOSED TIGHT ☐ _____ PSID	OPENED AT ____ PSID #1 CHECK _____ PSID	AIR INLET _____ PSID CHK VALVE _____ PSID

AIR GAP INSPECTION: Required minimum air gap separation provided? Yes ☐ No ☐ Detector Meter Reading _____

REMARKS: _____

_____ LINE PRESSURE _____ PSI

TESTERS SIGNATURE: _____ CERT. NO. _____ DATE _____

TESTERS NAME PRINTED: _____ TESTERS PHONE # ( ) _____

REPAIRED BY: _____ DATE _____

FINAL TEST BY: _____ CERT. NO. _____ DATE _____

LIBRATION DATE _____/_____/_____ GAUGE # _____ SERVICE RESTORED YES ☐ NO ☐

CITY OF SNOHOMISH

Founded 1859, Incorporated 1890

116 UNION AVENUE ▯ SNOHOMISH, WASHINGTON 98290 ▯ TEL (360) 568-3115 FAX (360) 568-1375

Cross Connection Control

Certified Mail **<number>**

<date>

<name>
<business>
<address>
<city,state,zip>

RE: **Backflow Prevention Assembly Testing**
Notice of Water Service Termination, Failure to Comply
<address>

Dear <name>,

On <date>, a letter was sent to you at the above address for the installation of a <type of protection> for the <process>. It was noted in the letter that the <type of protection> needed to be tested. This is a requirement of Washington Administrative Code 246-290-490 WAC, and Snohomish Municipal Code (SMC) Chapter 15.10.170, Section M entitled Installation Requirements and Instructions. Section M holds the requirement for testing upon installation and annually thereafter, and when applicable, retrofits.

On <date> your <type of protection> was approved for proper installation, and were informed also to have the assembly tested. On <date> I sent you a letter that the testing was to have been conducted within fifteen (15) working day's with the test results submitted to me. On <date> I sent you a letter by certified mail that the testing was to have been conducted by <date> and to forward a copy of the test results to the City if the test had been performed or that the City would take action to terminate your water service for failure to have your <type of protection> tested and test results returned.

Therefore, pursuant SMC 15.10.130 entitled Failure to Comply this letter shall serve as notice that your water service at <address> <u>will be terminated on <date></u> for failure to have your <type of protection> **tested.**

All costs associated with this action to achieve compliance shall be borne by the water user, and the City may use whatever means necessary to recover the costs of enforcement pursuant SMC 15.10.190 entitled Costs of Compliance.

If you have had the <type of protection> tested, please forward a copy of the test report to me so that this enforcement action can be closed and the termination of your water service cancelled. Your prompt attention in this matter is required.

If you have any questions regarding this letter, please contact me at 360-568-3115.

Sincerely,

Dan Miller
Cross Connection Control Specialist

Cc: <name>, City Manager
<name>, Public Works Director
<name>, Support Services Director
<name>, Water Division Lead
<name>, Planning Manager
<name>, Building/Fire Official
<name>, City Attorney
<name>, Snohomish Health District
<name>, Permit Coordinator II
Address File: <address>

Backflow Incident Report Form

There are many backflow incidents which occur that are not reported. This is usually because they are of short duration and are not detected, the customer is not aware they should be reported, or it may not be known to whom they should be reported. The PNWS-AWWA Cross Connection Control Committee is making an effort to bring these incidents to the attention of water purveyors and the public. If you have any knowledge regarding incidents, please fill out a copy of this form and return it to the committee, c/o the individual named on the reverse side. In addition, the state or provincial health agency should be notified.

Reporting Agency: _____ Report Date: _____

Reported By: _____ Title: _____

Mail Address: _____ City: _____

State: _____ Zip Code: _____ Telephone: _____

Date of Incident: _____ Time of Occurrence: _____

General Location (Street, etc.): _____

Backflow Originated From:

Name of Premise: _____

Street Address: _____ City _____

Contact Person: _____ Telephone: _____

Type of Business: _____

Description of Contaminants:
(Attach Chemical Analysis or MSDS if available)

_____

_____

Distribution of Contaminants:

Contained within customer's premise: Yes: _____ No: _____

Number of persons affected: _____

Effect of Contamination:

Illness Reported: _____

Physical irritation reported: _____

_____

Washington State Department of Health

Office of Drinking Water

Public Water System Cross-Connection Control Activities Annual Summary Report for Year 2010

Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information

PWS ID: 80915	PWS Name: SNOHOMISH, CITY OF	County: SNOHOMISH
Provide name and Cert No. of CCS who develops and implements your CCC program		
CCS Name (last, first & mi): Ray, Caroline A.		CCS Phone: (360) 568-x232
CCS Cert No.: 11439	BAT Cert. No. (if applicable):	
CCS is (check one):	PWS owner or employee ☑	On contract to PWS ☐ Volunteer or other ☐

Part 2: Status of Cross-Connection Control (CCC) Program at end of 2010

PWS has(check one box in each column below):	
A written CCC program plan Y ☑ N ☐	CCC implementation activities Y ☑ N ☐

(Written program may be a separate document, or part of water system plan or small water system management program).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is Currently:	
		Included in Written Program	Being Implemented or Is Completed
1	Legal Authority Established	Y ☑ N ☐	Y ☑ N ☐
2	Hazard Evaluation Procedures and Schedules	Y ☑ N ☐	Y ☑ N ☐
3	CCC Procedures and Schedules	Y ☑ N ☐	Y ☑ N ☐
4	Certified CCS Provided	Y ☑ N ☐	Y ☑ N ☐
5	Backflow Preventer Inspection and Testing	Y ☑ N ☐	Y ☑ N ☐
6	Testing Quality Control Assurance Program	Y ☑ N ☐	Y ☑ N ☐
7	Backflow Incident Response Procedures	Y ☑ N ☐	Y ☑ N ☐
8	Public Education Program	Y ☑ N ☐	Y ☑ N ☐
9	CCC Records	Y ☑ N ☐	Y ☑ N ☐
10	Reclaimed Water Permit	Y ☐ N ☐ N/A ☑	Y ☐ N ☐ N/A ☑

Part 3A: System Characteristics at End of 2010

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). **Estimate if necessary.**

Type of Service Connection	Number
Residential (As defined by PWS)	2722
All Other (Include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers and docks.)	441
Total Number of Connections	3163

Part 3B: Cross-Connection Control for High-Hazard Premises or Systems Served by the PWS

If PWS does not serve any high-hazard premises or systems, check here ☐ and go to Part 4.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2010			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested[2]	D. Granted Exception from Mandatory Premises Isolation
Agricultural (farms and dairies)	1	1	1	0
Beverage bottling plants (including breweries)	0	0	0	0
Car washes	2	1	1	0
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	4	4	4	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	0	0	0	0
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies	0	0	0	0
Food processing plants (including canneries, slaughter houses, rendering plants)	0	0	0	0
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers	29	21	21	1
Separate irrigation systems using purveyor's water supply and chemical addition[4]	0	0	0	0
Laboratories	0	0	0	0
Metal plating industries	0	0	0	0
Petroleum processing or storage plants	0	0	0	0
Piers and docks	0	0	0	0
Radioactive material processing plants or nuclear reactors	0	0	0	0
Survey access denied or restricted	0	0	0	0
Wastewater lift/pump stations (non-residential only)	8	8	8	0
Wastewater treatment plants	1	1	1	0
Unapproved auxiliary water supply interconnected with potable water supply	0	0	0	0
	0	0	0	0
	0	0	0	0
Totals	45	36	36	1

[1]Count multiple connections or parallel installations as ***separate*** connections.

[2]Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

[3]Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during #session.FormYear#.

[4]For example, dedicated lines to irrigation systems in parks, playgrounds, golf courses, cemeteries, estates, etc.

[5]Premises with hazardous materials or processes (requiring isolation by AG or RPBA) such as: aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, e.g.: other manufacturing or other commercial. If needed, attach additional sheet giving same information as requested in table.

Part 3C: Cross-Connection Control for Medical Category High-Hazard Premises Served by the PWS

If PWS does not serve any medical type premises, check here ☐ and go to Part 4.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2010			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested[2]	D. Granted Exception from Mandatory Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	0	0	0	0
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers	0	0	0	0
Out-patient clinics and offices	4	3	3	1
Alternative health out-patient clinics and offices	3	1	1	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors	5	0	0	0
Hospice care centers	0	0	0	0
Childbirth centers	0	0	0	0
Kidney dialysis centers	0	0	0	0
Blood centers	0	0	0	0
Dental clinics and offices	9	9	9	0
Facilities for Housing Patients				
Nursing homes	3	3	3	0
Boarding homes	1	1	1	0
Residential treatment centers	0	0	0	0
Other Medical-Related Facilities				
Mortuaries	0	0	0	0
Morgues and autopsy facilities (not in hospitals)	1	1	1	0
Veterinarian offices, clinics and hospitals	3	3	3	0
All other (describe in Part 6: Comments on page 6)	0	0	0	0
Totals	29	21	21	1

[1]Count multiple connections or parallel installations as ***separate*** connections.

[2]Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

[3]Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during 2010.

Part 4: Backflow Preventer Inventory and Testing Data During Year 2010

- Complete all cells. Enter zero (0) if there are no backflow preventers in that category.
- Count only the backflow preventers that the PWS relies upon for protection of the distribution system. If your records do not distinguish between premises isolation and in-premises protection preventers, enter all data in Premises Isolation section and check the box.
- Count AVBs on irrigation systems only. **If you do not track AVBs, enter "UNK".**
- Count multiple tests or failures for any particular backflow preventer as one test or failure for that backflow preventer.
- Multiple Service or Parallel Connections: Count each assembly separately.
- Assemblies on Dedicated Fire or Irrigation Lines: Count as Premises Isolation Assemblies.

If PWS does not track AVBs Check here: ☑

	Backflow Preventer Category and Testing/Inspection Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. ***If In-Premises Protection preventers are also included, check here.*** ☐									
Rows 1-3 pertain ONLY to Premises Isolation preventers in service at beginning of 2010									
1	In service on 1/1/2010	0	67	1	75	52	0	0	unk
2	Inspected and/or Tested in 2010[1]	0	67	0	75	52	0	0	unk
3	Failed Inspection or Test in 2010	0	8	0	3	2	0	0	unk
Rows 4 - 6 pertain ONLY to NEW Premises Isolation preventers installed during 2010									
4	New preventers installed in 2010[2]	0	0	0	4	3	0	0	unk
5	Inspected and/or Tested in 2010[1]	0	0	0	4	3	0	0	unk
6	Failed inspection or test in 2010[3]	0	0	0	0	0	0	0	unk
7	Preventers taken out of service in 2010[3]	0	0	0	1	0	0	0	0
Premises Isolation Total at end of 2010[4]		0	67	1	78	55	0	0	unk
In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.									
Rows 8 - 10 pertain ONLY to In-Premises Protection Preventers in service at beginning of 2010									
8	In service on 1/1/2010	1	152	0	58	0	0	2	unk
9	Inspected and/or Tested in 2010[1]	0	150	0	58	0	0	2	unk
10	Failed Inspection or Test in 2010	0	14	0	3	0	0	0	unk
Rows 11 - 13 pertain ONLY to NEW In-Premises Protection Preventers installed during 2010									
11	New preventers installed in 2010[2]	0	4	0	0	0	0	4	unk
12	Inspected and/or Tested in 2010[1]	0	0	0	0	0	0	0	unk
13	Failed inspection or test in 2010	0	0	0	0	0	0	0	unk
14	Preventers taken out of service in 2010[3]	0	6	0	4	0	0	0	0
In-Premises Protection Total at end of 2010[4]		1	150	0	54	0	0	6	unk
Grand Total at end of 2010		1	217	0	132	55	0	6	unk

[1]Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only using DOH/USC test procedures).Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at beginning of 2010. Replacement preventers may be of a different type than the original.

[2]Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of 2010. Replacement preventers may be of a different type than the original.

[3]New or existing preventers taken out of service, whether or not they were replaced by the same type or different type of preventer.

[4]Total at end of 2010 should be equal to the number of preventers in service at beginning of 2010 plus those installed during 2010 minus the number of preventers taken out of service during 2010.

Part 4B: Other Implementation Activities in 2010

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New service connections evaluated for cross-connection hazards to PWS in 2010.	38
New service connections requiring backflow protection to protect PWS.[1]	2
Existing service connections evaluated for cross-connection hazards to PWS in 2010.	9
Existing service connections requiring backflow protection to protect PWS.[1,2]	3
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b) in 2010.[3]	1
CCC enforcement actions taken by PWS during 2010.[4]	0

[1]Include services where either premises isolation or in-premises preventers were required to protect the PWS.

[2]Include existing services that need new, additional or higher level backflow prevention.

[3]A DOH Exceptions to Hazard Premises Form *must* be attached for each exception granted during the year.

[4]"Enforcement actions" mean actions taken by the PWS (such as water shut-off, PWS installation of backflow preventer) when the customer fails to comply with PWS's CCC requirements.

Part 5: Backflow Incidents and "Off-Normal" Events in 2010

	Backflow Incidents, Risk Factors and Indicators during 2010	Number (Enter 0 if none)	Check if Data Not Available
Backflow Incidents during 2010			
1	Backflow incidents that contaminated the PWS[5].	0	☐
2	Backflow incidents that contaminated the customer's drinking water system ***only***[5].	0	☐
Risk Factors for Backflow during 2010			
3	Distribution main breaks per 100 miles of pipe.	7.00	☐
4	Low pressure events (<20 psi in PWS distribution system).	0	☐
5	Water outage events.	0	☐
Indicators of Possible Backflow during 2010			
6	Total health-related complaints received by PWS.[6]	0	☐
7	Received during BWA or PN events.[7]	0	☐
8	Received during low pressure or water outage events.	0	☐
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).	6	☐
10	Received during BWA or PN events.[7]	0	☐
11	Number of these complaints received during low pressure or water outages events.	0	☐

[5]Complete and submit a Backflow Incident Report form for each known backflow incident.

[6]Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.

[7]**"BWA"** means ***Boil Water Advisory*** and **"PN"** means ***Public Notification*** for water quality reasons.

Part 6: Comments and Clarifications

Enter comments or clarifications to any of the information included in this report. Note for on-screen completion: Comments will not "word wrap" from one line to the next. Press to continue on new line. Maximum length of each comment is 255 characters, including spaces.

Part No.	Date Added	Comment
Pt 4B	12/4/08	ENFORCEMENT ACTION TAKEN: In my written program i use the termination letter (certified) as my means for enforcement action which is effective. 12/4/08 - Updated information regarding Mortuaries. The premise previously noted, did not do any embalming or other hazardous processes. In addition, this premise is not longer utilized by Purdy and Walters, it was sold at the end of 2004 and is now being utilized as a Bed and Breakfast. I have adjusted the count for Mortuaries from "1" to "0".
Pt 3C	4/22/10	4/22/10 - I removed all referrences to Psychiatric Clinics - none of the sites in town qualify as psychiatric clinics -they are not multi disiplinary. They are in fact just counseling centers with no medical functions. Alt health - I lowered this number because one of the clinics is in the same building as an outpatient site. Previously had been counted multiple times Chiropractor - I removed one of the chiropractor offices since is shares space with one of the Alt Health offices.
Pt 4A	4/29/10	4/29/10 Total number of assemblies in place for the beginning of 2009 has been changed from the end of 2008 data. We have purchased new CC software and are better able to track the assemblies and their function premise/in premise than previously. Previous tracking was through an Excel spreadsheet.
Pt 3B	3/2/11	I removed one of the connections for Agricultural - it is not actually a farm and doesn't meet any definition for farm. I removed one of the connections for Car Wash - It is no longer used as a car wash the property is being leased by another business and used as dry storage.

Part 7: Report Completion Information

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name[1]: Caroline A. Ray		Title: Water Quality Control Specialist
Signature:		Date: 04/01/2011
Phone: (360) 568-7070	E-mail: ray@ci.snohomish.wa.us	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
PWS Mgr./Owner Name[2]: Karen Latimer		Title: Public Works Operations Manager
Signature:	Op. Cert. No.: 6364	Date: 04/01/2011

[1] CCC Program Manager is generally the CCS who is responsible for development and implementation of the PWS's CCC Program.

[2] The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program.

Washington State Department of Health

Office of Drinking Water

Cross-Connection Control Program Summary Report For 2010

Describe the characteristics of the PWS's CCC Program at the end of 2010. Complete this form only if PWS had written CCC program plan, policies or procedures at end of 2010.

Part 1: Public Water System (PWS) Identification

PWS ID: 80915	PWS Name: SNOHOMISH, CITY OF	County: SNOHOMISH

Part 2: Cross-Connection Control (CCC) Program Characteristics

A. Type of Program Currently Implemented

Type of Program	Check One
Premises isolation only.	☐
Combination program: reliance on both premises isolation and in-premises protection.	☑
In transition from a combination program to a premises isolation only program.	☐

B. Coordination with Authority Having Jurisdiction (AHJ) on Cross-Connection Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code. ***Check one box in each of last 3 columns for each AHJ in your service area.***

AHJ No.	Name of AHJ (e.g., the City or County Building Department)	PWS Currently:		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	City of Snohomish	Y ☑ N ☐	Y ☑ N ☐	Y ☐ N ☑
2	Snohomish County	Y ☑ N ☐	Y ☐ N ☑	Y ☐ N ☑
3		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
4		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
5		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐

[1] If more than 5 AHJs, attach separate sheet giving the above information.

C. Corrective or Enforcement Actions Available to the Purveyor

Type of Corrective Action	Indicate Whether Available	Most Often Used (Check One)
Denial or discontinuance of water service.	Y ☑ N ☐	☑
Purveyor installs backflow preventer and bills customer.	Y ☐ N ☑	☐
Assessment of fines (in addition to elimination or control of cross-connection).	Y ☑ N ☐	☐
Other corrective actions (describe): Failure to comply is a misdemeanor infraction, pursuant to Snohomish Municipal Code 19 (SMC)	Y ☑ N ☐	☐

D. CCC Program Responsibilities

Do not include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	☐	☑
Backflow preventer (BP) ownership	☑	☐
BP installation	☑	☐
BP ***initial*** inspection (for proper installation - all BPs)	☐	☑
BP ***initial*** test (for testable assemblies)	☑	☐
BP ***annual*** inspection (Air Gaps and AVBs)	☐	☑
BP ***annual*** test (for testable assemblies)	☑	☐
BP maintenance and repair	☑	☐

E. Backflow Protection for Fire Protection Systems

Please remember to enter number of days allowed if you require retrofitting.

PWS coordinates with ***AHJ*** on CCC issues for fire protection systems(FPS).	Y ☑ N ☐ N/A ☐
PWS coordinates with ***local Fire Marshal*** on CCC issues for FPS.	Y ☑ N ☐ N/A ☐
PWS ensures backflow prevention is installed before serving ***new*** connections with FPS.	Y ☑ N ☐
PWS requires retrofits to ***high***-hazard FPS.	Y ☐ No. of days allowed: 0 N ☐ N/A ☑
PWS requires retrofits to ***low***-hazard FPS.	Y ☐ No. of days allowed: 0 N ☐ N/A ☑

F. Backflow Protection for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems ***without*** chemical addition.	Not Addressed ☐ AVB ☐ PV/SVBA ☐ DCVA ☑ RPBA ☐
PWS currently inspects AVBs upon ***initial*** installation.	Y ☐ N ☐ N/A ☑
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Y ☐ N ☐ N/A ☑

G. Used Water

PWS prohibits, by ordinance, rules, policy or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system.	Y ☑ N ☐
If not prohibited at present, date plan to prohibit use.	N/A ☑
Current number of service connections returning used water to distribution system.	0

H. Backflow Protection for Auxiliary Water Supplies[1] NOT Interconnected with PWS

Indicate the minimum backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies when they are NOT interconnected to the PWS. Check one box per row.

Existing service connections.	None ☐ DCVA ☐ RPBA ☑ AG ☐
Type of protection required.	None ☐ In-premises protection ☐ Premises isolation ☑

New service connections.	None ☐ DCVA ☐ RPBA ☑ AG ☐
Type of protection required.	None ☐ In-premises protection ☐ Premises isolation ☑

[1] An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.

I. Backflow Protection for Tanker Trucks and Temporary Water Connections

Minimum level of backflow protection (installed on or associated with the truck) required for tanker trucks taking water from PWS.	AG ☐ DCVA ☐ RPBA ☑ Not Specified ☐ Tanker trucks not allowed ☐
PWS requires tanker trucks to obtain water at designated filling sites each equipped with permanently installed backflow preventer(s).	Y ☑ (Min. protection: DCVA ☐ RPBA ☑) N ☐ N/A ☐ No sites provided ☐
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Y ☐ N ☑ N/A ☐
Minimum level of backflow protection required for temporary water connections (e.g. for construction sites).	AG ☐ DCVA ☑ RPBA ☐ Not specified ☐ Temp. connections not allowed ☐
PWS requires testing each time the temporary connection backflow preventer is relocated.	Y ☑ N ☐ N/A ☐ (Temp. connections not allowed)
PWS provides approved backflow preventer for temporary connections.	Y ☐ N ☑ N/A ☐ (Temp. connections not allowed)

J. Backflow Protection for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow protection required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Protection Required
Commercial	Y ☑ N ☐	Not Required ☐ DCVA ☑ RPBA ☐
Industrial	Y ☑ N ☐	Not Required ☐ DCVA ☑ RPBA ☐
Institutional	Y ☑ N ☐	Not Required ☐ DCVA ☑ RPBA ☐

K. Backflow Protection for Wholesale Customers

Indicate whether the PWS requires backflow protection at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has (plans to have) Customers of this Type	Backflow Protection Required
Existing	Y ☑ N ☐	Not specified / Not required ☐ Always required ☑ Required only if purchaser's CCC program is inadequate ☐ Minimum required (if applicable): DCVA ☐ RPBA ☑
New	Y ☐ N ☑	Not specified / Not required ☑ Always Required ☐ Required only if purchaser's CCC program is inadequate ☐ Minimum required (if applicable): DCVA ☐ RPBA ☐

L. Exceptions to Mandatory Premise Isolation

PWS's written CCC Program Plan *allows* system to grant Exceptions to mandatory premises isolation per WAC 246-290-490(4)(b(iii).	Y ☑ N ☐ Doesn't Address ☐
PWS currently grants new Exceptions.	Y ☑ N ☐
PWS granted Exceptions in previous reporting years.	Y ☑ N ☐

Part 3: CCC Program Record-Keeping and Inventory

Indicate the type or name of computer software used by the PWS to track CCC records.

Cross-Track (BMI) ☐	BPMS ☐	XC2 (Engsoft) ☑	Tokay ☐	Other commercial CCC software (specify) ☐
Custom developed for or by PWS[1] ☐	Other non-CCC software (e.g. Excel) ☐	None Used ☐		

[1] Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

Part 4: Comments and Clarifications

Enter comments or clarifications to any of the information provided in this report.

Part No.	Date Added	Comment
Pt 3	4/14/09	Utilizing Xc2 software now, still learning software and capablilities, expect some fluctuation with assembly counts as more consistent information entered and tracked.
Pt 2L	3/8/11	Previous exceptions not listed in system. Last exception granted in 2006 but by 2008 exception was no longer valid - premise had been protected

Part 5: CCC Program Summary Completion Information

I certify that the information provided in this CCC Program Summary is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name[1]: Caroline A. Ray		Title: Water Quality Control Specialist
Signature:		Date: 04/01/2011
Phone: (360) 568-7070	E-mail*: ray@ci.snohomish.wa.us	
I certify that the information provided in this report accurately represents the status and description of this water system's CCC Program.		
PWS Mgr/Owner Name[2]: Karen Latimer		Title: Public Works Operations Manager
Signature:	Op. Cert. No.: 6364	Date: 04/01/2011

*Required Field. For security reasons, an e-mail address must be provided. DOH will e-mail you to confirm any changes made to your data

1 The CCC Program Manager is generally the CCS responsible for developing and implementing the PWS's CCC program.

2 The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program. This person doesn't need to be in charge of the entire water system.

Washington State Department of Health

Office of Drinking Water

Severe Health Hazard Facility for 2010 Annual Summary Report

PWS ID: 80915	PWS Name: SNOHOMISH, CITY OF	County: SNOHOMISH

Part 1: Backflow Protection Status

Describe the backflow protection status at the end of 2010 for each *wastewater treatment plant and nuclear facility* your system serves.

Facility Index # 1		Status of Backflow Protection at End of 2010 (check one box per row)							
Facility Name, Physical Address, and NPDES Permit Number		**Premises Isolation RP *and* In-plant Air Gap (s)**	**Premises Isolation RP but *No* In-Plant Air Gap(s)**	**Premises Isolation Air Gap**	**Fixture Protection Only**	**No Protection At All**	**Unknown**	**Exception Granted**	**Other (explain in Comment Section)**
Name	Snohomish WWTP	○	◉	○	○	○	○	○	○
Address	2115 Second St								
City	Snohomish,								
Zip	98290								
NPDES Permit#	WA0029548D								
Facility Type		**Wastewater Treatment Plant (WWTP)**							
Comment		**We are continuing to work with DOE and City of Everett on the possiblility of pumping all of our waste to the City of Everett**							

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name[1]: Caroline A. Ray		Title: Water Quality Control Specialist
Signature:		Date: 04/01/2011
Phone: (360) 568-7070	E-mail: ray@ci.snohomish.wa.us	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
PWS Mgr./Owner Name[2]: Karen Latimer		Title: Public Works Operations Manager
Signature:	Op. Cert. No.: 6364	Date: 04/01/2011

[1] CCC Program Manager is generally the CCS who is responsible for development and implementation of the PWS's CCC Program.

[2] The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program.

Office of Drinking Water

Exceptions to High Hazard Premises Isolation Requirements for 2010 Annual Summary Report

Exceptions forms must be completed and submitted to the Department of Health (DOH) with the Annual Summary Report per WAC 246-290-490(4)(b)(iii).

Complete and submit one form for each exception PWS granted:

- In 2010,
- Before 2010, if PWS didn't previously submit an Exceptions form to DOH.

Don't

- Duplicate previously submitted Exceptions forms.
- Submit any Exceptions forms for 2010, if PWS didn't grant any exceptions in 2010, and already submitted forms for exceptions granted before 2010.

This Exception is: New

Part 1: Public Water System (PWS) Information

PWS ID: 80915	PWS Name: SNOHOMISH, CITY OF	County: SNOHOMISH

Part 2: Premises Information

Name of Premises	Snohomish Oral Surgery
Service Address	207 Cedar Avenue
Premises Type or Category - Refer to Table 9 of WAC 246-290-490(4)(b)	Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers
Additional Information or Description of Premises (to help explain why exception is appropriate):	

Part 3: Information Regarding Exception to Premises Isolation

Date of Hazard Evaluation	09/13/2010
Date Exception Granted or Renewed	09/14/2010
Expiration Date of Exception (If Any)	12/31/2011
Date of Next Hazard Evaluation	12/31/2011

Part 4: Justification for not Requiring Premises Isolation Using AG, RPBA, or RPDA.

- The following table shows typical reasons for not requiring mandatory premises isolation. *The WAC doesn't require purveyors to grant exceptions – exceptions are optional.*
- Purveyors may provide other reasons consistent with WAC 246-290-490(4)(b)(ii), i.e. no hazard exists for this particular service.

Reason that the Premises Do Not Pose a High Health Hazard to Public Water System	Check if Applicable
Medical/Health Services Facility not having laboratory or similar facilities, no water-connected X-ray equipment, e.g. Psychiatric or Counseling Office, outpatient clinics, etc.	☑
Dental Office having independent water supplies for dental work (no interconnection with purveyor's water system) and digital X-ray equipment, i.e. no water-connected X-ray or other dental equipment.	☐
"Bottling Plant" without bottling processes, e.g. Warehousing only.	☐
Laundry or Dry Cleaners without cleaning processes on premises, e.g. customer drop-off and/or pick-up only.	☐
Marina/Dock for small boat moorage only (no water/sewage facilities on board).	☐
Agricultural Premises with "hobby farm" (non-commercial) activities only.	☐
Chiropractor's office with digital X-ray equipment, i.e. no water-connected X-ray or other medical equipment.	☐
Mortuary facility with funeral services only, no water-connected equipment for processing or embalming bodies.	☐
Nursing or boarding home with no water-connected medical equipment, specialized plumbing, or other hazards.	☐

Part 5: Form Completion Information

I am the Cross-Connection Control Specialist (CCS) who granted this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name: Caroline A. Ray		CCS Cert. No.: 11439
Signature:		Date: 04/01/2011
Phone: (360) 568-7070	E-mail*: ray@ci.snohomish.wa.us	
I am the manager of the PWS and I concur with the granting of this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name: Karen Latimer		Title: Public Works Operations Manager
Signature:	Op. Cert. No.: 6364	Date: 04/01/2011

*Required Field. For security reasons, an email address must be provided. DOH will email you to confirm any changes made to your data.

Water District City of Snohomish

Size	Model		Type	Mfr	Install Date
			RP		00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	007M2QT		DC	WATTS	00/00/00
1"	950XL		DC	WILKINS	00/00/00
2"	009M1QT		RP	WATTS	00/00/00
2"	009M1QT		RP	WATTS	00/00/00
1 1/2"	825Y		RP	FEBCO	00/00/00
2"	009M1QT		RP	WATTS	00/00/00
2"	009M1QT		RP	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00
1 1/4"	950XL		DC	WILKINS	00/00/00
3/4"	825Y		RP	FEBCO	00/00/00
1"	975XL		RP	WILKINS	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00
3/4"	009M2QT		RP	WATTS	00/00/00
1"		909	RP	WATTS	00/00/00
1"			RP	HERSEY	00/00/00
1"	825Y		RP	FEBCO	00/00/00
3/4"		860	RP	FEBCO	00/00/00
1 1/2"	805Y		DC	FEBCO	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	007M1PCQT		DC	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	007M2QT		DC	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
1"	775QT		DC	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
3/4"	805Y		DC	FEBCO	00/00/00
1"	909QT		RP	WATTS	00/00/00
4"	350DA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
1"		850	DC	FEBCO	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	2000B		DC	AMES	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	2000B		DC	AMES	00/00/00
6"	3000B		DCDA	AMES	00/00/00
3/4"		709	DC	WATTS	00/00/00

Size	Model		Type	Mfr	Install Date
1/2"	009QT		RP	WATTS	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	2000B		DC	AMES	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1 1/2"	007M2PCQT		DC	WATTS	00/00/00
4"	876V-VUVD		DCDA	FEBCO	00/00/00
3/4"	805YB		DC	FEBCO	00/00/00
2"		860	RP	FEBCO	00/00/00
3/4"		860	RP	FEBCO	00/00/00
4"	876-VUVD		DCDA	FEBCO	00/00/00
3/4"	805YB		DC	FEBCO	00/00/00
2"	975XL		RP	WILKINS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"		860	RP	FEBCO	00/00/00
1"	805Y		DC	FEBCO	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1"		850	DC	FEBCO	00/00/00
4"	876V-VUVD		DCDA	FEBCO	00/00/00
3/4"	805YB		DC	FEBCO	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
3/4"	825Y		RP	FEBCO	00/00/00
8"	805Y		DC	FEBCO	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	008PCQT-VUH		SVB	WATTS	00/00/00
1 1/2"	009QT		RP	WATTS	00/00/00
1/2"	008PCQT-VUH		SVB	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
4"	2000SS		DC	AMES	00/00/00
4"		909	RP	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
3/8"	975XL		RP	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00

Size	Model		Type	Mfr	Install Date
3/4"	805Y		DC	FEBCO	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
2"			DC	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1 1/2"		550	DC	WILKINS	00/00/00
1 1/2"		550	DC	WILKINS	00/00/00
1 1/2"		950	DC	WILKINS	00/00/00
1 1/2"		950	DC	WILKINS	00/00/00
1 1/2"		550	DC	WILKINS	00/00/00
1 1/2"		950	DC	WILKINS	00/00/00
1 1/2"		950	DC	WILKINS	00/00/00
3/4"	009M2QT		RP	WATTS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1/2"		4020302	RP	CONB	00/00/00
1 1/2"	709QT		DC	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
4"	709DCDA		DCDA	WATTS	00/00/00
3/4"		709	DC	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
2"			DC	HERSEY	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1 1/4"	007M2PCQT		DC	WATTS	00/00/00
1 1/2"		550	DC	WILKINS	00/00/00
1 1/2"	805Y		DC	FEBCO	00/00/00
3/4"		550	DC	WILKINS	00/00/00
4"		856	DCDA	FEBCO	00/00/00
3/4"	805Y		DC	FEBCO	00/00/00
1/2"	975XL		RP	WILKINS	00/00/00
1/2"		9	RP	WATTS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
6"	3000SS		DCDA	AMES	00/00/00
3/4"		709	DC	WATTS	00/00/00
1"	007M1PCQT		DC	WATTS	00/00/00
1"		950	DC	WILKINS	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	007M2QT		DC	WATTS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
3/4"	007M2QT		DC	WATTS	00/00/00
8"	3000SS		DCDA	AMES	00/00/00
3/4"	007M2QT		DC	WATTS	00/00/00
1"	009M3QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00

Size	Model		Type	Mfr	Install Date
1/2"	009QT		RP	WATTS	00/00/00
1"	950XL		DC	WILKINS	00/00/00
			AIRGAP		00/00/00
8"	2000SE		DC	AMES	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
3/4"	009M2QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1 1/2"	007M2QT		DC	WATTS	00/00/00
3/4"	007M2QT		DC	WATTS	00/00/00
2 1/2"	DCDA		DCDA	WILKINS	00/00/00
3/4"		550	DC	WILKINS	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
6"	805YD		DC	FEBCO	00/00/00
4"		2	DC	HERSEY	00/00/00
1"	950XL		DC	WILKINS	00/00/00
1/2"		4020302	RP	CONB	00/00/00
1"	950XL		DC	WILKINS	00/00/00
1"	805Y		DC	FEBCO	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
3/4"	009M2QT		RP	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
1"		850	DC	FEBCO	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
4"	709DCDA		DCDA	WATTS	00/00/00
3/4"	007M1QT		DC	WATTS	00/00/00
1/2"	975XL		RP	WILKINS	00/00/00
1 1/2"	007M2QT		DC	WATTS	00/00/00
1 1/2"	40-107-A2		DC	CONB	00/00/00
1"		850	DC	FEBCO	00/00/00
1/2"	40203A2		RP	CONB	00/00/00
1"	775QT		DC	WATTS	00/00/00
2"	40-108-A2		DC	CONB	00/00/00
2"	805Y		DC	FEBCO	00/00/00
2"		850	DC	FEBCO	00/00/00
2"	950XLT		DC	WILKINS	00/00/00
2"		909	RP	WATTS	00/00/00
2"		909	RP	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
4"	806YD		DCDA	FEBCO	00/00/00
3/4"	805Y		DC	FEBCO	00/00/00
1 1/2"	805Y		DC	FEBCO	00/00/00

Size	Model		Type	Mfr	Install Date
3/4"		975	RP	WILKINS	00/00/00
2"		850	DC	FEBCO	00/00/00
1"		860	RP	FEBCO	00/00/00
6"	3000SS		DCDA	AMES	00/00/00
3/4"	007M1QT		DC	WATTS	00/00/00
2"	805Y		DC	FEBCO	00/00/00
3/4"		909	RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1 1/2"	909QT		RP	WATTS	00/00/00
1 1/2"	009M2PCQT		RP	WATTS	00/00/00
1 1/4"	009M2QT		RP	WATTS	00/00/00
1"	825Y		RP	FEBCO	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
3/4"	909QT		RP	WATTS	00/00/00
3/4"	009M2QT		RP	WATTS	00/00/00
3/4"		860	RP	FEBCO	00/00/00
3/4"		860	RP	FEBCO	00/00/00
3/4"	825Y		RP	FEBCO	00/00/00
4"	2000SS		DC	AMES	00/00/00
2"	007M1QT		DC	WATTS	00/00/00
2 1/2"		550	DC	WILKINS	00/00/00
4"	375DA		RPDA	WILKINS	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00
1"		950	DC	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1 1/2"	975XL		RP	WILKINS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
1 1/2"	007M2QT		DC	WATTS	00/00/00
1 1/2"	007M2QT		DC	WATTS	00/00/00
1"		909	RP	WATTS	00/00/00
3/4"			DC	RAIN	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	2000B		DC	AMES	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
1 1/2"	950XLT		DC	WILKINS	00/00/00
1"	975XL		RP	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	2000B		DC	AMES	00/00/00
2 1/2"		9	RP	WATTS	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
1"	009QT		RP	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
1"	775QT		DC	WATTS	00/00/00

Size	Model		Type	Mfr	Install Date
3/4"	009M3QT		RP	WATTS	00/00/00
1"		850	DC	FEBCO	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
4"	3000SS		DCDA	AMES	00/00/00
3/4"	2000B		DC	AMES	00/00/00
3"	350DA		DCDA	WILKINS	00/00/00
3/4"	950XLD		DC	WILKINS	00/00/00
2 1/2"	350DA		DCDA	WILKINS	00/00/00
3/4"	950XLD		DC	WILKINS	00/00/00
3"	350DA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
4"	350DA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
2 1/2"	350DA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1 1/2"	40-107-A2T		DC	CONB	00/00/00
1 1/2"		950	DC	WILKINS	00/00/00
1"		950	DC	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1"	950XL		DC	WILKINS	00/00/00
1"	40205A2		RP	CONB	00/00/00
3/4"	825Y		RP	FEBCO	00/00/00
1"	709QT		DC	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1"	950XL		DC	WILKINS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1"	775QT		DC	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
1/2"	975XL		RP	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
3/8"		4020202	RP	CONB	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
6"	876V-VUVD		DCDA	FEBCO	00/00/00

Size	Model		Type	Mfr	Install Date
3/4"	805YB		DC	FEBCO	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
3/4"	950XLT		DC	WILKINS	00/00/00
1 1/2"		850	DC	FEBCO	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
1"		950	DC	WILKINS	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
1"	007M1QT		DC	WATTS	00/00/00
1 1/2"	805Y		DC	FEBCO	00/00/00
1"	009M2QT		RP	WATTS	00/00/00
1"		850	DC	FEBCO	00/00/00
1 1/2"	2000B		DC	AMES	00/00/00
1 1/2"	2000B		DC	AMES	00/00/00
1 1/2"	2000B		DC	AMES	00/00/00
1"		850	DC	FEBCO	00/00/00
3/4"	009M2QT		RP	WATTS	00/00/00
2"	805Y		DC	FEBCO	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00
1/2"	975XL		RP	WILKINS	00/00/00
3/4"	009M2QT		RP	WATTS	00/00/00
2"	007M1QT		DC	WATTS	00/00/00
1 1/2"	009M2QT		RP	WATTS	00/00/00
2"	2000B		DC	AMES	00/00/00
1"	950XL		DC	WILKINS	00/00/00
2"	2000B		DC	AMES	00/00/00
2 1/2"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
2 1/2"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
4"	350DA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
4"	Colt 300aBF		DCDA	AMES	00/00/00
3/4"	2000BM3		DC	AMES	00/00/00
8"	450DA-VUVD		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00
1"		850	DC	FEBCO	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00
1"	975XL		RP	WILKINS	00/00/00
4"	350ADA		DCDA	WILKINS	3/1/2008
1/2"		9	RP	WATTS	00/00/00
3/4"	975XL		RP	WILKINS	00/00/00

Size	Model	Type	Mfr	Install Date
4"	350ADA	DCDA	WILKINS	00/00/00
3/4"	950XL	DC	WILKINS	00/00/00
1 1/2"	805Y	DC	FEBCO	00/00/00
2"	950XL	DC	WILKINS	00/00/00
3/4"	950XLT	DC	WILKINS	00/00/00
1"	950XLT	DC	WILKINS	00/00/00
1/2"	009QT	RP	WATTS	5/1/2008
1 1/4"	975XL	RP	WILKINS	5/1/2008
1"	975XL	RP	WILKINS	5/1/2008
1/2"	009M3QT	RP	WATTS	5/1/2008
1/2"	975XL	RP	WILKINS	5/1/2008
1/2"	975XL	RP	WILKINS	5/1/2008
1/2"	009QT	RP	WATTS	5/1/2008
3"	350	DC	WILKINS	5/1/2008
2"	009M2QT	RP	WATTS	5/1/2008
1/2"	975XL	RP	WILKINS	5/1/2008
2"	009M2QT	RP	WATTS	4/1/2008
8"	Colt200	DC	AMES	4/1/2008
3/4"	2000B	DC	AMES	4/1/2008
1/2"	009QT	RP	WATTS	00/00/00
6"	375A	RP	WILKINS	7/1/2008
2"	007M1QT	DC	WATTS	8/1/2008
1 1/2"	2000B	DC	AMES	00/00/00
1 1/2"	2000B	DC	AMES	5/1/2008
1 1/2"	2000B	DC	AMES	5/1/2008
3/4"	950XL	DC	WILKINS	3/1/2008
1"	950XL	DC	WILKINS	3/1/2008
2"	009M2QT	RP	WATTS	3/1/2008
3/4"	909HWQT	RP	WATTS	2/1/2008
4"	350ADA	DCDA	WILKINS	2/1/2008
3/4"	950XL	DC	WILKINS	2/1/2008
1"	950XLT	DC	WILKINS	00/00/00
1/2"	975XL	RP	WILKINS	12/7/2008
2"	009M2QT	RP	WATTS	00/00/00
1"	2000B	DC	AMES	00/00/00
1/2"	009QT	RP	WATTS	7/1/2008
1/2"	009QT	RP	WATTS	8/1/2008
1/2"	009QT	RP	WATTS	00/00/00
6"	375A	RP	WILKINS	7/1/2008
2"	009M2QT	RP	WATTS	00/00/00
4"	DCDA	DCDA	WILKINS	9/1/2008
3/4"	950XL	DC	WILKINS	9/1/2008
1 1/2"	975XL	RP	WILKINS	9/1/2008
1 1/2"	975XL	RP	WILKINS	7/1/2008
3/4"	350	DC	WILKINS	9/1/2008
1/2"	009QT	RP	WATTS	6/1/2008
1"	860	RP	FEBCO	9/1/2008
3/4"	009M3QT	RP	WATTS	9/1/2008
1/2"	009QT	RP	WATTS	9/1/2008
1/2"	009QT	RP	WATTS	9/1/2008
1/2"	009QT	RP	WATTS	9/1/2008

Size	Model		Type	Mfr	Install Date
1/2"	009QT		RP	WATTS	9/1/2008
1/2"	007QT		DC	WATTS	9/1/2008
1/2"	009QT		RP	WATTS	11/1/2008
1 1/2"	009M2QT		RP	WATTS	00/00/00
2"	009M2QT		RP	WATTS	10/10/2008
2"	009M2QT		RP	WATTS	10/1/2008
1"	009M2QT		RP	WATTS	10/1/2008
3/4"	009M2QT		RP	WATTS	10/1/2008
2"	009M2QT		RP	WATTS	10/1/2008
2"		850	DC	FEBCO	10/1/2008
1 1/2"	975XL		RP	WILKINS	10/1/2008
1 1/2"		850	DC	FEBCO	00/00/00
2"		850	DC	FEBCO	3/27/2008
2"	950XLT		DC	WILKINS	3/1/2008
2"	950XLT		DC	WILKINS	3/1/2008
4"	350ADA		DCDA	WILKINS	9/1/2008
3/4"	950XL		DC	WILKINS	9/1/2008
1 1/2"	975XL		RP	WILKINS	5/1/2008
1 1/2"	975XL		RP	WILKINS	5/1/2008
1 1/2"	975XL		RP	WILKINS	5/1/2008
1 1/2"	975XL		RP	WILKINS	10/1/2008
4"	350ADA		DCDA	WILKINS	9/1/2008
3/4"	950XL		DC	WILKINS	9/1/2008
8"	870-VUVD		DC	FEBCO	00/00/00
4"	Colt 300aBF		DCDA	AMES	2/1/2009
3/4"	2000BM3		DC	AMES	2/1/2009
1"	950XL		DC	WILKINS	2/1/2009
1 1/2"	975XL		RP	WILKINS	1/1/2009
1/2"	975XL		RP	WILKINS	3/1/2009
1/2"	975XL		RP	WILKINS	3/1/2009
1 1/2"	975XL		RP	WILKINS	2/1/2009
4"	350ADA		DCDA	WILKINS	2/1/2009
3/4"	950XL		DC	WILKINS	2/1/2009
1"			DC	WATTS	00/00/00
2"		850	DC	FEBCO	00/00/00
8"	350A		DC	WILKINS	00/00/00
1 1/2"		850	DC	FEBCO	5/1/2009
3/4"	007M3QT		DC	WATTS	6/1/2009
1/2"	009M3QT		RP	WATTS	7/1/2009
3/4"	009M3QT		RP	WATTS	00/00/00
1/2"	009QT		RP	WATTS	5/9/2009
4"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
6"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
1 1/2"	805Y		DC	FEBCO	00/00/00
3/4"	975XL		RP	WILKINS	8/12/2009
3/4"	975XL		RP	WILKINS	8/1/2009
4"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
4"	350ADA		DCDA	WILKINS	00/00/00

Size	Model		Type	Mfr	Install Date
3/4"	950XL		DC	WILKINS	00/00/00
4"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
4"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
4"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
4"	350ADA		DCDA	WILKINS	00/00/00
3/4"	950XL		DC	WILKINS	00/00/00
1"	975XL		RP	WILKINS	00/00/00
1/2"	009QT		RP	WATTS	8/1/2009
2"	40208T2		RP	CONB	8/1/2009
3/4"	009M3QT		RP	WATTS	8/1/2009
3/4"	009M3QT		RP	WATTS	8/1/2009
3/4"		919	RP	WATTS	8/1/2009
1/2"	975XL		RP	WILKINS	7/1/2009
1"	975XL		RP	WILKINS	7/1/2009
3/4"	009M3QT		RP	WATTS	10/1/2009
3/4"	009M3QT		RP	WATTS	10/1/2009
1/2"	009QT		RP	WATTS	00/00/00
3/4"	009M3QT		RP	WATTS	00/00/00
8"	Colt 300aBF		DCDA	AMES	11/1/2009
3/4"	2000BM3		DC	AMES	11/1/2009
3/4"	009M3QT		RP	WATTS	12/1/2009
4"	350ADA		DCDA	WILKINS	4/1/2009
3/4"	950XL		DC	WILKINS	4/1/2009
2"	825YA		RP	FEBCO	7/1/2009
1"	950XLT		DC	WILKINS	11/1/2009
2"	009M2QT		RP	WATTS	11/1/2009
3/4"	009M3QT		RP	WATTS	00/00/00
1"	009M2QT		RP	WATTS	11/1/2009
1 1/2"	2000B		DC	AMES	00/00/00
1 1/4"	2000B		DC	AMES	11/1/2009
1 1/2"	2000B		DC	AMES	11/1/2009
1 1/2"	2000B		DC	AMES	11/1/2009
1 1/2"	2000B		DC	AMES	11/1/2009
1 1/2"	2000B		DC	AMES	11/1/2009
1 1/2"	2000B		DC	AMES	11/1/2009
1 1/2"	2000B		DC	AMES	11/1/2009
1 1/2"	2000B		DC	AMES	11/1/2009
3"	880-VUVD		RP	FEBCO	12/1/2009
3/4"	805YB		DC	FEBCO	00/00/00
2"	009M2QT		RP	WATTS	00/00/00
2"	950XLT		DC	WILKINS	4/1/2010
1 1/2"	975XL		RP	WILKINS	00/00/00
4"	350ADA		DCDA	WILKINS	5/1/2010
3/4"	950XL		DC	WILKINS	5/1/2010
1/2"	009QT		RP	WATTS	2/9/2010
4"	350ADA		DCDA	WILKINS	4/1/2010
3/4"	950XL		DC	WILKINS	4/1/2010
1 1/4"	2000B		DC	AMES	00/00/00

Size	Model		Type	Mfr	Install Date
1 1/2"		850	DC	FEBCO	4/1/2010
2"	009M2QT		RP	WATTS	9/2/2010
3/4"	009QT		RP	WATTS	00/00/00
3/4"	009QT		RP	WATTS	00/00/00
1 1/2"	975XL		RP	WILKINS	00/00/00
2"	950XLT		DC	WILKINS	00/00/00
3"	Colt 300aBF		DCDA	AMES	10/1/2010
3/4"	2000B		DC	AMES	10/1/2010
1/2"	975XL		RP	WILKINS	10/1/2010
1/2"	975XL		RP	WILKINS	10/1/2010
3/4"	975XL		RP	WILKINS	10/1/2010
3/4"	975XL		RP	WILKINS	10/1/2010
3/4"	975XL		RP	WILKINS	10/1/2010
3/4"	825Y		RP	FEBCO	10/1/2010
2"	009M2QT		RP	WATTS	00/00/00
1"	950XLT		DC	WILKINS	00/00/00
1/2"	008PCQT-VUH		SVB	WATTS	00/00/00
1/2"	008PCQT-VUH		SVB	WATTS	00/00/00
1/2"	008PCQT-VUH		SVB	WATTS	00/00/00
1/2"	008PCQT-VUH		SVB	WATTS	00/00/00
1"	009M2QT		RP	WATTS	3/1/2011
2"	975XL		RP	WILKINS	4/1/2011
2"	009M2QT		RP	WATTS	4/1/2011
1/2"	009QT		RP	WATTS	5/1/2011

ENGINEERING STANDARDS

SECTION 5

WATER DISTRIBUTION

5-1 DESIGN

5-1.01 GENERAL

Extension or modification to the City's water system shall be made strictly in accordance with the construction plans prepared in accordance with these Standards, the Snohomish Municipal Code, and the City's Water Comprehensive Plan, and approved by the City Engineer. Additionally, all construction of water system extensions shall conform to these Standards, applicable American Water Works Association (AWWA) Specifications and the current WSDOT/APWA Standard Specifications.

These Standards do not include design of the City's general facilities such as wells, pump stations, in-ground reservoirs, storage tanks, or treatment plant. The City's general facilities require special design and will be reviewed and approved by the City Engineer on a case-by-case basis.

5-1.02 HYDRAULIC REQUIREMENTS

Distribution System Pressure

All water mains shall be sized following a hydraulic analysis based on flow demands and pressure requirements. Per the DOH design manual current edition, during fire suppression events, the water system must be able to provide 20-psi minimum pressure at ground level at all points throughout the distribution system. The water system must be able to provide this minimum pressure under fire-flow conditions plus the MDD rate when all equalizing and fire flow storage is depleted (WAC 246-290-230(6)). The required working pressure in the City of Snohomish distribution system should be approximately 40 to 80 psi, not less than 30 psi when all equalizing storage is depleted, and not greater than 90 psi due to the age and condition of the current infrastructure. Higher pressures in unusual circumstances shall be submitted to the City Engineer for review. Individual pressure reducing valves (PRV) are required when the static pressure at the service level exceeds 60 psi.

Distribution System Velocities

Per the DOH design manual current edition, "DOH recommends a maximum velocity of no more than 8-feet per second (fps) under PHD conditions, unless the pipe manufacturer specifies otherwise. Maximum velocities greater than 8 fps may occur under fire flow conditions, for short main sections, or piping in pump and valve station facilities.

Engineers should conduct a hydraulic transient (water hammer) analysis for distribution piping designed to exceed 10 fps during PHD or fire flow conditions (Walski et al. 2003; AWWA 2004)."

Distribution System Fire Flow

Fire flow requirements shall be determined by the City Fire Marshall. The available fire flow will be determined by the City Engineer using the water system hydraulic model.

5-1.03 WATER MAIN EXTENSION

Residential

Water main extensions shall be required when a parcel does not front an existing water main. All residential water main extensions shall be extended to a point 10 feet beyond the farthest property corner where practical as determined by the City Engineer. In addition, water mains shall be installed through all internal streets and looped to all adjacent mains that will, in the City Engineer's opinion, extend past or through the property in the future; and stub to the property line where it is likely that they will be needed to connect to future mains. Depending on the property size, shape and the Water Comprehensive Plan, the City may require mains to be constructed on more than one, and up to all, sides of the property. The City Engineer may also require that extra service lines be installed to be used for sampling stations.

If a proposed water main extension is located in 2 or more pressure zones, the City Engineer may require installation of pressure reducing stations, isolation valves, check valves, and/or booster pump stations.

Dead-end mains shall be kept to a minimum by making appropriate looping and tie-ins whenever practical in order to provide increased reliability of service, assist with water quality and reduce head loss.

If a water main extension directly benefits multiple property owners, a latecomer reimbursement agreement in accordance with SMC Chapter 15.17 may be appropriate.

Non-Residential Properties

Water main extensions shall be required when a parcel does not front an existing water main. All non-residential water main extensions shall be extended to a point 10 feet beyond the farthest property corner where practical as determined by the City Engineer, and/or stub or connect to present and future mains or as directed by the City Engineer. The City Engineer may also require that extra service lines be installed to be used for sampling stations.

If the proposed water main extension is located in 2 or more pressure zones, the City Engineer may require installation of pressure reducing stations, isolation valves, check valves, and/or booster pump stations.

Dead-end mains shall be kept to a minimum by making appropriate looping and tie-ins whenever practical in order to provide increased reliability of service, assist with water quality and reduce head loss.

If a water main extension directly benefits multiple property owners, a latecomer reimbursement agreement in accordance with SMC Chapter 15.17 may be appropriate.

5-1.04 WATER MAIN LOCATION

Water mains and appurtenances should be installed within the right-of-way of public streets and roads. Water mains may be installed within City easements across private properties. Water mains within public right-of-way shall be located on the north and east sides of the centerlines. Water mains shall be in the shoulder of the roadway for rural roads, and approximately 6 feet from the street centerline for urban streets. See Standard Plan 322.

The City Engineer may approve exceptions to this requirement in order to minimize the cutting and replacing of pavement, to avoid conflicts with other underground utilities, to permit sanitary sewers to be installed on the "low side" of streets, or for other appropriate reasons. As nearly as practical, mains shall be installed on a particular street with the distance from the property line and/or centerline varied as little as possible. Water mains shall not be located under or behind parking lanes, curbs, gutters, or sidewalks. Valve boxes shall be located outside the normal wheel track whenever possible.

If there is an easement across a paved area on private property, the water main shall be installed in the driving lanes (not under parking stalls).

Water mains may be laid along road/street curves by using bends. Pipe joint deflection may be allowed upon approval by the City Engineer but the deflection shall not exceed one half of the manufacturer's recommended deflection.

5-1.05 HORIZONTAL SEPARATION

Water mains shall be laid at least 10 feet horizontally from any existing or proposed sanitary sewer, storm drain, and septic tank and/or absorption field. The distance shall be measured edge to edge. If the City Engineer determines it is not practical to maintain a 10 foot separation, the City Engineer may approve deviation on a case-by-case basis using criteria from the Washington State Department of Ecology (DOE). Such deviation may include installation of the water main closer to a sanitary sewer provided that the water main is laid in a separate trench or on undisturbed earth shelf located on one side of the sanitary sewer at such an elevation that the bottom of the water main is at least 18

inches above the top of the sewer. Water service connections and side sewers shall have minimum horizontal clearance of 10 feet unless otherwise approved by the City Engineer.

Minimum horizontal clearances from water mains:

Utility	Minimum Horizontal Clearance in feet
Cable	5
Gas	5
Power	5
Telephone, Fiber Optic	5
Storm Drain	10
Sanitary Sewer	10
Septic Tanks/Drainfields	10

5-1.06 VERTICAL SEPARATION

Wherever practical, water mains shall cross other utilities at right angles. If this is not practical as determined by the City Engineer, the crossing angle shall be maintained between 45 and 90 degrees. Water mains crossing sanitary and storm sewers shall be laid to provide a minimum vertical clearance of 18 inches between the outside of the water main and the outside of the sewer. Where a water main crosses sanitary and storm sewers, one full length of water pipe shall be used with the pipe centered over the sewer for maximum joint separation. When the above conditions cannot be met and in accordance with applicable DOE criteria, the City Engineer may approve a variance, but shall require that the sewer be constructed of ductile iron pipe and be pressure tested before being activated, and/or be encased.

Minimum vertical clearances from water mains:

Utility	Minimum Vertical Clearance in feet
Cable	1
Gas	1
Power	1
Telephone, Fiber Optic	1
Storm Drain	1.5
Sanitary Sewer	1.5

When it is not practical to maintain this minimum separation between the water main and sanitary and storm sewers, the vertical clearance may be less than 6 inches and Ethafoam pads are required. The water main may also be encased per Section 5.1.11 Steel Casing.

5-1.07 SETBACK DISTANCE FROM BUILDINGS

Water mains shall be located a minimum of 5 feet from covered parking, 10 feet minimum from building and retaining walls. A 20 foot wide minimum easement shall be provided for a water main between buildings.

5-1.08 WATER MAIN SIZING

Transmission mains and specific areas outlined in the City's Water Comprehensive Plan require 12 inch or larger water mains.

When serving fire hydrants and for local distribution mains in residential areas, 8 inch or larger pipe is required.

6 inch pipe shall not be used as part of the distribution system except as fire hydrant runs not longer than 50 feet.

5-1.09 PIPE MATERIAL

Water mains shall be cement mortar lined ductile iron pipe (DIP) Class 52 unless otherwise approved by the City Engineer.

5-1.10 PIPE FITTINGS

Pipe shall be furnished with mechanical joints or rubber gasket push-on joints (Tyton joint only) unless flanged joints or restrained joints are required. Horizontal or vertical bends shall be used when joint deflection would exceed one-half of the pipe manufacturer's recommended maximum deflection. Restrained joints are required on all hydrant runs, steep slopes, non-bearing soils and in other conditions as determined necessary by the City Engineer.

5-1.11 STEEL CASING

Ductile iron pipe shall be encased in a steel casing when crossing: (1) under rockeries over 5 feet high; (2) under retaining wall footings over 5 feet wide; and (3) under reinforced earth retaining walls (both wall and reinforcing material). Casings shall extend a minimum of 5 feet past each edge of the structure, or a distance equal to the depth of pipe, whichever is greater. Minimum vertical clearance between the bottom of the wall or footing and top of the pipe or casing shall be 2 feet. The pipe trench at the casing shall be backfilled with gravel backfill material when the vertical clearance is less than 3 feet.

Ductile iron pipe shall be encased in a steel casing when crossing under a railroad or State/County highway. Casings and carrier pipe shall be installed in accordance with applicable other local, State, and/or Federal laws and/or regulations. In the case of

railroad crossings, the project shall also comply with regulations established by the railroad company.

The carrier pipe shall be supported by casing spacers. Casing spacers shall be placed under the carrier pipe to ensure approximate centering within the casing pipe and to prevent damage during installation. See Standard Plan 522.

Steel casings may also be required when water mains cross creeks or wetlands.

5-1.12 COVER DEPTH

A cover depth of 3 feet above the top of water mains shall be maintained if possible. The cover depth shall not be less than 3 feet or more than 5 feet without the approval of the City Engineer.

If the water main is within the State or County right-of-way, the cover depths shall be in accordance with the State or County requirements.

5-1.13 SLOPES

Where the longitudinal slopes are 20% or greater, all pipe joints shall be restrained. Anchor blocks shall be used in conjunction with joint restraint where slopes are 20% or greater. Timber baffle/hill holders shall be required on unpaved slopes that exceed 20%. Maximum spacing between the holders shall be 18-foot on center with a minimum of 1 holder for each pipe length.

5-1.14 POLYETHYLENE ENCASEMENT

The City Engineer may require that ductile iron pipe and fittings be protected by 8-mil polyethylene encasement in areas of severely corrosive soils or in accordance with AWWA/ANSI C105/A21.5.

5-1.15 CONCRETE BLOCKING

When using horizontal and vertical concrete blocking, show locations and type of blocking on the plans as shown on Standard Plans 505 and 506. Concrete blocking is required on all fittings including restrained joint fittings.

An 8 inch pipe at a vertical bend shall be restrained a minimum of 36 feet (2 joints) from each side of a bend. A 12 inch or larger pipe at a vertical bend shall be restrained a minimum of 54 feet (3 joints) from each side of a bend. No change in horizontal direction or diameter shall occur within 36 feet of the vertical bend. Special blocking or joint restraint designs may be required for poor soil, conflicting utility, etc.

5-1.16 ASBESTOS CONCRETE PIPE CROSSING

When a proposed water main crosses existing asbestos concrete (A.C.) pipe, the City shall require removal and replacement of the A.C. pipe with ductile iron pipe at the expense of the person or entity responsible for the water main project. The A.C. pipe removal and disposal shall be performed in accordance with all applicable Puget Sound Clean Air Agency (PSCAA) requirements, including but not limited to obtaining a permit from PSCAA for the removal work, and other applicable State and/or Federal laws and regulations. A permit from PSCAA to perform the A.C. pipe removal is required prior to construction drawing approval. Ductile iron pipe crossings shall be connected to the existing A.C. main with Romac extended range transition couplings.

5-1.17 VALVES

Sufficient valves shall be provided on water mains so that interrupted service and sanitary hazards will be minimized during repairs. Valves shall be located at no more than 300 foot intervals in commercial, industrial and multi-family areas and at no more than one block or 600 foot intervals in other areas. At water main intersections, valves shall be placed on 4 legs at each cross and 3 legs at each tee (unless tapping an existing water main). The valves shall be spaced so that no more than one fire hydrant is removed from service with any separate main shut down.

An auxiliary valve shall be installed on each hydrant run at the tee. A valve shall be installed on a water main at each end of an easement for the main. Additional valves may be required for area isolation and unidirectional flushing. Valves on water mains shall, where practical, be located within paved area of the street. A valve box or chamber shall be provided for every valve.

Generally valve sizes shall be the same as the water main. All valves 12 inch and smaller shall be resilient seated gate valves unless minimum cover cannot be achieved. If minimum cover cannot be achieved a butterfly valve shall be installed. All valves larger than 12 inch shall be butterfly type if approved by the City Engineer. When butterfly valves are installed, the operation nuts shall be on the north or east sides of the water mains. If a valve is installed in gravel or unpaved area, a concrete pad shall be set around each valve box at finished grade per Standard Plan 512.

5-1.18 FIRE HYDRANTS

Fire hydrants shall be installed for buildings where water is served by the City. The final number of hydrants and their locations shall be approved by the City Fire Marshal.

The maximum spacing of fire hydrants serving single-family dwellings or duplex dwellings on individual lots shall be 600 feet and not more than 300 feet from the front property line of the main body of a lot. Required distances shall be measured along the normal fire department hose laying route.

Fire hydrants serving multi-family and commercial lots shall be located not more than 300 feet on center and shall be located so that at least one hydrant is located within 150 feet of all structures or uses. Fire hydrants shall not be closer than 50 feet from multi-family or commercial buildings. On arterial streets without residential access, maximum hydrant spacing shall be 600 feet.

Any hydrant run exceeding 50 feet in length shall be 8 inches in diameter unless otherwise approved by the City Engineer. The joints of hydrant runs shall be restrained. No domestic or fire sprinkler service shall be tapped on any hydrant run. Fire hydrants shall be installed at the ends of each dead end line more than 300 feet in length. Said fire hydrants may be removed to conform to standard spacing requirements when the main is again extended with the City's approval. Hydrant valves shall be no more than one pipe length and no closer than three feet from the hydrant it serves. Fire hydrant installation is shown in Standard Plan 507.

5-1.19 COMBINATION AIR VACUUM RELIEF VALVES

Combination air vacuum relief valves as shown in Standard Plan 511 shall be installed on high points of new water mains where the elevation difference between the high point and the next low point exceeds one (1) pipe diameter, or as otherwise required by the City Engineer. The air valves shall be located outside the traveled portion of the roadway, preferably behind the curb or sidewalk and within the public right-of-way and the public utility easement. If possible, the water main profile shall be adjusted to eliminate the use of the air valves.

5-1.20 BLOW-OFFS

Each dead-end main shall be provided with a fire hydrant if flow and pressure are sufficient or with an approved flushing hydrant or a blow-off assembly shown in Standard Plan 510 for flushing purposes. Flushing devices shall be sized to provide flows that will give a velocity of at least 2.5 feet per second in the water main being flushed. No flushing device shall be directly connected to any sewer. Blow-off assemblies shall be located outside the traveled portion of the roadway, behind the curb or sidewalk, and within the public right-of-way or public utility easement.

A 2 inch blow-off assembly shall be required for testing and disinfection of new water mains, where hydrants are not available.

5-1.21 CONNECTION TO EXISTING SYSTEM

Connections to existing water mains 8 inches and larger shall be via a wet tap shown in Standard Plan 513 unless cut-in is required by the City Engineer in order to install additional valves. Connections to existing water mains smaller than 8 inch diameter shall be made by cutting in a tee, unless otherwise approved by the City Engineer.

5-1.22 EASEMENTS

All water mains, valves, fire hydrants, meters, sampling stations, air vacuum relief valves, blow-offs, and other appurtenances not in public right-of-way shall be within public utility easements designated on submitted plans to provide the City with permanent access to these mains and appurtenances, as well as easements for future line connections, as required. Unless otherwise approved by the City Engineer, the easement for the water mains shall be 20 feet in width and 10 feet on all sides of the pipe lines, a minimum of 5 feet on each side of fire hydrants and other appurtenances (such as meters, sampling stations, air/vacuum valves, blow-offs, etc). Easements shall be fully executed and recorded with the Snohomish County Auditor prior to project acceptance by the City. The form of easement documents shall be subject to the approval of the City Attorney. Easement drawings and legal description shall be included as exhibits to each easement.

If off-site easements are required on properties not owned by the party responsible for the project, the responsible party shall acquire the easements at his/her expense before construction plans will approved by the City Engineer.

5-1.23 SERVICE CONNECTIONS

Service connections, including saddle, service line, meter box and appurtenances, shall be installed as part of the construction of all new water system extensions. A fire sprinkler meter per City Standards shall be provided if required by the City Fire Marshal. All service connections must be protected by a Washington State Department of Health (DOH) approved backflow prevention assembly in accordance with WAC 246-290-490. See Standard Plans 501 through 504a.

For residential developments, meter boxes shall be located in front of the lot to be served unless otherwise approved by the City Engineer. Meter boxes shall be close to the property line, behind the sidewalk, in a landscape area within public right-of-way or public utility easement, but not in paved areas such as sidewalk or driveway. An easement shall be established and recorded for placement of the water service if the required location is outside of the right-of-way or established public utility easement. Meters for two neighboring lots shall be installed near the common lot line to ease meter reading. Meters located close to driveways shall use boxes with traffic rating. The distance from the water main to the meter box shall not exceed 50 feet unless otherwise approved by the City Engineer. Meters shall be located in or as close to the public right-of-way as possible. Service lines shall be perpendicular to the water main if possible. See Standard Plan 502 for single family services and 503 and 504 for multi-family or commercial.

For commercial and multi-family developments, meters shall be located behind the back of a curb or sidewalk and not behind parking space or other obstructions. Meters shall be located for ease of reading.

Minimum allowable service lines from mains to meters shall be 1 inch for a single family residential buildings and 2 inch for multi-family or commercial buildings. All duplexes,

triplexes and fourplexes must have separate services and meters for each unit. Multifamily buildings with five or more units must have separate services and meters for each building. Irrigation and fire sprinkler systems shall also be served by separate services and meters unless otherwise approved by the City Engineer. Each irrigation and fire sprinkler system shall be equipped with an approved backflow preventer. A minimum pressure of 30 psi at the meter shall be maintained when service is flowing at anticipated maximum flow rates. If friction losses will cause the pressure at the building to drop below the minimum, the service line size shall be increased to an appropriate size to maintain the required minimum pressure level.

The standard meter size is ⅝ inch x ¾ inch for a single family residential house. Non-residential services and meter sizes (minimum ⅝ inch x ¾ inch) shall be determined by the engineer or architect per the current Uniform Plumbing Code and subject to the approval of the City Building Official, and the plans shall show the locations and sizes of the services and meters.

Static service pressures at ground floor elevation shall be determined at all lots/buildings to ensure compliance with system pressure standards. Plans shall identify lots/buildings where the builder/owner will be required to install individual pressure reducing valve (PRV) when service pressures exceed 60 psi. A PRV shall be located on the customer side of the meter, outside of the public right of way, and a minimum of 3 feet from the water meter box.

5-1.24 EXISTING WATER MAIN ABANDONMENT

Existing water mains that are out of service shall be removed or abandoned as required by the City Engineer. If water mains are to be abandoned, the ends of the abandoned water mains shall be plugged by filling with Class 2500 concrete for a minimum length of 12 inches.

5-1.25 PRESSURE REDUCING STATIONS

If the proposed water project shall be located in two or more pressure zones, pressure reducing stations may be required by the City Engineer.

5-1.26 CROSS-CONNECTION CONTROL

The City strictly prohibits interconnection of other water supplies with the City's water system.

A backflow prevention device is required for all irrigation systems, fire sprinkler systems, commercial service connections and other water uses which may cause contamination of the City water system. Approved backflow prevention assemblies shall meet the requirements of the WAC 246-290-490 ("Cross Connection Control Regulation in Washington State"), and the recommendations of the PNWS-AWWA Cross Connection Control Manual and the City of Snohomish Cross Connection Control Program. The

types of backflow prevention devices to be used for a specific project shall be determined by the City's Cross Connection Specialist.

Fire sprinkler system connections to the City's water system shall be owned and maintained by the property owner, beginning immediately at the valve where the fire sprinkler system connects to the City's water main.

The backflow prevention assembly on fire sprinkler system connections shall be located as close to the serving water main as possible, either on the owner's property or in an easement.

5-1.27 PRIVATE WELLS

To receive water services from the City, the property owner shall either:

(1) decommission the existing well(s) in accordance with WAC 173-160-381. The owner shall provide a copy of the decommission report to the City Water Division.

OR

(2) physically separate all domestic water supply piping from well(s) piping and permanently cap all terminations so that the two systems cannot be intertied. A double check valve (DCV) assembly shall be installed at the water meter and annual DCV testing requirements shall be meet and reports submitted to the City's Water Division.

However, if the property is undergoing development such as, but not limited to, platting or subdivision, all well(s) shall be decommissioned in accordance with WAC 173-160-381 and a copy of the decommission report shall be delivered to the City Water Division.

5-2 MATERIAL

5-2.01 GENERAL

All materials shall be new and undamaged. The same manufacturer of each item shall be used throughout the work. All materials not specifically referenced shall comply with applicable sections of ANSI, ASTM, AWWA or the current WSDOT/APWA Standard Specifications and approved by the City Engineer.

When specific manufacturers or models are specified in these Standards, no substitutions will be allowed without prior approval by the City Engineer. If required by the City Engineer, the Contractor shall furnish certification from the manufacturer of the materials being supplied that the inspection and all of the specified tests have been made and the results thereof comply with the requirements of the reference Standards.

5-2.02 DUCTILE IRON PIPE

Ductile iron pipe shall be Class 52 (Tyton joint only) and cement mortar lined unless otherwise specified and shall conform to AWWA/ANSI C151/A21.51. Standard thickness of cement mortar lining shall be in accordance with AWWA/ANSI C104/A21.4.

5-2.03 HIGH DENSITY POLYETHYLENE PIPE

High density polyethylene (HDPE) pipe shall conform to AWWA C900.

5-2.04 WATER SERVICE PIPE

Water service pipe shall be Driscopipe IPS Class 200 Hi-Mol Poly pipe for 1-inch and Driscopipe CTS Class 200 Hi-Mol Poly pipe for 2-inch Driscopipe shall conform to ASTM D-27370SDR9 (PE3408). CTS 110 SS liners for polypipe shall be used.

5-2.05 FITTINGS AND JOINTS

All fittings for ductile iron pipe shall be ductile iron compact (short body) fittings conforming to AWWA/ANSI C153/A21.53 and shall be cement mortar lined conforming to AWWA/ANSI C104/A21.4.

Joints shall be mechanical joints or rubber gasket push-on joints (Tyton joints only) unless flanged joints or restrained joints are required and shown in the plans. Pipe with push-on joints shall be suitable for use with mechanical joint fittings. Ductile iron pipe fittings shall have a pressure rating of 350 psi for push-on or mechanical joint fittings and 250 psi for flange joint fittings drilled in accordance with AWWA/ANSI C111/A21.11, unless otherwise noted.

Rubber gaskets for push-on joints (Tyton joint only) or mechanical joints shall be in accordance with AWWA/ANSI C111/A21.11. Gasket material for flanges shall be neoprene, Buna N, chlorinated butyl, or cloth inserted rubber.

All Mechanical Joints, unless otherwise noted on the plans, shall use Mechanical thrust restraint followers. Mechanical thrust restraint shall be EBAA Iron MegaLug/Flange, Romac, RomaGrip, Star Pipe StarGrip, or as approved by the City Engineer.

5-2.06 RESTRAINED JOINTS

Where restrained joints are required, they shall be either bolted or boltless design, flexible after assembly, and can be disassembled without special tools. Any device utilizing round point set screws shall not be permitted. All couplings installed underground to connect ductile iron pipe shall be manufactured of ductile iron.

Restrained joints shall be Meg-A-Lug Series 1100, TR Flex, Grinnell 595 shackle clamp, or approved equal.

5-2.07 COUPLINGS

Flexible coupling and transition coupling cast components shall be ductile iron. Bolts and nuts shall be in accordance with ASTM A536-80, Grade 65-45-12. Bolts shall be high strength, low alloy steel track head bolts with national course rolled thread and heavy hex nuts. Gaskets shall meet AWWA/ANSI C111/A21.11 composition specifications.

5-2.08 BOLTS AND NUTS

Bolts, nuts and washers used for securing fittings shall be of similar materials. Steel bolts shall meet the requirements of ASTM A307 or ASTM F568 for carbon steel or ASTM F593 or ASTM F738 for stainless steel. Nuts shall meet the requirements of ASTM A563 for carbon steel or ASTM F594 or ASTM F836 for stainless steel. Iron bolts and nuts shall meet the requirements of ASTM A536, grade 65-45-12.

5-2.09 GATE VALVES

All gate valves shall be resilient seated gated valves conforming to the latest revision of AWWA C509 or C515. All gate valves shall be epoxy coated and turn counter clockwise to open. All gate valves shall have ANSI flanges or mechanical joints ends.

Buried gate valves shall be non-rising stem suitable for installation with the type and class of pipe being installed. Operating stems shall be equipped with standard 2 inch operation nut, and O-ring stem seals.

5-2.10 BUTTERFLY VALVES

Butterfly valves shall be used only when adequate cover cannot be achieved with gate valves.

5-2.11 VALVE MARKER POSTS

Valve marker posts shall be Carsonite blue plastic markers and labeled “WATER” or approved equal. See Standard Plan 509.

5-2.12 VALVE BOXES

Valve boxes shall be installed on all buried valves. Ears (lugs) on all valve boxes shall be placed in alignment with the pipe. The box and lid shall be cast iron, two piece slip type. The cover shall have the word “WATER” cast in the upper surface. Valve boxes, lids and

extensions shall be East Jordan Ironworks deep style lid. All castings shall be coated with asphaltic varnish.

A valve operating nut extension shall be furnished and installed on all valves where the finished grade is more than 36 inches above the valve operating nut. Extensions are to be a minimum of 12 inches long with only one extension per valve. The operating nut extension shall extend into the top section of the valve box. See Standard Plan 512.

5-2.13 VALVE VAULTS

Valve vaults shall be dimensioned and sized for valve removal and replacement. Vaults shall be furnished in pre-cast concrete sections with sufficient strength to withstand H-20 traffic loading together with access frames and covers.

5-2.14 COMBINATION AIR VALVES

Combination air valves shall be designed to operate with potable water under pressure to permit discharging a surge of air from an empty line when filling and relieve the vacuum when draining the system. The air valves shall also release an accumulation of air when the system is under pressure. This shall be accomplished in a single valve body designed to withstand a pressure of 300 psi.

The body and cover shall be cast iron conforming to ASTM A48, Class 30. Floats shall be stainless steel conforming to ASTM A 240 and designed to withstand 1,000 psi. Seats shall be Buna N rubber. Internal parts shall be stainless steel or bronze. Combination air valves shall conform to AWWA C512. Air valves shall have double concrete meter boxes Fogtite 2T with solid steel lid. See City of Snohomish Standard Plan 511.

5-2.15 BLOW-OFF ASSEMBLIES

Blow-off assemblies shall be as shown in Standard Plan 510.

5-2.16 FIRE HYDRANTS

Fire hydrants shall be 5 ¼ inch MVO "Traffic Model" type with approved breakaway features, and meet or exceed the requirements of AWWA C502 as well as have the following:

1) A standard 4 inch Storz pumper port and two 2½ inch NST side ports, all opening by turning counter clockwise with 1½ inch operating nut;

2) Be painted with two coats of hi-gloss equipment yellow enamel paint, with the distance from the foot valve stenciled on the hydrant; and

3) A 4 inch Storz adaptor.

Fire hydrants shall be M&H 929 Reliant, Mueller Super Centurion 250 only or East Jordan Iron Model No. 5CD250 with operating cap.

5-2.17 TAPPING SLEEVES

Tapping sleeves shall be used in lieu of cut-in tees except as otherwise approved by the City Engineer. Tapping sleeve valves shall be epoxy coated and resilient seat. Acceptable sleeves include:

Pipe Material	**Type of Tapping Sleeve**
Ductile Iron or Cast Iron Pipe	Epoxy Coated Fabricated Steel
Asbestos Cement	Fabricated Stainless Steel Full

5-2.18 SADDLES AND CORPORATION STOPS

Service saddles shall be ROMAC, Ford or equal and shall have stainless steel double straps. See Standard Plans 501 and 502.

Corporation stops shall be the ball valve type and shall be Ford or Mueller. Corporation stops for use with the saddle shall be of bronze in accordance with AWWA Standard C800 with AWWA IP inlet by compression outlet.

5-2.19 METER BOXES

Meter boxes used for meters, sampling stations, and blow-offs shall be high density polyethylene meter boxes with solid ductile iron hatches with 2 inch touch read hole manufactured by Raven, Inc., or an equivalent as approved by the City Engineer. Refer to Standard Plans 501 and 502 for sizes and part numbers.

5-2.20 PRESSURE REDUCING STATION

Any pressure reducing station for a specific project shall be designed by a qualified, licensed engineer. The design shall be submitted to the City Engineer for approval. A typical pressure reducing station is shown in Standard Plan 520.

5-2.21 REDUCED PRESSURE BACKFLOW ASSEMBLY

All reduced pressure backflow assemblies (RPBA) shall be as listed on the most current edition of the "Approved Backflow Prevention Assemblies" published by DOH. The assembly shall include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks. The RPBA shall be installed in an above ground enclosure. The enclosure shall be

Hot Box, or an equivalent as approved by the City Engineer. See Standard Plans 517 through 519.

5-2.22 DOUBLE CHECK VALVE ASSEMBLY

All double check valve assemblies (DCVA) shall be as listed on the most current edition of the "Washington State Approved Backflow Prevention Assemblies" published by DOH. The assembly shall include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks. See Standard Plans 514 through 516.

5-2.23 STEEL CASING

Steel casing shall be black steel pipe conforming to ASTM A53. Casing shall be as specified in Standard Plan 522.

5-2.24 CASING SPACERS AND END SEALS

Casing spacers and end seals shall be sized for pipe being installed and shall be manufactured by Advance Products & Systems, Cascade Waterworks, Pipeline Seal and Insulators Co., or an equivalent as approved by the City Engineer. See Standard Plan 522.

5-2.25 CONCRETE

Thrust blocking, encasement, or slope anchor concrete shall be mixed from materials acceptable to the City Engineer and shall have a 30-day compressive strength of not less than 2,500 psi. See Standard Plans 505 and 506.

The mix shall contain five (5) sacks of cement per cubic yard and shall be of such consistency that the slump is between 1 inch and 5 inches. All concrete shall be mechanically mixed.

5-2.26 BEDDING MATERIAL

Bedding material shall be as specified in Section 9-03.12(3) “Gravel backfill for Pipe Zone Bedding” of the WSDOT/APWA Standard Specifications. See Standard Plan 524.

5-2.27 CONTROLLED DENSITY FILL

Controlled Density Fill (CDF) shall be a mixture of Portland Cement, admixture (optional), FlyAsh, aggregates and water. It shall be proportioned to provide a grouty, non-segregating, free flowing, self-consolidating and excavatable material that will result in a non-settling fill which has measurable unconfined compressive strength.

Controlled Density Fill (CDF) shall conform to the requirements of Section 2-09.3(1)E of the current WSDOT/APWA Standard Specifications.

5-3 CONSTRUCTION STANDARDS

5-3.01 GENERAL REQUIREMENTS

All work shall be constructed as shown in the plans and in accordance with these Standards.

Materials shall be installed in compliance with the manufacturer's instructions and specifications, except where a higher quality of workmanship is required by the plans and these Standards.

All work shall also be done in accordance with all applicable Federal, State, County and other local laws and regulations. The Contractor shall arrange for inspection by these agencies and shall submit evidence of their approval if requested by the City.

5-3.02 MATERIAL SUBMITTALS

Material submittals shall be submitted to the City Engineer for approval after the plans are approved for construction.

Five (5) sets of material submittals are required. The City Engineer shall either approve or otherwise indicate the reasons for disapproval. Disapproved submittals shall be resubmitted to the City Engineer for approval.

The City Engineer's review of material submittals covers only general conformance to the plans and these Standards and not for quantity determination. No material quantities shall be verified by the City.

Each "Material Submittal" section shall follow a cover page and state the category of the materials that are submitted for review. Each submittal must have the specific part number(s) checked or highlighted along with its specific purpose. The following shows the preferred order to list the material categories:

1) Pipe, Fittings, Pipe Restraints and Casing.

2) Valves (Gate Valves, Air Valves, Blow-off, and Valve Boxes).

3) Hydrants and Attachments.

4) Service Fittings, Service Pipe, Saddles, Ball Valves, Corps, Sleeves, etc.

5) Boxes for Meters, Sampling Stations, Blow-offs, and Air Valve Assemblies.

6) Cross Connection Control Assemblies (DCDA, RPBA, RPDA, DCVA).

7) Bedding Material with Sieve Analysis.

8) Other items if required.

5-3.03 PRE-CONSTRUCTION CONFERENCE

The party responsible for the project shall contact the City Public Works Inspector (360-282-3193) to schedule a pre-construction conference after the plans, material submittals, grading, and right-of-way permits are approved. The conference shall include the party responsible for the project, design engineer, and contractor, representatives from the permit agencies, other utility companies, and City staff. An on-site tailgate meeting between the contractor and the Public Works Inspector shall be arranged by the contractor at least 48 hours prior to commencing construction.

5-3.04 CONSTRUCTION SCHEDULE

The party responsible for the work shall provide the City Engineer with the water system extension construction schedule a minimum of five (5) business days prior to start of water system extension construction to arrange staking inspection and to give permitting agencies and customers two (2) business days notice.

5-3.05 EASEMENT

Prior to start of water system extension construction, the party responsible for the project must acquire and record all necessary public utility easements for construction, installation and maintenance of any water mains or facilities not located in the public right-of-way, in City easements, or on the party's property.

5-3.06 PERMITS

The party responsible for a water system extension project shall obtain at their expense all necessary permits from the City and other appropriate State and Local agencies and entities. The party responsible for the work shall provide the traffic control plan prepared by themselves, the design engineer or the Contractor.

5-3.07 HANDLING OF PIPE

All types of pipe shall be handled in a manner that prevents damage to the pipe, pipe lining or coating. Pipe shall be bagged or plugged from the manufacturer or supplier before unloading at the site. Pipe and fittings shall be loaded and unloaded using forks or cable choker in a manner to avoid shock or damage, and under no circumstances shall they be dropped, skidded, or rolled against other pipe. Damaged pipe will be rejected, and all damaged pipe shall be placed apart from the undamaged pipe and shall be removed from the project site within 24 hours.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails or other similar supports. Pipe on succeeding tiers shall be alternated by bell and plain end. Timbers of 4"×4" dimensions shall be placed between tiers and chocks shall be placed at each end to prevent movement. Each size of pipe shall be stacked separately.

Threaded pipe ends shall be protected by couplings or other means until the pipe is installed. Dirt or other foreign material shall be prevented from entering the pipe or pipe joints during handling and installation. When pipe installation is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by the City Engineer to ensure cleanliness inside the pipe.

5-3.08 STAKING

Staking shall be performed by or under the direct supervision of a land surveyor licensed in the State of Washington. Two (2) business days notice shall be provided to the City to inspect construction staking before construction begins.

Staking shall be placed in 50 foot intervals and at all fittings on base line or edge of easement with stationing, hub elevations, and cuts to top of pipe.

5-3.09 DEVIATION FROM PLANS

No deviations from the approved plans and these Standards shall be allowed without the City Engineer's approval. Minor changes may be approved by the Public Works Inspector. If major changes are required, the design engineer shall revise, sign and submit the plans for the City Engineer's approval prior to restart of construction.

5-3.10 INSPECTION AND TESTING

The City Public Works Inspector shall have access to the project site for the purpose of inspections and testing at all times. Proper facilities shall be provided for such access, inspection, and testing.

If any work is covered without approval or consent of the City Public Works Inspector, it must be uncovered for inspection if required by the City Public Works Inspector.

Before a pressure test is to be observed by the City Public Works Inspector, the party responsible for the work shall make whatever preliminary tests are necessary to ensure that the material and/or equipment are in accordance with the plans and these Standards. Written and/or verbal notices of deficiency shall be given to the party responsible for the work. The party responsible for the work shall correct such deficiencies before final project inspection by the City Public Works Inspector.

5-3.11 WATER QUALITY

Water pollution controls shall be implemented and maintained until the project is accepted by the City Engineer. The party responsible for the project shall familiarize themselves with the requirements of DOE and other regulatory agencies having jurisdiction over such matters.

Water with chlorine residual must be dechlorinated using City-approved means and discharged into the environment when the water has zero chlorine residual. Dechlorinated water discharged into the environment shall be done so without causing erosion or impact to the environment. With the approval of the City Engineer, water with chlorine residual may be discharged into the City's sanitary sewer system. Water containing chlorine residual shall not be discharged into the storm drainage system or any waterway.

The oil and chemical storage site for the project shall be approved by the City Engineer and the area shall be diked. There shall be no disposal of waste oil or oil products on the project site. A waste oil disposal tank shall be provided if deemed necessary by the City Engineer.

5-3.12 CONSTRUCTION ON EXISTING EASEMENTS

All work within public utility easements shall be performed in accordance with terms and conditions of the respective easement. Each easement area shall be restored to equal to or better than the condition of the easement area that existed prior to the work. Work shall not be performed within any public utility easement area unless such work is specifically authorized by the City Engineer. The party responsible for the project shall provide advance written notification to and shall coordinate the authorized work with the persons and/or entities owning property that is adjacent to the easement area.

5-3.13 PRE-CONSTRUCTION PHOTOS

Prior to commencement of work, photographs shall be provided to the City that clearly show the conditions of the project site immediately before the anticipated start of the work. Photographs will be obtained as follows:

1) 50 foot interval in easements up station and down station.

2) Any other locations as directed by the Public Works Inspector.

The photographs shall be 4 inch x 6 inch, color prints, contained in albums, catalogued, and cross-referenced. A digital copy of each photograph shall also be provided to the City Engineer.

5-3.14 UNDERGROUND UTILITIES

The plans shall show the approximate locations of various existing utilities known to the design engineer such as gas lines, water mains, storm drainage, power lines, telephone lines, TV cables, fiber optics, and other obstructions based on information obtained from

various sources. The party responsible for the project is responsible to check for interferences and obstructions by inquiry from the different utilities and by underground exploration before commencing excavation.
The party responsible for the project shall request field locating and notify the owners of underground utilities about the scheduled commencement of excavation through the one-call system (1-800-424-5555).

Notice shall be made to owners of underground utilities not less than two (2) business days or more than ten (10) business days prior to scheduled date of commencement of excavation. Test pits, for the purpose of locating underground utilities or structures in advance of the construction, shall be excavated and backfilled. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the City or applicable agency.

Excavation around and under active utilities shall be performed with special care to ensure that utility service is not interrupted. Where it is necessary to cut, move or reconnect any service lines, arrangements shall be made with the respective utility owners.

The party responsible for the work shall coordinate with all utility owners and arrange for the movement or adjustment, either temporary or permanent, of utility conflicts and shall also notify the City, in advance, of any conflicts affecting the work.

The party responsible for the project shall indemnify, defend and hold harmless the City from any claim for damage of utilities and/or disruption to services resulting from project activities/operations. The form of the indemnification agreement shall be subject to the approval of the City Attorney.

5-3.15 TRENCH EXCAVATION

Trench excavation and backfill operations within State right-of-way: All excavation and backfill within the State right-of-way shall adhere to the current *WSDOT/APWA Standard Specifications*.

Trench excavation and backfill operations within County right-of-way: Excavation within Snohomish County right-of-way shall conform first to Snohomish County Road Standards, and secondly to current *WSDOT/APWA Standard Specifications*.

Trench excavation and backfill operations within City right-of-way: Excavation within the City right-of-way shall conform to these Standards.

Clearing and grubbing limits may be established by the City or governing agency for certain areas. Debris resulting from the clearing and grubbing shall be appropriately disposed of in accordance with applicable local and State laws and regulations.

Trenches shall be excavated to the line and grade shown in the plans or as designated by the City Engineer. Higher pressure class pipe or special bedding may be required because of excess trench width.
Unsuitable material below the depth of the bedding shall be removed to the extent approved by the Public Works Inspector and replaced with materials approved by the City Engineer.

The length of trench excavation in advance of pipe laying shall be kept to a minimum and shall not exceed more than 100 feet without prior written approval of the City Engineer.

When trenching operations take place in public right-of-way, the pavement and all other improvements shall be restored as required by the right-of-way permit.

When excavation of rock is encountered, all rock shall be removed to provide a clearance below and on each side of all pipe, valves, and fittings of at least 6 inches for pipe sizes 24 inches or smaller and 9 inches for pipe sizes 30 inches and larger. Material removed shall be replaced with appropriate backfill material, which shall be compacted to 95% standard proctor. See Standard Plan 525.

5-3.16 SHEETING AND SHORING

Sheeting and shoring shall be provided and installed as necessary to protect workers, the work and existing utilities and other properties in compliance with OSHA and WISHA requirements. All sheeting and shoring above the pipe shall be removed prior to backfilling. Sheeting below the top of the pipe may be cut off and left in place. Removal of the sheeting and shoring shall be accomplished in such a manner that there will be no damage to the work or to other properties.

5-3.17 TRENCH DEWATERING

Sufficient pumping equipment shall be provided and maintained on the project site to keep the trench free from standing water. Surface runoff shall not be allowed to flow into the trench. The trench water or other deleterious materials shall not be allowed to enter the pipe at any time. If water is found to be entering the new water main at any time, the water main shall be plugged and all work shall stop until the trench water is completely pumped out or otherwise controlled to the satisfaction of the Public Works Inspector. Any dewatering method used shall be in accordance with the specifications and requirements of the City and DOE.

5-3.18 PIPE BEDDING

Bedding material, when required by the City, shall be as specified in these Standards and the current WSDOT/APWA Standard Specifications. For the type of pipe (rigid or flexible) to be installed, pipe zone bedding is defined as 6 inches below the pipe and around the pipe, and 12 inches above the pipe. Native material may be used for bedding of ductile iron pipe if judged to be suitable by the City Engineer. Gravel backfill for pipe

zone bedding shall be select granular material free from wood waste, organic material, and other extraneous or objectionable materials and shall have a maximum dimension of 1½ inches. Pipe zone bedding up to 12 inches over the top of the pipe shall be evenly and carefully placed. Gravel backfill for pipe zone bedding shall be compacted to 95% maximum dry density per ASTM D1557 by approved methods (hand-held tools), so as to provide firm and uniform support for the full length of the pipe, valves, and fittings. See Standard Plan 524.

5-3.19 CONCRETE THRUST BLOCKING

Bends, tees, plugs, reducers, and caps, unless otherwise specified, shall be blocked in accordance with Standard Plans 505 and 506. All poured in place blocking shall have a minimum measurement of twelve inches 12 inches between the pipe and the undisturbed soil. Concrete blocking shall have a minimum of ¼ square foot bearing against the fitting. Blocking shall be adequate to withstand full test pressure as well as to continuously withstand operating pressure under all conditions of service. All concrete shall be 2,500 psi minimum and mechanically mixed.

Blocking shall, unless otherwise shown or directed, be placed so that pipe and fittings will be accessible for repair. Eight-mil polyethylene sheets shall be installed around all fittings and all bolts, nuts, and glands for future dismantling.

In the event of a shut down where time does not permit the proper setting of the concrete blocking, ecology blocks shall be installed with concrete poured around the connection point of the fitting and the blocks with the approval of the Public Works Inspector.

5-3.20 TRENCH BACKFILL AND COMPACTION

Trench backfill shall be done above the pipe zone bedding. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, frozen soil, or other unsuitable material. Trench backfill material shall be as specified in these Standards and the current WSDOT/APWA Standard Specifications.

Compaction of the backfill shall, at the minimum, be accomplished by mechanical tamper, by vibrating, by rolling, or by a combination of these methods, as approved by the City Engineer. Water settling is not permitted. A testing laboratory acceptable to the City Engineer shall be used to perform on-site density tests to show that the specified density has been obtained. The approval of the compaction method and the achievement of the specified density shall in no way relieve the Contractor of responsibility for all repairs caused by settlement of the backfill prior to acceptance and during the two year period after acceptance of the project.

Prior to backfilling, form lumber and debris shall be removed from the trench. Sheeting used by the Contractor shall be removed just ahead of the backfilling. Backfill shall not be deposited in the trench in any manner which will damage or disturb the pipe or the initial backfill. Care shall be taken to prevent any damage to the pipe or its protective

coating. After the initial backfill is placed, the remaining backfill material shall be placed in successive layers not exceeding 1 foot, (12 inches) in loose thickness, and each layer shall be compacted to the density specified below.
Asphalt pavement restoration shall either be by a patch or overlay method as required and noted on the right-of-way permit. When a patch method is used, the trench limits shall be saw cut prior to the final patch.

All pavement cuts shall be made by saw cuts. The saw cuts shall be 1 foot outside the trench width. If the permit requires an overlay, then the Contractor may use a jackhammer for cutting the existing pavement. Grinding may be required.

All trenching shall be backfilled in accordance with Standard Plan 525. All trench backfill materials shall be compacted to 95% maximum dry density, as determined by ASTM D1557.

Native material may be used for backfill upon approval of the City Engineer or the permitting agency.

When the trench is perpendicular to the traveled lane or any driveways, the full depth shall be backfilled with crushed surfacing top course material. When the trench is parallel, the top 4 feet must be backfilled with crushed surfacing top course material. Controlled Density Fill (CDF) may be required by the City Engineer or the permitting agency.

Backfill compaction shall be performed in 8 to 12 inch lifts. Compaction tests shall be performed in 4 foot vertical increments maximum. The test results shall be given to the City Engineer for review and approval prior to paving. Tests shall be performed at maximum intervals of 50 feet along the length of the trench.

If the area is unpaved and not subject to vehicle traffic, the backfill shall be compacted to a minimum of 90% of maximum dry density as determined by ASTM D-1557.

5-3.21 LAYING DUCTILE IRON PIPE

Work shall be accomplished in accordance with AWWA C600 and the manufacturer's recommendations.

Depths of pipe shall conform to approved plans. The typical cover depth of pipe is 36 inches measured from finished grade to top of pipe.

The bottom of the trench shall be finished to grade in such a manner that the pipe will have bearing along the entire length of the barrel. Bolts on mechanical pipe and fittings shall be tightened uniformly with a "Torque" wrench which measures the torque for mechanical joints as follows:

2 inch to 3 inch pipe sizes ⅝ inch bolts 40 to 60 foot pounds

4 inch to 24 inch pipe size ¾ inch bolts 60 to 90 foot pounds

Except where restrained joint systems are required, mechanical or push-on Tyton joints shall be used. Installation of push-on joint pipe shall be in accordance with the manufacturer's instructions.

When it is necessary to deflect pipe from a straight line in either the horizontal or the vertical plane, the amount of joint deflection shall not exceed one half (½) of the maximum deflection recommended by the pipe manufacturer. The pipe manufacturer's joint deflection recommendations shall be provided to the City Engineer prior to pipe installation as a part of the Material Submittals.

Where field conditions require deflection or curves not anticipated on the plans, an appropriate plan revision shall be prepared by the design engineer and submitted to the City Engineer for approval.

Whenever it becomes necessary to cut a length of pipe, the cut shall be done in conformance with all safety recommendations of the cutting equipment manufacturer. Cutting shall be done in a safe manner without creating damage to the pipe or cement mortar lining. The cut shall be made by an abrasive pipe saw or an approved pipe cutter.

The outside of slip joint pipes shall be beveled and smoothed so that good connections can be made without gasket damage.

All parts of the pipe ends, couplings, fittings and appurtenances shall be cleaned to remove oil, grit, or other foreign matters from the joints. Care shall be taken to keep the joints from contacting the soil.

5-3.22 POLYETHYLENE ENCASEMENT

Installation of polyethylene encasement shall be in accordance with the latest AWWA Standard C105. All ductile iron pipe and fittings installed in highly corrosive soils shall be wrapped in a manner approved by the City Engineer except as specifically excluded in the approved plans or in these Standards.

5-3.23 FIRE HYDRANT INSTALLATION

Fire hydrants shall be set as shown in Standard Plans 507 through 509 and AWWA Standard C600. The portion of the hydrants above the ground shall be painted with 2 coats of high gloss equipment yellow paint. The entire hydrant run shall be restrained joint.

All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the curb or at the City Fire Marshall's discretion, with pumper nozzle facing the curb.

Hydrants shall be set to the established grade. Hydrants shall be installed so that the breakaway flange is 2" to 6" inches above finished grade per Standard Plan 507.

When a dry barrel hydrant is set, drainage shall be provided at the base of the hydrant by placing 1½ inches of washed drain rock from the bottom of the trench to at least 12 inches above the drain port opening in the hydrant and to a distance of 2 foot around the elbow. Fire hydrants shall not be located within 10 feet horizontally of a sanitary sewer main or side sewer.

When a hydrant is installed in an unpaved area, a concrete fire hydrant pad shall be installer per Standard Plan 508.

Additional information regarding placement of hydrants can be found in AWWA Manual M17.

When fire hydrants are located in parking lots, or other areas where vehicles may have access, hydrant guard posts shall be installed. Guard posts shall be installed according to the minimum dimensions shown in Standard Plan 509.

Reflective pavement markers for fire hydrants are required.

5-3.24 VALVE INSTALLATION

Prior to installation, valves shall be inspected for approved part/manufacturer's numbers; cleanliness of valve ports, especially seating surfaces, handling damage, and cracks.

When butterfly valves are installed, the operation nuts must be on the north or east sides of the water mains or as directed by the Public Works Inspector.

The valve and valve box shall be set plumb and centered on the valve. Valves 12 inches or larger shall be supported by a concrete block (16 inches x 16 inches x 4 inch solid concrete) on a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.

Valves shall be installed in the closed position. Where the valve operating nut is more than 3 feet below finished grade, a valve stem extension conforming to the Standard Plans must be installed. See Standard Plan 512. Tapping valves shall be water tested prior to tapping water main.

A valve box or vault shall be provided for every valve. Valve box top sections shall be adjusted flush with the finished pavement, and in those areas to be excavated for future roadway grades, enough adjustment shall be provided in the valve box to allow the top of the box to be adjusted to the required grade.

Backfill around valves shall be carefully tamped in 6 inch lifts for the full depth of the trench with the valve box in place. A minimum of 2 feet x 2 feet x 4 inch concrete pad shall be provided for a single valve box and a minimum of 4 feet x 4 feet x 4 inch concrete pad shall be provided for multiple valve boxes installed in gravel or unpaved areas as shown in Standard Plan 512.

5-3.25 COMBINATION AIR AND VACUUM RELEASE VALVE

Location of the air/vac shown in the plans is approximate. Air valves shall be set at the high points of the water main. The water main profile may need adjustment so that the high point and air/vacuum valve is installed in a convenient location with the Public Works Inspector's approval. Installation shall be as shown in Standard Plan 511.

5-3.26 BLOW-OFF ASSEMBLIES

Blow-off assemblies shall be installed as shown in Standard Plan 510. A valve marker post shall be installed when the gate valve is installed in unpaved area or as directed by the Public Works Inspector.

5-3.27 VALVE MARKER INSTALLATION

Marker posts shall be set for all valves located in unpaved areas and as directed by the City Engineer except auxiliary hydrant valves. Installation shall be as shown in Standard Plan 509.

5-3.28 SERVICE LINES

New Service Installations

Generally, corporation stops are located at ten o'clock or two o'clock positions on the circumference of the pipe. Taps shall be accomplished by saddle tap only. No direct taps shall be allowed. Taps shall be installed with double strap stainless steel saddles. When more than one tap in an existing cast iron pipe is necessary to deliver the required flow, the taps should be staggered around the circumference at least 12 inches apart (not in line). The service line shall be pressure tested before placing in service. Service installation shall be as shown in Standard Plans 501 through 504a.

Reconnecting Existing Services

Service connections shall be installed as shown in the approved plans and Standard Plans. Service lines shall be installed in paved areas by boring, and under sidewalks and curbs by boring and tunneling. Damages shall be repaired by the Contractor. A 30 inch minimum cover shall be provided on service lines. Service lines shall be installed 90 degrees horizontally to the main to intercept the existing meters. Installed service lines shall be flushed prior to connection to the meter.

Angle ball meter valves, check valves and setters (if required) and boxes shall be installed as shown in the Standard Plans or as directed by the City Engineer.

Existing service connections shall not be transferred to the new mainline until the new mainline has been successfully flushed, disinfected, tested and approved by the Public Works Inspector. When transferring services from the existing mainline to the new mainline, sanitary precautions shall be taken as necessary to protect the potable water supply in both the existing and new mains.

5-3.29 PRESSURE REDUCING STATION

Pressure reducing stations shall be installed as shown in Standard Plan 520, in approved plans, and in accordance with the manufacturer's recommendations. The pressure reducing valves, strainers, pressure relief, pipe and fittings shall be constructed in accordance with the applicable AWWA and Uniform Plumbing Code requirements. Pressure reducing valves 6 inches or larger shall be supported by pipe supports. Supports shall be bolted to the vault floor.

Pressure relief discharge pipe shall be placed in a location that will not be subject to damage or erosion during discharge of water. The pressure reducing valve manufacturer's representative(s) shall be present during the start up of the pressure reducing station.

5-3.30 CONNECTION TO EXISTING WATER MAIN

Points of connection to existing water mains shall be exposed prior to trenching of the new mains, and not less than 48 hours prior to the anticipated connection time. Unless specifically provided for elsewhere in these Standards, at least five (5) business days notice shall be given to the City Engineer prior to the anticipated connection time. The City Engineer shall be responsible for notifying the City Fire Chief and customers affected by the shut-off. Water main shut-off shall not be scheduled to take place on Fridays, or on the day before a holiday, unless otherwise approved by the City Engineer.

The party responsible for the project shall ensure that existing fittings are in accordance with the approved plans and that the connection will be made in accordance with the plans. If the connection cannot be made in accordance with the plans, the City Engineer shall be so notified. The design engineer shall submit revised plans that provide appropriate connection to the City Engineer for approval.

Connection to the existing water system shall be done only after the new mains are flushed and have passed pressure and purity tests. All connections to the existing water system must be approved by the City Engineer and shall be made in the presence of the City Public Works Inspector. Only authorized City representatives shall operate the valves in the existing water system.

Connections to existing water system may be made under pressure with a tapping machine by determining the size and type of pipe and installing a tapping tee with a tapping gate valve. Tapping tees shall be installed as shown in Standard Plan 513. Work shall not start until all materials, equipment, and labor are ready. The tapping tee and valve shall be installed in a horizontal position so that the valve stem is vertical. Where cut-ins are required in existing pipes, the work shall be conducted so as to minimize the interruption of service. Necessary pipe, fittings and gate valves shall be assembled at the site ready for installation prior to the shut-off of water in the existing main. Once the water main has been shut off, the work shall be promptly completed and shall not be halted until the water main is back in service.

The interiors of all pipe and fittings, particularly couplings and sleeves, to be used in final cut-in connection shall be swabbed or sprayed with a 200 mg/L hypochlorite solution prior to installation.

Flushing shall start as soon as repairs or connections are completed and shall be continued until discolored water is eliminated. Flushing shall be done in the presence of the City Water Quality Control Specialist.

5-3.31 SCHEDULE OF TESTS

The Public Works Inspector and the Water Quality Control Specialist shall be notified at least two (2) business days before a section of water main is ready for inspection and test. The Water Quality Control Specialist shall inspect and observe the hydrostatic test. The City Engineer shall be notified at least two (2) business days prior to purity test and flushing. The party responsible for the project shall be present at the project site when the Water Quality Control Specialist takes water samples. Sufficient manpower and resources shall be provided by the responsible party to accomplish the work in a timely manner. Flushing shall be done under direct supervision of the Water Quality Control Specialist.

5-3.32 HYDROSTATIC PRESSURE TESTS

Water main, appurtenances and service connections shall be tested in sections of convenient lengths under a hydrostatic pressure of 220 psi for 15 minutes.

Pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose, piping, and measuring equipment necessary for performing the test shall be furnished and operated by the party responsible for the project.

Sections to be tested shall normally be limited to a maximum of 1,000 feet. The pipe shall be backfilled sufficiently to prevent movement of the pipe under pressure. Thrust blocking shall be in place for an adequate time for concrete to cure before testing. Where permanent blocking is not required, temporary blocking shall be furnished and installed prior to and removed after testing.

An approved double check valve assembly (DCVA) shall be provided to fill the new water mains for testing and flushing. The new water mains shall be filled and remain under 200 psi to 210 psi pressure for 24 to 48 hours to allow air to escape and the lining of the pipe to absorb water.

The pressure test shall be accomplished by pumping the main up to 200 psi to 210 psi, stopping the pump for 15 minutes, and pumping the main up to the test pressure again. During the test, the section being tested shall be observed to detect any visible leakage.

A clean container shall be used for holding water for pumping up pressure on the main being tested.

The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter. The meter shall be approved by the City Water Quality Control Specialist. Acceptability of the test will be determined as follows: The quantity of water lost from the main shall not exceed the number of gallons per hour as determined by the formula:

$$L = \frac{SD\sqrt{P}}{266{,}400}$$

in which,

L	=	allowable leakage (gallons/hour)
D	=	nominal diameter of the pipe (inches)
P	=	test pressure during the leakage test (psi)
S	=	gross length of pipe tested (feet)

There shall not be an appreciable or abrupt loss in pressure during the 15 minute test period. Any visible leakage shall be corrected regardless of the allowable leakage specified above. Should the tested section fail to meet the pressure test successfully as specified, the defects shall be located and repaired and the pipeline retested.

Tests shall be made with the hydrant auxiliary gate valves open and the hydrant valve in the closed position. Once the new line is successfully tested, each valve shall be tested by closing each in turn and relieving the pressure behind it. The mains shall be tested between valves. As possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. This test of the valve will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The pressure differential across the valve shall not exceed the rated working pressure of the valve.

All service lines shall be flushed prior to contacting the Water Quality Control Specialist for a pressure test. All necessary equipment shall be ready and available for set up but not connected until the Water Quality Control Specialist is present for operation.

Defective materials or workmanship discovered as a result of hydrostatic field test shall be replaced or repaired and the hydrostatic test shall be repeated to the satisfaction of the City Engineer.

5-3.33 DISINFECTION AND FLUSHING OF WATER MAINS

Before being placed into service, new water mains and repaired portions of existing mains shall be chlorinated and a satisfactory bacteriological report obtained. Disinfection of water mains shall be accomplished in accordance with the requirements of the Washington State Department of Health, AWWA Standard C651, and in a manner satisfactory to the City Engineer. Sections shall be disinfected between adjacent valves unless otherwise approved by the City Engineer. All filling and flushing shall be done through a meter with a DCVA provided by the party responsible for the project. Valves shall only be operated by authorized City employees.

Flushing

Where dry calcium hypochlorite is used for disinfection of the pipe, flushing shall be done after disinfection. If a hydrant is not installed at the end of the water main, the Contractor shall provide a tap large enough to develop a flow velocity of at least 2.5 feet per second in the water main.

The flushing period must be approved by the City Engineer. The source water used for disinfection and pressure testing shall be flushed prior to its use to ensure that contaminants or debris are not introduced into the new pipe.

Taps for temporary or permanent release of air, chlorination or flushing purposes shall be provided as a part of the construction of the water mains.

Chlorination

The section to be tested shall be chlorinated so that a chlorine residual of no less than 25 mg/l (parts per million or ppm) remains in the water after standing 24 hours in the pipe. The initial chlorine content of the water shall not be less than 50 mg/l. The forms of chlorine that may be used in the disinfection operations are liquid chlorine and calcium hypochlorite granules.

Liquid Chlorine: Chlorine shall be applied by solution fed at one end of the section with a valve or hydrant at the opposite end open sufficiently to permit a flow through during chlorine application. The chlorine solution shall be fed into the pipeline already mixed by an automatically proportioning applicator to provide a steady application rate no less than 50 mg/l (ppm) chlorine. Hydrants along the chlorinated section shall be open during application until the presence of chlorine has definitely been detected in each hydrant run. When a chlorine concentration of no less than 50 ppm has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours.

Dry Calcium Hypochlorite: Calcium hypochlorite conforming to AWWA B300 is available in granular tablet form and must contain approximately 65% available chlorine by weight. This procedure is allowed only when the extension has been kept clean and dry. If piping has been submerged, or is unclean, refer to AWWA Standard C651.

Granulated chlorine: Dry calcium hypochlorite at 65% - 70% chlorine shall be placed in the pipe to yield a dosage no less than 50 mg/l. The number of ounces of 65% test calcium hypochlorite required for a 20 foot length of pipe equals 0.00843ld, in which "D" is the diameter in inches (see current WSDOT Standards and Specifications). The main shall be filled with water at a rate to ensure that the water within the main will flow at a velocity no greater than 1 foot per second. Precautions shall be taken to ensure that air pockets are eliminated. When a chlorine concentration of not less than 50 ppm has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours. If the water temperature is less than 41 degrees F, the water shall remain in the pipe for at least 48 hours.

After chlorination in accordance with the above, the line shall be thoroughly flushed and water samples taken. Flushing shall be done in a manner that avoids damage to surrounding property and that conforms to these Standards.

5-3.34 FINAL FLUSHING AND TESTING

Following chlorination, chlorinated water shall be flushed from the new water main until the replacement water throughout its length shows an absence of chlorine. In the event chlorine is normally used in the source of supply, the tests shall show a residual not in excess of that normally carried in the water supply system (never to exceed 2 mg/l).

After final flushing and before the new water main is connected to the distribution system, a sample collection test shall be scheduled with the City Engineer a minimum of two (2) business days in advance of test. The number of samples from the source and the number of representative sample points required will be determined by the Water Quality Control Specialist. Appropriate sample taps shall be furnished by the party responsible for the project. No hose or fire hydrant shall be used in the collection of samples.

At least one set of samples shall be collected from every 1,200 feet of the new water main, plus one set from the end of the line and at least one set from each branch. All samples shall be tested for total coliform bacteria and for heterotrophic bacteria by the heterotrophic plate count (HPC) analysis. The maximum allowable coliform content of the flushed sample shall be zero. The maximum allowable HPC population count in all source samples shall be 80/ml. Any source sample that exceeds a count of 80/ml shall be ruled as an indeterminate test and a new set of source and construction samples for analysis shall be required. The maximum allowable HPC population count from any construction sample shall be no greater than twenty (20) counts above the highest source HPC population count.

Before placing the lines into service, a satisfactory report shall be provided to the Water Quality Control Specialist from the certified laboratory evidencing successful tests on samples collected from representative points in the system extension.

Should the initial test result in an unsatisfactory bacteriological test, additional chlorination using the above procedure shall be repeated until satisfactory results are

obtained. Treated water flushed from the mains shall be disposed of in accordance with applicable State and local laws and regulations.

Chlorinated water shall never be flushed into the storm drain or a body of water. This includes lakes, rivers, streams, stormwater drainage systems, and any waters where fish or other natural aquatic life can be expected to be present.

5-3.35 ADJUST EXISTING STRUCTURE TO GRADE

Existing Structure Adjustment

Existing structures, including valve box covers affected by a pavement overlay, or adjustment in surface grade, shall normally be adjusted to grade within three (3) business days after the pavement overlay. The City Engineer may require immediate adjustment if the structure is critical to operations.

Valve Box Adjustment in Paved Areas

Raising the existing valve box shall be accomplished by adjusting the existing top section of the valve box or replacing the valve box. If the valve box base section needs to be extended, a 4 inch diameter cast iron soil pipe shall be installed with the bell end of the soil pipe inserted over the top of the existing valve box base section. The spigot end of the soil pipe shall be located a minimum of 6 inches and a maximum of 9 inches below finished grade. The valve box top section shall be slipped over the soil pipe and adjusted to the final grade. A polyethylene sheet, 8-mil thick, shall be placed between the valve box and soil pipe to prevent metal to metal contact where the sections overlap. In asphalt concrete pavement and overlay areas, excavation of the valve box to be raised shall be accomplished by saw cutting or neat line jack hammering the pavement a minimum of 12 inches around the perimeter of the valve box. The final adjustment of valve boxes shall be done within 24 hours after paving. Paving, repaving, and patching shall be completed within 72 hours.

Valve Box Adjustment in Unimproved Areas

Adjustment of valve box covers located in unpaved areas shall be the same as in paved areas.

5-3.36 ABANDONING FACILITIES

Abandonment of Water Main

Water mains no longer in service shall be removed and disposed of by the party responsible for the project. The water main may be abandoned in place with the approval of the City Engineer. When water mains are abandoned, the ends of the pipe and fittings shall be plugged by filling with Class 2500 concrete a minimum length of 12 inches on each pipe end. The City Engineer may require that the abandoned water mains be filled with sand or cement grout depending on the size, material, and location of the water main.

Removal of Service Lines

Service lines that are no longer in service and associated corporate stops shall be removed and disposed of by the party responsible for the project. Saddles shall be plugged with MIPT brass plugs.

Abandonment of Structures

Abandonment of structures shall be completed only after water facilities have been properly removed and/or abandoned. All valves and valve boxes shall be removed on abandoned valves.

5-3.37 LANDSCAPING AND LAWN REMOVAL AND REPLACEMENT

During the construction and installation of a water distribution system, the party responsible for the project shall minimize the disturbance and damage to any landscaping and lawn within the project area and shall restore the landscaping and lawn area to conditions prior to construction and installation.

5-3.38 BORING UNDER ROOTS

Boring under the root systems of trees that cannot be removed shall be accomplished by excavating a trench or pit on each side of the tree, being careful to avoid root injury, and then hand digging or pushing the pipe through the soil under the tree. The pit walls shall be a minimum of 7 feet from the center of the tree and shall have sufficient depth to lay the pipe at the grade shown on the plan and profile. Trees shall be removed unless otherwise directed by the City Engineer.

5-3.39 BORING AND JACKING

The vertical and horizontal location of existing utilities shall be verified by the party responsible for the project. If required to avoid conflicts and maintain minimum clearances, adjustment shall be made to the grade of the casing.

The pipe shall be bored and jacked where shown on the plans. All obstructions encountered shall be removed or penetrated. If groundwater is found to be a problem during boring operations, all necessary measures shall be taken to control the flow sufficiently to protect the excavation, pipe and equipment so that the work is not impaired. Any pipe damaged during the boring and jacking operation shall be repaired in a manner approved by the City Engineer.

The installation of the bored and jacked pipe shall be done in manner to ensure that no settlement or caving is caused to the above surface. Any such caving caused by the placement of the pipe shall be repaired by the party responsible for the project as directed by the City Engineer.

During the jacking operations, particular care shall be exercised to prevent caving ahead of the pipe which will cause voids outside of the pipe. If voids exist, the party responsible for the project shall drill through the wall of the pipe and fill the voids by pumping cement grout. All voids shall be filled to the satisfaction of the Public Works Inspector.

The carrier pipe shall be installed in the casing as shown in the City Standard Plans. The carrier pipe shall be supported with casing spacers as shown in the Standard Plans. The casing spacers shall conform to these Standards. The material shall be resistant to abrasion and sliding wear. There shall be a minimum of two spacers per length of pipe, and the spacing between spacers shall be as shown in Standard Plan 522. Spacers shall be installed per manufacturer's instructions.

Boring and receiving pits shall be backfilled with select native material approved by the City Engineer and compacted to 95% maximum dry density as determined by ASTM D-1557. A sufficient amount of select backfill material shall be provided to make up for the rejected material.

All disturbed ground shall be restored to its original condition or better.

5-3.40 WORKING WITH ASBESTOS CEMENT PIPE

When working with asbestos cement pipe, the work shall be done in manner that minimizes workers' exposure to asbestos material at or below the exposure limit as prescribed in WAC 296-62- 07705 State and Federal Guidelines and Certification and PSAPCA requirements.

5-3.41 ASBESTOS CEMENT WATER MAIN CROSSINGS

Where a new utility line crosses below an existing asbestos cement (A.C.) water main, the A.C. water main shall be replaced with ductile iron pipe to a minimum of 8 feet on either side of the pipe crossing. Where directed by the City Engineer, the trench shall be backfilled with CDF from the bottom of the trench to the bottom of the A.C. main. All DIP crossings shall be constructed using ROMAC extended range transition couplings.

5-3.42 CONTROLLED DENSITY FILL

Controlled Density Fill (CDF) shall be used only by approval of the City Engineer. CDF can be proportioned to be flowable, non-segregating, or excavatable by hand or machine. Desired flowability shall be achieved with the following guidelines:

Low Flowability	below 6 inch slump
Normal Flowability	6 – 8 inch slump
High Flowability	8 inch slump or greater

CDF shall be placed by any reasonable means into the area to be filled. CDF patching, mixing and placing may be started if weather conditions are favorable, when the

temperature is at 34 degrees F and rising. At the time of placement, CDF must have a temperature of at least 40 degrees F. Mixing and placing shall stop when the temperature is 38 degrees F or less and falling. Each filling stage shall be as continuous as possible. CDF shall not be placed on frozen ground.

Trench section to be filled with CDF shall be contained at either end of the trench section by bulkhead or earth fill.

When used to support existing A.C. pipe, the flowable CDF shall be brought up uniformly to the bottom of the A.C. pipe, as shown on the plans, or as directed by the City Engineer. Steel plates shall be provided and installed to span the utility trenches and prevent traffic contact with CDF for at least 24 hours after placement or until CDF is compacted or hardened to prevent rutting by construction equipment or traffic.

If CDF is used for trench backfill on ductile iron pipe it shall be encased in ⅝ inch minus crushed rock and services shall be encased in sand.

5-3.43 VAULT INSTALLATION

Vaults for water facilities (pressure reducing stations, valves, water service, flow meters, backflow prevention assemblies, etc.) shall be installed at the locations shown on the plan and as staked. Vaults shall be constructed as shown on the plans, Standard Plans and as directed by the City Engineer.

The excavation shall have a minimum of one (1) foot clearance between the vault outer surface and the earth bank. Foundation gravel or bedding concrete shall be used on top of undisturbed soil to support the vault. The vault shall be plumb and watertight. The access cover shall be seated properly to prevent rocking and shall be adjusted to match the finished grade.

The vault floor shall drain to daylight, or to a location specified on the plans. Gravity drain pipe shall be a minimum of 3 inches in diameter.

Where knockout locations for the pipe do not coincide with the locations of pipe penetrations into the vault, the party responsible for the project shall core drill openings for pipe.

A sump pump shall be required if directed by the City Engineer.

5-3.44 UTILITY CROSSING

If the minimum vertical distance between utility pipes is less than 6 inches and such installations are approved by the permitting agency, a rigid foam pad shall be placed between the pipes. The pad shall be outside diameter O.D. × O.D. × 2.5 inches thick minimum or as required to protect the pipes and O.D. is equal to the outside diameter of the larger pipe. The pad shall be a polyethylene foam plank (Dow Plastics Ethafoam 220),

or approved equal. Additional measures may be necessary to ensure system integrity and may be required as evaluated by the permitting agency on a case by case basis.

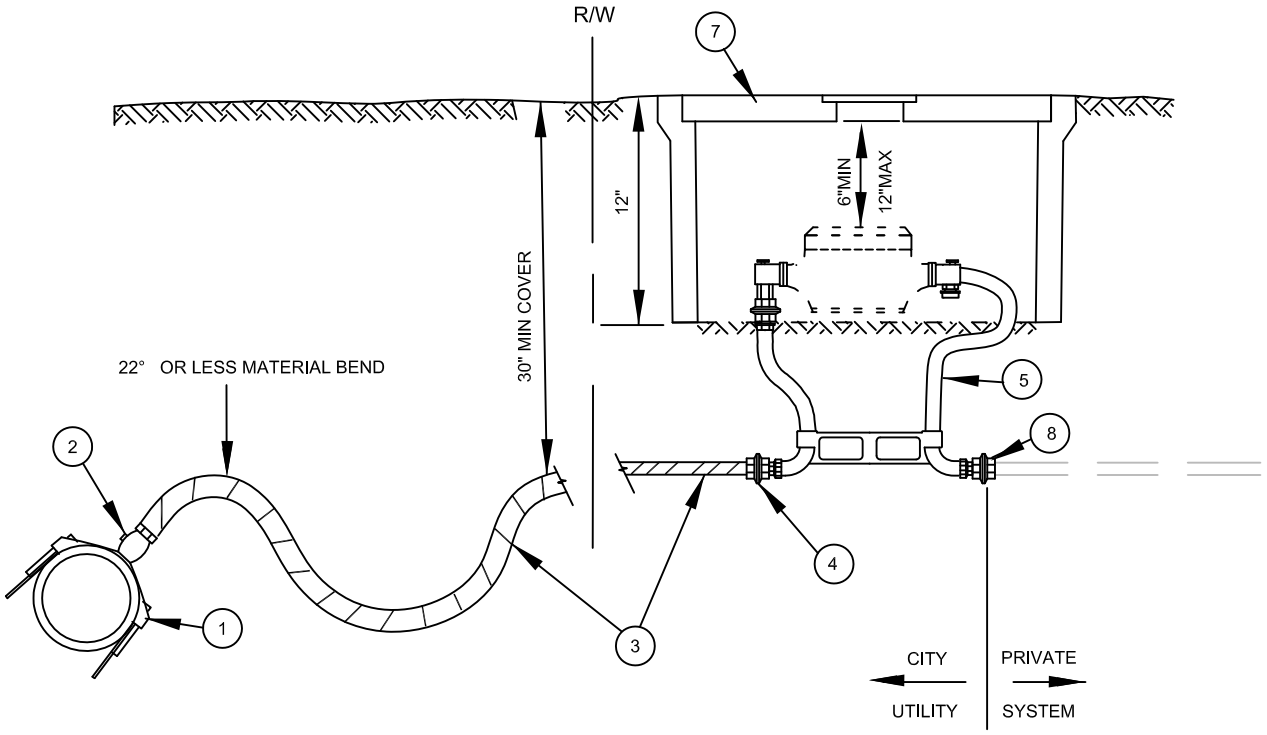
END OF SECTION

CITY OF SNOHOMISH

ENGINEERING DESIGN AND CONSTRUCTION STANDARDS

WATER DISTRIBUTION

DRAWING INDEX



NTS

NOTE:

1. ROMAC, FORD OR EQUAL DOUBLE STRAP SERVICE SADDLE WITH I.P. THREAD TO BE USED ON ALL MAINS 3" DIA AND LARGER AND ON ALL A.C. MAINS. ALL NEW TAPS ON EXISTING WATER MAINS SHALL BE DONE BY THE CITY OF SNOHOMISH WATER DIVISION AT THE DEVELOPER'S OR CONTRACTOR'S EXPENSE.

2. CORPORATION STOP: 1" MUELLER I.P. OR APPROVED EQUAL, SET AT 45° ON UPPER QUADRANT OF PIPE.

3. 1" WATER SERVICE LINE SHALL BE POLYETHYLENE TUBING (IPS).
   POLYETHYLENE SHALL:
   1. MEET THE REQUIREMENTS OF AWWA C901
   2. BE HIGH MOLECULAR MASS WITH AT LEAST 200 PSI RATING
   3. HAVE A #10 COPPER TRACE WIRE WRAPPED ALONG ITS ENTIRE LENGTH (ONE WRAP PER FT)
   4. ALL TUBING SHALL MEET THE APPLICABLE ASTM AND AWWA STANDARDS.

4. ORISEAL CURB STOP H10283 (TYP) MUELLER OR FORD.

5. 5/8" x 3/4" METER SETTER SHALL BE MUELLER B-24046A SERIES WITH CHECK VALVE.

6. METERS SHALL BE PLACED AT THE BACK OF SIDEWALK WHERE POSSIBLE AT DEVELOPER'S AND CONTRACTOR'S EXPENSE. OWNER SHALL PROVIDE CITY WITH UTILITY EASEMENT IF REQUIRED.

7. METER BOX SHALL BE RAVEN RMB 17-30-12 1 1/2" AND 2" SERVICES; RAVEN RMB 11-18-12 FOR 3/4" SERVICES AND 1" SERVICES. METER BOX LID SHALL BE SIGMA DWG LC 1730T-D DUCTILE IRON WITH READER FOR 1 1/2" AND 2" SERVICE AND SIGMA DWG LC 1118T-D DUCTILE IRON WITH READER BFC11RL FOR 3/4" AND 1" SERVICE. METER BOX SHALL HAVE A 2" HOLE FOR TOUCH READ SENSOR.

8. MUELLER BEND WITH PLUG.

Updated 01/14/2016 MMS

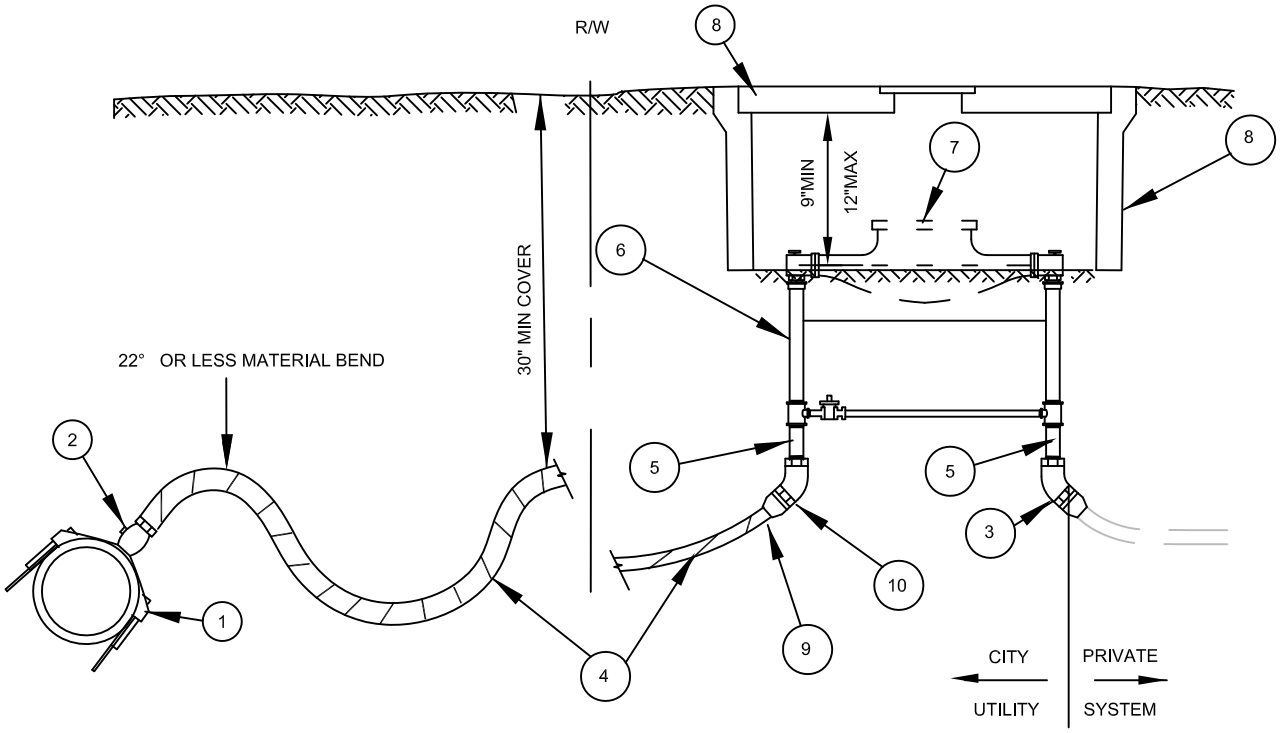
SNOHOMISH
WASHINGTON

5/8" TO 1" METERED WATER SERVICE

Approved By:
S L S
City Engineer
Date: April 2010

501
Number

City of Snohomish Public Works Department



NTS

NOTES:

1. ROMAC, FORD OR EQUAL DOUBLE STRAP SERVICE SADDLE WITH I.P. THREAD TO BE USED ON ALL SERVICE TAPS ALL NEW TAPS ON EXISTING WATER MAINS SHALL BE DONE BY THE CITY OF SNOHOMISH WATER DIVISION AT THE DEVELOPER'S OR CONTRACTOR'S EXPENSE.

2. 2" BRASS CORP STOP MUELLER ORI-CORP H9969 OR FORD.

3. MUELLER BEND WITH PLUG.

4. 2" WATER SERVICE LINE SHALL BE POLYETHYLENE TUBING :
   POLYETHYLENE TUBING SHALL BE 2" COPPER TUBE SIZE (CTS) ASTM D-2737 - SDR9 (PE3408)
   POLYETHYLENE SHALL:
   1. MEET THE REQUIREMENTS OF AWWA C901
   2. BE HIGH MOLECULAR MASS WITH AT LEAST 200 PSI RATING
   3. HAVE A #10 COPPER TRACE WIRE WRAPPED ALONG ITS ENTIRE LENGTH (ONE WRAP PER FT)
   4. ALL TUBING SHALL MEET THE APPLICABLE ASTM AND AWWA STANDARDS.

5. BRASS FITTINGS AS NEEDED.

6. METER SETTERS SHALL BE MUELLER SERIES COPPER SETTER B2427-2.012 WITH HORIZONTAL INLET AND OUTLET WITH CHECK VALVE OR APPROVED EQUAL.

7. METER SHALL BE INSTALLED BY CITY WATER DIVISION AT DEVLOPER'S OR CONTRACTOR'S EXPENSE.

8. METER BOX SHALL BE RAVEN RMB 17-30-12 FOR 1-1/2 AND 2" SERVICES;
   METER BOX SHALL HAVE A 2" HOLE FOR TOUCH READ SENSOR.
   METER BOX LID SHALL BE SIGMA DWG LC 1730T-D DUCTILE IRON WITH READER (17.5" X30.375") FOR 1-1/2 AND 2" SERVICES.

9. 1-1/2" SERVICE SHALL BE REDUCED AT THE SETTER.

10. ORISEAL CURB STOP H10283 (TYP) MUELLER OR FORD.

Updated 01/14/2016 MMS

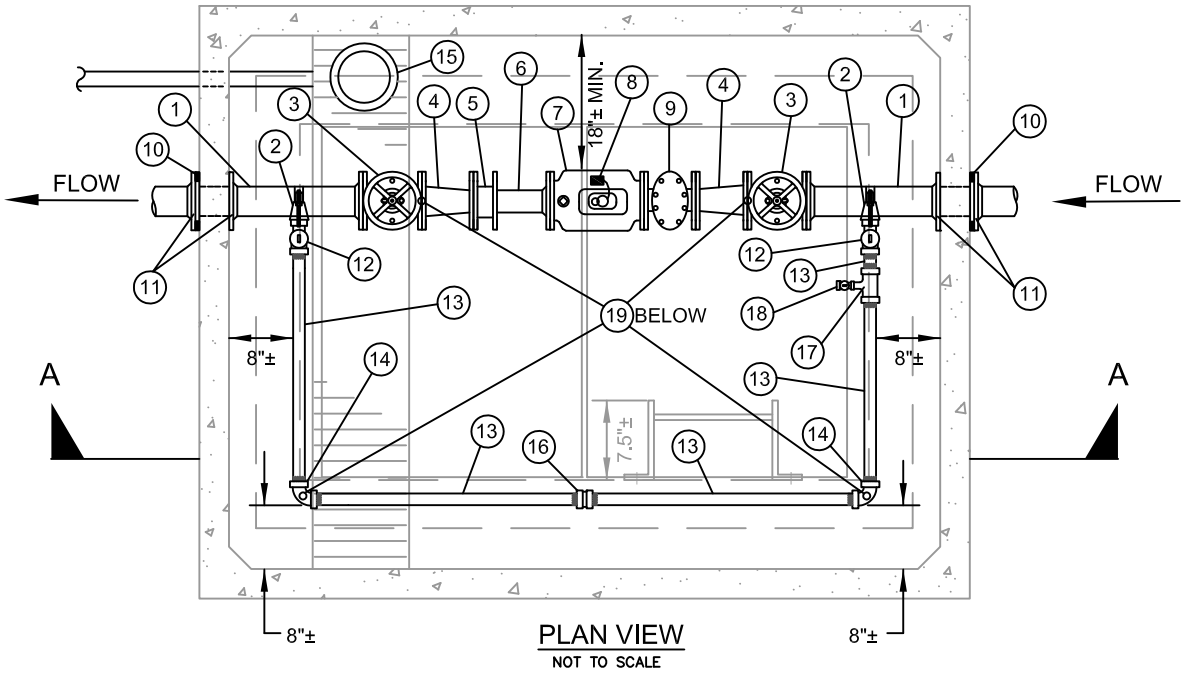
SNOHOMISH
WASHINGTON

2" METERED WATER SERVICE

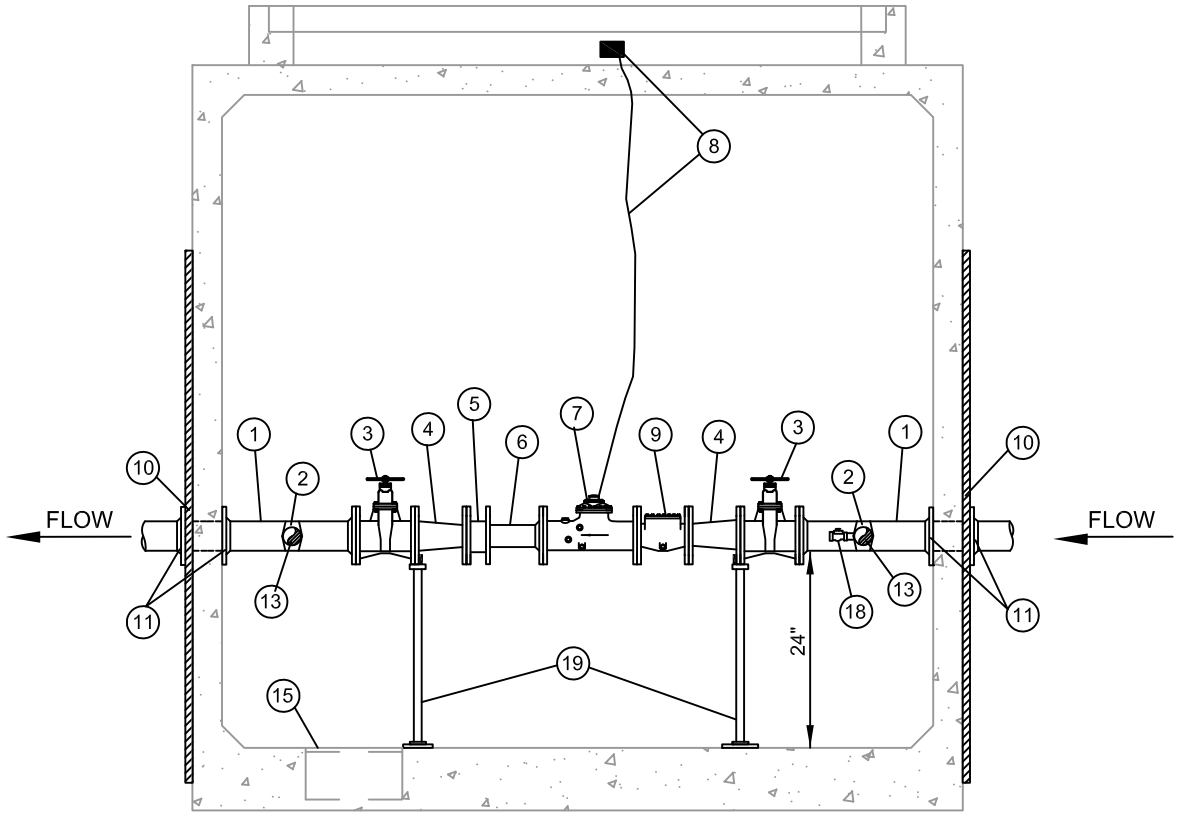
Approved By:
S L S
City Engineer
Date: April 2010

502
Number

City of Snohomish Public Works Department



PLAN VIEW
NOT TO SCALE



SECTION A-A
NOT TO SCALE

3" WATER METER INSTALLATION

PIPING DETAIL

SNOHOMISH
WASHINGTON

METER/VAULT FOR 3" METER

Approved By:
S L S
City Engineer
Date: April 2010

503
Number

City of Snohomish Public Works Department

MATERIAL LIST:

ITEM	QTY.	DESCRIPTION
1	2	4" D.I. ADAPTER, FL x PE, 5'± LONG.
2	2	SADDLE WITH STAINLESS STEEL STRAP, 2" IP TAP, FORD#FS202 SADDLE WITH IP7 TAP OR EQUAL
3	2	4" RESILIENT SEAT GATE VALVE, NRS, FL, O-RING PACKING WITH HAND WHEEL. VALVE TO BE AMERICAN, WATEROUS, MUELLER, M&H, OR CLOW MEETING AWWA C-509.
4	2	4" X 3" D.I. REDUCER, FL.
5	1	3" FLANGED COUPLING ADAPTER TO BE FORD FLANGED COUPLING ADAPTER, STYLE FFCA W/STAINLESS STEEL ANCHOR STUDS, OR EQUAL.
6	1	3" D.I. ADAPTER, FL x PE, LENGTH TO FIT.
7	1	3" FLANGED SINGLE REGISTER HIGH PERFORMANCE COMPOUND METER, TO BE PROVIDED BY THE CITY AND INSTALLED BY CONTRACTOR.
8	1	METER TRANSCEIVER UNIT (MXU) AND MOUNTING BRACKET, TO BE PROVIDED BY THE CITY AND INSTALLED BY CONTRACTOR ON HATCH RISER.
9	1	3" FLANGED STRAINER.
10	4	2" X 2" X 1/4" MIN. WALL THICKNESS SQUARE STEEL TUBING, 6' MIN. LENGTH. BOLT TO VAULT WALL IN FOUR PLACES WITH STAINLESS STEEL ANCHOR BOLTS.
11	4	UNI-FLANGE ADAPTER.
12	2	2" MIP X FIP LOCKABLE BALL VALVE.
13	5	2" BRASS NIPPLE, LENGTH TO FIT.
14	2	2" BRASS 90° BEND.
15	1	SUMP PUMP OR GRAVITY DRAIN AS REQUIRED BY SITE CONDITIONS, TO BE DETERMINED BY THE DEVELOPER AND CONTRACTOR AND REVIEWED AND APPROVED BY THE CITY. FOR GRAVITY: SUMP DRAIN, ZURN Z-551, THREADED, WITH ZURN Z-1099 BACKWATER VALVE, THREADED x NO-HUB, WITH D.I. PIPE TO 12" MIN. BEYOND VAULT WALL AND 4" PVC D3034 SDR35, MIN. 1% SLOPE TO DAYLIGHT OR C.B. FOR SUMP PUMP: 16" DIAM. x 6" DEEP SUMP WITH ZOELLER MODEL 57 SUMP PUMP. PROVIDE ELECTRICAL POWER PERALL APPLICABLE CODES. CONSTRUCT 1-1/4" DISCHARGE PIPING ENCASED IN G.I.P. TO NEAREST CATCH BASIN OR APPROVED LOCATION.
16	1	2" BRASS UNION.
17	1	2" X 1" BRASS TEE.
18	1	1" MIP LOCKABLE BALL VALVE WITH CAP.
19	4	ADJUSTABLE PIPING SUPPORT, STANDON MODEL #S89, OR EQUAL.

NOTES:

1. PROVIDE SHOP DRAWINGS AND SUBMITTALS FOR ALL MATERIALS TO THE CITY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
2. VAULT SHALL BE UTILITY VAULT CO PRECAST VAULT OR EQUAL.
3. PIPE AND CONDUIT PENETRATIONS SHALL BE CORE-DRILLED ON-SITE AND SHALL BE SEALED WATERTIGHT. PROVIDE "LINK-SEAL" FITTINGS AT ALL PENETRATIONS.
4. ALL PIPING AND APPURTENANCES OUTSIDE THE VAULT SHALL BE RESTRAINED JOINT. IN ADDITION TO THE RESTRAINED JOINTS, THRUST BLOCKING AT ALL TEES AND BENDS PER STANDARD PLANS 505 AND 506 SHALL BE REQUIRED.
5. THE CONTRACTOR IS RESPONSIBLE FOR ELECTRICAL PERMITS AND APPROVALS FOR SUMP PUMP INSTALLATIONS.

3" WATER METER INSTALLATION
PIPING DETAIL NOTES

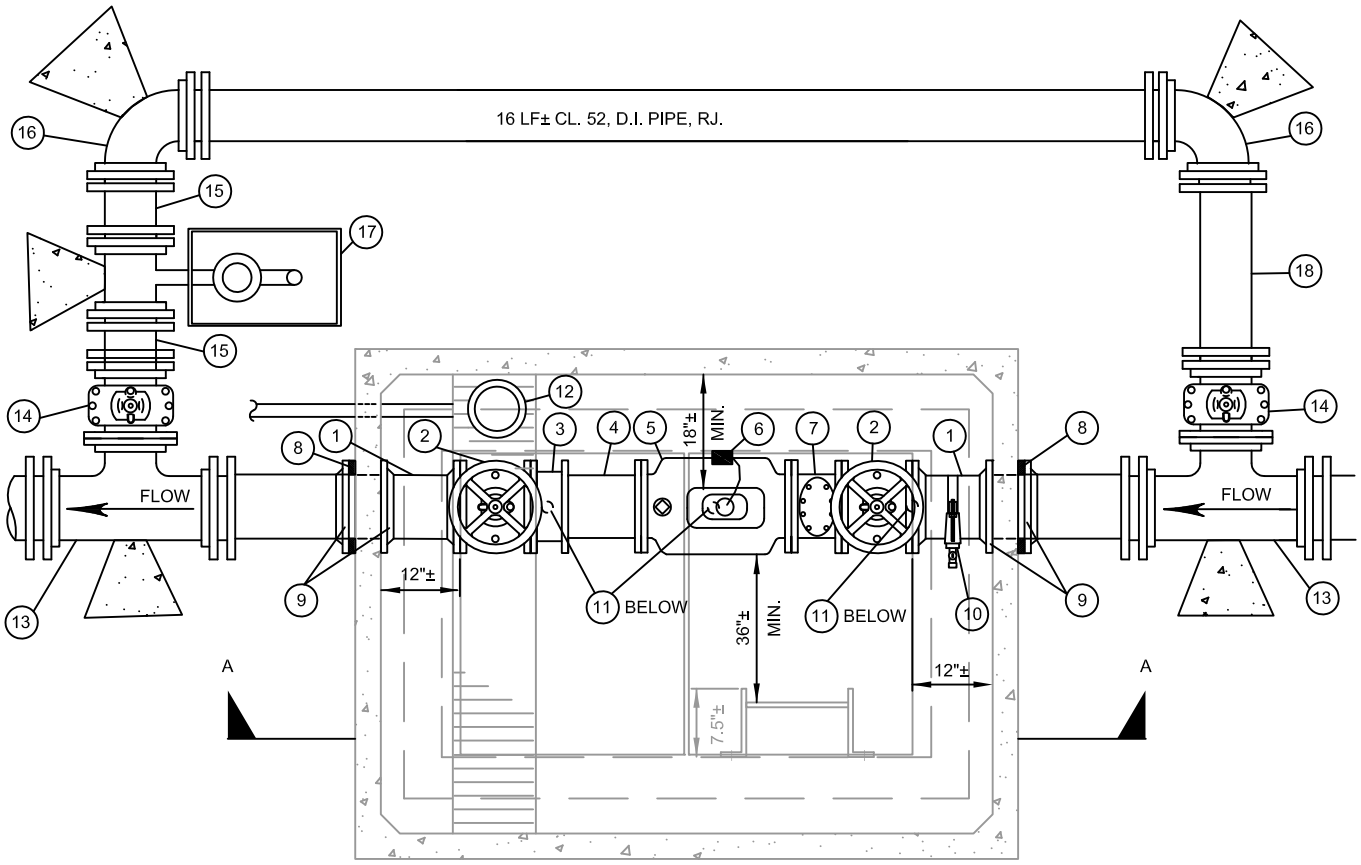
SNOHOMISH
WASHINGTON

NOTES FOR 3" METER/VAULT

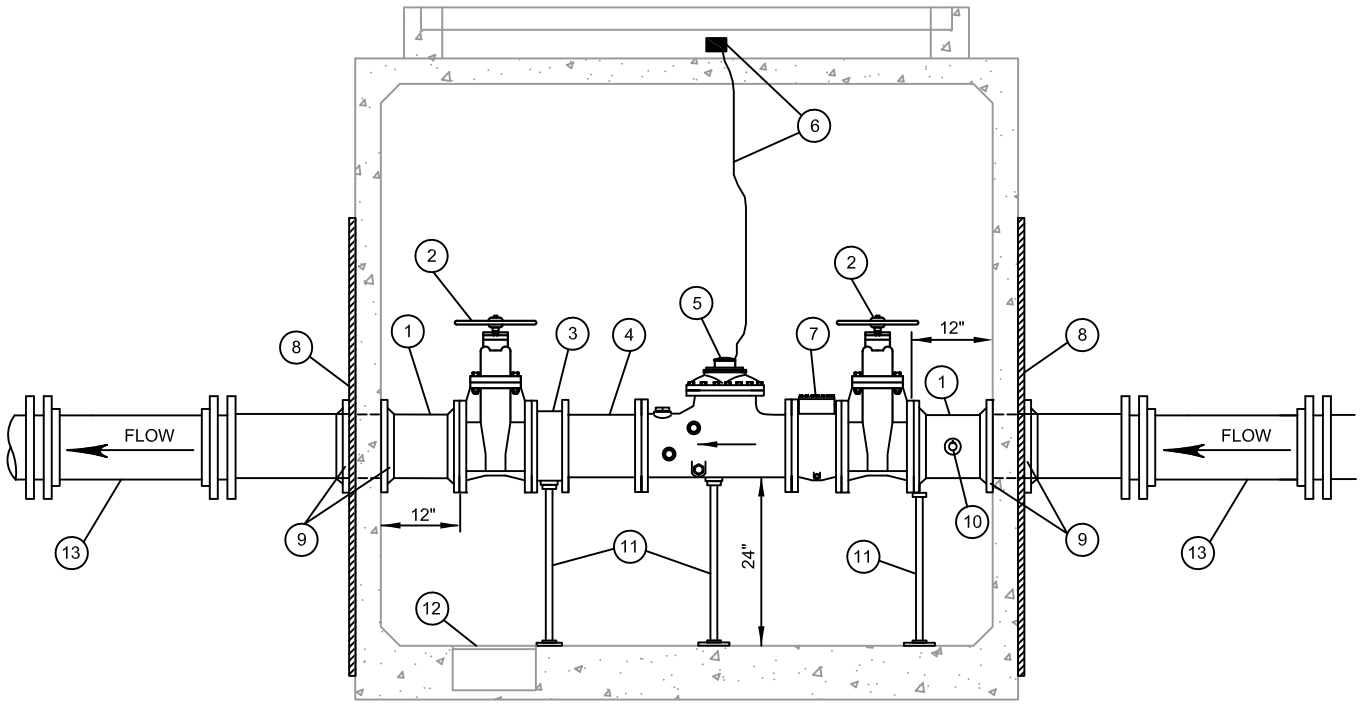
Approved By:
S L S
City Engineer
Date: April 2010

503a
Number

City of Snohomish Public Works Department



PLAN VIEW
NOT TO SCALE



SECTION A-A
NOT TO SCALE

4" & 6" WATER METER INSTALLATION
PIPING DETAIL

SNOHOMISH
WASHINGTON

METER/VAULT FOR 4" & 6" METER

Approved By:
S L S
City Engineer
Date: April 2010

504
Number

City of Snohomish Public Works Department

MATERIAL LIST: ALL PIPING & APPURTENANCES TO MATCH METER SIZE

ITEM	QTY.	DESCRIPTION
1	2	D.I. ADAPTER, FL x PE, 5'± LONG.
2	2	RESILIENT SEAT GATE VALVE, NRS, FL, O-RING PACKING WITH HAND WHEEL. VALVE TO BE AMERICAN, WATEROUS, MUELLER OR CLOW MEETING AWWA C-509.
3	1	FLANGED COUPLING ADAPTER TO BE FORD FLANGED COUPLING ADAPTER, STYLE FFCA W/STAINLESS STEEL ANCHOR STUDS, OR EQUAL.
4	1	D.I. ADAPTER, FL x PE, LENGTH TO FIT.
5	1	FLANGED SINGLE REGISTER HIGH PERFORMANCE COMPOUND METER, TO BE PROVIDED BY THE CITY AND INSTALLED BY CONTRACTOR.
6	1	METER TRANSCEIVER UNIT (MXU) AND MOUNTING BRACKET, TO BE PROVIDED BY THE CITY AND INSTALLED BY CONTRACTOR ON HATCH RISER.
7	1	FLANGED STRAINER.
8	4	2" X 2" X 1/4" MIN. WALL THICKNESS SQUARE STEEL TUBING, 6' MIN. LENGTH. BOLT TO VAULT WALL IN FOUR PLACES WITH STAINLESS STEEL ANCHOR BOLTS.
9	4	UNI-FLANGE ADAPTER.
10	1	SADDLE WITH STAINLESS STEEL STRAP, 1" IP TAP AND 1" MIP LOCKABLE BALL VALVE WITH CAP.
11	3	ADJUSTABLE PIPING SUPPORT, STANDON MODEL #S89, OR EQUAL.
12	1	SUMP PUMP OR GRAVITY DRAIN AS REQUIRED BY SITE CONDITIONS, TO BE DETERMINED BY THE DEVELOPER AND CONTRACTOR AND REVIEWED AND APPROVED BY THE CITY. FOR GRAVITY: SUMP DRAIN, ZURN Z-551, THREADED, WITH ZURN Z-1099 BACKWATER VALVE, THREADED x NO-HUB, WITH D.I. PIPE TO 12" MIN. BEYOND VAULT WALL AND 4" PVC D3034 SDR35, MIN. 1% SLOPE TO DAYLIGHT OR C.B. FOR SUMP PUMP: 16" DIAM. x 6" DEEP SUMP WITH ZOELLER MODEL 57 SUMP PUMP. PROVIDE ELECTRICAL POWER PER ALL APPLICABLE CODES. CONSTRUCT 1-1/4" DISCHARGE PIPING ENCASED IN G.I.P. TO NEAREST CATCH BASIN OR APPROVED LOCATION.
13	2	D.I. TEE, FL x RJ.
14	2	RESILIENT SEAT GATE VALVE, NRS, FL x RJ. VALVE TO BE AMERICAN, WATEROUS, MUELLER, M&H, OR CLOW MEETING AWWA C-509. VALVE BOX TO BE PER STANDARD PLAN 512
15	2	D.I. SPOOLS, 1'± LONG.
16	2	90° D.I. BENDS, RJ.
17	1	2" BLOW-OFF ASSEMBLY, STANDARD PLAN 510.
18	1	D.I. SPOOL, 3'± LONG.

NOTES:

1. PROVIDE SHOP DRAWINGS AND SUBMITTALS FOR ALL MATERIALS TO THE CITY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
2. VAULT SHALL BE UTILITY VAULT CO PRECAST VAULT OR EQUAL.
3. PIPE AND CONDUIT PENETRATIONS SHALL BE CORE-DRILLED ON-SITE AND SHALL BE SEALED WATERTIGHT. PROVIDE "LINK-SEAL" FITTINGS AT ALL PENETRATIONS.
4. ALL PIPING AND APPURTENANCES OUTSIDE THE VAULT SHALL BE RESTRAINED JOINT. IN ADDITION TO THE RESTRAINED JOINTS, THRUST BLOCKING AT ALL TEES AND BENDS PER STANDARD PLANS 505 AND 506 SHALL BE REQUIRED.
5. THE CONTRACTOR IS RESPONSIBLE FOR ELECTRICAL PERMITS AND APPROVALS FOR SUMP PUMP INSTALLATIONS.

4" & 6" WATER METER INSTALLATION DETAIL NOTES

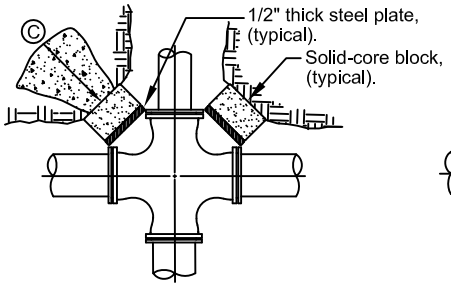
SNOHOMISH WASHINGTON

NOTES FOR 4" & 6" METER/VAULT

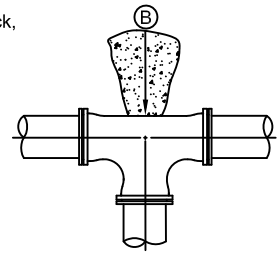
Approved By: S L S
City Engineer
Date: April 2010

504a
Number

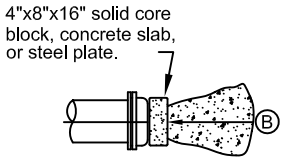
City of Snohomish Public Works Department



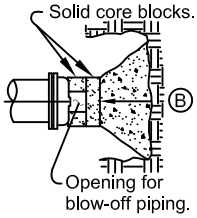
UNBALANCED CROSS



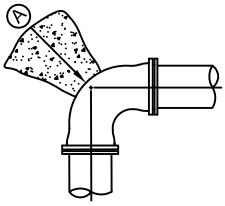
TEE



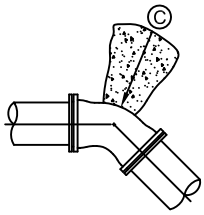
CAP



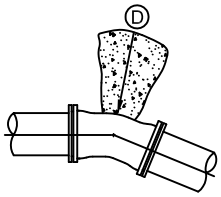
TAPPED CAP/PLUG



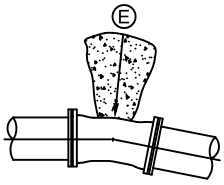
90° BEND



45° BEND



22½° BEND



11¼° BEND

NOT TO SCALE

THRUST BLOCK SIZING FOR 250 PSI PRESSURE

MIN. BEARING AREA AGAINST UNDISTRUBED SOIL-SQ. FT.

PIPE SIZE	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
4"	3/(2)	2/(1)	2/(1)	1/(1)	1/(1)
6"	6/(4)	4/(3)	3/(2)	2/(1)	1/(1)
8"	10/(7)	7/(5)	5/(4)	3/(2)	2/(1)
10"	15/(10)	11/(7)	8/(5)	4/(3)	2/(2)
12"	22/(14)	15/(10)	12/(8)	6/(4)	3/(2)
14"	29/(20)	21/(14)	16/(11)	8/(5)	4/(3)
16"	38/(26)	27/(18)	21/(14)	11/(7)	5/(4)
18"	48/(32)	34/(23)	26/(18)	13/(9)	7/(5)
20"	60/(40)	42/(28)	32/(22)	17/(11)	8/(6)
24"	86/(58)	61/(41)	47/(31)	24/(16)	12/(8)

SAFE BEARING LOADS IN LBS./SQ. FT.

THE SAFE BEARING LOADS GIVEN IN THE FOLLOWING TABLE ARE FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET.

SOIL	SAFE BEARING LOAD
*MUCK, PEAT, ETC. (SEE NOTE 7)	0
SOFT CLAY	1,000
SAND	2,000
SAND AND GRAVEL	3,000
SAND AND GRAVEL CEMENTED W/CLAY	4,000
HARD SHALE	10,000

GENERAL NOTES

1. CONCRETE THRUST BLOCK AREA BASED UPON A SAFE BEARING LOAD OF 2000/(3000) LBS. PER SQ. FT.
2. AREAS MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES AND SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST-IN-PLACE AND HAVE MINIMUM OF 1/2 SQUARE FOOT CONTACT BEARING AGAINST THE FITTING.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. POLYETHYLENE WRAP NOT SHOWN FOR CLARITY.
7. IN MUCK OR PEAT, ALL THRUSTS SHALL BE RESTRAINED BY PILES OR TIE RODS TO SOLID FOUNDATIONS OR BY REMOVAL OF MUCK OR PEAT AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THRUSTS.

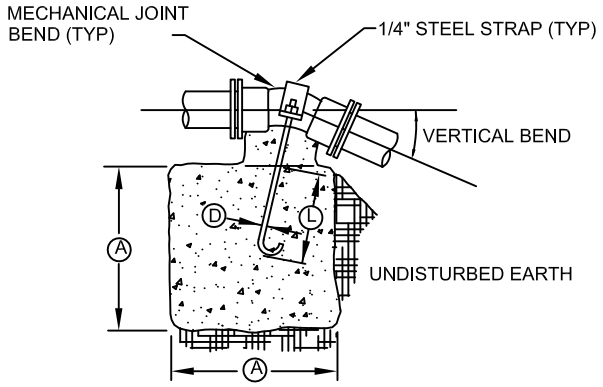
SNOHOMISH WASHINGTON

HORIZONTAL THRUST BLOCKS

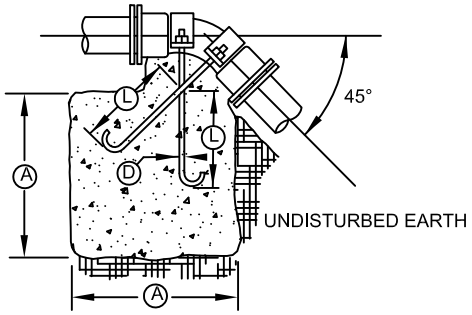
Approved By: S L S
City Engineer
Date: April 2010

505
Number

City of Snohomish Public Works Department



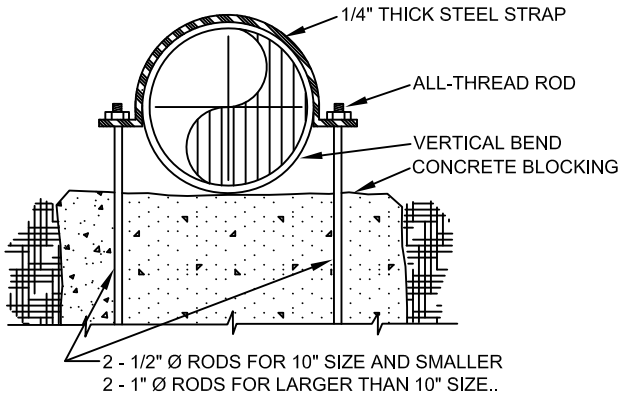
BLOCKING FOR 11-1/4°, 22-1/2° & 30° VERTICAL BENDS



BLOCKING FOR 45° VERTICAL BENDS

VERTICAL BLOCKING

PIPE SIZE	VERT. BEND	CU.FT.	(A)	(D)	(L)
4"	11-1/4°	8	2.0'	3/4"	1.5'
	22-1/2°	11	2.2'	3/4"	2.0'
	30°	17	2.6'	3/4"	2.0'
	45°	30	3.1'	3/4"	2.0'
6"	11-1/4°	11	2.2'	3/4"	2.0'
	22-1/2°	25	2.9'	3/4"	2.0'
	30°	41	3.5'	3/4"	2.0'
	45°	68	4.1'	3/4"	2.0'
8"	11-1/4°	16	2.5'	3/4"	2.0'
	22-1/2°	47	3.6'	3/4"	2.5'
	30°	70	4.1'	3/4"	2.5'
	45°	123	5.0'	3/4"	2.0'
12"	11-1/4°	32	3.2'	3/4"	2.0'
	22-1/2°	88	4.5'	7/8"	3.0'
	30°	132	5.1'	7/8"	2.5'
	45°	232	6.1'	3/4"	2.5'
16"	11-1/4°	70	4.1'	7/8"	3.0'
	22-1/2°	184	5.7'	1-1/8"	4.0'
	30°	275	6.5'	1-1/4"	4.0'
	45°	478	7.8'	1-1/8"	4.0'
20"	11-1/4°	91	4.5'	7/8"	3.0'
	22-1/2°	225	6.1'	1-1/4"	4.0'
	30°	330	6.9'	1-3/8"	4.5'
	45°	560	8.2'	1-1/4"	4.0'
24"	11-1/4°	128	5.0'	1"	3.5'
	22-1/2°	320	6.8'	1-3/8"	4.5'
	30°	480	7.9'	1-5/8"	5.5'
	45°	820	9.4'	1-3/8"	4.5'



TYPICAL CROSS-SECTION

NOTES:

1. CONCRETE BLOCKING IS BASED ON 250psi WATER PRESSURE AND 2500 psi CONCRETE STRENGTH.
2. BOLTS AND NUTS NOT EMBEDDED IN CONCRETE SHALL BE CLEANED AND COATED WITH COAL TAR EPOXY.
3. POLYETHYLENE WRAP NOT SHOWN FOR CLARITY.

NOT TO SCALE

SNOHOMISH WASHINGTON

VERTICAL THRUST BLOCKS

Approved By:
S L S
City Engineer
Date: April 2010

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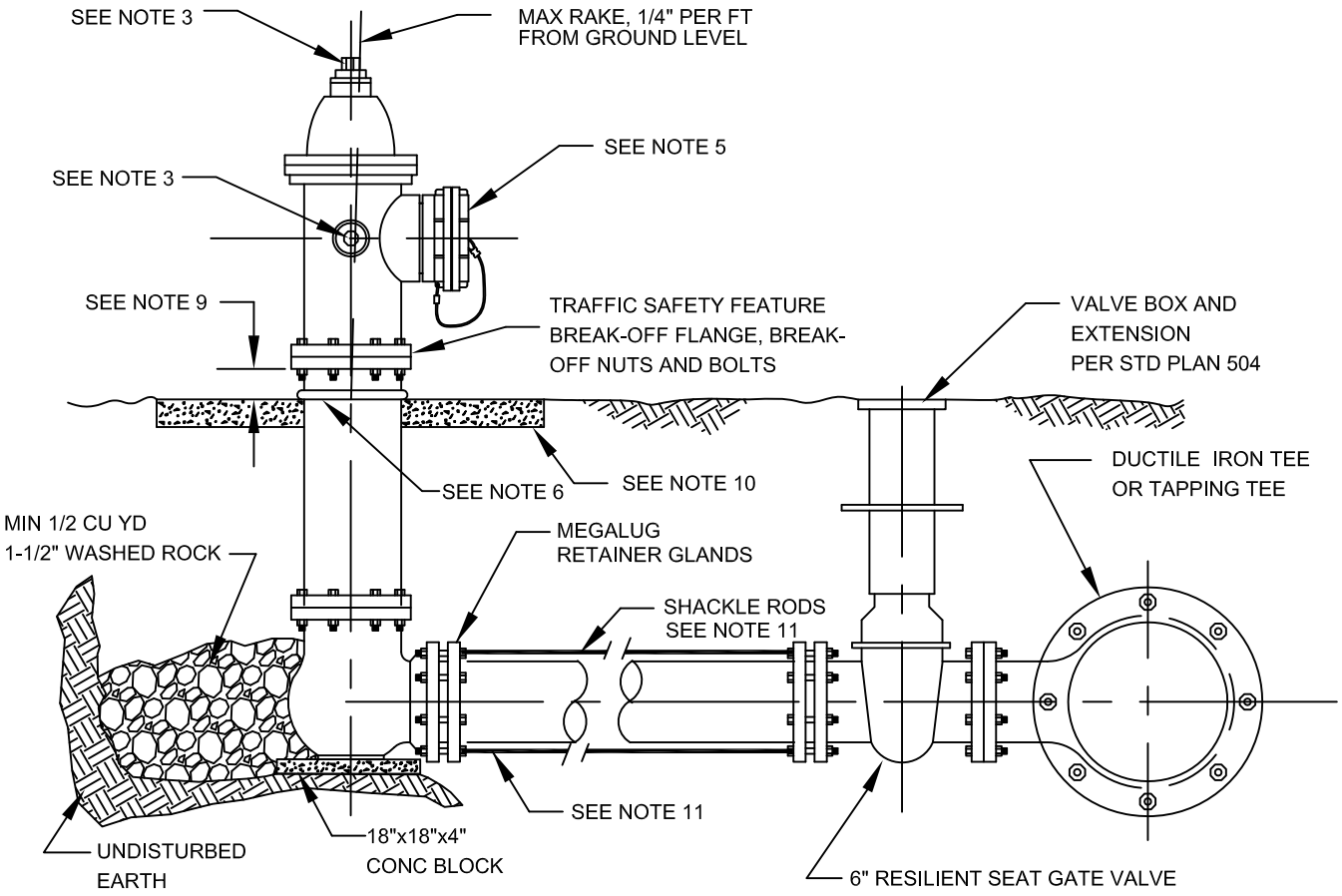
Number

City of Snohomish Public Works Department



NOTES:

1. HYDRANTS AND ALL MATERIALS SHALL CONFORM TO AWWA STANDARDS AND SHALL BE OF STANDARD MANUFACTURE - MUELLER SUPER CENTURION, M&H 929, OR EAST JORDAN IRON MODEL NO. 5CD250.
2. 5-1/4" VALVE MINIMUM.
3. 1-1/2" OPERATING NUT AND CAP NUT FOR 2-1/2" PORTS
4. N.S.T. THREAD ON 2-1/2" PORTS.
5. 5" STORZ FITTING WITH NATIONAL STANDARD THREAD ON THE 4-1/2" PORT.
6. IF HYDRANT RISES THROUGH CONCRETE, USE EXPANSION STRIP AROUND HYDRANT BARREL, PER STD PLAN 509.
7. PROVIDE FOR VEHICULAR TRAFFIC PROTECTION WHEN NECESSARY PER STD. PLAN 509.
8. STEAMER PORT TO BE FACING STREET OR ROADWAY FOR FIRE ENGINE ACCESS.
9. BREAK-OFF FLANGE SHALL BE MINIMUM 2", MAXIMUM 6" ABOVE CONCRETE PAD AND/OR BACK OF SIDEWALK.
10. INSTALL CONCRETE PAD AROUND HYDRANT IN UNPAVED, SOD AND ASPHALT AREAS PER STD. PLAN 508.
11. HYDRANT CONNECTION PIPE TO BE DUCTILE IRON CLASS 52. MINIMUM 3' MAXIMUM 18' LENGTH BETWEEN HYDRANT AND FOOT VALVE. JOINTS SHALL BE MJ WITH RETAINER GLANDS OR FIELD LOCK GASKETS. SHACKLE RODS SHALL BE PART OF ASSEMBLY.
12. FIRE HYDRANTS SHALL BE PAINTED WITH TWO COATS OF EQUIPMENT YELLOW HYDRANT PAINT "RUST-OLEUM" TYPE PAINT.

Updated 01/14/2016 MMS

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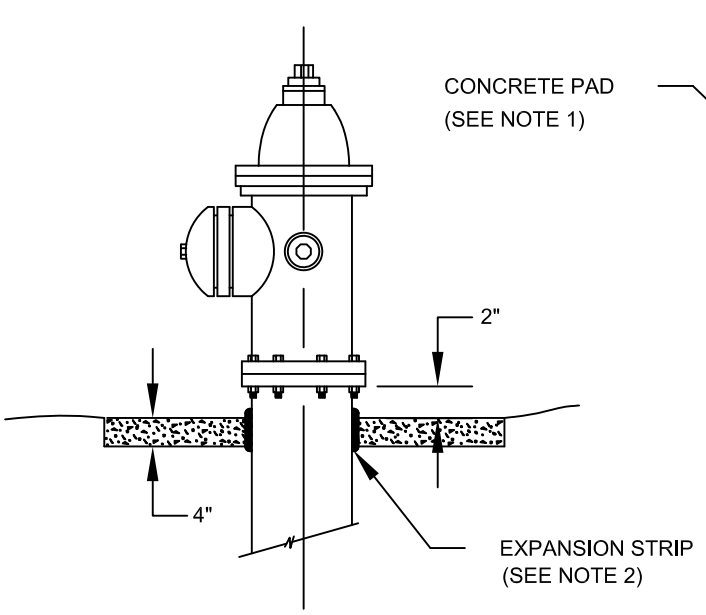
FIRE HYDRANT ASSEMBLY

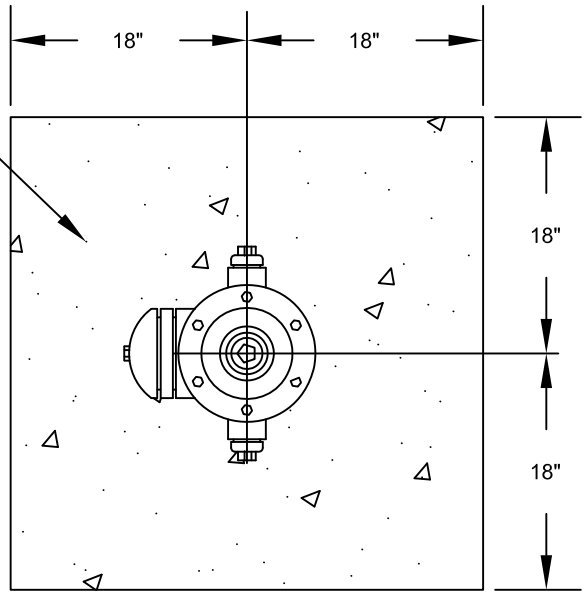
Approved By:
S L S
City Engineer
Date: April 2010

507
Number

City of Snohomish Public Works Department



ELEVATION



PLAN

NOTES:

1. CONCRETE SHALL BE CLASS 3000.
2. INSTALL 1/2"x 4" EXPANSION STRIP AROUND HYDRANT.

SNOHOMISH
WASHINGTON

CONCRETE FIRE HYDRANT PAD

Approved By:
S L S
City Engineer
Date: April 2010

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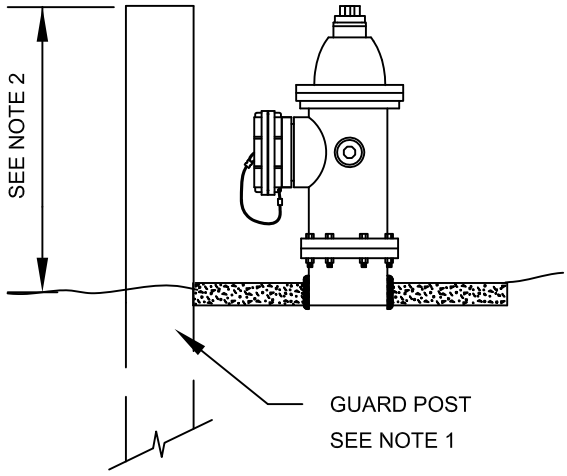
Number

City of Snohomish Public Works Department



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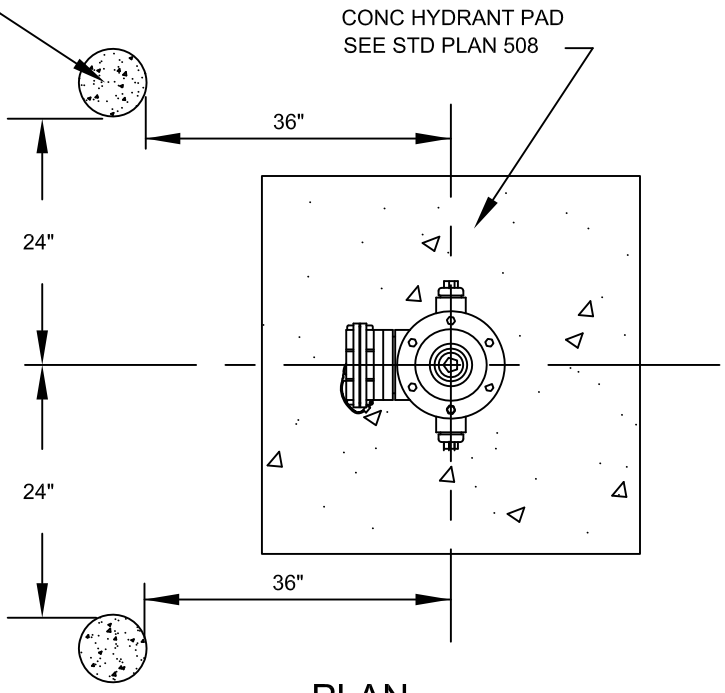
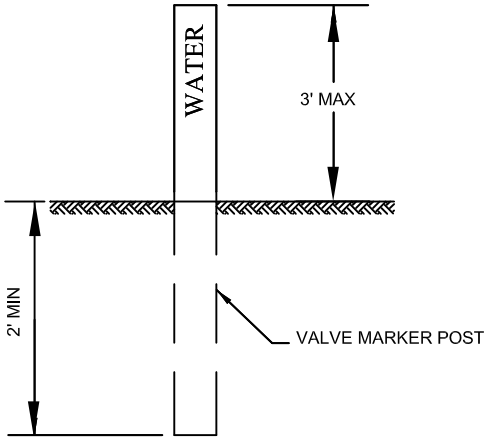


PLAN

FIRE HYDRANT GUARD POST

(SEE NOTES 1 AND 2)



VALVE MARKER POST

(SEE NOTES 3, 4 AND 5)

NOTES:

1. GUARD POSTS SHALL BE 6' LONG, 6" DIAMETER CONCRETE CLASS 52 DI. PIPE OR 6' LONG, 8" DIAMETER REINFORCED CONCRETE. PAINTED WITH TWO COATS OF HIGH GLOSS EQUIPMENT YELLOW (RUST-OLEUM) TYPE PAINT.
2. TOP OF GUARD POST SHALL BE LEVEL WITH THE TOP OF THE OPERATING NUT.
3. CARSONITE PLASTIC POST MARKER, BLUE, LABELED "WATER".
4. VALVE MARKER POSTS SHALL BE INSTALLED FOR ALL VALVES LOCATED IN UNPAVED AREAS. VALVE MARKER POSTS SHALL BE SET AS DIRECTED BY THE CITY ENGINEER IN A SAFE AND REASONABLY CONSPICUOUS LOCATION.
5. VALVE MARKER POSTS MAY NOT BE REQUIRED FOR AUXILIARY HYDRANT VALVES.

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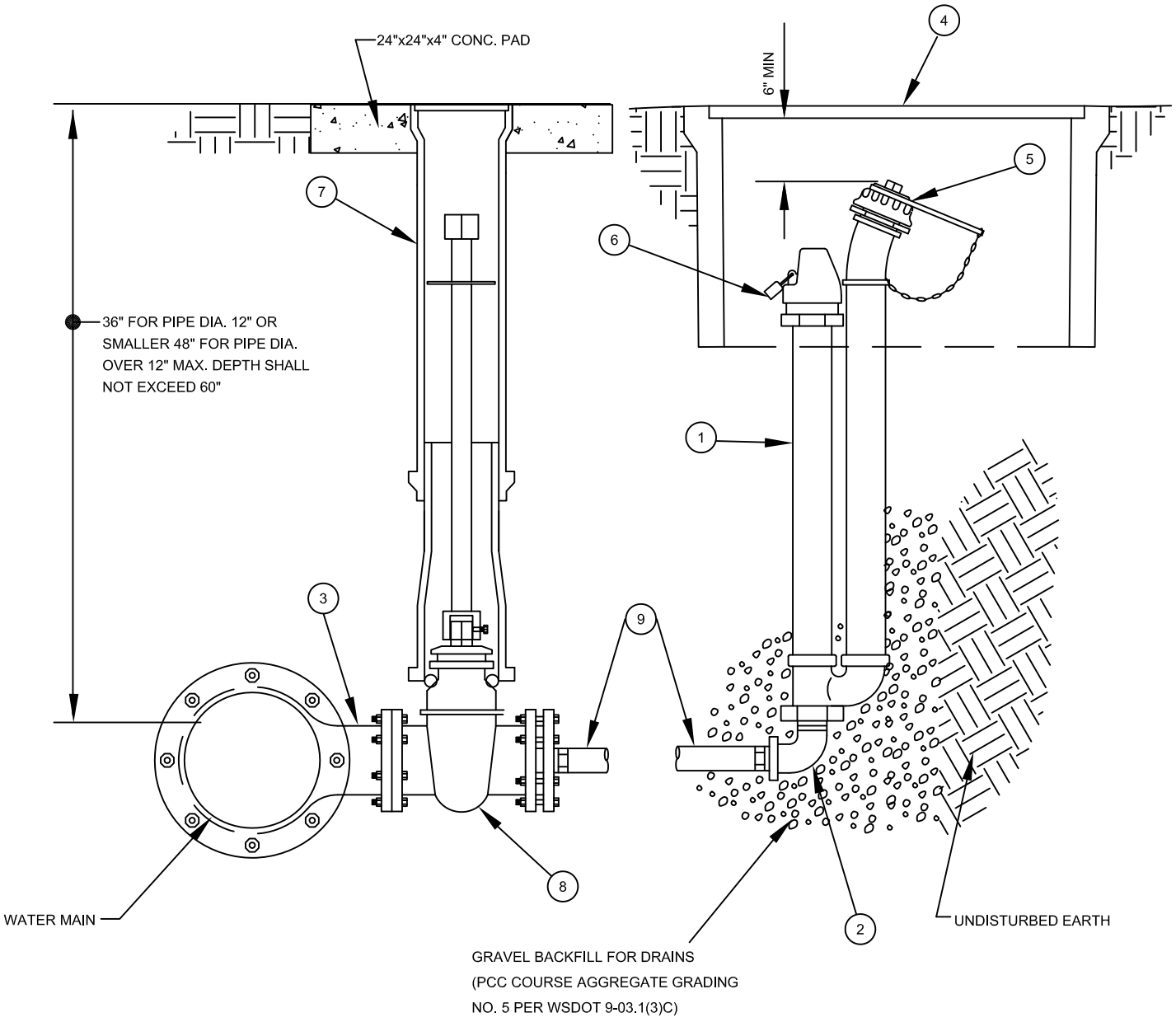
WASHINGTON

FIRE HYDRANT GUARD POST AND VALVE MARKER POST

Approved By:
S L S
City Engineer
Date: April 2010

509
Number

City of Snohomish Public Works Department



MATERIAL LIST:

1. BLOWOFF HYDRANT KUPFERLE FOUNDRY #78 BRONZE TO BRONZE DESIGN SERVICEABLE FROM ABOVE WITH OUTLET EXPOSED. 2-1/2" NST OUTLET LOCKING CAP ON OPERATOR.
2. 2" BRASS 90° BEND
3. MAINLINE SIZE TEE WITH 6" FLANGE
4. MID-STATES PLASTICS METER BOX MSBCF 1730-18/W DI LID.
5. 2-1/2" CAP NATIONAL STANDARD THREAD.
6. LOCK TO BE SUPPLIED BY CITY OF SNOHOMISH.
7. CAST IRON VALVE BOX AND EXTENSION PER STD DETAIL W-190
8. 6" GATE VALVE WITH RESILIENT SEAT (MUELLER, M&H OR APPROVED EQUAL) WITH A 6" FLANGE X 2" COMPANION FLANGE
9. 2" HDPE HI MOL CL 200 CTS POLY PIPE W/2 2" MIP COMPRESSION ADAPTERS

SNOHOMISH WASHINGTON

BLOW OFF ASSEMBLY

Approved By: S L S
City Engineer
Date: April 2010

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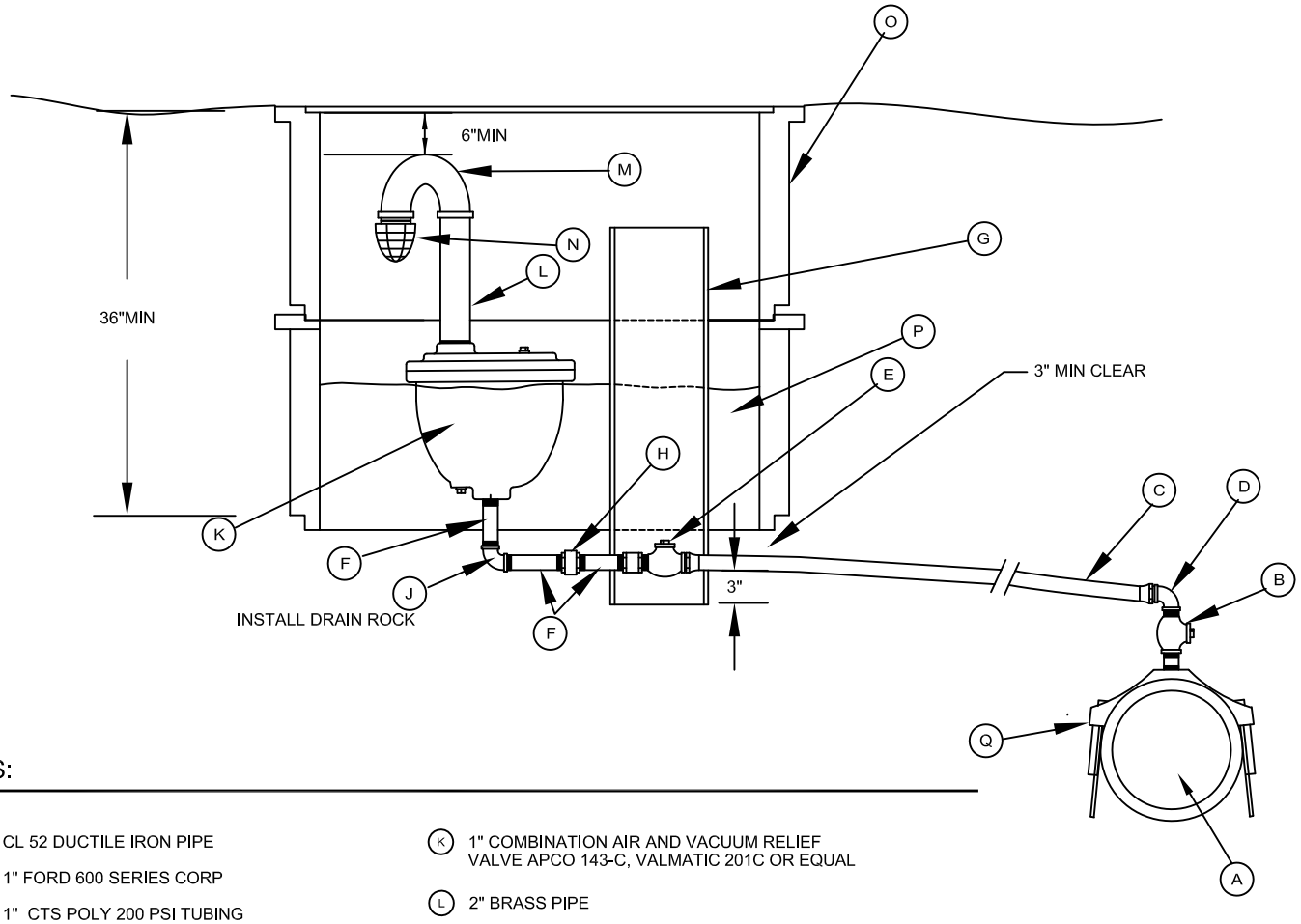
Number

City of Snohomish Public Works Department



PARTS:

- (A) CL 52 DUCTILE IRON PIPE
- (B) 1" FORD 600 SERIES CORP
- (C) 1" CTS POLY 200 PSI TUBING
- (D) 1" FORD 602-44 ANGLE COUPLING
- (E) 1" FORD B21-444 CURB STOP
- (F) 1" BRASS NIPPLE
- (G) 6" PVC PIPE
- (H) 1" BRASS UNION
- (I) AIR VAC SHALL BE PAINTED APPROVED BLUE
- (J) 1" BRASS 90° ELL
- (K) 1" COMBINATION AIR AND VACUUM RELIEF VALVE APCO 143-C, VALMATIC 201C OR EQUAL
- (L) 2" BRASS PIPE
- (M) 2" BRASS RETURN BEND
- (N) BRASS BEEHIVE STRAINER GREENBURG P-24-08, FOR 2" PIPE
- (O) METER BOX SHALL BE MID STATES PLASTICS BFC111812BXL METER BOX LID SHALL BE DUCTILE IRON WITH READER BFC11RL
- (P) BACKFILL WITH CRUSHED ROCK TO BONNET.
- (Q) DOUBLE STRAP SADDLE.

NOTES

1. AIR-VAC UNIT AND BOX TO BE INSTALLED IN NON-TRAFFIC AREA.
2. USE MUELLER DOUBLE STRAP SERVICE CLAMP OR APPROVED EQUAL ON ALL MAINS PER STANDARD PLAN 501
3. ALL PIPE FITTINGS BETWEEN MAIN AND UNION, AFTER AIR/VACUUM RELIEF VALVE, SHALL BE BRASS.
4. INSTALLATIONS FOR OTHER SIZE AIR/VACUUM RELIEF VALVES SHALL BE INDIVIDUALLY DESIGNED AND WILL REQUIRE APPROVAL BY THE CITY ENGINEER.
5. PAINT METER BOX LID AND RISER ASSEMBLY (2) COATS BLUE, OIL BASE ENAMEL- HAND BRUSH APPLIED. STENCIL RISER ASSEMBLY WITH "AV" AND SIZE OF AIR/VAC ASSEMBLY ON SIDE FACING ROADWAY IN 2" BLACK LETTERS.
6. AIR/VAC RELEASE VALVE ASSEMBLY SHALL BE INSTALLED AT HIGH POINT ON LINE. IF HIGH POINT FALLS IN LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH TO CREATE NEW HIGH POINT.
7. CONCRETE VAULT PENETRATIONS SHALL BE CORE DRILLED AND GROUTED.

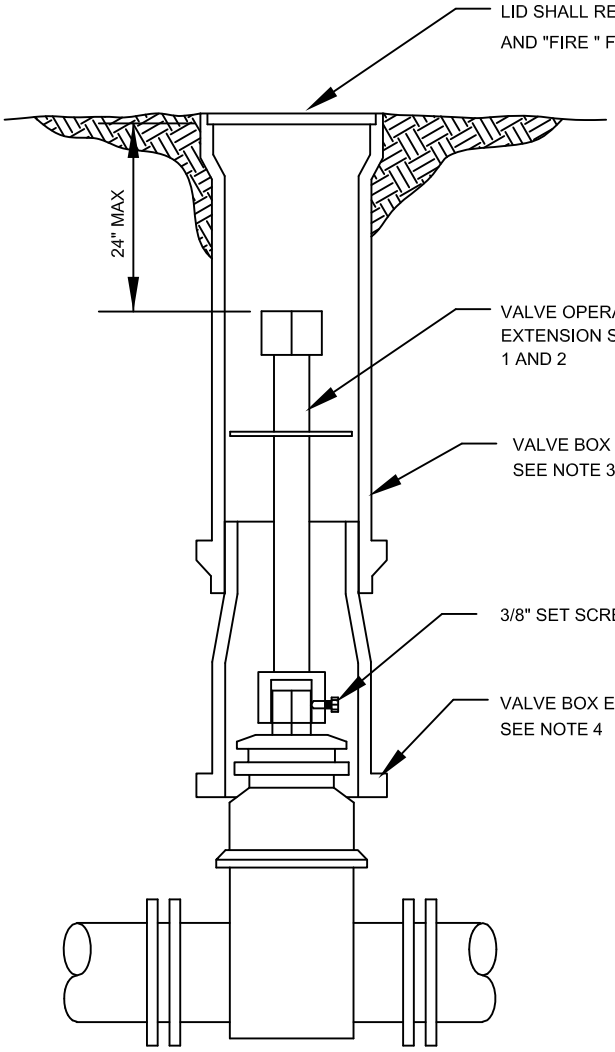
SNOHOMISH WASHINGTON

1" AIR VACUUM VALVE ASSEMBLY

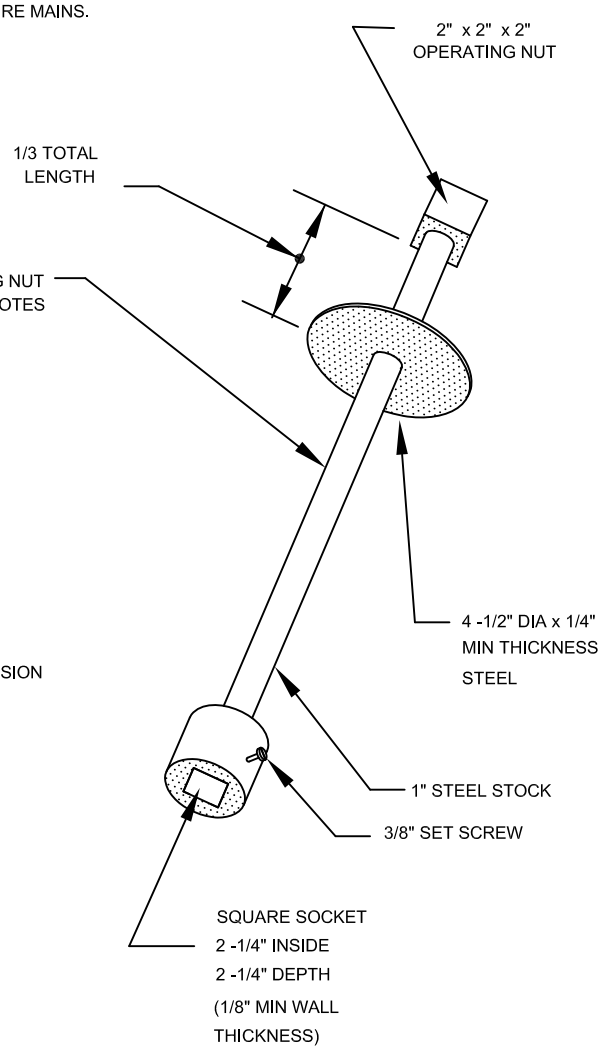
Approved By: S L S
City Engineer
Date: April 2010

511
Number

City of Snohomish Public Works Department



VALVE BOX AND EXTENSION



VALVE OPERATING NUT EXTENSION

NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL,SIZED AS NOTED AND PAINTED WITH TWO (2) COATS OF METAL PAINT.
3. VALVE BOXES IN PAVED AREAS SHALL BE CAST IRON, TWO PIECE UNITS, DESIGNED WITH (LUGS) ON COVER, AS MANUFACTURED BY EAST JORDAN IRON WORKS OR APPROVED EQUAL.
4. APPROVED VALVE BOX EXTENSIONS SHALL BE INSTALLED AT THE TOP OF THE BONNET.
5. ALIGN TABS OR PICK HOLES WITH THE DIRECTION OF THE WATER MAIN.

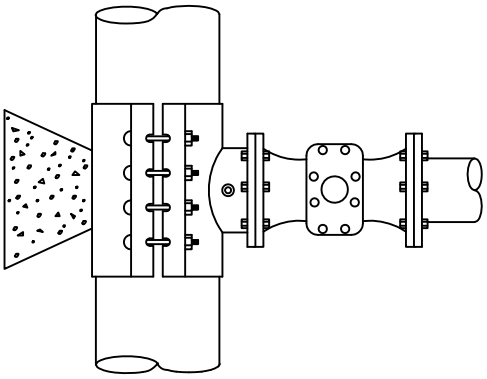
SNOHOMISH
WASHINGTON

WATER VALVE BOX AND EXTENSION

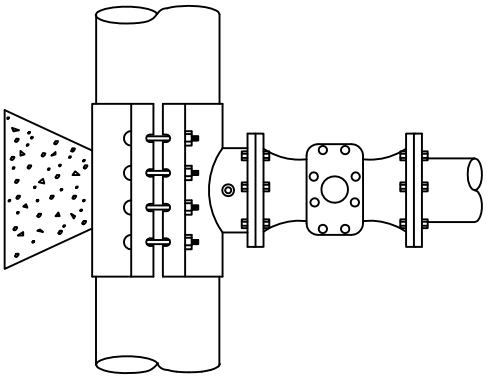
Approved By:
S L S
City Engineer
Date: April 2010

512
Number

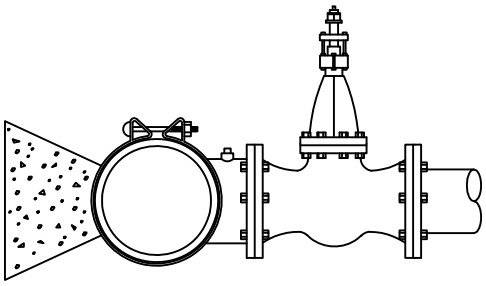
City of Snohomish Public Works Department



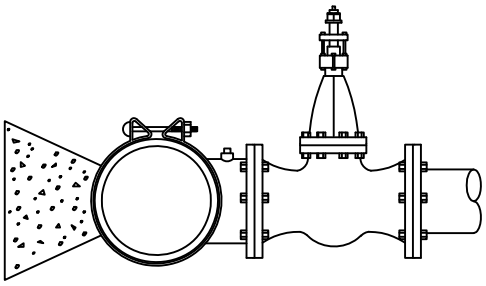
PLAN



PLAN



ELEVATION



ELEVATION

STEEL FABRICATED EPOXY COATED TAPPING SLEEVE

INSTALLED ON DI PIPE

FABRICATED STAINLESS STEEL TAPPING SLEEVE

INSTALLED ON AC PIPE

NOTES:

1. STAINLESS STEEL TAPPING TEES SHALL HAVE FULL CIRCLE SEAL.
2. STEEL TAPPING TEES SHALL BE EPOXY COATED.
3. ALL TEES AND VALVES TO BE WATER TESTED BEFORE TAPPING.
4. NO SIZE ON SIZE TAPS. TAP SHALL BE AT LEAST 2" SMALLER THAN THE EXISTING MAIN.

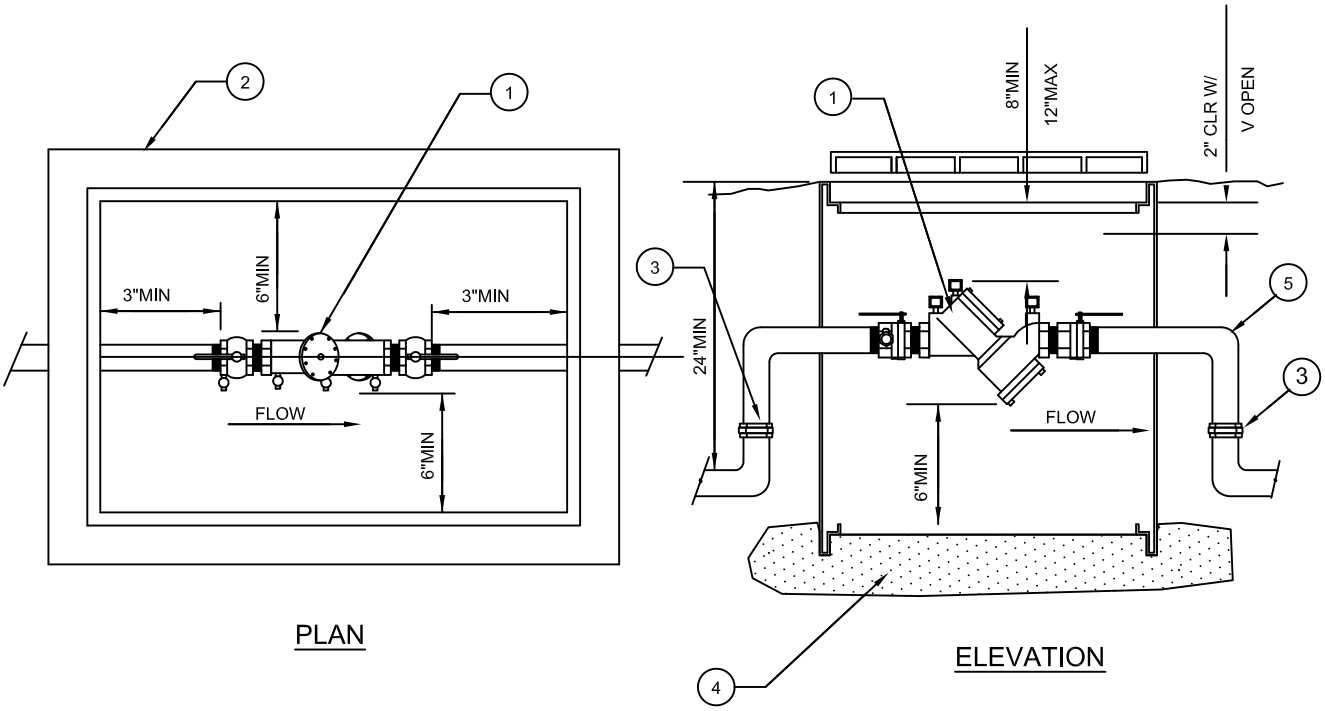
SNOHOMISH WASHINGTON

TAPPING TEES

Approved By:
S L S
City Engineer
Date: April 2010

513
Number

City of Snohomish Public Works Department



MATERIAL LIST:

1. WASHINGTON STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY.
2. IN NON-TRAFFIC AREAS USE:

   FOR 3/4" TO 1" ASSEMBLIES, USE A MID STATE MSBCF 1324-12.

   FOR 1-1/4" TO 2" ASSEMBLIES, USE A MID STATE MSBCF 1730-18.

   IN TRAFFIC AREAS:

   A TRAFFIC LOADED BOX MUST BE USED AND LOCATION APPROVED BY THE CITY OF SNOHOMSIH PRIOR TO INSTALLATION
3. PROVIDE TWO UNIONS.
4. IF A DAYLIGHT DRAIN CANNOT BE PROVIDED THERE MUST BE A 12" MIN LAYER OF FREE DRAINING GRAVEL AT THE BOTTOM OF BOX.
5. ANGLES MAY BE IN OR OUT OF BOX SO LONG AS SUFFICIENT ROOM IS ALLOWED AT EACH END FOR VALVE OPERATION AND DCVA REPAIR OR MAINTENANCE.

NOTES:

1. INSTALL ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
2. INSTALL ONLY IN HORIZONTAL CONFIGURATION, UNLESS APPROVED OTHERWISE BY CITY ENGINEER.
3. INSTALL TEST COCKS FACE UP OR TO ONE SIDE.
4. INSTALL BRASS PLUGS IN ALL TEST COCKS.
5. FOR 3/4" TO 1" ASSEMBLIES, USE A MIDSTATES 1324-12.
6. FOR 1-1/4" TO 2" ASSEMBLIES, USE A MID STATE MSBCF 1730-18.
7. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY.
8. ALL MINIMUM CLEARANCES MUST BE MET.
9. ALL BRANCH CONNECTIONS SHALL BE LOCATED DOWN STREAM OF THE ASSEMBLY. ANY BRANCH CONNECTION ON THE SUPPLY SIDE OF THE ASSEMBLY MUST BE PROTECTED BY A SEPARATE APPROVED BACKFLOW PREVENTION ASSEMBLY.

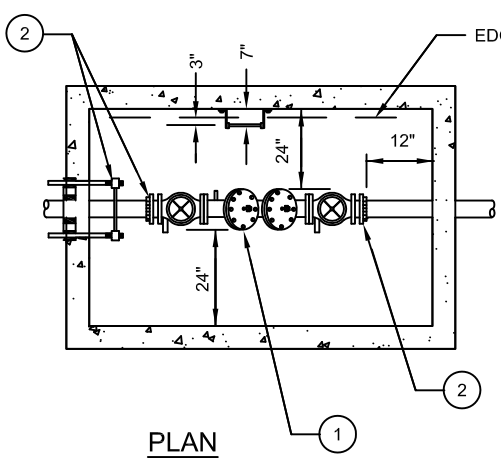
SNOHOMISH
WASHINGTON

DOUBLE CHECK VALVE ASSEMBLY (DCVA) FOR 2" AND SMALLER

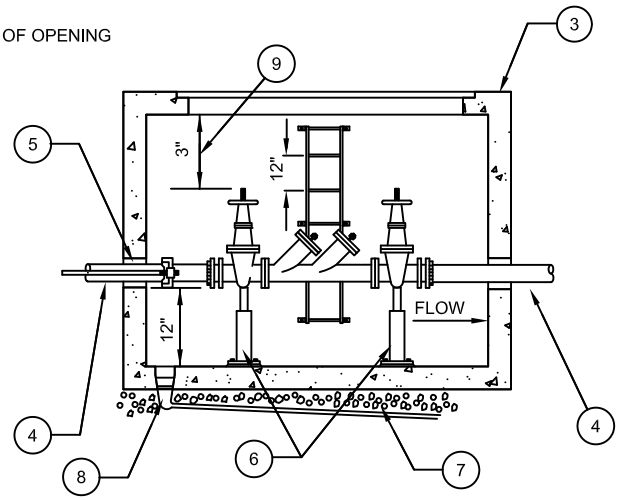
Approved By:
S L S
City Engineer
Date: April 2010

514
Number

City of Snohomish Public Works Department



PLAN



ELEVATION

MATERIAL LIST:

1. WASHINGTON STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING: 2 EACH 0.S.& Y RESILIENT SEATED GATE VALVES, AND FOUR RESILIENT SEATED TEST COCKS.
2. UNI-FLANGE WITH SET SCREWS OR MJ x FL ADAPTER WITH MEGALUG OR GALVANIZED SHACKLE TO MAIN WITH TWO 3/4" RODS, OR MJ RETAINER GLANDS.
3. PRECAST CONCRETE VAULT WITH STEEL ACCESS HATCH (AS MANUFACTURED BY UTILITY VAULT CO OR AN APPROVED EQUAL). COVER TO READ "WATER". PROVIDE OSHA APPROVED HOT DIPPED GALVANIZED STEEL LADDER. INSTALL LADDER IN SUCH A WAY AS TO PROVIDE VAULT ACCESS THAT DOES NOT INTERFERE WITH INSTALLED EQUIPMENT OR MAINTENANCE THEREOF. PROVIDE A SPRING LOADED TRAFFIC LOAD RATED DOUBLE DOOR.
4. DUCTILE IRON PIPE (SIZED AS REQUIRED) CLASS 52.
5. WATER TIGHT GROUT SHALL BE USED IN ALL VAULT PENETRATIONS.
6. 2 EACH GALVANIZED OR STAINLESS STEEL ADJUSTABLE PIPE SUPPORTS FOR 2-1/2" AND LARGER PIPE.
7. GRAVEL FOUNDATION AS REQUIRED.
8. DRAIN, SLOPE TO DAYLIGHT WHEN POSSIBLE. PROVIDE A SUMP PER STANDARD PLAN 514 IF DAYLIGHT DRAIN CANNOT BE PROVIDED.
9. 3" MIN CLEARANCE FROM UNDERSIDE OF VAULT LID TO STEM AND OS&Y WHEN FULLY OPEN.

NOTES:

1. TEE AND GATE VALVE REQUIRED ON MAIN.
2. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY.
3. TEST COCKS ARE REQUIRED TO BE PLUGGED.
4. MAXIMUM HEIGHT OF ASSEMBLY IS FIVE FEET UNLESS AN OSHA APPROVED PLATFORM IS PROVIDED.
5. MINIMUM INSIDE VAULT HEIGHT IS 78", OR AS APPROVED BY THE ENGINEER, FOR 2-1/2" SERVICE AND LARGER.
6. METER SHALL BE INSTALLED SUCH THAT IT CAN BE READ WITHOUT ENTERING VAULT WITH ACCESS HATCH OPEN.
7. ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.

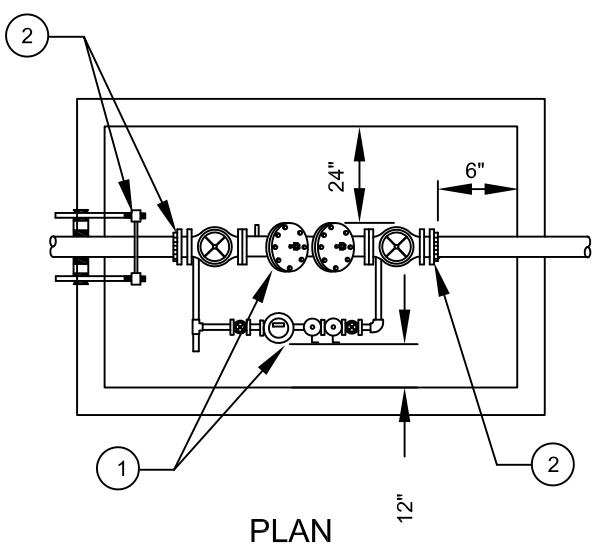
SNOHOMISH
WASHINGTON

DOUBLE CHECK VALVE ASSEMBLY (DCVA) FOR 2-1/2" AND LARGER

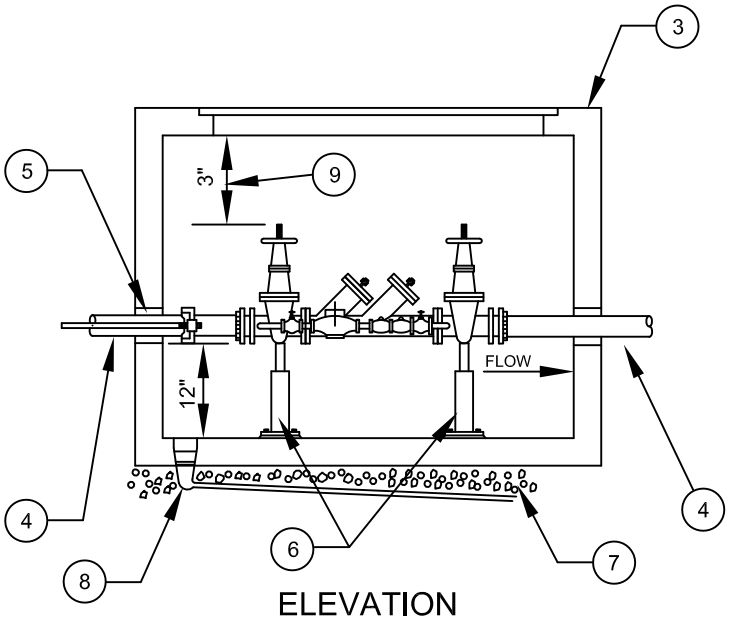
Approved By:
S L S
City Engineer
Date: April 2010

515
Number

City of Snohomish Public Works Department



PLAN



ELEVATION

LEGEND

1. WASHIINGTON STATE APPROVED DOUBLE CHECK DETECTOR VALVE ASSEMBLY METER TO READ IN CUBIC FEET.
2. UNI-FLANGE WITH SET SCREWS OR MJ x FL ADAPTOR WITH MEGALUG OR GALVANIZED SHACKLE TO MAIN WITH 2-3/4" RODS, OR MJ RETAINER GLANDS.
3. PRECAST CONCRETE VAULT WITH STEEL ACCESS HATCH (AS MANUFACTURED BY UTILITY VAULT CO OR AN APPROVED EQUAL). PROVIDE OSHA APPROVED HOT DIPPED GALVANIZED STEEL LADDER INSTALL IN SUCH A WAY THAT VAULT ACCESS DOES NOT INTERFERE WITH INSTALLED EQUIPMENT MAINTENANCE. PROVIDE SPRING LOADED, TRAFFIC LOAD RATED DOUBLE DOOR.
4. DUCTILE IRON PIPE (SIZED AS REQUIRED) CLASS 52.
5. WATER TIGHT GROUT SHALL BE USED IN ALL VAULT PENETRATIONS.
6. 2 - GALVANIZED ADJUSTABLE PIPE SUPPORTS FOR 2 1/2" DIAM AND LARGER PIPE.
7. GRAVEL FOUNDATION AS REQUIRED.
8. DRAIN, SLOPE TO DAYLIGHT WHEN POSSIBLE. INSTALL SUMP PER STANDRD PLAN 518.
9. 3" MIN CLEARANCE FROM UNDERSIDE OF VAULT LID TO STEM OF OS&Y WHEN FULLY OPEN.

NOTES

1. TEE AND GATE VALVE REQUIRED ON MAIN.
2. SINGLE DETECTOR CHECKS ARE NOT APPROVED BACKFLOW PREVENTION DEVICES.
3. ASSEMBLY REQUIRES TESTING UPON INSTALLATION, RETROFITTING, MOVING OR REPAIR AND TESTED ANNUALLY.
4. TEST COCKS ARE REQUIRED TO BE PLUGGED.
5. MAXIMUM HEIGHT OF ASSEMBLY IS FIVE FEET UNLESS AN OSHA APPROVED PLATFORM IS PROVIDED.
6. MINIMUM INSIDE VAULT HEIGHT IS 78" OR AS APPROVED BY THE CITY ENGINEER FOR 3" SERVICE AND LARGER.
7. METER SHALL BE INSTALLED SUCH THAT IT CAN BE READ WITHOUT ENTERING VAULT WITH ACCESS HATCH OPEN.
8. ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.

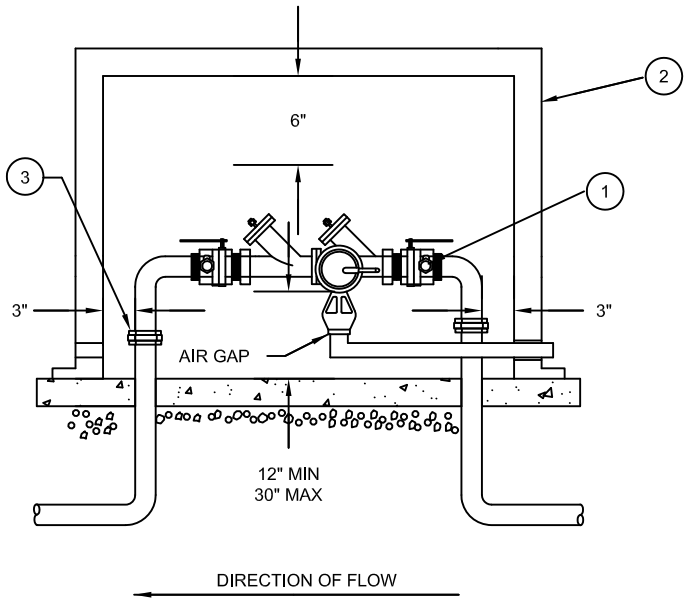
SNOHOMISH WASHINGTON

DOUBLE CHECK DETECTOR VALVE ASSEMBLY (DCDA) 2 1/2" AND LARGER

Approved By:
S L S
City Engineer
Date: April 2010

516
Number

City of Snohomish Public Works Department



ELEVATION

MATERIAL LIST:

1. WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY
2. INSULATED PROTECTIVE ENCLOSURE (HOT BOX) REQUIRED FOR OUTSIDE INSTALLATIONS. THE PROTECTIVE ENCLOSURE MUST BE PROVIDED WITH DRAINS AT BOTH ENDS OF THE BOTTOM SUFFICIENTLY SIZED TO PROVIDE FREE GRAVITY DRAINAGE OF MAXIMUM DISCHARGE OF RELIEF VALVE PORT (2" MIN).
3. 90° ELBOW WITH A CLOSE NIPPLE AND UNION ON VERTICAL.

NOTES:

1. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY, BY OWNER.
2. THE ENCLOSURE MUST BE INSTALLED ON A 4" THICK CONCRETE PAD.
3. AN ELECTRICAL OUTLET MUST BE PROVIDED.
4. GUARD POSTS SHALL BE INSTALLED IF LOCATED IN A TRAFFIC AREA.
5. ALL BRANCH CONNECTIONS SHALL BE LOCATED ON THE DOWNSTREAM SIDE OF THE ASSEMBLY.

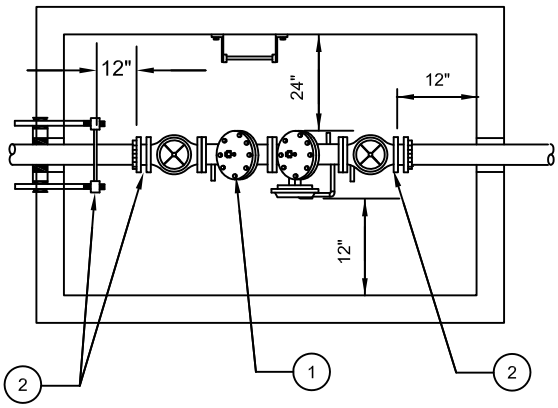
SNOHOMISH
WASHINGTON

REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) 2" AND SMALLER

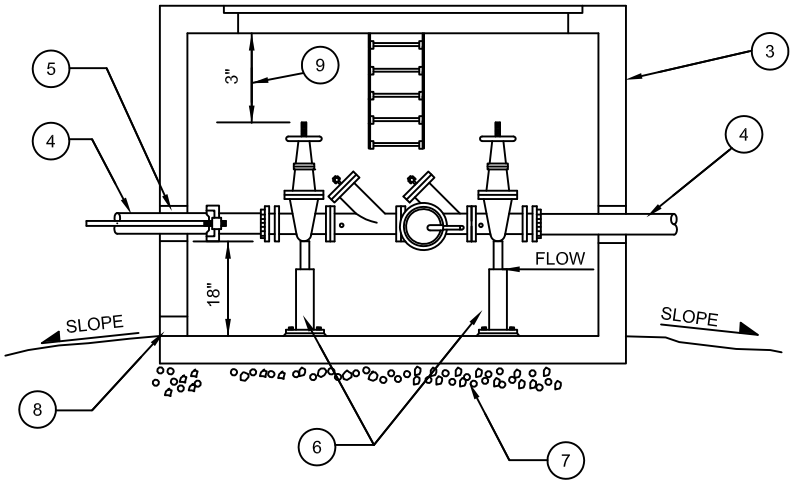
Approved By:
S L S
City Engineer
Date: April 2010

517
Number

City of Snohomish Public Works Department



PLAN



ELEVATION

MATERIAL LIST:

1. WASHINGTON STATE APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY
2. UNI-FLANGE WITH SET SCREWS OR MJ x FL ADAPTOR WITH MEGALUG OR GALVANIZED SHACKLE TO MAIN WITH TWO 3/4" RODS, OR MJ RETAINER GLANDS.
3. INSULATED PROTECTIVE ENCLOSURE (HOT BOX) REQUIRED FOR OUTSIDE INSTALLATIONS. THE PROTECTIVE ENCLOSURE MUST BE PROVIDED WITH DRAINS AT BOTH ENDS OF THE BOTTOM AND SUFFICIENTLY SIZED TO PROVIDE FREE GRAVITY DRAINAGE OF MAXIMUM DISCHARGE OF RELIEF VALVE PORT (2" MIN.).
4. DUCTILE IRON PIPE (SIZED AS REQUIRED) CLASS 52.
5. WATER TIGHT GROUT SHALL BE USED IN ALL VAULT PENETRATIONS.
6. 2 EACH GALVANIZED ADJUSTABLE PIPE SUPPORTS.
7. 5/8" CRUSHED ROCK FOUNDATION AS REQUIRED.
8. DRAIN SHALL BE INSTALLED WITH APPROVED AIR GAP, BE ABLE TO BE BORE SIGHTED TO DAYLIGHT WHICH MUST BE ABOVE 100 YEAR FLOOD LEVEL. DRAIN WILL BE SIZED SO AS TO PROVIDE FREE GRAVITY DRAINAGE OF MAXIMUM DISCHARGE OF RELIEF VALVE PORT.
9. 3" MIN CLEARANCE FROM UNDERSIDE OF VAULT LID TO STEM OF OS&Y WHEN FULLY OPEN.

NOTES:

1. TEE AND GATE VALVE REQUIRED AT WATER MAIN.
2. TEST COCKS ARE REQUIRED TO BE PLUGGED.
3. MAXIMUM HEIGHT OF ASSEMBLY IS FIVE FEET UNLESS AN OSHA APPROVED PLATFORM IS PROVIDED.
4. MINIMUM INSIDE VAULT HEIGHT IS 78", OR AS APPROVED BY CITY ENGINEER, FOR 2-1/2" SERVICE AND LARGER.
5. INSIDE INSTALLATIONS SEE STD. DETAIL NO. W-120.
6. ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.
7. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY.

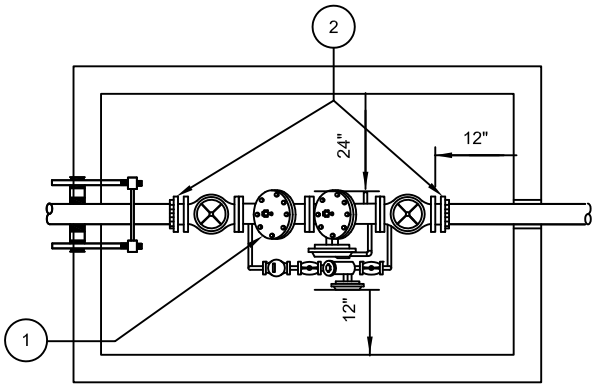
SNOHOMISH
WASHINGTON

REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) 2-1/2" AND LARGER

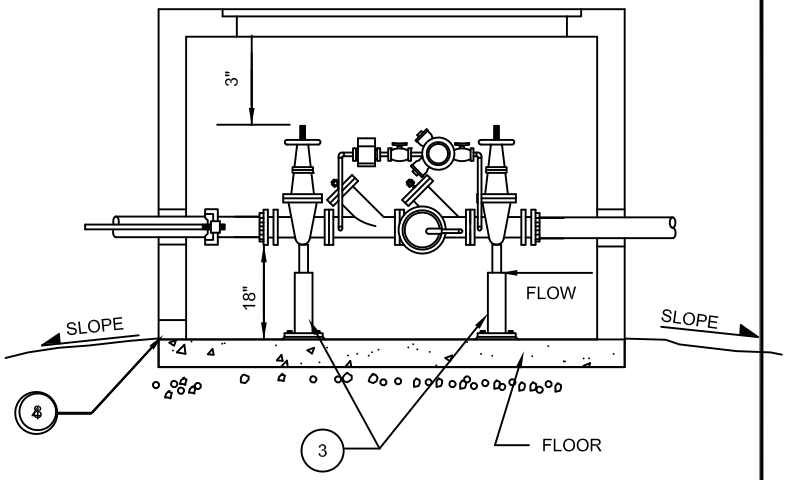
Approved By:
S L S
City Engineer
Date: April 2010

518
Number

City of Snohomish Public Works Department



PLAN



ELEVATION

MATERIAL LIST:

1. WASHINGTON STATE APPROVED REDUCED PRESSURE DETECTOR ASSEMBLY I (METER TO READ IN CUBIC FEET),
2. UNI-FLANGE WITH SET SCREWS OR MJ x FL ADAPTER WITH MEGALUG OR GALVANIZED SHACKLE TO MAIN WITH 2 EACH 3/4" RODS, OR MJ RETAINER GLANDS.
3. TWO - GALVANIZED ADJUSTABLE PIPE SUPPORTS FOR 2-1/2" DIAMETER AND LARGER PIPE.
4. DRAIN SHALL BE INSTALLED WITH APPROVED AIR GAP, BE ABLE TO BE BORE SIGHTED TO DAYLIGHT WHICH MUST BE ABOVE 100 YEAR FLOOD LEVEL. DRAIN WILL BE SIZED SO AS TO PROVIDE FREE GRAVITY DRAINAGE OF MAXIMUM DISCHARGE OF RELIEF VALVE PORT.

NOTES:

1. TEE AND GATE VALVE REQUIRED AT WATER MAIN.
2. TEST CLOCKS ARE REQUIRED TO BE PLUGGED IF ASSEMBLY IS INSTALLED UNDERGROUND.
3. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY, BY OWNER.
4. 2 1/2" AND LARGER RPDAS REQUIRE EITHER AN APPROVED BUILDING ENCLOSURE.
5. INSULATED PROTECTIVE ENCLOSURE (HOT BOX) REQUIRED FOR OUTSIDE INSTALLATIONS. THE PROTECTIVE ENCLOSURE MUST BE PROVIDED WITH DRAINS AT BOTH ENDS OF THE BOTTOM AND SUFFICIENTLY SIZED TO PROVIDE FREE GRAVITY DRAINAGE OF MAXIMUM DISCHARGE OF RELIEF VALVE PORT (2" MIN.).

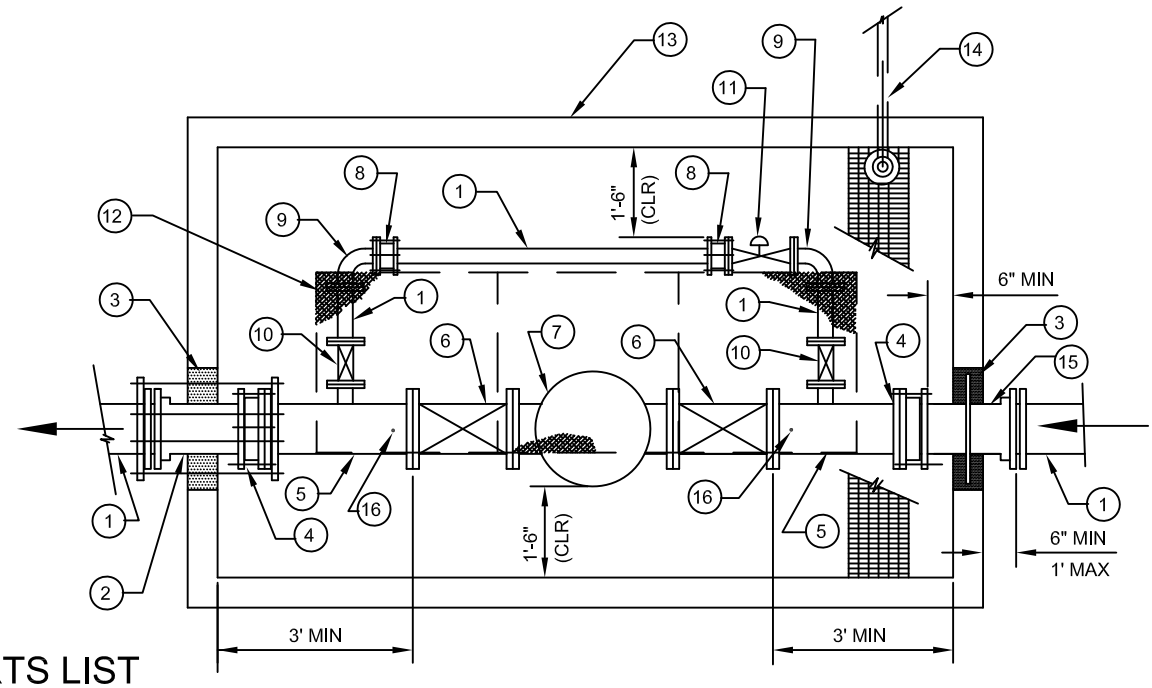
SNOHOMISH WASHINGTON

REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 2 1/2"AND LARGER

Approved By:
S L S
City Engineer
Date: April 2010

519
Number

City of Snohomish Public Works Department



PARTS LIST

1. DUCTILE IRON PIPE
2. SPOOL (MJxPE) WITH SHACKLE BOLTS TO BE USED IN PRECAST VAULTS
3. NON-SHRINK GROUT
4. FLANGE COUPLING ADAPTOR (FLxMJ)
5. TEE (ALL FL)
6. GV CL 200 (FLxFL)
7. PRV (FLxFL)
8. FLANGE COUPLING ADAPTOR
9. 90° ELL (ALL MJ W/MEGA LUGS)
10. GV (FLxFL)
11. PRV (FLxFL)
12. UTILITY VAULT CO LID WITH TRAFFIC LOADED LOCKING STEEL COVERS OR EQUAL.
13. UTILITY VAULT CO PRECAST VAULT.
14. 2" GRAVITY SUMP DRAIN EXTEND TO DAY-LIGHT OR TO STORM DRAINAGE SYSTEM.
15. WALL SLEEVE (FLxPE) TO BE USED WITH CAST IN PLACE VAULTS.
16. 1/4" GAUGE TAPS WITH 1/4" BALL VALVES FOR ISOLATION.

NOTES

1. MINIMUM VAULT INSIDE HEIGHT SHALL BE 78", OR AS APPROVED BY THE ENGINEER.
2. MINIMUM CLEARANCE BETWEEN PRV VALVES AND FLOOR SHALL BE 12".
3. PROVIDE LIQUID FILLED 2 1/2" GAUGES AMETEK SERIES 550L OR EQUAL.
4. ALL EQUIPMENT MUST BE RATED FOR SOURCE PRESSURE.
5. PIPING AND VALVES SHALL BE SUPPORTED BY POURED-IN-PLACE CONCRETE OR STEEL STANDS. NUMBER OF AND PLACEMENT OF STANDS TO BE DETERMINED BY CITY ENGINEER ACCORDING TO VALVE SIZE.
6. BRAND, MINIMUM CLEARANCES, TYPE OF PRV AND ACCESSORIES TO BE DETERMINED BY CITY OF SNOHOMISH PUBLIC WORKS DIVISION.

SNOHOMISH
WASHINGTON

TYPICAL PRV INSTALLATION

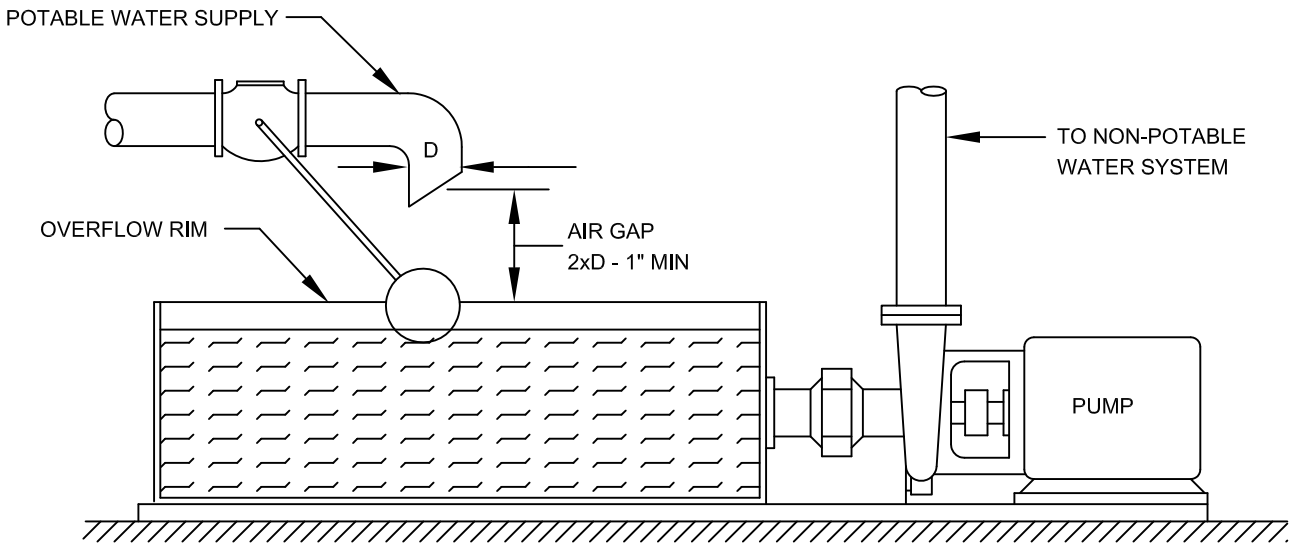
Approved By:
S L S
City Engineer
Date: April 2010

520
Number

City of Snohomish Public Works Department

APPROVED AIR GAP SEPARATION

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



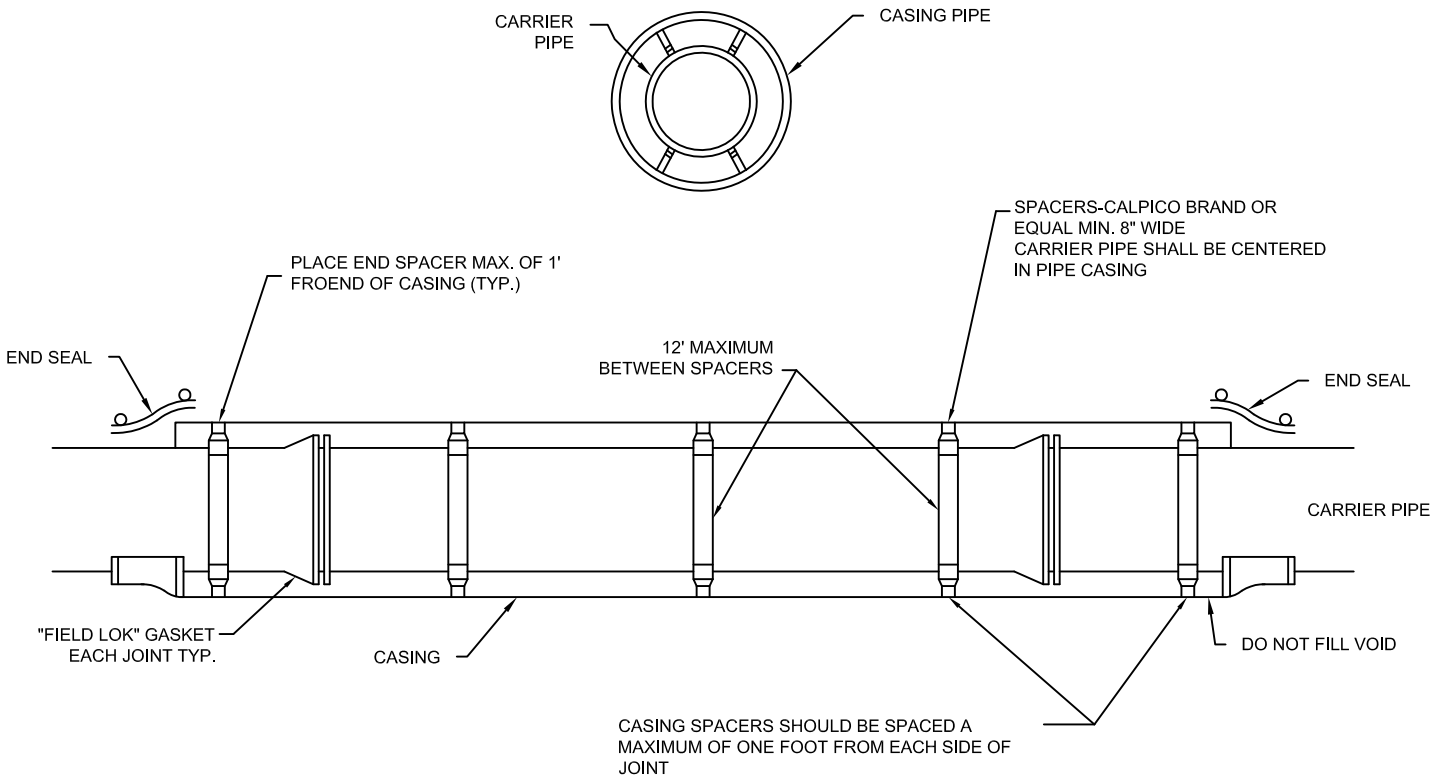
SNOHOMISH
WASHINGTON

AIR GAP FOR MAKEUP TANK

Approved By:
S L S
City Engineer
Date: April 2010

521
Number

City of Snohomish Public Works Department



CARRIER PIPE DIAMETER	4"	6"	8"	10"	12"
CASING DIAMETER (MJ/MEGALUG JOINT CARRIER PIPE)	14"	16"	18"	20"	22" *
STEEL CASING THICKNESS	0.25"	0.25"	0.25"	0.25"	0.25
SPACER BAND WIDTH	8"	8"	8"	8"	8"

* USE 24" DUCTILE IRON PIPE

NOTES:

1. ANY VARIATION TO THIS DETAIL SHALL BE REVIEWED AND APPROVED BY CITY ENGINEER.
2. CASING SHALL BE SEALED AT BOTH ENDS.
3. PIPE CASINGS SHALL EXTEND 6 FEET BEYOND THE EDGE OF PAVEMENT. IF THE RIGHT-OF-WAY IS NOT OWNED BY CITY OFSNOHOMISH, PIPE CASING SHALL EXTEND 6 FEET BEYOND RIGHT-OF-WAY.

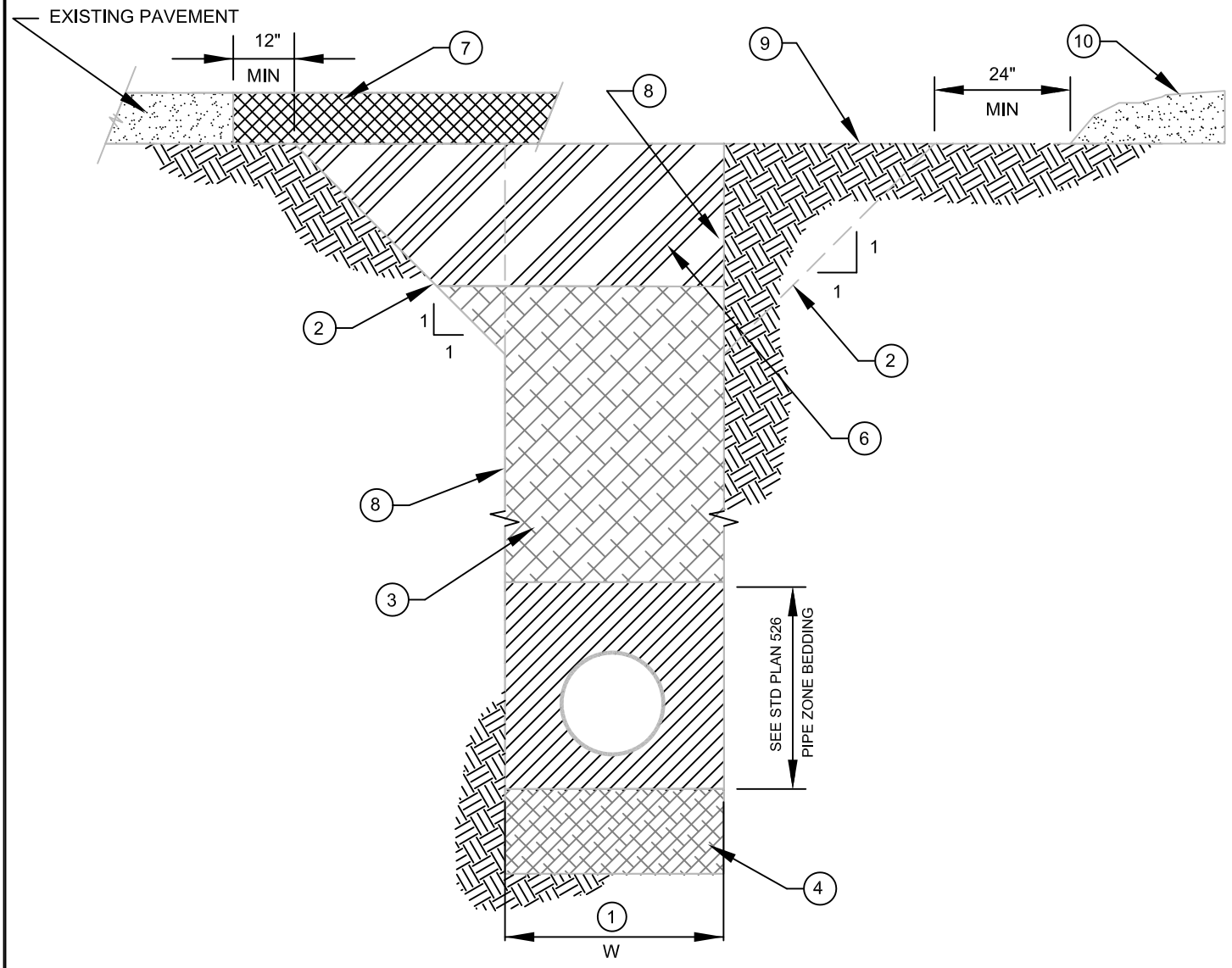
SNOHOMISH WASHINGTON

STEEL CASING FOR WATER MAIN

Approved By: S L S
City Engineer
Date: April 2010

522
Number

City of Snohomish Public Works Department



NOTES

1. W = MAXIMUM WIDTH OF TRENCH FOR PIPES 15" OR LESS IN DIA, W-40 FOR PIPES 18" OR GREATER, W = 1-1/2 X I.D. + 18".
2. ALTERNATE LAID-BACK TRENCH TO MEET O.S.H.A. REQUIREMENTS (NO SLOPES STEEPER THAN 1:1 EXCEPT FOR ROCKE).
3. NATIVE MATERIAL IF ALLOWED IN ADVANCE BY THE CITY ENGINEER, OR IMPORTED GRAVEL BORROW AS DIRECTED SHALL COMPACT TO 90% MAXIMUM DENSITY EXCEPT FROM SUBGRADE DOWN 4' WHICH SHALL BE CSTC.
4. CLASS A FOUNDATION GRAVEL, IF REQUIRED BY THE CITY ENGINEER TO REPLACE UNSUITABLE MATERIAL.
5. FOR ADDITIONAL COMPACTION INFORMATIONS SEE STANDARD PLAN 527
6. THE TOP 4' OF BACKFIL SHALL BE CSTC. THE CONTRACTOR HAS THE OPTION TO FILL THE ENTIRE EXCAVATION TO SUBGRADE WITH CSTC.
7. SEE CITY OF SNOHOMISH STANDARD PLAN 316 FOR PAVEMENT PATCH DETAILS.
8. VERTICAL TRENCH WALLS WITH SHORING SHALL CONFORM TO O.S.H.A. REGULATIONS.
9. SUBGRADE OR GROUND SURFACE IN NON-PAVED AREAS.
10. EXCAVATED NATIVE MATERIAL OR APPROVED STOCKPILED BACKFILL MATERILAL

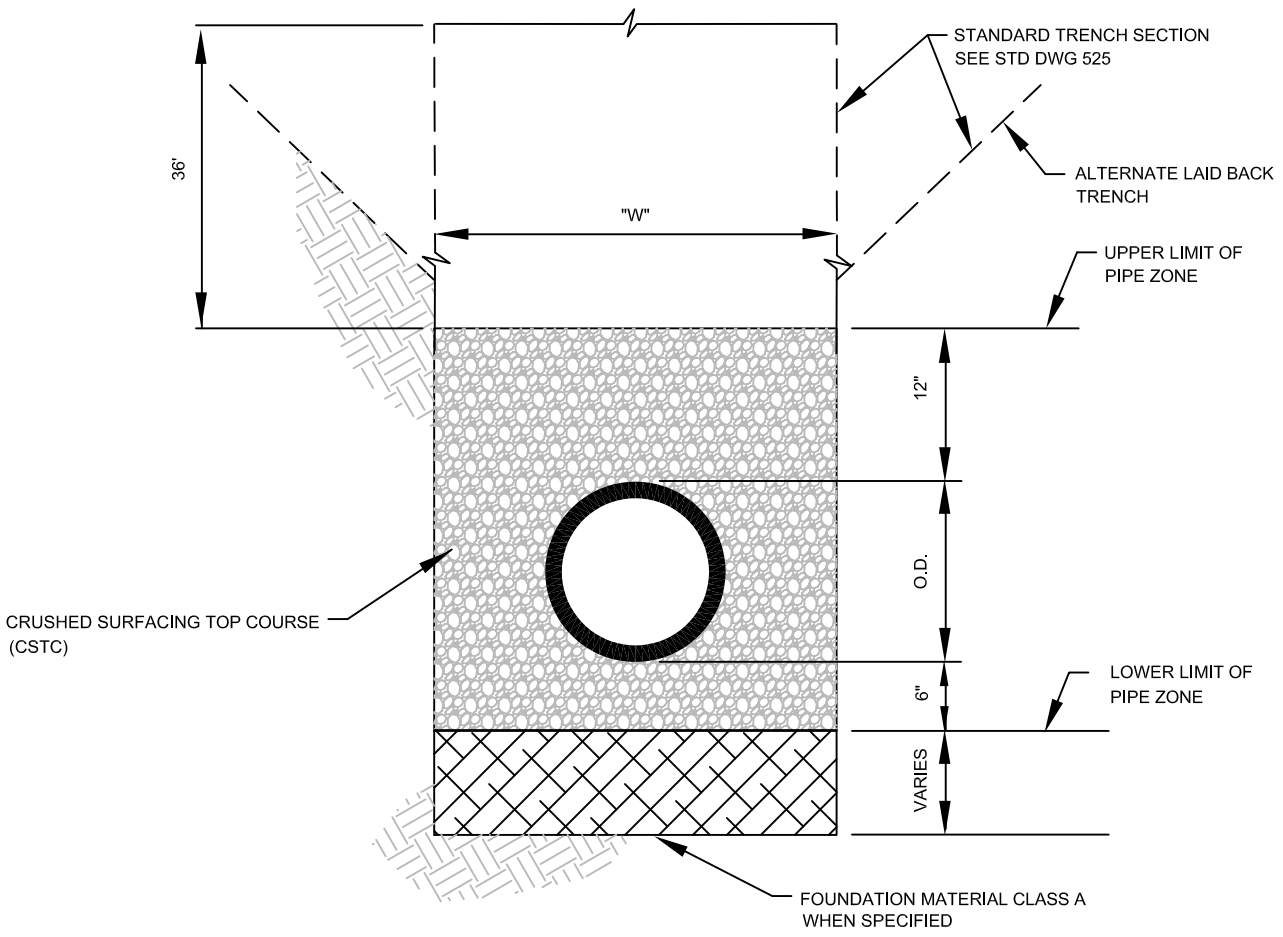
SNOHOMISH
WASHINGTON

TYPICAL WATER TRENCH SECTION

Approved By:
S L S
City Engineer
Date: April 2010

523
Number

City of Snohomish Public Works Department



LIMITS OF TRENCH:

W = MAXIMUM WIDTH OF TRENCH. FOR PIPES 15" OR LESS IN DIAMETER W = 40". FOR PIPES 18" OR GREATER W = 1 1/2 x I.D. + 18".

BEDDING AND FOUNDATION MATERIALS:

1. BEDDING MATERIAL SHALL BE CRUSHED SURFACING TOP COURSE CONFORMING TO SECTION 9-03.08(3) OF THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION WSDOT/APWA
2. FOUNDATION MATERIAL, IF REQUIRED, SHALL BE FOUNDATION MATERIAL CLASS A CONFORMING TO SECTION 9-03.12 OF THE STANDARD SPECIFICATION FOR ROAD , BRIDGE AND MUNICIAPL CONSTRUCTION WSDOT/APWA.

PROCEDURE FOR COMPACTION:

1. PROVIDE UNIFORM SUPPORT UNDER BARREL.
2. COMPACT BEDDING MATERIAL TO 90% MAXIMUM DENSITY EXCEPT DIRECTLY OVER PIPE. HAND TAMP ONLY.
3. HAND TAMP UNDER HAUNCHES.
4. FOR ADDITIONAL COMPACTION INFORMATION SEE STANDARD PLAN NO. 527.

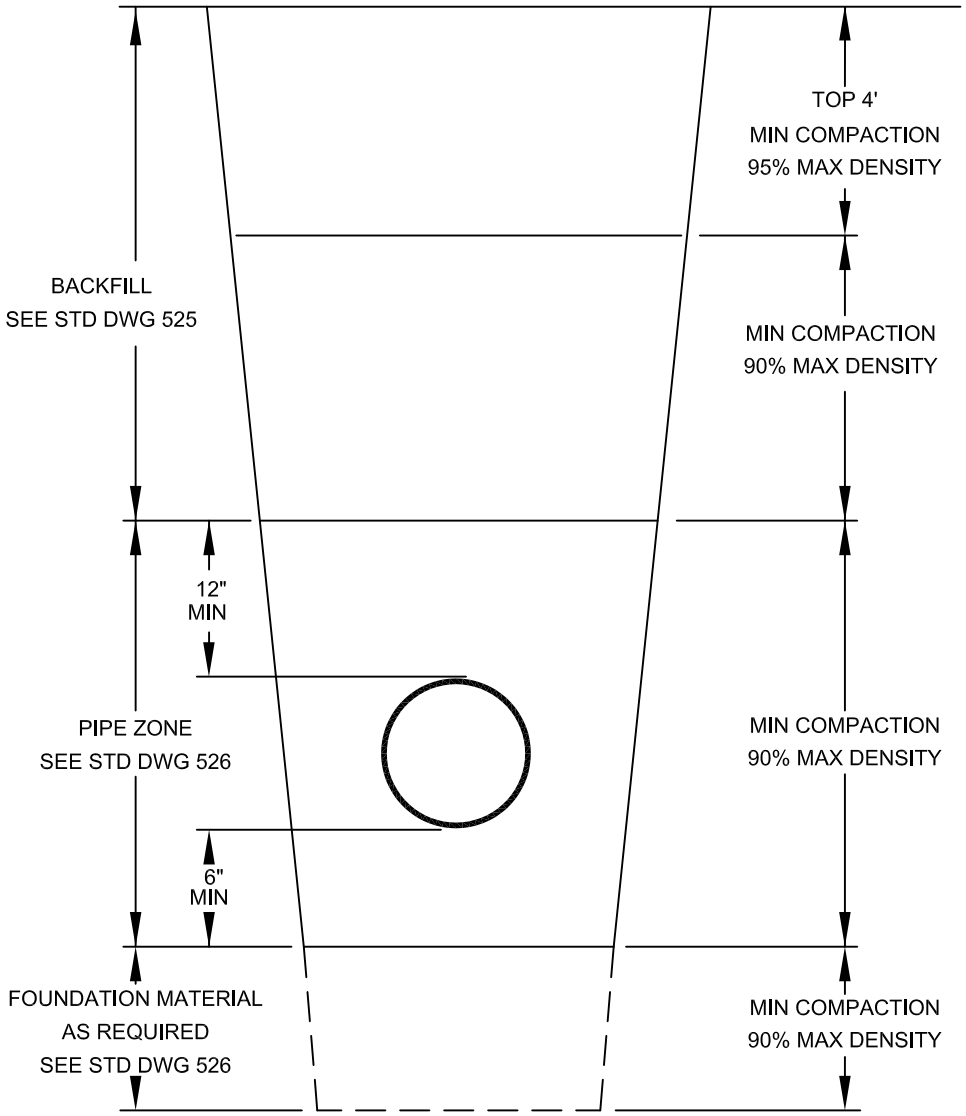
SNOHOMISH
WASHINGTON

BEDDING FOR WATER PIPE IN TRENCHES

Approved By:
S L S
City Engineer
Date: April 2010

524
Number

City of Snohomish Public Works Department



SECTION

NTS

NOTES:

1. ALL BACKFLL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 12 INCHES BEFORE COMPACTION UNLESS AUTHORIZED BY THE CITY ENGINEER DUE TO THE CHARACTER OF THE MATERIAL AND COMPACTING EQUIPMENT.
2. MECHANICAL COMPACTION OF BACKFILL MATERIAL SHALL NOT BEGIN UNTIL THE DEPTH OF COMPACTED MATERIAL IS 2 FEET ABOVE THE TOP OF PIPE.
3. EACH LIFT SHALL BE MECHANICALLY COMPACTED TO THE REQUIRED DENSITY PRIOR TO PLACING SUCCEEDING LIFTS OF BACKFILL MATERIAL
4. COMPACTON TESTS SHALL BE AS REQUIRED BY THE CITY ENGINEER, BUT IN NO CASE LESS THAN 2 TESTS EVERY 200 FEET OF TRENCH LENGTH (ONE AT SUBGRADE AND ONE AT 50% OF TRENCH DEPTH).
5. IN PLACE DENSITY WILL BE DETERMINED BY ONE OR MORE OF THE FOLLOWING METHODS
   ASTM D1556 - TEST FOR DENSITY OF SOIL IN PLACE BY THE SAND CONE METHOD.
   ASTM D2167 - (RUBBER. BALLON METHOD)
   ASTM D2922 - (NUCLEAR METHOD)
6. LABORATORY DENSITY WILL BE DETERMINED BY ASTM D698, MOISTURE DENSITY RELATIONS OF SOILS AND SOIL AGGREGATE MIXTURES.

SNOHOMISH
WASHINGTON

TYPICAL WATER TRENCH COMPACTION

Approved By:
S L S
City Engineer
Date: April 2010

525
Number

City of Snohomish Public Works Department

Water Right Claim – S1-043282CL

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
OCT 17 1973 549
CASH ___ OTHER ___ NONE ✓

1. NAME CITY OF SNOHOMISH

ADDRESS 1009 1st Street

Snohomish, Washington ZIP CODE 98290

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: Surface (SURFACE OR GROUND WATER)

W.R.I.A. 07 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS

B. IF SURFACE WATER, THE SOURCE IS Pilchuck River

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 2.5 cfs. PRESENTLY USED 2.5 cfs.
(CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED PRESENTLY USED
(ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED PRESENTLY IRRIGATED

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: Continuous

4. DATE OF FIRST PUTTING WATER TO USE: MONTH YEAR 1890

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 1,976 FEET S20°15'45"W AND

FEET FROM THE NE CORNER OF SECTION 9

BEING WITHIN NE 1/4 OF SECTION 9 T. 29 N., R. 7 (E[redacted].) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT BLOCK OF

(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED:

Section 7,8,9,17,18,19 in Township 29 North, Range 7 East

Section 14,15,16,20,21,22,23,24,28,29,32 in Township 29 North, Range 6 East

Section 5,7,8,9,17,18,19 in Township 28 North, Range 6 East

Section 1,12,13,14,24 in Township 28 North, Range 5 East

COUNTY SNOHOMISH

7. PURPOSE(S) FOR WHICH WATER IS USED: Municipal

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: Appropriation

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

[redacted]043282

John Biggs

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF

X Richard J. Thompson, City Atty

DATE October 15, 1973

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW

Richard J. Thompson
City Attorney
108 Union Avenue
Snohomish, WA 98290

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE

A FEE OF $[redacted] MUST ACCOMPANY THIS WATER RIGHT CLAIM

RETURN ALL THREE COPIES WITH CARBONS INTACT, ALONG WITH YOUR FEE TO DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

Surface Water Certificate – S1-00500C

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

[X] *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

[ ] *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
S1-00500C	1887	3571	December 9, 1931

NAME
CITY OF SNOHOMISH

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
1009 1st Street	Snohomish	Washington	98290

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
Pilchuck River
TRIBUTARY OF (IF SURFACE WATERS)
Snohomish River

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
5.0 cubic feet per second		3000 acre-feet per year

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal Supply - continuous use

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1,976 feet south 20°15'45" west from northeast corner of Section 9 being within NE¼ of Section 9

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼SE¼NE¼	9	29	7E		Snohomish

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by the City of Snohomish.

Nothing in this certificate shall be construed as excusing the certificate holder from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971.

The entire opening of the diversion intake shall be tightly screened at all times with wire mesh having openings with dimensions not greater than 0.125 (1/8) inch. Water approach velocity to the screen shall be less than 1 foot per second and approaching 0.5 foot per second, as measured one foot in front of the screen.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 28th *day of* February, *19* 74.

JOHN A. BIGGS, *Director*
Department of Ecology

by R. Jerry Collen
R. JERRY COLLEN, Assistant Director

ENGINEERING DATA
OK Hewitt

FOR COUNTY USE ONLY

S. F. No. 7355—OS.

Proof of Appropriation of Water

Application No. 3571 Permit No. 1887

1. Name of Permittee CITY OF SNOHOMISH
2. Postoffice address (include zip code) 1009 1st Street, Snohomish, Washington 98290
3. Actual source of appropriation 1,976 feet South 20°15'45"W from NE corner of Section 9 being within NE 1/4 of Section 9, T. 29 N. Range 7 E.W.M.
4. For what purpose or purposes is water used? Municipal
5. Give date of beginning of construction of hydraulic system: 1934
6. Give date of completion of construction of this work, including water distribution system 1935
7. Give date when water was completely applied to permitted use 1935
8. If used for irrigation:

   Give number of acres described in permit

   Give number of acres actually irrigated
9. If used for power: HP actually developed
10. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

Sec. 7,8,9,17,18,19 in Township ~~29~~ North, Range 7 East
Section 14,15,16,20,21,~~22,23~~,24,28,29,32 in Township 29 North, Range 6 East
Section 5,7,8,9,~~17,18~~,19 in Township 28 North, Range 6 East
Section 1,~~12,~~13,14,24 in Township 28 North, Range 5 East

AREA SERVED BY THE City of SNOHOMISH

11. If source is a well, is an access port or airline now installed?
12. During what months is water used? Continuously
13. Does map filed with your application show correctly the location of well(s) or point(s) of diversion for withdrawal of water, and area of land where water is used? Yes
14. If the dimensions, location, or type of hydraulic system and structure do not correspond to those described in your permit, state what changes have been made, giving dimensions, etc. Yes
15. Actual measured discharge or diversion of permanent system: 5 ~~gallons~~ cfs).

(Sign certification on reverse side)

OK FOR CERT, ISSUE FOR 5 CFS, 3000 A/F USE LEGAL ABOVE 2/13/74

STATE OF WASHINGTON,
County of SNOHOMISH } ss.

I, RICHARD J. THOMPSON, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 15th day of October, 1973.

Richard J. Thompson

Subscribed and sworn to before me this 15th day of October, 1973.

Edith E. Watson
Notary Public.
in and for the State of Washington,
residing at Snohomish.

PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same, subject to the following limitations and conditions: If for irrigation, this appropriation shall be subject to such reasonable rotation system as may be ordered by the State Supervisor of Hydraulics.

This permit is subject to all rights legally established by appropriation for beneficial use prior to August 18th, 1926. It is specifically subject to the rights of the Puget Sound Power and Light Company and may be enjoyed only when and to the extent that it does not interfere with diversion for beneficial use by that company.

The amount of water appropriated shall be limited to the amount which can be applied to beneficial use and not to exceed ------16.0------ *cubic feet per second, or its equivalent in case of rotation.*

The priority date of this permit is December 9th, 1931.

Actual construction work shall begin on or before May 15th, 1933

and shall thereafter be prosecuted with reasonable diligence and be completed on or before May 15th, 1937 Extended to 1-1-44 (same project as P.949) Ext. to 10-1-46, 10-1-63 10-1-67 10-1-70

Complete application of the water to the proposed use shall be made on or before May 15th, 1942

Given under my hand and the seal of this office at Olympia, Washington, this 19th *day of* May, *19* 32

Chas J Barthelet

State Supervisor of Hydraulics.

Application No. 3571

Permit No. 1887

PERMIT

To Appropriate Public Waters of the State of Washington

Filed by City of Snohomish.

County of Snohomish

This instrument was first received in the office of the State Supervisor of Hydraulics, Olympia, Washington, on the 9th *day of* December, *19* 31, *at* 1:30 *o'clock* P. *M.*

Approved May 19th, 1932

Recorded in Book No. 8 *of Permits, on Page* 1887.

CHAS. J. BARTHOLET
State Supervisor of Hydraulics.

JAY THOMAS, PUBLIC PRINTER

Before your certificate of water right is issued it will be necessary for you to file with the State Supervisor of Hydraulics a copy of each of the following reports:

1st. Progress reports (in case temporary permit is issued).
2nd. Affidavit of publication of notice of water right application.
3rd. Notice of beginning of construction.
4th. Notice of prosecution of work with diligence.
5th. Notice of completion of construction.
6th. Notice of application of water to a beneficial use.
7th. Proof of appropriation of water.

Upon a satisfactory showing that the appropriation has been perfected as provided by statute the State Supervisor of Hydraulics will issue a water right certificate.

(Blanks will be furnished by the office of State Supervisor of Hydraulics)

MUNICIPAL SUPPLY—

16. *To supply the city of* SNOHOMISH (Name), SNOHOMISH *County, having a present population of* 3000 *and an estimated population of* 6000 in city limits *in 19* 50. also now serving 2000 suburban population which is rapidly increasing

(*a*) *Estimated present requirement* 3 second feet 3 second feet

(*b*) *Estimated future requirement* 30 second feet

17. *Construction work will begin on or before* Dam is completed. Pipeline also under construction under a ten year plan

18. *Construction work will be completed on or before* 1942

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the State Supervisor of Hydraulics accompany this application.

City of Snohomish
(Name of applicant)

By C. T. Bateman
Its Mayor.

Attest: E. Whittemore
City Clerk

Signed in the presence of us as witnesses:

(1) ..... (Name), Snohomish, Washington (Address of witness)

(2) ..... (Name), Snohomish, Washington (Address of witness)

Remarks: August 18th,1926, above applicant filed application for 21 c.f.s. for power and 9 c.f.s. for municipal supply. The 16 c.f.s hereby applied for is in addition to the 9 c.f.s. applied for Aug.8th,1926, for municipal supply. The 5 c.f.s herein applied for for power is sufficient for present needs and the 21 c.f.s. applied for by the former application will now not be used for power development. It is the purpose of the city ~~to~~ under new development plan to furnish water supply to suburban communities particularly along its gravity pipeline, which are being developed and settling very fast.

STATE OF WASHINGTON, } ss.
COUNTY OF THURSTON. }

This is to certify that I have examined the foregoing application together with the accompanying maps and data, and return the same for correction or completion, as follows: .....

In order to retain its priority, this application must be returned to the State Supervisor of Hydraulics, with corrections, on or before ....., *19*.....

WITNESS my hand this .....*day of* ....., *19*.....

.....
State Supervisor of Hydraulics.

Form 10

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

RECEIVED DEC 9 1931 DIVISION OF HYDRAULICS

APPLICATION FOR A PERMIT
To Appropriate Public Waters of the State of Washington

Application No. 3571 *Permit No.* 1887

I, CITY OF SNOHOMISH (Name of applicant),

of SNOHOMISH (Postoffice), *County of* SNOHOMISH,

State of WASHINGTON, *do hereby make application for a permit to appropriate the following described public waters of the State of Washington subject to existing rights:*

If the applicant is a corporation, give date and place of incorporation 1890

1. *The source of the proposed appropriation is* Pilchuck River (Name of stream)

tributary of Snohomish River. (16.0 c.f.s. allowed)

2. *The amount of water which the applicant intends to apply to beneficial use is* 21 *cubic feet per second.* (5 c.f.s for power, and) 16 c.f.s. additional for municipal supply.

3. *The use to which the water is to be applied is* municipal water supply and (Irrigation, power, mining, manufacturing, domestic supplies, etc.)

power for operating gates and lighting

4. *Time during which water will be required each year* twelve months.

5. *The approximate point of diversion is located* S. 20° 15' 45" W. of the N.E. (Give distance and bearing to section corner)

corner of Section 9, Township 29 N., R. 7 E., W.M. 1976 feet,

being within the N.E.¼ of SE¼ of NE¼ (Give smallest legal subdivision) *of Sec.* 9, *Tp.* 29 N. *N., R.* 7 E. *W. M.,* (No. E. or W.)

in the county of Snohomish.

6. *The* pipe line (Main ditch, canal, or pipe line) *to be* 16 ~~ft.~~ or *miles in length, terminating in the* Sec. 9, 17, 18, 19 (Smallest legal subdivision) *of Sec.* , *Tp.* 29 *N. R.,* 7 E. *W. M.,*
and Sec. 24, 23, 14, 15, 22, 21, 29, 32 Tp. 29 N.R. 6 (No. E. or W.) E. W. M.
and Sec. 5, 7 Tp. 28 N., R. 6 E. W. M.
the proposed location being shown on the accompanying map.

7. *The name of the ditch, canal or other works is*

8. *Estimated cost of development necessary to utilize fully the appropriation herein asked for*

$ 250 000.00

9. *Does the stream from which you wish to appropriate water flow through the tract of land on which the water is to be used?* Partly

10. *Do you own the required right-of-way for the proposed works?* Yes

DESCRIPTION OF WORKS.

DIVERSION WORKS—

11. (a) *Height of diversion dam* 18 *feet; length on top* 100 *feet; length at bottom* 70 *feet; material to be used and character of construction*

Concrete and steel
(Loose rock, concrete, masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) *Description of headgate* 2 openings- one 24 inches for pipeline
(Timber, concrete, etc.; number and size of openings)

and one 3 X 4 feet for gate

When storage works are contemplated a storage permit must be filed in addition to the above. These forms can be secured, together with instructions, by addressing the State Supervisor of Hydraulics, Olympia, Washington.

CANAL SYSTEM—

12. (*a*) *Give approximate dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line)*.....*feet; width on bottom*.....*feet; depth of water*.....*feet; grade*.....*feet fall per one thousand feet.*

(*b*) *At*.....*miles from headgate: Width on top (at water line)*.....*feet; width on bottom*.....*feet; depth of water*.....*feet; grade*.....*feet fall per one thousand feet.*

Initial pipe line
26,000 feet of 24-inch pipe, 20,000 feet of 18-inch pipe
35,000 feet of 16-inch pipe.

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

IRRIGATION—

13. *The land to be irrigated has a total area of*.....*acres, described as follows:*.....
(Give legal subdivision by section, township and range)

(If more space is required, attach separate sheet)

14. *Give the legal description of land when water is to be used for purposes other than irrigation, power and municipal supply*..... (Legal subdivisions) *Sec*....., *Tp*.....*N., Rge*..... (E. or W.) *W. M.*

(*a*) *To what stream is water returned*.....

(*b*) *Locate the point of return*..... (Smallest legal subdivision of section) *Sec*....., *Tp*.....*N., Rge*..... (E. or W.) *W. M.*

POWER—

15. (*a*) *Total amount of power to be developed* 14 5 (Theoretical horsepower) *H. P.*

(*b*) *Total fall to be utilized* 25 (Head) *feet.*

(*c*) *The nature of the works by means of which the power is to be developed*.....
Hydraulic turbine direct connected to generator

(*d*) *Such works to be located in* NE¼ of SE¼ of NE¼ (Legal subdivision) *of Sec.* 9,
Tp. 29 *N., Rge.* 7 E. (No. E. or W.) *W. M.*

(*e*) *To what stream is the water to be returned* Pilchuck River

(*f*) *Locate point of return* at point of diversion below dam *Sec*....., *Tp.* 29 *N., Rge.* 7 (No. E. or W.) E. *W. M.*

(*g*) *The use to which power is to be applied is* ~~for pumping municipal water sup-~~ ply.
for power to operate gates and light dam and building

10-1-71
CC

PROGRESS SHEET

Name: City of Snohomish
Snohomish, Washington

Assigned to:

Date:

APPLI. NO. 3571 PERMIT NO. 1887 CERT. NO. S100500C

Appli. received 12-9-31 Initial Exam. fee received 12-9-31
Appli. returned for completion or correction _____ Received _____
Statement of add. exam. fee sent 12-11-31 Amount: 18.00
Additional examination fee received 12-17-31

Application amended _____
Application cancelled _____

O.K.'d for publication by C.J.B. Date 12-17-31
Notice of Water Right Application sent 1-7-32
Protests filed _____
Affidavit of Publication received and checked 2-8-32

Report of Game: Approved _____ Proviso _____ Protest _____
Report of Fish: Approved _____ Proviso _____ Protest _____

Temporary Permit issued _____ to _____

Examination made _____ by _____
Statement of filing and recording fee sent 3-14-32 Amount $32.00
Filing and recording fee received _____
O.K.'d for Permit C.J.B. by March 12, 1932
Permit issued 5-19-32 No. 1887

Notice of Beginning of Construction sent 5-24-32
Fee for Extension " " " $_____ to _____
Notice of Beginning " " received 10-33

Notice of Completion of Construction sent _____
Time for " extended to 5-15-34 (1-1-44same project as 949)10-1-46 10-1-57 10-1-62 10-1-63 10-1-65 10-1-67 10-1-68 10-1-69 10-1-70 10-1-71
Notice of " filed _____

Notice of Complete Application of Water sent _____
Time for " " extended to _____
Notice filed _____

Proof of Appropriation sent _____ Filed 2/7/74
Statement of Certificate fee sent _____ Received 2/7/74

Certificate of Water Right issued S100500C No. 2-28-74

City of Snohomish, Washington
June 21, 2016
Resolution 1347

CITY OF SNOHOMISH
Snohomish, Washington

RESOLUTION 1347

A RESOLUTION OF THE CITY OF SNOHOMISH STATING A POLICY FOR THE FUTURE CLOSURE OF ITS WATER TREATMENT PLANT AND THE REMOVAL OF ITS WATER SUPPLY INTAKE AND DIVERSION DAM ON THE PILCHUCK RIVER CONDITIONED ON SEVERAL OUTCOMES INCLUDING THE INTENT TO PROTECT AND PRESERVE ITS WATER RIGHTS IN THE PILCHUCK RIVER SYSTEM

WHEREAS, the City of Snohomish (City) currently serves the northern half of the City with water purchased from the City of Everett (Everett) and supplied from Everett's No. 5 water transmission line running through the City north of Blackmans Lake; and

WHEREAS, the City supplies most of the southern half of the City with water supplied by the City's water treatment plant originally constructed in 1981, and located approximately 9 miles outside the City limits and outside the City's Urban Growth Area northeast of the City, just north of Lake Roesiger; and

WHEREAS, the City's supply for the treatment plant is provided through a diversion dam and water intake structure which was constructed beginning in 1932 on the Pilchuck River which is also several miles outside the City limits and the City's Urban Growth Boundary; and

WHEREAS, the City's water is conveyed through a 14.6 mile water transmission main originally constructed in 1912 and replaced in 1981. The main supplies a City reservoir located near the intersection of Pine Avenue and 13th Street; and

WHEREAS, the City's 14.6 mile water transmission main has a limited number of years of useful life and has the potential in the future to fail and cease to meet standards which could cause interruption of service and extraordinary costs to remedy; and

WHEREAS, the 14.6 mile water transmission main serves approximately 76 metered customers who are outside the City limits and outside of the City's Urban Growth boundary; and

WHEREAS, the City completed the *Water Treatment Plant and Water Supply Study* in May 2009 *(2009 Study)* which examined the City's existing Pilchuck River water treatment plant and alternative sources of water supply; and

WHEREAS, changes in projected population growth and cost assumptions have occurred since the 2009 Study was completed. Said changes may result in different cost projections for supply of water to customers. Some of the changes since the 2009 study include:

- The City of Everett's 2014 Amendment to the 2007 Water Comprehensive Plan which was approved by the State of Washington Department of Health on April 9, 2015. This amendment is to remain in effect until April 9, 2021;

- Despite improvements in water production and optimization at the City's water treatment plant over the last 7.5 years, the plant faces continued limits on total water production, especially during the winter months, due to the new Washington State Department of Health (DOH) regulations on filtered water turbidity; and

- Significant reduction of the City's population projections for 2025 (interpolated) and 2035 based on revised County planning targets for the 2015 to 2035 planning period; and

WHEREAS, the City Council deems it to be in the public interest to declare its policy and intent to protect and preserve its water rights in the Pilchuck River system to the greatest extent possible for current, near term, and long term water planning purposes and to forecast its plans for addressing the water treatment facilities and 14.7 mile water transmission pipeline; and

WHEREAS, the City Council held workshops on March 4, 2014, and November 4, 2014, regarding the City's water supply and water treatment options; and

WHEREAS, at the August 4, 2015, City Council meeting, the Council unanimously approved Resolution 1331 to explore other sources of water supply, including but not limited to City of Everett water, Snohomish County PUD water and ground water as alternatives to its Pilchuck River treatment plant source, and continue planning and take necessary steps to fully protect and preserve its water rights in the Pilchuck River, and to advance other related planning actions; and

WHEREAS, at the September 15, 2015, City Council meeting, the Council authorized the City Manager to enter into an agreement with FCS Group, Inc. for a Water Rate Update and Area Specific Charge Study; and

WHEREAS, on May 3, 2016, the City Council held a workshop to review the results on the water rate study and to consider the basic procedures for working with the Washington State Department of Ecology for "banking" of the City's water right;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SNOHOMISH, WASHINGTON AS FOLLOWS:

Section 1. City Customer Water Supply from the City of Everett.
The City of Snohomish will pursue measures that would result in a course of action to obtain all of its City water supply for customers within the City's Retail Water Service Area (both the north and southern zones) from the City of Everett.

Section 2. Transmission Main Customers.
The City will continue to explore options, including, but not necessarily limited to the decommissioning, rehabilitation, retrofitting, transfer, lease or sale of its existing 14.6 mile water transmission line which serves customers outside the City limits and outside the City's Urban Growth Area and which runs between its treatment plant and the City reservoirs. For the near-term, the City will pursue the action to supply the transmission main customers with water from Snohomish PUD and/or the City of Everett. Subject to available utility funding and budget restrictions, the City will endeavor to develop a program to reimburse a portion of the costs for

existing transmission main customers to directly connect at their cost to another water purveyor (typically Snohomish PUD) or to install private groundwater wells. The purpose and objective of a possible reimbursement program will be to remove all customers from the lower section of the transmission main in order to ultimately abandon this portion of the main before the end of its useful life.

Section 3. Treatment Facilities.
The City will pursue a course of action to decommission its existing intake, diversion dam and water treatment facilities. Subject to the additional actions set forth in Section 4 below, the objective will be to shut down operations at the water treatment plant and the withdrawal of water from the Pilchuck River in about 18 to 36 months. The intake and diversion dam removal schedule will be determined by environmental permitting constraints, the availability of federal and state grants, and additional funding by stakeholders.

Section 4. Additional Actions before Treatment Facilities Decommissioned.
The water treatment plant will not be decommissioned and the City will keep both the City of Snohomish and Everett sources of supply until the following are completed and approved to the satisfaction of the City Council:

1) **Meeting with Transmission Line Customers:** A notice and scheduling of a separate meeting with transmission line customers will be held in order to go over the details of the proposed plan and provide follow-up by City staff;

2) **Planning for Removal of the Existing Dam and Intake Structure on the Pilchuck River:** City staff will work with the Tribes, Washington Water Trust, State agencies and other stakeholders on a Memorandum of Understanding regarding financial grants, outside funding, payments or reimbursements to the City, and schedule for removal of the existing dam and intake structure. The objective is to facilitate, to the greatest extent possible, a significant amount of the decommissioning work to be paid for by federal and state grants, with local funds coming from non-profits, environmental groups, and other local and regional stakeholders who are interested in the Pilchuck River system;

3) **Water Right Banking Agreement:** Staff and legal counsel will work with the Washington State Department of Ecology on a draft water right banking agreement for Council review and consideration;

4) **Snohomish PUD Water Supply Agreement:** Staff and legal counsel will work with the Snohomish PUD on a wholesale supply agreement for supplying water to the transmission line customers and future conversion of some of the parcels to the PUD for direct service.

Section 5. Perfect and Protect the City's Water Rights.
Notwithstanding sections 1-4 above, the City will continue planning and taking necessary steps to fully protect and preserve its water rights in the Pilchuck River. Options include, but are not limited to, sale, lease or transfer to another agency or non-profit, trust water donation, transfer of the water intake and place of withdrawal downstream, or future expansion of the existing or a new plant.

Section 6. Coordination with Other Parties.
The City Council finds that examination of the foregoing matters, exploration of options and potential partners, and analysis of potential risk factors are complex and interrelated and will involve other parties. Accordingly, the Council directs staff to conduct outreach to other parties and stakeholders who could participate in building solutions to the City's long term water supply issues, including state agencies, cities, special purpose districts, Native American tribes, conservation and environmental similar organizations. The Council further directs staff to undertake the examination and exploration of the various alternatives and related considerations together so as to enable comprehensive review and analysis by the Council.

Section 7. Varying Cost of Service.
To the extent legally and financially feasible, the City's policy will be to promote a water supply to customers that is supported by rates and fees that reflect the varying cost of service and the need for future water utility improvements to the different areas served by the utility, both within and outside the City limits and outside the Urban Growth Area.

Section 8. Comprehensive Plans.
At the time of the next update to the City's Comprehensive Land Use Plan and Water Comprehensive Plan, this Resolution and any amendments thereto may be reviewed, revised and incorporated into and made a part thereof.

Section 9. Previous Resolutions Withdrawn.
All prior Resolutions or parts thereof which are inconsistent with this Resolution are hereby withdrawn and replaced by this Resolution.

PASSED by the City Council and **APPROVED** by the Mayor this 21 day of June, 2016.

CITY OF SNOHOMISH

By _____
Karen Guzak, Mayor

Attest:

By _____
Pat Adams, City Clerk

Approved as to form:

By _____
Grant K. Weed, City Attorney

Water Right Self-Assessment Form for Water System Plans

331-372 • 1/13/2017

All water right permits, claims, and certificates must be evaluated in a water right self-assessment for all sources used to supply the water system. The self-assessment compares the parameters and other limitations of existing water rights against current and forecasted water production, as described in your water system plan, to determine whether the rights are adequate to serve your system's current and future water needs.

You must account for all sources of supply and total quantities of water withdrawn from the source. If you purchase water from another purveyor through a non-emergency intertie, you must complete the INTERTIES section of the self-assessment.

A Note on Exempt Wells

If you're seeking DOH approval of a new Group A or Group B water system using an exempt well, you must complete the self-assessment, although certain fields will not apply. Talk to your DOH regional planner about using the Water Right Self-Assessment form for a Small Water System Management Program instead of this version.

Local governments must ensure that an adequate potable water supply is available from the exempt well before issuing a building permit. Before developing a permit exempt well, check with your local authorities on their criteria for establishing an adequate potable water supply for your planned public water system.

Water Right Parameters

Below is a brief description of the parameters associated with a typical water right. For the self-assessment, you only need to describe the last two bulleted items if they apply to your water rights.

Source Type – this refers to whether the source is surface water, groundwater or a spring.

Source Location – this refers to the location of points of groundwater withdrawal or surface water diversion for each right.

Purpose of Use – this refers to the type of use, such as municipal water supply, community domestic, industrial or agricultural purposes.

Place of Use – this describes where water can be put to beneficial use under the right. Under the 2003 Municipal Water Law, RCW 90.03.386, the place of use for a water right held for municipal water supply purposes may be the system's service area as identified in an approved water system plan or small water system management program. See Ecology Policy 2030 for information on how Ecology administers the Municipal Water Law.

Washington State Department of Health

If you need this publication in an alternative format, call 800.525.0127 (TDD/TTY call 711). This and other publications are available at www.doh.wa.gov/drinkingwater.

Period of Use – this refers to time-of-year limitations in which the water right may be put to use. If any water right has a time-of-year limitation, please include this information in the INTERRUPTIBLE WATER RIGHTS section.

Provisions or Limiting Conditions – this refers to any provisions or conditions placed on the water right. If a water right has a limiting condition or other provision, such as a collection and reporting requirement, other than a time-of year limitation, include this information in the ADDITIONAL COMMENTS section at the bottom of the self-assessment and in the water system plan narrative.

See Ecology Policy 1040 for more information on water right terminology. If you have questions about your water rights, please contact the Ecology regional office in your area.

Completing the Water Right Self-Assessment Form

The self-assessment is a Word document to allow users to make changes or to expand the document. You may use another format, if preferred, as long as all required information is included. Below is a description of all fields and how to complete them. This form is divided into four different sections. Each section is described in the headings below.

See the column identifiers (A, B, C, etc) at the bottom of each column for guidance in completing the necessary calculations.

Water Right Permit, Certificate, or Claim Number: This number is assigned by Ecology when a permit application is filed. It's listed at the top of the permit or certificate. For water right claims, this is the registration number stamped in the lower left hand corner of the claim form.

WFI Source #: Identify the individual sources (e.g. well #1, well #2) as defined on the DOH Water Facilities Inventory form. If a water right is associated with multiple sources, list all sources in the same row in this column. If a source is associated with multiple water rights, identify each water right on a separate row.

If you have any source(s) that is not currently being used (categorized as standby, back-up, or emergency), and the source has an associated water right that is not listed in column #1, please include the source and water right information in the ADDITIONAL COMMENTS section. This will identify that the source is still intended for a beneficial use under RCW 90.03.015(4). See Ecology Policy 1040.

EXISTING WATER RIGHTS SECTION *(olive green color, top section)*

This section refers to existing water rights. It does not include any water right applications that have been submitted to Ecology.

Primary Qi (Instantaneous Quantity): This is also known as instantaneous flow rate. It's the amount of water allowed to be taken under the right from the source during a period of peak operation. For surface water, this is generally expressed in terms of cubic feet per

second (cfs). For groundwater, this is generally expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm. Please indicate the units of measurement you are using for each source. If there are situations where the flow rate will be limited (e.g. limitations established on the source when other sources are utilized), please note them in the ADDITIONAL COMMENTS section in the form and in the WSP narrative.

Non-Additive Qi: This term was formally known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qi quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qi totals.*

Primary Qa (Annual Quantity): This is the amount of water that can be taken from the source under the right on an annual basis. It's usually expressed in terms of acre-feet. An acre-foot is the amount of water necessary to submerge an acre of land to a depth of one foot. One acre-foot equals 43,560 cubic feet or 325,851 gallons of water.

Non-Additive Qa: This term was formerly known as "supplemental." Your water rights may use the old terminology. See Ecology Policy 1040 for more information. Not all water rights have non-additive quantities. If a water right has non-additive Qa quantities, include the non-additive quantity in this field. This is generally listed in the "quantity, type of use, period of use" section on both permits and certificates. *Non-additive quantities should not be included in the primary Qa totals.*

CURRENT SOURCE PRODUCTION SECTION *(light green color, top section)*

This section refers to how much water is withdrawn from the source under each water right for the most recent full calendar year. You will need to determine any excess or deficiency for each water right after calculating how much water was withdrawn compared to how much water is allowed under each water right. If demand has decreased over past years, you may wish to include historic maximum production information in the ADDITIONAL COMMENTS section. This will provide a more complete picture of the use of your water rights.

Use the water use data and demand projections from your water system plan to define current and projected water needs. You can determine if you'll need additional water rights based on the comparison of existing water rights, current water production, and projected 10- and 20-year needs.

Total Qi (Instantaneous Quantity): This refers to the total maximum instantaneous flow rate withdrawn from the source under each water right during the most recent calendar year. For surface water, this is expressed in terms of cubic feet per second (cfs). For groundwater, this is expressed in terms of gallons per minute (gpm). One cfs equals 448.8 gpm.

Current Excess or Deficiency (Qi): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

Total Qa (Annual Quantity): This refers to the total volume of water withdrawn from each source under each water right during the most recent calendar year. It's usually expressed in acre-feet.

Current Excess or Deficiency (Qa): Please calculate the excess or deficiency for each water right after comparing the total amount withdrawn against each water right. Please use parentheses for deficient amounts.

10-YEAR FORECASTED SOURCE PRODUCTION SECTION *(light blue color, top section)*

This section refers to how much water you project to withdraw from each source in ten years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 10-year forecasted amounts.

20-YEAR FORECASTED SOURCE PRODUCTION SECTION *(darker blue color, top section)*

This section refers to how much water you project to withdraw from each source in twenty years as determined in your water system plan. Please complete this section in the same manner (using the same units of measurement) as the current source production section using your 20-year forecasted amounts. If you are unable to provide 20-year forecasts for each source, you may choose to include the combined 20-year total at the bottom.

PENDING WATER RIGHTS SECTION *(second section of form)*

Please complete this section for any water right applications that have been submitted to Ecology. Please include the application number, whether it's a new or a change application, the date submitted, and the total quantities requested.

INTERTIES SECTION *(third section of form)*

This section must be completed by purveyors who purchase any amount of wholesale water. If your system sells water to another public water system, include the quantity sold in the CURRENT SOURCE PRODUCTION section.

Purchasers of wholesale water must account for all water obtained through the intertie for non-emergency supply purposes. This is to ensure that all sources of supply are considered when evaluating whether new water rights are needed within 20 years.

Please identify the maximum quantity of water, expressed in the same manner as the above sections, allowed under each intertie contract. If there are limiting conditions or temporary

agreements that effect the long-term use of the intertie, you must account for such limiting conditions when evaluating the current and forecasted water supply needs in your water system plan.

Finally, purchasers of wholesale water are responsible for ensuring that the underlying water right (held by the purveyor selling water) are adequate for such use. You should confirm that the selling system has accounted for the wholesale area in their water system plan to ensure that the water right authorizes the distribution of water through the intertie.

INTERRUPTIBLE WATER RIGHTS SECTION *(bottom section of form)*

This section refers to water rights that have an annual time-of-year interruption. Please complete this section for any water right listed in the above fields that has a time-of-year interruption. Please include the water right number, describe the limitation, and the time period of interruption. Purveyors with interruptible rights should develop a water shortage response plan as part of their water system plan to describe how demand will be met during periods of interruption through aggressive demand-side conservation, fixing leaks or other means.

ADDITIONAL COMMENTS SECTION *(bottom section of form)*

If the system has any source that is not currently being used on a regular basis (such a source may be categorized as stand-by, back-up, emergency), you should identify the source in this section if the source has an associated water right that is not listed in the above sections. The purpose is to identify that such water rights are still intended for a future beneficial use as required under RCW 90.03.015(4). See Page 2, Item 9 (b) in ECY Policy 2030. For these water rights, please briefly describe the future intended use of the source and when you expect to utilize the water right. This does not refer to sources categorized as seasonal sources.

You should also include any other comments in this section that will explain aspects of your water right portfolio that are not identified above.

Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1 S1-043282CL	01 – Pilchuck River	2.5 cfs	0 cfs	1,810 afy [1]	0 afy	0 cfs	2.5 cfs	0 afy	1,810 afy	0 cfs	2.5 cfs	0 afy	1,810 afy	0 cfs	2.5 cfs	0 afy	1,810 afy
2 S1-00500C	01 – Pilchuck River	5.0 cfs	0 cfs	3,000 afy	0 afy	0 cfs	5.0 cfs	0 afy	3,000 afy	0 cfs	5.0 cfs	0 afy	3,000 afy	0 cfs	5.0 cfs	0 afy	3,000 afy
3																	
4																	
5																	
6																	
	TOTALS =	7.5 cfs		4,810 afy		0 cfs	7.5 cfs	0 afy	4,810 afy	0 cfs	7.5 cfs	0 afy	4,810 afy	0 cfs	7.5 cfs	0 afy	4,810 afy
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa
None						

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract [2]		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1 City of Everett	**8,575 gpm**	**13,832 afy**	**NA**	**2,295 gpm**	**6,280 gpm**	**934 afy**	**12,898 afy**	**2,909 gpm**	**5,667 gpm**	**1,184 afy**	**12,648 ayf**	**3,269 gpm**	**5,306 gpm**	**1,331 afy**	**11,567 afy**
2 Snohomish County PUD No. 1	**95 gpm**	**153 afy**	**NA**	**95 gpm**	**0 gpm**	**39 afy**	**114 afy**	**48 gpm**	**48 gpm**	**19 afy**	**134 afy**	**0 gpm**	**95 gpm**	**0 afy**	**153 afy**
3															
TOTALS =	8,670 gpm	13,985 afy		2,390 gpm	6,280 gpm	973 afy	13,012 afy	2,956 gpm	5,714 gpm	1,203 afy	12,781 afy	3,269 gpm	5,401 gpm	1,331 afy	11,681 afy
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
1 None		
2		
3		

ADDITIONAL COMMENTS:

[1] No annual volume specified on S1-043282CL. Annual volume assigned in this table is equal to 2.5 cfs continuously.

[2] The rate and volume listed is the current physical capacity of the intertie connections since the City of Everett does not place a contractual limitation on the instantaneous rate or annual volume taken by the City.

Forecasted Purchase volumes based on calculations without water use efficiency.

Maximum Qi based on Peak Hour Demand, to be conservative.

WATER QUALITY MONITORING PLAN

INTRODUCTION

This Water Quality Monitoring Plan presents the requirements for monitoring water quality at the sources and in the distribution system in accordance with the drinking water regulations contained in Washington Administrative Code (WAC) 246-290-300. This plan also provides a summary of the existing water system facilities and system operation.

EXISTING WATER SYSTEM DESCRIPTION

Water System Information

The City of Snohomish (City) is a municipal corporation that owns and operates a public water system within its retail water service area. Water system data on file at the Washington State Department of Health (DOH) for the City's system is as follows in **Table 1**.

Table 1

Water System Ownership Information

Information Type	Description
System Type	Group A - Community - Public Water System
System Name	Snohomish, City of
County	Snohomish
DOH System ID Number	809158
Address	PO Box 1589, Snohomish, WA 98291
Contact	Mr. Tim Jackson, Public Works Utility Manager
Contact Phone Number	360-282-3170

The City also owns and operates the NEPA Pallet Water System located near the intersection of Highway 2 and Three Lakes Road. The water system data on file at DOH for the NEPA Pallet Water System is as follows in **Table 2**.

Table 2

NEPA Pallet Water System Ownership Information

Information Type	Description
System Type	Group A - Non-Transient Non-Community
System Name	NEPA Pallet
County	Snohomish
DOH System ID Number	AA475K
Address	PO Box 1589, Snohomish, WA 98291
Contact	Mr. Tim Jackson, Public Works Utility Manager
Contact Phone Number	360-282-3170

Water System Operation and Control

Overview

Water supply is provided by interties from the City of Everett (Everett) and Snohomish County Public Utility District No. 1 (PUD).

City of Everett Transmission Line No. 5 Water Source

Water supply to the City's 362, 384, 425, 438, and 450 Zones is provided directly through four metered connections on Everett's Transmission Line No. 5. The Bickford Avenue Intertie provides water directly to the 384 Zone. A zone valve at the intersection of Highway 9 and 72nd Street SE is normally closed and restricts the movement of water between the 384 and 362 Zones. The King Charley's Intertie provides water directly to the 438 Zone. A zone valve that is normally closed restricts the movement of water between the 438 and 450 Zones. The Park Avenue Intertie provides water directly to the 450 Zone. Zone valves that are normally closed restrict the movement of water between the 450 and 362 Zones. The Terrace Avenue Intertie provides water directly to the 425 Zone and fills Reservoir No. 3, which serves the 362 Zone. The zone valves between the 362, 425, 438, and 450 Zones can be opened to allow Reservoir No. 3 to supply all four northern zones. The settings of the Terrace Avenue Intertie and water usage throughout the system dictate the amount of water flowing into or out of Reservoir No. 3. Water supply to Reservoir No. 3 is controlled by a level transducer that fills the reservoir when the water level drops to 45 feet, and closes when the water level reaches 61.5 feet. An altitude valve provides secondary control of the amount of water flowing into or out of Reservoir No. 3 if the level transducer fails. Two zone valves restrict the movement of water between the 362 Zone and the 218 Zone, and both are normally closed.

PUD Water Source

Water is supplied to the Water Treatment Plant Transmission Main customers from the PUD Intertie. To reduce water age along the transmission main, the City typically flows water in excess of customer demands. This is accomplished by manually adjusting a valve at the Reservoir No. 2 site. Water in excess of customer demands flows into Reservoir No. 2.

Pressure Zones

A list of the City's existing pressure zones and their estimated 2016 demands is presented in **Table 3**. The table also shows the water demand allocation based on a review of 2016 water demand data.

Table 3
Pressure Zones

Pressure Zone	2016 Annual Supply (gallons)	Average Daily Demand (gpm)	Average Daily Demand (gpd)	Percent of Total Demand (%)
218	166,143,465	315	453,944	52.2%
362	86,769,256	165	237,074	27.3%
384	28,726,306	55	78,487	9.0%
425	17,905,185	34	48,921	5.6%
438	4,838,669	9	13,220	1.5%
450	753,736	1	2,059	0.2%
Transmission Main	12,908,390	24	35,269	4.1%
Total	318,045,008	603	868,975	100%

Water Sources

A list of the City's existing water sources is presented in **Table 4**. The combined capacity of the interties supplying the City's distribution system is 16,495 gallons per minute (gpm).

Table 4
Water Sources

Intertie	Location	Pressure Zone (Existing)	Pressure Zone (Future)[1]	Existing Capacity (gpm)	Future Capacity (gpm)[1]	Master Meter Size (gpm)	PRV Size (inches)
Bickford Avenue Intertie	Bickford Ave and 52nd St SE	384 Zone	362 Zone	4,900	4,900	10	10, 6, and 2
King Charley's Intertie	Lake Ave and 56th St SE	438 Zone	362 Zone	1,600	3,100	8	8 and 4
Park Avenue Intertie	Approx. Park Ave and Rainbow Pl	450 Zone	362 Zone	3,500	4,900	10	10 and 3
Terrace Avenue Intertie	2014 Terrace Ave	362 Zone 425 Zone	362 Zone 425 Zone	4,900 1,500	4,900 1,500	8	362 Zone: 10 and 6 425 Zone: 8 and 3
NEPA Pallet Intertie	Three Lakes Rd and Highway 2	278 Zone	278 Zone	1,200	1,200	4	4
PUD Intertie	Robe Menzel Rd, S of 36th St NE	Transmission Main (471 Zone)	Transmission Main (471 Zone)	95	210	2	2

1 = Future capacity is intertie capacity after CIP PZ1 and CIP TM2 have been completed.

Water Storage

A list of the City's existing water storage facilities is presented in **Table 5**.

Table 5
Water Storage

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Dimensions (feet)	Base Elev. (feet)	Overflow Elev. (feet)
Reservoir No. 2	Pine Ave and 13th St	218 Zone	1953	Concrete	5.00	282 x 198 (Ground Level)	197.4	218.2
Reservoir No. 3	1701 Terrace Ave	362 Zone[1]	1991	Steel	2.52	81 (Diameter)	296.5	362.0

1 = The Reservoir No. 3 operating area includes the 362, 384, 425, 438, and 450 Zones if normally closed zone valves between the zones are opened.

Water Treatment

In January of 2017, the City discontinued operation of its Pilchuck River water treatment plant. Water for the City is now purchased solely from Everett, excepting a small amount supplied by the PUD for the customers connected to the Water Treatment Plant Transmission Main. The City continues to maintain and operate approximately 67 miles of pipeline in its distribution system and monitor various water quality parameters.

Pressure Reducing Stations

A list of the City's pressure reducing valve (PRV) stations is presented in **Table 6**.

Table 6
Pressure Reducing Stations

Station Name	Upper Pressure Zone	Lower Pressure Zone	PRV Size (inches)
PRV No. 1	338 Zone	286 Zone	12 and 3
PRV No. 2	471 Zone	338 Zone	12 and 3
9th Street and Avenue A PRV	362 Zone	218 Zone	12 and 3
10th Street and Avenue D PRV	362 Zone	218 Zone	6 and 2
Reservoir No. 2 PRV	362 Zone	218 Zone	8 and 3

NEPA Pallet Water System

The City owns and operates the NEPA Pallet Water System located near the intersection of Highway 2 and Three Lakes Road. The system is supplied directly from Everett's Transmission Line No. 5. The system serves the NEPA Pallet & Container Company and one residential customer. It is unknown when the water system was connected to Transmission Line No. 5 and when the City began operating the water system. Ownership and operation of the NEPA Pallet Water System may be transferred to the customers in the future.

SOURCE WATER QUALITY MONITORING

The City is required to perform water quality monitoring of the purchased supply for lead and copper (LCR), asbestos, total trihalomethanes (TTHM), and haloacetic acids (HAA5). The monitoring requirements that the City must comply with are specified in WAC 246-290-300.

Table 7 summarizes the source water quality monitoring requirements through 2023, is based on information available at the time that this document was prepared, and may change in the future.

Table 7

Monitoring Schedule for 2018 to 2023

Month	Monitor	Monitoring Group	Test Method	Upon Violation
		2018		
January	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
April	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
July	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
August	Distribution	Lead and Copper	LCR	Two 6-Month Periods
October	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
		2019		
January	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
April	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
July	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
		2020		
January	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
April	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
July	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
		2021		
January	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
April	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
July	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
August	Distribution	Lead and Copper	LCR	Two 6-Month Periods
October	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
		2022		
January	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
April	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
July	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
		2023		
January	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
April	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
July	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	Distribution	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter

Stage 2 DBPs = Stage 2 Disinfection Byproducts

MONITORING REQUIREMENTS AND PROCEDURES

The City no longer withdraws raw water from the Pilchuck River for surface water treatment; therefore, it is no longer required to monitor the following water quality parameters: inorganic chemical and physical substances; volatile organic chemicals; synthetic organic chemicals; unregulated inorganic chemicals; unregulated volatile organic chemicals; unregulated synthetic organic chemicals; and radionuclides.

DISTRIBUTION SYSTEM WATER QUALITY MONITORING

The City is required to perform water quality monitoring within its distribution system for coliform bacteria, disinfectant (chlorine) residual concentration, lead and copper, and trihalomethanes in accordance with Chapter 246-290 WAC.

MONITORING REQUIREMENTS AND PROCEDURES

Coliform Bacteria Routine Sampling – Specific requirements are contained in WAC 246-290-300. A minimum of ten samples per month shall be taken from different locations throughout the system, based on the current population of 10,089 in 2018. If a coliform presence is detected in a sample, three repeat samples must be taken. Currently, the City takes ten samples each month to obtain an adequate representation of the pressure zones, reservoirs, and distribution system.

Table 8 lists the locations of the City's routine sampling sites, including the upstream and downstream sampling locations in the event that repeat sampling is necessary. The sample sites also are shown in **Figure 1** and correspond to the assigned numbers in the table.

A total of ten samples are collected each month. Sampling days are the 1st and 15th days of each month, with the two weeks in between available for repeat sampling if needed. Five samples are collected twice per month, in accordance with the schedule shown in **Table 9** as a general guide.

The City is required to collect one sample each month at the NEPA Pallet Water System. All of the coliform samples collected since December 2007 at the NEPA Pallet Water System resulted in levels much less than the Maximum Contaminant Level (MCL). The City will continue to monitor for coliform within the NEPA Pallet Water System once each month.

Coliform Bacteria Repeat Sampling – In the event that a sample tests positive for coliform, a repeat sample shall be taken at the same location as the suspect sample, and two additional samples shall be taken within five service connections upstream and downstream of the suspect sample. **Table 8** shows the repeat sampling locations for the City. These repeat samples shall be taken by the end of the next business day after receiving the unsatisfactory results. If the results conclude that an MCL is exceeded (i.e., coliform are present in two or more samples for the month, including repeat samples), the City shall proceed with public notification in accordance with WAC 246-290-495.

Table 8
Coliform Monitoring Sampling Locations

Sample Site	Sample Type	Address	Location	Pressure Zone
1	Source	3330 Bickford Avenue - Fobes Hill Business Park	Hose Bib	384
2	Routine	2811 Bickford - Blazing Onion	Bathroom Sink	384
	Repeat Upstream	2929 Bickford - Bridges Pet Store	Bathroom Sink	384
	Repeat Downstream	2623 Bickford - Starbucks	Bathroom Sink	384
3	Routine	2801 Bickford - Fred Meyer	Bathroom Sink	384
	Repeat Upstream	2909 Bickford - Kohls	Bathroom Sink	384
	Repeat Downstream	2601 Bickford - Home Depot	Bathroom Sink	384
4	Routine	1608 23rd Street - Single Family House	Hose Bib	384
	Repeat Upstream	1629 23rd Street - Single Family House	Hose Bib	384
	Repeat Downstream	1526 23rd Street - Single Family House	Hose Bib	384
5	Routine	1505 Weaver Way - Single Family House	Hose Bib	384
	Repeat Upstream	1425 Weaver Way - Single Family House	Hose Bib	384
	Repeat Downstream	1515 Weaver Way - Single Family House	Hose Bib	384
6	Routine	1820 Bickford Avenue - Sno Business Park	Bathroom Sink	384
	Repeat Upstream	1830 Bickford Avenue - Sno Business Park	Bathroom Sink	384
	Repeat Downstream	1818 Bickford Avenue - Sno Business Park	Bathroom Sink	384
7	Routine	1926 Bickford Avenue - Sno Business Park	Bathroom Sink	384
	Repeat Upstream	2020 Bickford Avenue - Sno Business Park	Bathroom Sink	384
	Repeat Downstream	1920 Bickford Avenue - Sno Business Park	Bathroom Sink	384
8	Source	1401 30th Street - Fuel Stop 76 Station	Bathroom Sink	438
9	Routine	2615 Lake Avenue - Single Family House	Hose Bib	438
	Repeat Upstream	2727 Lake Avenue - Emmanuel Baptist Church	Hose Bib	438
	Repeat Downstream	2400 Lake Avenue - Methodist Church	Hose Bib	438
10	Source	2401 Park Avenue - Cascade View Elementary	Staff Sink	450
11	Routine	500 Rainbow Place - Single Family House	Hose Bib	450
	Repeat Upstream	518 Rainbow Place - Single Family House	Hose Bib	450
	Repeat Downstream	422 Rainbow Place - Single Family House	Hose Bib	450
12	Routine	1017 Lake Crest Avenue - Single Family House	Hose Bib	438
	Repeat Upstream	1007 Lake Crest Avenue - Single Family House	Hose Bib	438
	Repeat Downstream	1103 Lake Crest Avenue - Single Family House	Hose Bib	438
13	Routine	705 21st Place - Single Family House	Hose Bib	438
	Repeat Upstream	703 21st Place - Single Family House	Hose Bib	438
	Repeat Downstream	709 21st Place - Single Family House	Hose Bib	438
14	Routine	414 22nd Street - Single Family House	Hose Bib	450
	Repeat Upstream	500 22nd Street - Single Family House	Hose Bib	450
	Repeat Downstream	328 22nd Street - Single Family House	Hose Bib	450
15	Routine	2219 Baird Avenue - Single Family House	Hose Bib	450
	Repeat Upstream	2205 Baird Avenue - Single Family House	Hose Bib	450
	Repeat Downstream	2225 Baird Avenue - Single Family House	Hose Bib	450
16	Source	2014 Terrace Avenue - Single Family House	Hose Bib	425

Table 8
Coliform Monitoring Sampling Locations – Continued

Sample Site	Sample Type	Address	Location	Pressure Zone
	Routine	1705 Terrace Avenue - Delta Rehab	Bathroom Sink	425
17	Repeat Upstream	1911 Terrace Avenue - Single Family House	Hose Bib	425
	Repeat Downstream	1625 Terrace Avenue - Single Family House	Hose Bib	425
	Routine	1321 Cypress Lane - Single Family House	Hose Bib	425
18	Repeat Upstream	1307 Cypress Lane - Single Family House	Hose Bib	425
	Repeat Downstream	1325 Cypress Lane - Single Family House	Hose Bib	425
	Routine	1627 Holly Vista Drive - Single Family House	Hose Bib	425
19	Repeat Upstream	1629 Holly Vista Drive - Single Family House	Hose Bib	425
	Repeat Downstream	1621 Holly Vista Drive - Single Family House	Hose Bib	425
	Routine	2001 Stone Ridge Drive - Single Family House	Hose Bib	425
20	Repeat Upstream	1927 Stone Ridge Drive - Single Family House	Hose Bib	425
	Repeat Downstream	2005 Stone Ridge Drive - Single Family House	Hose Bib	425
	Routine	1527 Holly Vista Drive - Single Family House	Hose Bib	425
21	Repeat Upstream	1606 Holly Vista Drive - Single Family House	Hose Bib	425
	Repeat Downstream	1518 Holly Vista Drive - Single Family House	Hose Bib	425
	Routine	1604 Lakeview Place - Single Family House	Hose Bib	425
22	Repeat Upstream	210 16th Street - Single Family House	Hose Bib	425
	Repeat Downstream	1610 Lakeview Place - Single Family House	Hose Bib	425
23	Source	206 15th Street - Single Family House	Hose Bib	362
	Routine	1330 Ferguson Park Road - Snohomish Food Bank	Sink	362
24	Repeat Upstream	1525 Ferguson Park Road - Sno County Fire Station	Bathroom Sink	362
	Repeat Downstream	1300 Ferguson Park Road - City of Sno Ferguson Park	Bathroom Sink	362
	Routine	1027 Avenue B - Single Family House	Hose Bib	362
25	Repeat Upstream	1016 Avenue B - Single Family House	Hose Bib	362
	Repeat Downstream	1103 Avenue B - Single Family House	Hose Bib	362
	Routine	933 Van Jan Street - Single Family House	Hose Bib	362
26	Repeat Upstream	916 Root Avenue - Single Family House	Hose Bib	362
	Repeat Downstream	923 Van Jan Street - Single Family House	Hose Bib	362
	Routine	526 Pulliam Place - Single Family House	Hose Bib	362
27	Repeat Upstream	1408 Pulliam Place - Single Family House	Hose Bib	362
	Repeat Downstream	530 Pulliam Place - Single Family House	Hose Bib	362
	Routine	1005 Ryan Court - Single Family House	Hose Bib	362
28	Repeat Upstream	1001 Ryan Court - Single Family House	Hose Bib	362
	Repeat Downstream	919 Ryan Court - Single Family House	Hose Bib	362
	Routine	1305 Avenue A - Single Family House	Hose Bib	362
29	Repeat Upstream	1303 Avenue A - Single Family House	Hose Bib	362
	Repeat Downstream	1307 Avenue A - Single Family House	Hose Bib	362
	Routine	1017 13th Street - Church of the Nazarene	Hose Bib	362
30	Repeat Upstream	1109 13th Street - Sno Veterinary Hospital	Hose Bib	362
	Repeat Downstream	1002 13th Street - Kingdom Hall	Hose Bib	362

Table 8
Coliform Monitoring Sampling Locations – Continued

Sample Site	Sample Type	Address	Location	Pressure Zone
31	Routine	1605 Lake Mount Drive - Single Family House	Hose Bib	362
	Repeat Upstream	1611 Lake Mount Drive - Single Family House	Hose Bib	362
	Repeat Downstream	1531 Lake Mount Drive - Single Family House	Hose Bib	362
32	Routine	1305 Bonneville Avenue - Multi Family Smoots Apts	Hose Bib	362
	Repeat Upstream	1101 Bonneville Avenue - Multi Family Bonny Lane	Hose Bib	362
	Repeat Downstream	1311/1313 Bonneville Avenue - Commercial Smoots Bus Pk	Hose Bib	362
33	Routine	1409 Lakeview Avenue - Single Family House	Hose Bib	362
	Repeat Upstream	1315 Lakeview Avenue - Single Family House	Hose Bib	362
	Repeat Downstream	1525 Lakeview Avenue - Single Family House	Hose Bib	362
34	Routine	720 Summit Avenue - Single Family House	Hose Bib	362
	Repeat Upstream	701 Summit Avenue - Single Family House	Hose Bib	362
	Repeat Downstream	721 Summit Avenue - Single Family House	Hose Bib	362
35	Routine	1527 Park Avenue - Single Family House	Hose Bib	362
	Repeat Upstream	1514 Park Avenue - Single Family House	Hose Bib	362
	Repeat Downstream	1605 Park Avenue - Single Family House	Hose Bib	362
36	Routine	1911 Vaughn Court - Single Family House	Hose Bib	362
	Repeat Upstream	1907 Vaughn Court - Single Family House	Hose Bib	362
	Repeat Downstream	1915 Vaughn Court - Single Family House	Hose Bib	362
37	Routine	700 18th Street - Single Family House	Hose Bib	362
	Repeat Upstream	616 18th Street - Single Family House	Hose Bib	362
	Repeat Downstream	713 18th Street - Single Family House	Hose Bib	362
38	Routine	1013 19th Street - Single Family House	Hose Bib	362
	Repeat Upstream	1007 19th Street - Single Family House	Hose Bib	362
	Repeat Downstream	1015 19th Street - Single Family House	Hose Bib	362
39	Routine	1120 Avenue D - Snohomish Chevron	Bathroom Sink	362
	Repeat Upstream	1253 Avenue D - Kentucky Fried Chicken	Bathroom Sink	362
	Repeat Downstream	1100 Avenue D - Taco Bell	Bathroom Sink	362
40	Routine	502 Emerson Avenue - Single Family House	Hose Bib	362
	Repeat Upstream	406 Emerson Avenue - Single Family House	Hose Bib	362
	Repeat Downstream	510 Emerson Avenue - Single Family House	Hose Bib	362
41	Routine	1911 Northlake Avenue - Single Family House	Hose Bib	362
	Repeat Upstream	1909 Northlake Avenue - Single Family House	Hose Bib	362
	Repeat Downstream	1915 Northlake Avenue - Single Family House	Hose Bib	362
42	Source	3124 Robe Menzel Road - Water Treatment Plant	S Station	T-Line
43	Routine	4722 Old Machias Road - Single Family House	Hose Bib	T-Line
	Repeat Upstream	4733 Old Machias Road - Single Family House	Hose Bib	T-Line
	Repeat Downstream	4717 Old Machias Road - Single Family House	Hose Bib	T-Line
44	Routine	1224 S. Machias Road - Green Blow Off	S. Station	T-Line
	Repeat Upstream	13609 Division Street - Single Family House	Hose Bib	T-Line
	Repeat Downstream	13528 Austin Avenue - Single Family House	Hose Bib	T-Line
45	Source	13th and Pine Reservoir - Pre-Reservoir off T-Line	S Station	T-Line

Table 8
Coliform Monitoring Sampling Locations – Continued

Sample Site	Sample Type	Address	Location	Pressure Zone
46	Routine	9900 Airport Way - Buzz Inn Restaurant	Hose Bib	218
	Repeat Upstream	9514 Airport Way - B and H Automotive	Bathroom Sink	218
	Repeat Downstream	10424 Airport Way - Single Family House	Hose Bib	218
47	Routine	1806 Eighth Street - Single Family House	Hose Bib	218
	Repeat Upstream	1802 Seventh Street - Single Family House	Hose Bib	218
	Repeat Downstream	1810 Eighth Street - Single Family House	Hose Bib	218
48	Routine	712 Avenue D - Step n Style Salon	Hose Bib	218
	Repeat Upstream	714 Avenue D - Kusler Home	Bathroom Sink	218
	Repeat Downstream	700 Avenue D - Kusler Pharmacy	Bathroom Sink	218
49	Routine	221 Avenue F - Single Family House	Hose Bib	218
	Repeat Upstream	224 Avenue F - Single Family House	Hose Bib	218
	Repeat Downstream	216 Avenue F - Single Family House	Hose Bib	218
50	Routine	527 Avenue H - Single Family House	Hose Bib	218
	Repeat Upstream	523 Avenue H - Single Family House	Hose Bib	218
	Repeat Downstream	1713 Sixth Street - Single Family House	Hose Bib	218
51	Routine	400 Riverview Lane - Single Family House	Hose Bib	218
	Repeat Upstream	404 Riverview Lane - Single Family House	Hose Bib	218
	Repeat Downstream	328 Riverview Lane - Single Family House	Hose Bib	218
52	Routine	331 Union Avenue - Zion Luth. Church Office	Bathroom Sink	218
	Repeat Upstream	405 Union Avenue - Single Family House	Hose Bib	218
	Repeat Downstream	325 Union Avenue - Single Family House	Hose Bib	218
53	Routine	29 Lincoln Avenue - Single Family House	Hose Bib	218
	Repeat Upstream	25 Lincoln Avenue - Single Family House	Hose Bib	218
	Repeat Downstream	35 Lincoln Avenue - Single Family House	Hose Bib	218
54	Routine	511 Maple Avenue - Snohomish Sport Center	Hose Bib	218
	Repeat Upstream	604 Maple Avenue - Parts Warehouse	Bathroom Sink	218
	Repeat Downstream	505 Maple Avenue - Car Repair Shop	Bathroom Sink	218
55	Routine	170 Cypress Avenue - Apt/Hotel Rooms	Hose Bib	218
	Repeat Upstream	162/166 Cypress Avenue - Duplex	Hose Bib	218
	Repeat Downstream	323 Second Street - Snohomish Inn Hotel	Hose Bib	218
56	Routine	1119 Kendall Court - Single Family House	Hose Bib	218
	Repeat Upstream	1109 Kendall Court - Single Family House	Hose Bib	218
	Repeat Downstream	1129 Kendall Court - Single Family House	Hose Bib	218
57	Routine	116 Union Avenue - City Hall	Kitchen Sink	218
	Repeat Upstream	903 Second Street - Bank of America	Bathroom Sink	218
	Repeat Downstream	900 First Street - Sno Candy Shop	Bathroom Sink	218
58	Routine	1105 Second Street - Smith Hometown Grocery	Bathroom Sink	218
	Repeat Upstream	1011 Second Street - Designers Warehouse	Bathroom Sink	218
	Repeat Downstream	1205 Second Street - 7-11 Store	Bathroom Sink	218
59	Routine	805 Mill Avenue - Single Family House	Hose Bib	218
	Repeat Upstream	815 Mill Avenue - Single Family House	Hose Bib	218
	Repeat Downstream	727 Mill Avenue - Single Family House	Hose Bib	218

Table 8
Coliform Monitoring Sampling Locations – Continued

Sample Site	Sample Type	Address	Location	Pressure Zone
60	Routine	11430 86th Street - Single Family House	Hose Bib	218
	Repeat Upstream	11320 86th Street - Single Family House	Hose Bib	218
	Repeat Downstream	11506 85th Street - Sample Station	S. Station	218
61	Routine	11308 92nd Street SE - Pilchuck Vet Hospital	Hose Bib	218
	Repeat Upstream	11204 92nd Street SE - Snohomish Auto Sales	Bathroom Sink	218
	Repeat Downstream	11320 92nd Street SE - Single Family House	Hose Bib	218
62	Routine	415 Avenue E - Single Family House	Hose Bib	218
	Repeat Upstream	419 Avenue E - Single Family House	Hose Bib	218
	Repeat Downstream	410 Avenue D - Single Family House	Hose Bib	218
63	Routine	1801 First Street - City Shop	Bathroom Sink	218
	Repeat Upstream	2115 Second Street - City WWTP	Lab Sink	218
	Repeat Downstream	1615 First Street - Service Electric	Bathroom Sink	218

Table 9
Coliform Monitoring Sampling Rotation Schedule

Sample Site	Address	Sample Location	Pressure Zone	Sample Number	Address	Sample Location	Pressure Zone
	January 1st				**January 15th**		
46	9900 Airport Way - Buzz Inn Restaurant	Hose Bib	218	47	1806 Eighth Street - Single Family House	Hose Bib	218
2	2811 Bickford - Blazing Onion	Bathroom Sink	384	43	4722 Old Machias Road - Single Family House	Hose Bib	T-Line
24	1330 Ferguson Park Road - Snohomish Food Bank	Sink	362	11	500 Rainbow Place - Single Family House	Hose Bib	450
9	2615 Lake Avenue - Single Family House	Hose Bib	438	48	712 Avenue D - Step n Style Salon	Hose Bib	218
25	1027 Avenue B - Single Family House	Hose Bib	362	26	933 Van Jan Street - Single Family House	Hose Bib	362
	February 1st				**February 15th**		
49	221 Avenue F - Single Family House	Hose Bib	218	50	527 Avenue H - Single Family House	Hose Bib	218
3	2801 Bickford - Fred Meyer	Bathroom Sink	384	44	1224 S. Machias Road - Green Blow Off	S Station	T-Line
27	526 Pulliam Place - Single Family House	Hose Bib	362	13	705 21st Place - Single Family House	Hose Bib	438
12	1017 Lake Crest Avenue - Single Family House	Hose Bib	438	51	400 Riverview Lane - Single Family House	Hose Bib	218
28	1005 Ryan Court - Single Family House	Hose Bib	362	29	1305 Avenue A - Single Family House	Hose Bib	362
	March 1st				**March 15th**		
52	331 Union Avenue - Zion Luth. Church Office	Bathroom Sink	218	53	29 Lincoln Avenue - Single Family House	Hose Bib	218
4	1608 23rd Street - Single Family House	Hose Bib	384	43	4722 Old Machias Road - Single Family House	Hose Bib	T-Line
30	1017 13th Street - Church of the Nazarene	Hose Bib	362	15	2219 Baird Avenue - Single Family House	Hose Bib	450
14	414 22nd Street - Single Family House	Hose Bib	450	54	511 Maple Avenue - Snohomish Sport Center	Hose Bib	218
31	1605 Lake Mount Drive - Single Family House	Hose Bib	362	32	1305 Bonneville Avenue - Multi Family Smoots Apts	Hose Bib	362
	April 1st				**April 15th**		
55	170 Cypress Avenue - Apt/Hotel Rooms	Hose Bib	218	56	1119 Kendall Court - Single Family House	Hose Bib	218
5	1505 Weaver Way - Single Family House	Hose Bib	384	44	1224 S. Machias Road - Green Blow Off	S. Station	T-Line
33	1409 Lakeview Avenue - Single Family House	Hose Bib	362	18	1321 Cypress Lane - Single Family House	Hose Bib	425
17	1705 Terrace Avenue - Delta Rehab	Bathroom Sink	425	57	116 Union Avenue - City Hall	Kitchen Sink	218
34	720 Summit Avenue - Single Family House	Hose Bib	362	35	1527 Park Avenue - Single Family House	Hose Bib	362
	May 1st				**May 15th**		
60	11430 86th Street - Single Family House	Hose Bib	218	59	805 Mill Avenue - Single Family House	Hose Bib	218
6	1820 Bickford Avenue - Sno Business Park	Bathroom Sink	384	43	4722 Old Machias Road - Single Family House	Hose Bib	T-Line
36	1911 Vaughn Court - Single Family House	Hose Bib	362	20	2001 Stone Ridge Drive - Single Family House	Hose Bib	425
19	1627 Holly Vista Drive - Single Family House	Hose Bib	425	58	1105 Second Street - Smith Hometown Grocery	Bathroom Sink	218
37	700 18th Street - Single Family House	Hose Bib	362	38	1013 19th Street - Single Family House	Hose Bib	362
	June 1st				**June 15th**		
61	11308 92nd Street SE - Pilchuck Vet Hospital	Hose Bib	218	62	415 Avenue E - Single Family House	Hose Bib	218
7	1926 Bickford Avenue - Sno Business Park	Bathroom Sink	384	44	1224 S. Machias Road - Green Blow Off	S Station	T-Line
39	1120 Avenue D - Snohomish Chevron	Bathroom Sink	362	22	1604 Lakeview Place - Single Family House	Hose Bib	425
21	1527 Holly Vista Drive - Single Family House	Hose Bib	425	63	1801 First Street - City Shop	Bathroom Sink	218
40	502 Emerson Avenue - Single Family House	Hose Bib	362	41	1911 Northlake Avenue - Single Family House	Hose Bib	362

Table 9
Coliform Monitoring Sampling Rotation Schedule – Continued

Sample Number	Address	Sample Location	Pressure Zone	Sample Number	Address	Sample Location	Pressure Zone
	July 1st				**July 15th**		
46	9900 Airport Way - Buzz Inn Restaurant	Hose Bib	218	47	1806 Eighth Street - Single Family House	Hose Bib	218
2	2811 Bickford - Blazing Onion	Bathroom Sink	384	43	4722 Old Machias Road - Single Family House	Hose Bib	T-Line
24	1330 Ferguson Park Road - Snohomish Food Bank	Sink	362	11	500 Rainbow Place - Single Family House	Hose Bib	450
9	2615 Lake Avenue - Single Family House	Hose Bib	438	48	712 Avenue D - Step n Style Salon	Hose Bib	218
25	1027 Avenue B - Single Family House	Hose Bib	362	26	933 Van Jan Street - Single Family House	Hose Bib	362
	August 1st				**August 15th**		
49	221 Avenue F - Single Family House	Hose Bib	218	50	527 Avenue H - Single Family House	Hose Bib	218
3	2801 Bickford - Fred Meyer	Bathroom Sink	384	44	1224 S. Machias Road - Green Blow Off	S Station	T-Line
27	526 Pulliam Place - Single Family House	Hose Bib	362	13	705 21st Place - Single Family House	Hose Bib	438
12	1017 Lake Crest Avenue - Single Family House	Hose Bib	438	51	400 Riverview Lane - Single Family House	Hose Bib	218
28	1005 Ryan Court - Single Family House	Hose Bib	362	29	1305 Avenue A - Single Family House	Hose Bib	362
	September 1st				**September 15th**		
52	331 Union Avenue - Zion Luth. Church Office	Bathroom Sink	218	53	29 Lincoln Avenue - Single Family House	Hose Bib	218
4	1608 23rd Street - Single Family House	Hose Bib	384	43	4722 Old Machias Road - Single Family House	Hose Bib	T-Line
30	1017 13th Street - Church of the Nazarene	Hose Bib	362	15	2219 Baird Avenue - Single Family House	Hose Bib	450
14	414 22nd Street - Single Family House	Hose Bib	450	54	511 Maple Avenue - Snohomish Sport Center	Hose Bib	218
31	1605 Lake Mount Drive - Single Family House	Hose Bib	362	32	1305 Bonneville Avenue - Multi Family Smoots Apts	Hose Bib	362
	October 1st				**October 15th**		
55	170 Cypress Avenue - Apt/Hotel Rooms	Hose Bib	218	56	1119 Kendall Court - Single Family House	Hose Bib	218
5	1505 Weaver Way - Single Family House	Hose Bib	384	44	1224 S. Machias Road - Green Blow Off	S. Station	T-Line
33	1409 Lakeview Avenue - Single Family House	Hose Bib	362	18	1321 Cypress Lane - Single Family House	Hose Bib	425
17	1705 Terrace Avenue - Delta Rehab	Bathroom Sink	425	57	116 Union Avenue - City Hall	Kitchen Sink	218
34	720 Summit Avenue - Single Family House	Hose Bib	362	35	1527 Park Avenue - Single Family House	Hose Bib	362
	November 1st				**November 15th**		
60	11430 86th Street - Single Family House	Hose Bib	218	59	805 Mill Avenue - Single Family House	Hose Bib	218
6	1820 Bickford Avenue - Sno Business Park	Bathroom Sink	384	43	4722 Old Machias Road - Single Family House	Hose Bib	T-Line
36	1911 Vaughn Court - Single Family House	Hose Bib	362	20	2001 Stone Ridge Drive - Single Family House	Hose Bib	425
19	1627 Holly Vista Drive - Single Family House	Hose Bib	425	58	1105 Second Street - Smith Hometown Grocery	Bathroom Sink	218
37	700 18th Street - Single Family House	Hose Bib	362	38	1013 19th Street - Single Family House	Hose Bib	362
	December 1st				**December 15th**		
61	11308 92nd Street SE - Pilchuck Vet Hospital	Hose Bib	218	62	415 Avenue E - Single Family House	Hose Bib	218
7	1926 Bickford Avenue - Sno Business Park	Bathroom Sink	384	44	1224 S. Machias Road - Green Blow Off	S Station	T-Line
39	1120 Avenue D - Snohomish Chevron	Bathroom Sink	362	22	1604 Lakeview Place - Single Family House	Hose Bib	425
21	1527 Holly Vista Drive - Single Family House	Hose Bib	425	63	1801 First Street - City Shop	Bathroom Sink	218
40	502 Emerson Avenue - Single Family House	Hose Bib	362	41	1911 Northlake Avenue - Single Family House	Hose Bib	362

Disinfectant Residual Concentration – The City must comply with disinfectant residual concentration requirements. The City's chlorination target is to maintain a residual disinfectant concentration greater than 0.2 milligrams per liter (mg/L) throughout the distribution system. The average residual chlorine concentration is 0.53 mg/L in the distribution system.

Samples collected and submitted for coliform testing also shall be tested for disinfectant residual concentration to ensure the disinfectant residual meets the regulatory requirements and achieves the target levels set by the City.

Lead and Copper – Specific requirements are contained in Title 40, Parts 141.86, 141.87, and 141.88 of the Code of Federal Regulations (CFR). Every 3 years, the City must collect and report a minimum of 30 samples. All previous samples indicate the City is in compliance with these regulations.

Sample sites shall be selected based on the known existence of lead pipes, copper pipes, and copper pipes with lead solder (40 CFR 141.86(a)). All samples, except for lead service line samples, shall be first draw tap samples taken at a cold water tap from which water has not been drawn for at least 6 hours, but no more than 12 hours. Sample faucets shall be flushed with cold water the evening prior to collecting the sample. Lead service line samples shall be collected with one of three methods in accordance with 40 CFR 141.86(b). The locations of future sample sites shall be the same as past sample sites, unless unavoidable conditions prevent sampling at the same locations.

The City has participated in Everett's Regional Monitoring Plan (RMP) since at least 1998 and plans to continue to participate.

Note to City: Is the City still participating in the RMP? See also comments in Chapter 6 regarding the RMP.

As part of the City's current participation with Everett's RMP, one sample is collected in the 362 Zone, which is currently only supplied by Everett's Transmission Line No. 5. In 2009, the City collected 19 samples in the 218 Zone to meet the reduced monitoring compliance requirement of 20 total samples. Once the City is not eligible to participate in Everett's RMP, there will not be a substantial impact on the City's monitoring program, since test results are consistently well below the action level for both lead and copper at all sampling locations. At that time, the City plans to collect ten samples in the 362 Zone and ten samples in the 218 Zone.

Fluoride Concentration – Specific requirements are contained in WAC 246-290-460 for systems that are fluoridating drinking water. Wholesale water purchased from other entities may be treated with fluoride, and it is the responsibility of those distributing entities to monitor the concentrations.

Disinfection Byproducts – Specific requirements are contained in WAC 246-290-300. The City is required to monitor for TTHM and HAA5 on a quarterly basis, with four samples being taken for each group. The sample shall be taken at the extreme end of the distribution system. The City developed a water system disinfection byproduct monitoring plan in April 2004.

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PARTICIPATION AGREEMENT
EVERETT REGIONAL CONSECUTIVE SYSTEMS LEAD AND COPPER RULE MONITORING PROGRAM

THIS AGREEMENT dated 4/7/09 between the City of Everett, a municipal corporation of the State of Washington ("City") and City of Snohomish, ("Participant") witnesses:

1. City and Participant acknowledge their respective responsibilities as drinking water purveyors under the USEPA's Lead and Copper Rule (40 CFR Part 141) to monitor drinking water at customer taps for possible lead and copper contamination. Accordingly, Participant agrees:

a. To conduct monitoring, as directed by City staff and as detailed in the most current version of the Everett regional LCR monitoring plan. Participant will collect and deliver samples to City in accordance with protocols and schedules established by City, DOH, Participant, and other participants;

b. To conduct follow up monitoring and investigation on any LCR sampling location where the initial routine monitoring results exceed the action limits for lead or copper and will report results to City and DOH according to the Everett regional LCR monitoring plan, the DOH, or federal regulations.

c. To select monitoring locations meeting the requirements of the LCR and 40CFR141.86(a);

d. To assist City with water quality parameters monitoring if assigned by the plan;

e. To conduct public notification if required by the plan or DOH as part of LCR compliance.

2. City agrees to establish and administrate the Everett regional consecutive systems lead and copper monitoring program. City will be responsible for regional coordination and reporting of data timely submitted to the City by all participants.

3. City will pay all costs of sample analysis, data coordination and analysis, and reporting. Participants will pay all costs of sample collection and monitoring, staff coordination and participation, and public notification materials and mailing. (City's retail water distribution system shall perform monitoring and pay its collection and monitoring costs as a participant.)

4. This agreement is directed toward monitoring for regulatory agency compliance and reporting only. The City and each participant remain responsible for LCR compliance within their respective local distribution systems.

5. This agreement may be terminated by either party by giving 90 days notice to the other.

City of ~~Everett~~ Snohomish:

Mayor:

Approved as to form

City Attorney:

Attest

City Clerk

Participant System:

City of Snohomish

System Representative Signature:

Larry Bauman, City Manager

Mailing address:

City of Snohomish
116 Union Avenue
Snohomish WA 98290

DOH System ID#: 109158

Population served: 9,018

City of Everett:

Mayor:

Approved as to form

City Attorney:

Attest

City Clerk

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

PUBLIC NOTICE CERTIFICATION
Acute Coliform MCL

Within 10 days of notifying your customers, you must send a copy of each type of notice you distribute (hand-delivered notices, press releases, newspaper articles, etc.) to our regional office. Also, complete and send this form, which certifies that you have met all the public notification requirements. If the boil water advisory remains in effect more than three months, you must notify your water users again and provide another Public Notice Certification to us. *With this certification, you are also stating that you will meet future requirements for notifying new billing units of the violation or situation.*

Water System:_____ID #_____County:_____

Violation Date:_____ / _____ / _____ Violation Type:_____

This public water system certifies that public notice has been given to water users, following state and federal requirements for delivery, content, and deadlines.

Complete the following items:

Yes No

☐ ☐ Distribution was completed on ___ / ___ /____. Check all that apply:
- ☐ Hand delivery,
- ☐ Press release (TV, radio, newspaper, etc.),
- ☐ Posting at_____ (by DOH approval only),
- ☐ Other _____ (by DOH approval only).

☐ ☐ Were the water users notified within 24 hours?

_____ _____ _____
Signature of owner or operator | Position | Date

If you need this publication in an alternate format, call (800) 525-0127 or for TTY/TDD call (877) 833-6341.

Northwest Regional Office:
20435 72nd Ave S Suite 200
Kent WA 98032
(253) 395-6775
Fax: (253) 395-6760

Southwest Regional Office:
PO Box 47823
Olympia WA 98504-7823
(360) 236-3030
Fax (360) 664-8058

Eastern Regional Office:
16201 E Indiana Ave Suite 1500
Spokane Valley WA 99216
(509) 329-2100
Fax: (509) 329-2104

NOTICE TO WATER SYSTEM USERS
ANNUAL NITRATE MONITORING VIOLATION FORM

We, _____ Water System, I.D. _____, located in _____County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During _____, we did not monitor or test for nitrate, and therefore cannot be sure of the quality of your drinking water during that time.

At this time:

☐ No action is required by the users.

☐ Our routine nitrate sample required for _____ *(current year)* has been collected.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, please contact _____ at ( )___-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on __/__/__

Annual Nitrate Monitoring Public Notice Certification Form

(This section must be completed by Water System. Signature below indicates notice contained all required elements.)

Complete the following items (check all that apply):

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

☐ Notice mailed to all water customers on ____ / ____/____.

☐ Notice hand delivered to all water customers on ___ / ___ /___.

☐ Notice published in newspaper (attach copy)

☐ Notice posted at _____ on ___ / ___ / ____.

(***By Department Approval Only***)

_____ _____ _____
Signature of owner or operator Position Date

Send copy of completed notification and certification to:

Denise Garrett, Lead and Copper Program Manager
Office of Drinking Water
PO Box 47822
Olympia, WA 98504-7822
FAX (360) 236-2252

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD, call (800) 833-6388.

AVISO A LOS USUARIOS DEL SISTEMA DE AGUA

FORMULARIO DE VIOLACIÓN DEL MONITOREO ANUAL DE NITRATO

Nosotros, el sistema de agua _____, con número de identificación (ID) _____, situado en el condado de _____, estamos obligados a monitorear regularmente su agua potable por contaminantes específicos. Los resultados del monitoreo indican si su agua potable cumple o no con las normas de salud. Durante el año _____, no realizamos monitoreo ni pruebas del agua para el nitrato, y por lo tanto no podemos asegurar la calidad de su agua potable durante ese tiempo.

En este momento:

☐ No se requiere ninguna acción de los usuarios.

☐ Hemos colectado la muestra rutinaria de nitrato para el _____ (el año actual).

☐ Colectaremos las muestras en el futuro según la norma.

☐ Otra información para los usuarios:

Para más información, por favor contacte a _____ al (_____) _____ - _____ o en
.

(El dueño / operador) (El número de teléfono) (La dirección)

Por favor comparte esta información con otras personas que pudieran tomar agua de este sistema, especialmente con aquellos que no hayan recibido este aviso directamente (por ejemplo, las personas que viven en apartamentos, residencias para ancianos, escuelas y negocios). Puede hacerlo colocando este aviso en un lugar público o entregando copias en persona o por correo.

Este aviso le fue enviado por el sistema de agua _____ la fecha ____/____/____.

Formulario de certificación de la notificación al público del monitoreo anual de nitrato

(Esta sección debe ser llenada por el sistema de agua. La firma abajo indica que la notificación contiene todos los elementos requeridos.)

Complete los siguientes puntos (marque todo lo que aplica)

☐ El aviso fue enviado por correo a todos los usuarios del sistema de agua el ____/____/

☐ El aviso fue distribuido a mano a todos usuarios del sistema de agua el ____/____/

☐ El aviso fue publicado en el periódico (adjunta la copia)

☐ Se colocó el aviso en _____ el ____/____/
(**Solo con permiso del departamento**)

_____ _____ ____/____/____.
(Firma del dueño u operador) (Posición) (Fecha)

Envíe una copia de la notificación completa y la certificación a:

Denise Garrett, Lead and Copper Program Manager
Office of Drinking Water
PO Box 47822
Olympia, WA 98504-7822
FAX (360) 236-2252

NOTICE TO WATER SYSTEM USERS

COLIFORM MAJOR MONITORING VIOLATION

We, _____ Water System, I.D. _____, located in _____ County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During the month of _____ we did not monitor or test for coliform bacteria, and therefore cannot be sure of the quality of your drinking water during that time.

At this time:

☐ No action is required by the users.

☐ Our routine coliform sample required for the month of _____ has been collected and was found to show no presence of coliform bacteria.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, contact _____ at ( )_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on ____/____/____

Coliform Major Monitoring Public Notice Certification Form
The purpose of this form (below) is to provide documentation to the department that public notice was distributed. Please check the appropriate box and fill in the date that the notice was distributed:

☐ Notice was mailed to all water customers on ____ / ____/____.

☐ Notice was hand delivered to all water customers on ___ / ___ /___.

☐ Notice was posted (*with department approval*) at:
_____ on ___ / ___ /____.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

_____ _____ _____
Signature of owner or operator Position Date

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Send copy of completed notification and certification to:

☐ Northwest Drinking Water
Department of Health
20435 72nd Ave S, Suite 200
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

☐ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

☐ Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

IMPORTANT NOTICE ABOUT YOUR WATER SYSTEM
Coliform Maximum Contaminant Level (MCL) Exceeded: Non-acute MCL

The _____ water system, ID# _____ in _____ County routinely monitors for the presence of total coliform bacteria and in _____ this type of bacteria was detected. Although this incident was not an emergency, as our customer, you have a right to know what happened and what we did or are doing to correct the situation.

Coliforms are bacteria which are naturally present in the environment and are used as indicators that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. The samples that showed the presence of coliform were further tested to see if other bacteria of greater concern, such as fecal coliform or *E.coli* were present. **None of these bacteria were found.**

You do not need to boil your water. People with severely compromised immune systems, infants, and some elderly may be at an increased risk. These people should seek advice from their health care provider.

What happened? What is the suspected or known source of contamination?

At this time:

☐ The problem is resolved. Additional samples collected were found to be free of coliform bacteria.
☐ We anticipate resolving the problem by ____ / ____ / ____.
☐ Other _____.

For more information, contact _____ at ( )____-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Date Distributed ____ / ____ / ____.

Coliform Non-acute Public Notice Certification Form

The purpose of this form (below) is to provide documentation to the department that public notice was distributed. Please check the appropriate box and fill in the date that the notice was distributed:

☐ Notice was mailed to all water customers on ____ / ____/____.
☐ Notice was hand delivered to all water customers on ___ / ___ /___.
☐ Notice was posted (*with department approval*) at:
_____ on ___ / ___ /____.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

_____ _____ _____
Signature of owner or operator Position Date

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Send copy of completed notification and certification to:

☐ Northwest Drinking Water
Department of Health
20435 72nd Ave S, Suite 200
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

☐ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

☐ Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

AVISO IMPORTANTE ACERCA DEL SISTEMA DE SUMINISTRO DE AGUA

Las bacterias coliformes rebasaron el Nivel Máximo de Contaminación: NMC no agudo

El sistema de suministro de agua _____, número (ID#) _____ en el condado de _____ monitorea rutinariamente la presencia de bacterias coliformes totales. En la fecha _____, se encontró este tipo de bacteria. Aunque este incidente no es considerado una emergencia, como consumidor, Usted tiene el derecho a saber que pasó y que se ha hecho o se esta haciendo para corregir esta situación.

Las bacterias coliformes se encuentran naturalmente en el medio ambiente y se usan como indicador de la posible presencia de otras bacterias que pueden causar daño a la salud. En las muestras tomadas, las bacterias se encontraron en mayor número que el permitido y esto es una indicación de posibles problemas. Las muestras con bacterias coliformes se analizaron con más detalle en el laboratorio para ver si bacterias coliformes fecales o E. Coli pudieran también haber estado presentes. Estas bacterias causan daño a la salud de las personas. **No se encontró ninguna de estas bacterias.**

No es necesario que usted hierva el agua. Personas con un sistema inmunológico severamente comprometido, los recién nacidos y algunas personas de edad avanzada pueden tener mas riesgo de salud y deberían llamar a algún personal médico para mayor información.

¿Qué fue lo que pasó? ¿Cuál es la fuente de contaminación de la que se sabe o sospecha?

En este momento:

- ☐ El problema esta resuelto. En muestras adicionales que se colectaron no se encontraron bacterias coliformes.
- ☐ Anticipamos resolver el problema el día ____/____/____.
- ☐ Otro _____.

Para mayor información comuníquese con _____ al teléfono ( ) _____-__ _____ o con

_____	_____	_____
(dueño u operador)	(teléfono)	(dirección)

Pase esta información a todas las personas pudieran tomar agua de este suministro, especialmente aquellas personas que no hayan recibido este aviso (por ejemplo, personas que vivan en apartamentos, asilos de ancianos, escuelas y negocios.) Usted puede hacer esto colocando este aviso en un lugar público donde se pueda leer claramente o distribuyendo copias en persona o enviándolas por correo.

Este aviso es enviado a Usted por el Sistema de Suministro de Agua_____ fecha ___/___/____.

AVISO A LOS USUARIOS DEL SISTEMA DE AGUA

VIOLACIÓN DEL MONITOREO DE LOS SUBPRODUCTOS DE LA DESINFECCIÓN

Nosotros, el sistema del agua _____, con numero de identificación_____, situado en el condado de _____ estamos obligados a monitorear regularmente su agua potable por contaminantes específicos. Los resultados del monitoreo indican si su agua potable cumple o no con las normas de salud. Durante ☐ el(los) mes(es) de _____ o ☐ los cuartos de _____ en el año de _____ no realizamos monitoreo ni pruebas del agua para ☐ el total de los trihalometanos, ☐ los haloácidos, o ☐ bromatos y por lo tanto no podemos asegurar la calidad de su agua potable durante ese tiempo.

En este momento:

☐ No se requiere ninguna acción de los usuarios.

☐ Colectaremos las muestras en el futuro según la norma.

☐ Otra información para los usuarios:

Por más información, contacte a _____ al (____)_____o en_____.
(Dueño / operador) (Número de teléfono) (Dirección)

Por favor comparte esta información con otras personas que pudieran tomar agua de este sistema, especialmente con aquellos que no hayan recibido este aviso directamente (por ejemplo, las personas que viven en apartamentos, hospicios para ancianos, escuelas y negocios). Puede hacerlo colocando este aviso en un lugar público o entregando copias en persona o por correo.

Este aviso le fue enviado por el sistema de agua _____ el __/__/____.

Formulario de certificación de la notificación al público del monitoreo de los subproductos de la desinfección
El propósito de este formulario (abajo) es documentar para el departamento que el aviso público fue distribuido. Marque por favor la caja apropiada y complete la fecha que el aviso fue distribuido: (Esta sección debe ser llenada por el sistema de agua):

☐ El aviso fue enviado por correo a todos los usuarios del sistema de agua el ____/____/____.

☐ El aviso fue distribuido a mano a todos usuarios del sistema de agua el ____/____/____.

☐ Se colocó el aviso (solo con permiso del departamento) en:

_____ el ____/____/____.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

_____ _____ ____/____/____
(Firma del dueño u operador) (Posición) (Fecha)

Si usted necesita esta publicación en un formato diferente, llame al (800) 525-0127. Para TTY/TDD, llame al (800) 833-6388.

Envíe una copia de la notificación completa y la certificación a*:*

☐ Northwest Drinking Water
Department of Health
20435 72nd Ave S, Suite 200
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

☐ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

☐ Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

NOTICE TO WATER SYSTEM USERS

DISINFECTION BYPRODUCTS MONITORING VIOLATION

We, _____ Water System, I.D. _____, located in _____ County are required to monitor your drinking water for specific contaminants on a regular basis Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During the ☐ month(s) of _____ _____ or ☐ quarter(s) _____ in the year of _____ we did not monitor or test for ☐ Total Trihalomethanes, ☐ Haloacetic Acids, or ☐ Bromate and therefore cannot be sure of the quality of your drinking water during that time.

At this time:

☐ No action is required by the users.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, contact _____ at ( )_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on ____/____/____

Disinfection Byproducts Monitoring Public Notice Certification Form
The purpose of this form (below) is to provide documentation to the department that public notice was distributed. Please check the appropriate box and fill in the date that the notice was distributed:

☐ Notice was mailed to all water customers on ____ / ____/____.

☐ Notice was hand delivered to all water customers on ___ / ___ /___.

☐ Notice was posted (*with department approval*) at:
_____ on ___ / ___ /____.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

_____ _____ _____
Signature of owner or operator Position Date

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Send copy of completed notification and certification to:

☐ Northwest Drinking Water
Department of Health
20435 72nd Ave S, Suite 200
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

☐ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

☐ Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

NOTICE TO WATER SYSTEM USERS
LEAD AND COPPER INITIAL MONITORING VIOLATION

We, _____ Water System, I.D. _____, located in _____ County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. In the initial monitoring period of _____ to _____ _____, we did not meet our monitoring requirements for lead and copper, and therefore cannot be sure of the quality of your drinking water at that time. At this time:

☐ No action is required by the users.

☐ Our required lead and copper samples have currently been collected.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, please contact _____ at ( )___-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on __/__/__

Lead & Copper Initial Monitoring Public Notice Certification Form
This section must be completed by Water System. Signature below indicates notice contained all required elements.

Complete the following items (check all that apply):

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

☐ Notice mailed to all water customers on ____ / ____/____.

☐ Notice hand delivered to all water customers on ___ / ___ /___.

☐ Notice published in newspaper (attach copy)

☐ Notice posted at _____ on ___ / ___ /____.
(***By Department Approval Only***)

_____ _____ _____
Signature of owner or operator Position Date

Send copy of completed notification and certification to:

Denise Garrett, Lead and Copper Program Manager
Office of Drinking Water
PO Box 47822
Olympia, WA 98504-7822
FAX (360) 236-2252

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD, call (800) 833-6388.

NOTICE TO WATER SYSTEM USERS

LEAD AND COPPER MONITORING VIOLATION

We, _____ Water System, I.D. _____, located in _____ County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. In _____ we did not meet our monitoring requirements for lead and copper, and therefore cannot be sure of the quality of your drinking water at that time.

At this time:

- ☐ No action is required by the users.
- ☐ Our required lead and copper samples have been collected for this monitoring period.
- ☐ Samples will be collected in the future as required.
- ☐ Other information for customers:

For more information, please contact _____ at ( )____-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on __/__/__

Lead & Copper Monitoring Public Notice Certification Form
This section must be completed by the water system. Signature below indicates notice contained all required elements.

Complete the following items (check all that apply):

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

- ❑ Notice mailed to all water customers on ____ / ____/____.
- ❑ Notice hand delivered to all water customers on ___ / ___ /___.
- ❑ Notice published in newspaper (attach copy)
- ❑ Notice posted at _____ on ___ / ___ /____.
  (***By Department Approval Only***)

_____ _____ _____
Signature of owner or operator Position Date

Send copy of completed notification and certification to:

Denise Garrett, Lead and Copper Program Manager
Office of Drinking Water
PO Box 47822
Olympia, WA 98504-7822
FAX (360)236-2252

DOH Form 331-461 (Updated 06/11)

AVISO PARA LOS USUARIOS DEL SISTEMA DE AGUA

VIOLACIÓN DEL MONITOREO DE PLOMO Y COBRE

Nosotros, el sistema de agua _____ , con número de identificación (I.D#) _____, ubicado en el condado de _____, regularmente debemos monitorear contaminantes específicos en el agua que usted toma. Los resultados del monitoreo son un indicador para comprobar si el agua que usted toma cumple con los estándares de salud. En _____ no cumplimos con el requisito de monitorear el plomo y el cobre, y por lo tanto no podemos estar seguros de la calidad del agua que usted tomó en esa fecha.

En este momento:

☐ Ninguna acción se requiere de parte de los usuarios.

☐ Nuestras muestras de plomo y cobre requeridas han sido tomadas para este periodo de monitoreo.

☐ Las muestras serán tomadas en el futuro como se requiere.

☐ Otra información para los usuarios:

Para mayor información comuníquese con _____ al teléfono ( ) _____-__ _____ o con

_____	_____	_____
(dueño u operador)	(teléfono)	(dirección)

Pase esta información a todas las personas que pudieran tomar agua de este suministro, especialmente aquellas personas que no hayan recibido este aviso (por ejemplo, personas que vivan en apartamentos, asilos de ancianos, escuelas y negocios.) Usted puede hacerlo colocando este aviso en un lugar público donde se pueda leer claramente o distribuyendo copias en persona o enviándolas por correo.

Este aviso es enviado a usted por el Sistema de Suministro de Agua_____ fecha ___/___/____.

NOTICE TO WATER SYSTEM USERS

MONTHLY BROMATE MONITORING VIOLATION FORM

We, _____ Water System, I.D. _____, located in _____County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During the month(s) of _____, we did not monitor or test for the disinfection by-product bromate, and therefore cannot be sure of the quality of your drinking water during that time.

At this time:

☐ No action is required by the users.

☐ Our routine monthly bromate sample(s) have been taken for _____ *(time period)*.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, please contact _____ at ( )___-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on __/__/__

Monthly Bromate Monitoring Public Notice Certification Form

(This section must be completed by Water System. Signature below indicates notice contained all required elements.)

Complete the following items (check all that apply):

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

☐ Notice mailed to all water customers on ____ / ____/____.

☐ Notice hand delivered to all water customers on ___ / ___ /___.

☐ Notice published in newspaper (attach copy)

☐ Notice posted at _____ on ___ / ___ / ____.

(***By Department Approval Only***)

_____ _____ _____
Signature of owner or operator Position Date

The Department of Health is an equal opportunity agency. For persons with disabilities, this form is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

Send copy of completed notification and certification to:
Office of Drinking Water, Water System Support Section, PO Box 47822, Olympia WA 985047822 fax (360) 236-2252

DOH Form #331-394 (02/08)

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

PUBLIC NOTICE CERTIFICATION FORM
NITRATE MCL VIOLATION

Within 10 days of notifying your customers, you are required to send to your Regional Office of Drinking Water this completed form and a copy of each type of notice you distributed (hand-delivered notices, press releases, newspaper articles, etc.). This form certifies that you have met all the public notification requirements. If the chemical contamination remains for more than three months, you must notify your water users again and provide another Public Notice Certification Form to the Department of Health.

With this certification, you are also stating that you will meet future requirements for notifying new billing units of the violation or situation.

Water System: _____ID #: _____County:_____

Violation Date:_____ / _____ / _____ Violation Type:_____

This public water system certifies that public notice has been given to water users following state and federal requirements for delivery, content, and deadlines.

Complete the following items:

Yes No

☐ ☐ Distribution was completed on ___ / ___ /____. Check all that apply:
- ☐ Hand delivery,
- ☐ Press release (TV, radio, newspaper, etc.),
- ☐ Posting at_____ (by DOH approval only),
- ☐ Other _____ (by DOH approval only).

☐ ☐ Were the water users notified within 24 hours?

_____ _____ _____
Signature of owner or operator | Position | Date

Northwest Regional Office:
20435 72nd Ave. S., Suite 200,
Kent WA 98032
Main Office: (253) 395-6750
Fax: (253) 395-6760

Area of Coverage: Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom Counties.

Southwest Regional Office:
243 Israel Road SE, Tumwater
PO Box 47823, Olympia WA 98504
Main Office: (360) 236-3030
Fax (360) 664-8058

Area of Coverage: Clallam, Clarks, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum Counties.

Eastern Regional Office:
16201 East Indiana Ave., Suite 1500,
Spokane Valley WA 99216
Main Office: (509) 329-2100
Fax: (509) 329-2104

Area of Coverage: Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima Counties.

The Department of Health is an equal opportunity agency. For persons with disabilities, this form is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

NOTICE TO WATER SYSTEM USERS
QUARTERLY NITRATE MONITORING VIOLATION FORM

We, _____Water System, I.D. _____, located in _____ County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. We are required to monitor for nitrates on a quarterly basis. We have failed to meet the monitoring requirements for nitrate for the _____ quarter(s) of _____ (year). We cannot be sure of the quality of your drinking water during that time. At this time:

☐ No action is required by the users.

☐ Our current quarterly nitrate samples have been collected.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, please contact _____ at ( )___-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on __/__/__

Quarterly Nitrate Monitoring Public Notice Certification Form
(This section to be completed by the Water System. Signature below indicates notice contained all required elements.)

Complete the following items (check all that apply):

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

☐ Notice mailed to all water customers on ____ / ____/____

☐ Notice hand-delivered to all water customers on ___ / ___ /___

☐ Notice published in newspaper (attach copy)

☐ Notice posted at _____ on ___ / ___ /____
(***By Department Approval Only***)

_____ _____ _____
Signature of owner or operator Position Date

Send copy of completed notification and certification to:

Denise Garrett, Lead and Copper Program Manager
Office of Drinking Water
PO Box 47822
Olympia, WA 98504-7822
FAX (360) 236-2252

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD, call (800) 833-6388.

NOTICE TO WATER SYSTEM USERS

QUARTERLY TOTAL TRIHALOMETHANE (TTHM)/HALOACETIC ACIDS (HAA5) MONITORING VIOLATION FORM

We, _____ Water System, I.D. _____, located in _____County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During the following quarters: _____, we did not monitor or test for the disinfection by-products TTHM and HAA5, and therefore cannot be sure of the quality of your drinking water during that time.

At this time:

☐ No action is required by the users.

☐ Our routine quarterly TTHM/HAA5 samples have been taken for _____ *(time period)*.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, please contact _____ at ( )___-_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on __/__/__

Quarterly TTHM/HAA5 Monitoring Public Notice Certification Form

(This section must be completed by Water System. Signature below indicates notice contained all required elements.)

Complete the following items (check all that apply):

☐ Notice mailed to all water customers on ____ / ____/____.

☐ Notice hand delivered to all water customers on ___ / ___ /___.

☐ Notice published in newspaper (attach copy)

☐ Notice posted at _____ on ___ / ___ / ____.

(***By Department Approval Only***)

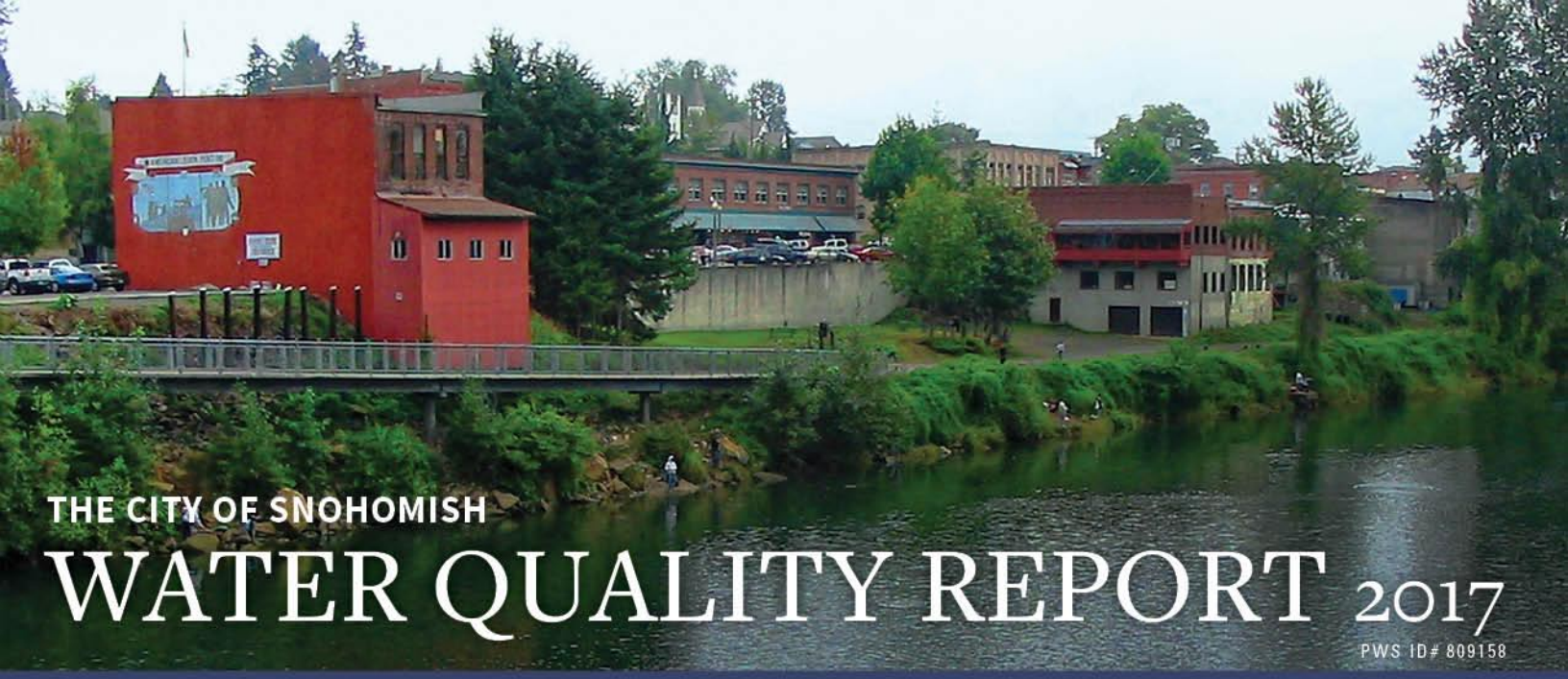
Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

_____ _____ _____
Signature of owner or operator Position Date

The Department of Health is an equal opportunity agency. For persons with disabilities, this form is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

Send copy of completed notification and certification to:
Office of Drinking Water, Water System Support Section, PO Box 47822, Olympia WA 985047822 fax (360) 236-2252

DOH Form #331-395 (02/08)



THE CITY OF SNOHOMISH

WATER QUALITY REPORT 2017

PWS ID# 809158

THE CITY OF SNOHOMISH PROVIDES

Exceptional water to you!

Once again we are proud to present our annual water quality report. This edition covers all testing completed from January through December 2017. We are pleased to tell you that our compliance with state and federal drinking water laws remains exemplary. As in the past, we are committed to delivering the best quality drinking water. To that end, we remain vigilant in meeting the challenges of source water protection, water conservation, and community education while continuing to serve the needs of all of our water users. For more information about this report, or for any questions relating to your drinking water, please call Ann Ray, Water Quality Control Specialist at 360-282-3165.

WATER USE EFFICIENCY UPDATE 2017

The City of Snohomish is committed to water conservation and preserving our water resources. As a part of this commitment we administer a Water Use Efficiency Program and are an active member of the Regional Water Use Efficiency program coordinated by the City of Everett.

Over the course of 2017 and as part of the Regional WUE program, we had 15 large water user audits completed. Our education outreach program within our water service area provided three presentation at Emerson Elementary. We had a savings goal of 12,495 gallons per day (gpd) for 2017, our recognized savings as 1.47% of the regional savings came out to be 9,849 gpd.

If you are a large or commercial consumer and are interested in participating or have questions about the new audit program, or if you are an educator at Central Primary, Emerson Elementary, Cascade View Elementary or Snohomish High School and are interested in more information on how our education programs may compliment your curriculum, please contact: Ann Ray at 360-282-3165 or ray@snohomishwa.gov

Indoor/Outdoor conservation kits are available at City Hall – 116 Union Avenue, Snohomish: Monday through Friday from 9:00am to 5:00pm, if you are not able pick up at City Hall please contact Ann Ray and a conservation kit can be delivered to your home.

SNOHOMISH HAS HIGH QUALITY WATER,

Where does it come from?

The City of Snohomish has two sources for providing drinking water: the **City of Everett** and **Snohomish County PUD #1.**

In January 2017, the City of Snohomish stopped operations of its own Water Treatment Plant located in Granite Falls on the bank of the Pilchuck River. Until then about 65% of our water was purchased from the City of Everett. Now about 90% our water comes from the City of Everett with the remainder from Snohomish County PUD #1. The City of Snohomish is still responsible for operation and maintenance of 35 miles of pipe in the water distribution system.

The City's water supply has been an ongoing focus of consideration since 2009. A water rate study analyzed the costs of two main scenarios: In Scenario 1, the City customers are supplied by two sources of water supply, both its City water treatment plant and supply from the City of Everett; and in Scenario 2, the City customers are served by one source, the City of Everett, and an alternative source of supply for the transmission line customers through Snohomish County PUD #1.

On June 21, 2016, the City Council passed Resolution 1347 to close the City's Water Treatment plant and remove the diversion dam. This action was conditioned on several outcomes, including preservation of water rights in the Pilchuck River system, an agreement with the Tulalip Tribes for removal of the Diversion Dam and a finalized agreement with Snohomish County PUD #1 outlining a permanent agreement to supply transmission line customers.

CITY OF EVERETT (City of Snohomish Customers)
City of Everett water is supplied from Spada Reservoir, which was created in 1965. The reservoir holds about 50 billion gallons of water and is located about 30 miles east of Everett in the Sultan Basin Watershed. From Spada Lake the water flows though about 7 miles of tunnels and pipelines to Chaplain Reservoir where the City of Everett water treatment facility is located. Chaplain Reservoir holds about 4.5 billion gallons of water. City of Everett water is supplied to the City of Snohomish through five connections to Everett's No. 5 transmission line located across the north end of town.

SNOHOMISH COUNTY PUD #1 SUPPLY: (Transmission Line Customers)
Snohomish County PUD #1 water is produced from two wells located at their treatment facility located northeast of downtown Lake Stevens. The water from these wells receives treatment for iron and manganese removal and is chlorinated. Fluoride is added to match levels found in the City of Everett drinking water. The water from this treatment facility is then blended with water received from the City of Everett in the distribution system. Snohomish PUD #1 water is supplied to the City of Snohomish through an intertie located on Robe Menzel Road in Granite Falls.

City of Snohomish Washington PUBLIC WORKS

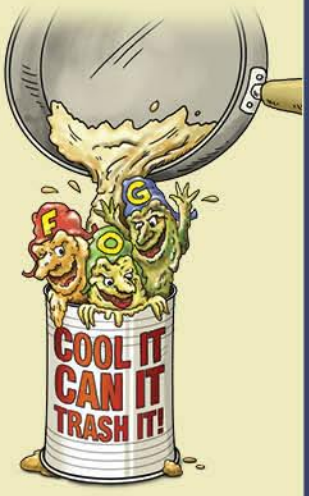
COMMUNITY PARTICIPATION
You are invited to participate in our public City Council meetings and voice your compliments or concerns about our drinking water. We meet on the first and third Tuesday of each month, beginning at 6:00 p.m. at the Snohomish School District Resource Center in the George Gilbertson Room, 1601 Avenue D, Snohomish, Washington 98290.

Fight F.O.G.

(Fats, Oils & Grease)

Keep Fats, Oils and Grease Out of Your Drain and Prevent Clogged Pipes and Sewer Back-ups!

1. Pour cold fats, oils and grease into a covered, disposable container and throw it into your garbage. Never pour fats, oil or grease down sink drains or toilets.



2. Soak up spilled oils and grease with an absorbent material such as paper towels or kitty litter and throw into your garbage.

3. Before you wash dishes, scrape food scraps, fats, oils and grease into your garbage.

4. Use sink strainers to catch any remaining food waste while washing dishes.

PREVENTION, REDUCTION AND ELIMINATION OF FATS, OILS AND GREASE

WHY PROVIDE A Water quality report?

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, which may come from wastewater treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

CROSS CONNECTIONS AND YOU!

Did you know common hazards in and around your house can contaminate your drinking water as well as your neighbors?

These hazards are known as cross-connections, and can result in contaminated water back-flowing into your home's drinking supply without you even knowing.

TWO COMMON CROSS-CONNECTIONS ARE:

Any hose is a cross-connection when left submerged in a swimming pool, laundry sink, or car wash bucket.

To protect your water from these cross connections, make sure to have air vacuum breakers installed on each of your hose bibs.

These simple devices are inexpensive and can be purchased from your local hardware store. They are easy to install; you just screw them on.

Your in-ground irrigation system is also a cross connection so make sure to do the following:

1. Confirm your irrigation system has a back flow assembly device, if not, get one installed.
2. Test the backflow prevention device annually.
3. Turn in your test results to the City of Snohomish Water Department.

If you have any questions, please contact Ann Ray, Water Quality Control Specialist at 360-282-3165.

SAMPLING RESULTS: During the past year, hundreds of water samples have been taken in order to determine the presence of any radioactive, biological, inorganic, volatile organic or synthetic organic contaminants. The table below shows only those contaminants that were detected in the water. Although all of the substances listed here are under the Maximum Contaminant Level (MCL), we feel it is important that you know exactly what was detected and how much of the substance was present in the water.

CITY OF SNOHOMISH

Contaminant	Year	MCL	MCLG	Amt Detect	Range[1]	Violation
Chlorine (ppm)	2017	4	4	0.51	1.21	No
Turbidity (ntu)	2017	TT	NA	0.03	100%	No
Haloacetic Acids (ppb)	2017	60	NA	31.0[3]	14.0 - 47.9[2]	No
Total Trihalomethanes(ppb)	2017	80	NA	44.8[3]	27.1 - 65.7[2]	No
Total Coliform (% Positive)	2017	5% month	0	0	0%	No

[1] Range of results when more than one sample taken per year
[2] Range of results taken from all four monitoring locations
[3] Highest Locational Running Annual Average of all four monitoring locations

Contaminant	Year	Action Level (AL)	MCLG	Amt Detect	Homes exceed AL	Violation
Copper (ppm)	2015	1.3	1.3	0.059	0/37	No
Lead (ppb)	2015	15	0	1.6	0/37	No

Contaminant (Unregulated)	Year	MCL	MCLG	Amt Detect	Range	Violation
Bromodichloromethane (ppb)	2017	NA	NA	3.2	1.3 - 22.8	No
Chloroform (ppb)	2017	NA	70	41.6	10.4 - 58.4	No
Dichloroacetic Acid (ppb)	2017	NA	NA	11.4	1.8 - 43.6	No
Trichloroacetic Acid (ppb)	2017	NA	20	19.1	2.2 - 31.8	No
Monochloracetic Acid (ppb)	2017	NA	20	2.9	2.0 - 3.4	No

These substances are individual disinfection by products for which no MCL/MCLG standard may have been set, but must be monitored to determine compliance with the USEPA Stage 2 Disinfection by products Rule MCL's for Total Trihalomethanes and Haloacetic Acids (5).

USEPA and State regulations require water systems to monitor for the presence of lead and copper at household taps every three years. Snohomish under the administration of the City of Everett participate in a regional monitoring program. The above data was collected in 2015. The 90th% level is the highest result obtained in 90 percent of the samples collected when the results are ranked in order from lowest to highest.

CITY OF EVERETT

Contaminant	Year	MCL	MCLG	Amt Detect	Range[4]	Violation
Turbidity (ntu)[5]	2017	TT	NA	0.15	100%	No
Fluoride (ppm)[6]	2017	4	2	0.7	0.2-0.8	No

Contaminant	Year	Daily Avg	Min Daily Avg	Average	Minimum	Violation
pH (s.u.)	2017	7.6	7.4	7.6	7.1	No

Everett is required to operate corrosion control treatment at or above a minimum daily average pH of 7.4. The average daily pH cannot be below 7.4 for more than nine days every six months. in 2017, the average daily pH dropped below 7.4 for eight days.

Additional Monitoring Violation required statement:

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During March, April and May 2017, we did not complete all monitoring or testing for turbidity, and therefore cannot be sure of the quality of your drinking water during that time. There is nothing you need to do. At no time was the quality of your drinking water compromised. The plant has resolved the problem and taken steps to prevent a repeat occurrence.

SNOHOMISH COUNTY PUD #1

Contaminant	Year	MCL	MCLG	Amt Detect	Range[4]	Violation
Turbidity (ntu)	2017	TT	NA	0.09	100%	No
Fluoride (ppm)[6]	2017	4	2	0.7	0.5 - 0.8	No

[4] Range of results when more than one sample taken per year

[5] The EPA turbidity limit is 0.3 NTU. in 2017, no filtered water turbidity results exceeded 0.3 NTU so the lowest percentage that met the EPA limit was 100%. During the months of March, April and May 2017, an equipment malfunction, caused erroneous turbidity data to be recorded and reported to the Dept. of Health. Although the problem was resolved and correct data was provided to the Dept. of Health, this constitutes a monitoring violation that requires public notification (see below).

[6] Fluoride is added in carefully controlled levels for dental health

TABLE DEFINITIONS

AL (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

NA: Not applicable

ND: Not detected

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water.

Trihalomethanes (TTHM) and Haloacetic Acids (HAA5) form as by-products of the chlorination process that is used to kill or inactivate disease causing microbes.

Turbidity: A measurement of the amount of particulates in water in Nephelometric Turbidity Units (NTU). Particulates in water can include bacteria, viruses and protozoans that can cause disease. Turbidity measurements are used to determine the effectiveness of the treatment processes used to remove these particulates.

Message from the EPA

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Snohomish is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your drinking water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://water.epa.gov/drink/info/lead.

CITY OF SNOHOMISH
Snohomish, Washington

RESOLUTION NO. 580

A RESOLUTION ESTABLISHING A CITY POLICY OF ALLOWING NO FURTHER CONNECTIONS TO THE CITY WATER TRANSMISSION LINE.

WHEREAS, the CITY OF SNOHOMISH owns a water transmission line from the CITY's water treatment plant to the CITY water reservoir; and

WHEREAS, historically the CITY OF SNOHOMISH has permitted public and private property owners abutting or near said transmission line to tap the transmission line, thereby creating water services outside of the CITY limits and being served directly from the water transmission line; and

WHEREAS, the City Council of the CITY OF SNOHOMISH has asked the CITY staff to evaluate the benefits and burdens of permitting further hookups to the water transmission line; and

WHEREAS, the City Engineer has reported to the City Council describing the benefits and burdens of allowing future hookups to the CITY's water transmission line; NOW, THEREFORE,

THE CITY COUNCIL MAKES THE FOLLOWING FINDINGS:

1. The primary purpose of the water transmission line is to provide for the safety and welfare of the citizens of the incorporated area of the CITY OF SNOHOMISH.

2. Increasing numbers of taps off of the transmission line increase the chances of line breakage and/or leakage, thus reducing the line's reliability in serving the CITY. Because the CITY's entire water supply is provided through one line, breaks in that line pose health and safety hazards to the citizens of the CITY and to others who are already served from the transmission line.

3. The transmission line is designed to function for the singular purpose of water transmission and is not designed as a water service line. Pressures along the line vary greatly. There is no backup or reservoir function for customers served by the transmission line when the service in the line is interrupted. Thus, service from the transmission line poses safety and health hazards not associated with service from water lines designed as service lines.

4. The transmission line has a limited capacity and further hookups to the transmission line reduce that capacity. The amount of water service required by the incorporated CITY, as well as those areas which will, within the reasonably foreseeable future, be incorporated within the CITY, is unknown and unquantified. It is not reasonable to reduce the capacity of the transmission line when that capacity may be needed to serve the incorporated areas of the CITY.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SNOHOMISH, WASHINGTON AS FOLLOWS:

That it shall be the policy of the City Council of the CITY OF SNOHOMISH that no further connections will be permitted with respect to the water transmission line from the CITY's filtration plant to the CITY's reservoirs. The only exceptions to said policy will be with respect to applications which are pending at the time of the adoption of this policy and with respect to contractual agreements, if any, which the CITY may already have to provide water service to specific property owners by contract entered into before the date of this resolution.

PASSED by the City Council and APPROVED by the Mayor this 16th day of OCTOBER, 1984.

CITY OF SNOHOMISH

By Ralph Davis
MAYOR

ATTEST:

By _____
CITY CLERK

APPROVED AS TO FORM:

By _____
BRUCE KEITHLY
City Attorney

CITY OF SNOHOMISH
Snohomish, Washington

RESOLUTION NO. 1189

A RESOLUTION OF THE CITY OF SNOHOMISH, WASHINGTON ADOPTING A WATER USE EFFICIENCY GOAL FOR THE YEARS 2008 TO 2013

WHEREAS, growing communities, agriculture, industry, and the importance of conserving water for fish have placed an increasing demand on our state's water resources; and

WHEREAS, to help meet these growing needs, the State of Washington passed the Municipal Water Supply – Efficiency Requirements Act of 2003, better known as the Municipal Water Law; and

WHEREAS, the Municipal Water Law directed the Department of Health to adopt a rule that establishes water use efficiency requirements for all municipal water suppliers; and

WHEREAS, the Department of Health adopted the Water Use Efficiency Rule which became effective January 22, 2007; and

WHEREAS, all municipal water suppliers with 1,000 or more connections must develop and implement their water use efficiency programs and set their initial water use efficiency goals through a public process by January 22, 2008; and

WHEREAS, information about the water use efficiency program, water use efficiency goal, and public process must be provided to the public at least two weeks prior to the public meeting; and

WHEREAS, notice of the City of Snohomish public meeting was advertised in the city's official newspaper on December 15, 2007 and notice of the public meeting and availability of water use efficiency program and water use efficiency goal documents (attached) was placed on the city's web site two weeks prior to the public hearing; and

WHEREAS, the City of Snohomish held a public hearing on January 2, 2008 to receive public comment about their water use efficiency program and water use efficiency goal; and

WHEREAS, the City of Snohomish is a wholesale water customer of the City of Everett and is a member of the Everett Water Utilities Committee (EWUC); and

WHEREAS, the EWUC, in conjunction with the City of Everett, developed a regional water conservation program that is documented in the Everett 2006 Water Comprehensive Plan; and

WHEREAS, historically the City of Snohomish water conservation program has been based upon the regional water conservation program and goals established by the EWUC and adopted by the City of Everett; and

WHEREAS, the City of Snohomish water use efficiency program and water use efficiency goal is consistent with the city's adopted Water Comprehensive Plan; and

WHEREAS, the City of Snohomish will continue with a regional based water use efficiency program for the next six year planning period;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SNOHOMISH, WASHINGTON AS FOLLOWS:

The water use efficiency goal for the City of Snohomish shall be to save 7,644 gallons per day, on an annual average basis, at full implementation of the program in six years.

PASSED by the City Council and **APPROVED** by the Mayor this 15th day of January, 2008.

CITY OF SNOHOMISH

By _____
Randy Hamlin, Mayor

ATTEST:

By _____
Torchie Corey, City Clerk

APPROVED AS TO FORM:

By _____
Grant Weed, City Attorney

ATTACHMENT B

CITY OF SNOHOMISH
Snohomish, Washington

RESOLUTION 1263

A RESOLUTION OF THE CITY OF SNOHOMISH ESTABLISHING RATES TO BE CHARGED FOR WATER, WASTEWATER, AND STORMWATER SERVICES AND REPEALING RESOLUTION 1248

WHEREAS, the City of Snohomish provides water, wastewater, and stormwater services; and

WHEREAS, the City of Snohomish has adopted Financial Management Policy B-1, which requires City water, wastewater, and stormwater utilities to be self-supporting; and

WHEREAS, the City of Snohomish prepared a Utility Revenue Requirement Study, which details the expected service revenues, operating expenditures, reserve requirements, capital requirements, system replacement requirements, and debt coverage requirements for the next six years; and

WHEREAS, the City Council has approved the Agreed Orders negotiated with the Department of Ecology on the scheduling and project specificity for the wastewater utility treatment options; and

WHEREAS, the wastewater utility projects will cost in excess of $50,487,000; and

WHEREAS, the water utility has capital funding obligations of $4,902,000, and the stormwater utility has capital funding obligations of $3,195,000; and

WHEREAS, the wastewater utility has operations and maintenance reserve requirements of 60 days of expenses, the water utility has operations and maintenance reserve requirements of 90 days of expenses, and the stormwater utility has operations and maintenance reserve requirements of 90 days of expenses; and

WHEREAS, the wastewater utility has emergency repair reserve requirements of $1,000,000, the water utility has emergency repair reserve requirements of $500,000, and the stormwater utility has emergency repair reserve requirements of $300,000; and

WHEREAS, the wastewater utility has system replacement reserve requirements of $272,000 - $393,000, the water utility has system replacement reserve requirements of $175,000 - $213,000, and the stormwater utility has system replacement reserve requirements of $100,000 - $180,000; and

WHEREAS the debt coverage target is a ratio of 1.5; and

WHEREAS, the City Council discussed the utility rate study on October 5, 2010 and November 2, 2010 that addressed the financial need for rate changes to water, wastewater, and stormwater; and

WHEREAS, notice of a public hearing was published on November 6, 2010 and November 20, 2010 in the Everett Herald; and

WHEREAS, the City Council held a public hearing on November 16 and continued it to December 7, 2010 to review the rates and revenue needs of the City's utilities; and

WHEREAS, the City Council last adopted Resolution 1248 on December 1, 2009;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SNOHOMISH, WASHINGTON:

The rates set forth below for water, wastewater, and stormwater services for all City of Snohomish utility customers shall be in effect in accordance with Section 2 below, until modified or amended by action of the City Council.

Section 1. **Definitions.** For the purpose of this resolution, the following definitions shall apply:

a. "Quantity Allowed" means the number of hundreds of cubic feet of water that may be consumed for the monthly minimum charge.

b. "Overage" means the water that is consumed over the quantity allowed for each meter size in a month.

c. "Low Income Household" means a household in which the total annual income is below the very low income level for the Seattle/Everett area as established and amended by survey from time to time by the United States Department of Housing and Urban Development.

d. "Senior Citizen" means a person 62 years of age or older.

e. "Disabled Person" means a person with a physical or mental impairment that substantially limits one or more major life activities, such as walking, seeing, hearing, speaking, learning, performing manual tasks, caring for oneself, et cetera.

f. "Abandoned Occupant" means an account where no usage of water (zero consumption) is anticipated for a continuous period of one-hundred and eighty (180) days or more, and where no human habitation or active business operations, other than site construction or demolition, is occurring.

g. "Winter Average" means the average measured water consumption for the four-month period of November through February for accounts in routes 01 through 08 and the December through March time periods for accounts in routes 09-17.

h. "Leak Adjustment Credit" means a credit applied to a customer's account when a private water line, valve, fixture, or other appurtenance is verified to be leaking as a result of accidental damage or natural deterioration. A Leak Adjustment Credit does not mean when a private water line, valve, fixture, or other appurtenance discharges water due to its being left on by the property owner, tenant, or other person(s).

i. "Final Utility Billing" means a billing requested by a customer prior to the sale of real estate between billing cycles to which the utility provides service.

j. "Unbilled Services" means an account for which the billing for services was incorrect for which the error was not immediately known and corrected.

k. "Equivalent Residential Unit (ERU)" means the average square footage of impervious surface of a detached single family residential property, which shall be 2,500 square feet for the calculation of stormwater rates.

l. "Single Family Residence" means a structure where a unique family unit resides for the calculation of stormwater, solid waste, and recycling rates.

m. "Other Developed Property" means all other developed property (i.e., non-single family detached residential property) in the City whose rate shall be the base rate multiplied by the numerical factor obtained by dividing the total impervious area (square feet) of the property by one ERU. The impervious surface area for other developed property is the square footage for the buildings and other improvements on the property. One ERU shall be 2,500 square feet of impervious surface. The minimum stormwater management fee for other developed property shall equal the base rate for single family residential property.

Section 2. **Effective Dates**.

a. All 2011 rates in this resolution shall be effective January 1, 2011 for all accounts in routes 01 through 08 (cycle 1); and February 1, 2011 for all accounts in routes 09 through 17 (cycle 2). All other provisions of this resolution shall be effective January 1, 2011.

b. All 2012 rates in this resolution shall be effective January 1, 2012, for all accounts in routes 01 through 08 (cycle 1); and February 1, 2012, for all accounts in routes 09 through 17 (cycle 2). All other provisions of this resolution shall be effective January 1, 2012.

c. All 2013 rates in this resolution shall be effective January 1, 2013, for all accounts in routes 01 through 08 (cycle 1); and February 1, 2013, for all accounts in routes 09 through 17 (cycle 2). All other provisions of this resolution shall be effective January 1, 2013.

Section 3. **Water Service Rates.** The following rates will be applied for monthly water service:

a. Metered Water.

1. Monthly Minimum Charges by Meter Size.

Meter Size (Inches)	Quantity Allowed (Hundreds of cu ft)	2011 Monthly Minimum Base Charge	2012 Monthly Minimum Base Charge	2013 Monthly Minimum Base Charge
5/8	2	19.65	20.63	21.46
1	5	50.30	52.82	54.93
1-1/2	11.5	113.20	118.86	123.61
2	20.5	201.25	211.31	219.77
3	46	452.75	475.39	494.40
4	82	804.85	845.09	878.90
6	133.5	1810.94	1901.49	1977.55
8	325	3188.20	3347.61	3481.52
Senior Rate	4	4.92	5.16	5.37

2. Charges for Overage by Hundreds of Cubic Feet.
All amounts in excess of quantity allowed: per 100 cubic feet.

2011	2012	2013
$3.63	$3.81	$3.96

b. Not Metered Water.

2011	2012	2013
$46.95	$49.30	$51.27

c. Water Service Outside the City Limits. Rates for services outside of the City of Snohomish shall be City rates as adopted, plus 50 percent, rounded to the nearest $0.05.

Section 4. **Wastewater Service Rates.** The following rates will be applied for monthly sewer service:

a. Metered Sewer.

1. Monthly Minimum Charges by Meter Size.

Meter Size (Inches)	Quantity Allowed (Hundreds of cu ft)	2011 Monthly Minimum Base Charge	2012 Monthly Minimum Base Charge	2013 Monthly Minimum Base Charge
5/8	2	$56.70	$62.99	$69.99
1	5	145.16	161.28	179.18
1-1/2	11.5	326.56	362.81	403.08
2	20.5	580.64	645.09	716.70
3	46	1306.38	1451.39	1612.49
4	82	2322.42	2580.21	2866.61
6	267	5225.46	5805.49	6449.90
8	325	7687.00	8540.26	9488.23
Senior Rate	4	14.18	15.75	17.50

2. Charges for Overage by Hundreds of Cubic Feet.
All amounts in excess of quantity allowed: per 100 cubic feet.

2011	2012	2013
$4.78	$5.31	$5.90

b. Not Metered Wastewater. Per month.

2011	2012	2013
$126.34	$140.36	$155.94

c. Wastewater Service Outside the City Limits. Rates for services outside the City of Snohomish shall be City rates as adopted, plus 50 percent.

Section 5. **Stormwater.** The following rates will be applied for monthly stormwater service:

a. Residential Equivalent Unit. Per month.

2011	2012	2013
$10.31	$11.16	$11.72

b. Impervious Surface Unit. Per month per Equivalent Residential Unit on other developed property.

2011	2012	2013
$10.31	$11.16	$11.72

Section 6. **Low-Income Water and Sanitary Sewer Senior Citizen and Disabled Rates.** Low-income senior citizens or low-income disabled persons who are customers of the utility shall be eligible to apply for water and wastewater services at one-quarter of the monthly minimum charges, and full charges for all overage consumption.

Low-income households in which the principal financial resources are provided by a person meeting the definition of "senior citizen" or "disabled person" may apply for the reduced rates. The application shall be made upon forms furnished by the City and approved or denied by the City Manager or his designee. Appeals of the determination of the City Manager, or his designee, shall be to the Utility Hearing Examiner. The decision of the Utility Hearing Examiner shall be final.

The City may require a customer who is receiving service at a reduced rate to provide information annually to confirm their continued eligibility for the special rate.

The reduced rate provided by this resolution shall apply only to 5/8-inch single family residential services.

Section 7. **Wastewater Winter Average Charges.** All metered wastewater accounts will have wastewater overage charges for the two summer billing cycles based on either their winter average consumption or current period consumption.

Winter average billing will be applied to wastewater overage charges for accounts in routes 01-08 for the summer billing periods of July/August, and September/ October as computed from the winter period billing of November/December and January/February.

Winter average billing will be applied to wastewater overage charges for accounts in routes 09-17 for the summer billing periods of June/July, and August/September as computed from the winter billing period of December/January and February/March.

Section 8. **Abandoned Occupant Rates.** An Abandoned Occupant rate is available to customers where no usage of water (zero consumption) is anticipated for a continuous period of one-hundred and eighty (180) days or more, and where no human habitation or active business operations, other than site construction or demolition, is occurring. The Abandoned Occupant rate will only be available upon prior written notice to the City. The Abandoned Occupant rate for all meter sizes shall be $10.00 per month within City limits, and $15.00 per month outside of City limits.

Section 9. **Rates for Unauthorized Use.** Water withdrawn without authorized service and wastewater discharged through unauthorized connections shall be charged at double the rates set forth above, from the date of the commencement of such unauthorized use, and appropriate measures shall be immediately taken to prevent further unauthorized use. Imposition of such charges shall not act as a waiver of the City's right to take such other actions as are authorized by law.

Section 10. **Rates for Service Levels Not Defined.** The City Manager shall have the authority to charge rates for service levels not otherwise defined in this resolution under the following methodologies:

Water and Sanitary Sewer Rate Methodology – For any new account requiring a service level, defined by the meter size, not provided in this resolution, the method for determining the customer's service rate shall be the sectional area of the undefined meter size in ratio to the sectional area of a 5/8" meter. The ratio shall be applied to the determination of both the base rate and number of included units for the purposes of calculating overage charges.

Section 11. **Unbilled Services.** The City Treasurer shall be authorized to make retroactive adjustments, either billings for services or refunds for charges, for accounts in which the billing for services did not match the services provided for a period not to exceed three years. Customers of the utility have a duty to provide the City with written requests for changes in service and to review their bi-monthly billing and notify the utility of any errors or corrections.

Section 12. **Final Utility Billings.** Customers who sell real property to which the City provides utility service may request in writing, prior to the property's sale closing date, a Final Utility Bill. The City shall read the property's meter on the next proceeding Friday before the closing date and provide the customer by mail with a Final Utility Bill of all charges known to the account.

Nothing within Section 12 shall prohibit the City from collecting any outstanding balances from the property to which services have been provided as authorized by

Snohomish Municipal Code 15.02.020 and RCW 60.80.020. A Final Utility Bill request shall not be considered the request for final or estimated utility bill as provided by RCW 60.80.020.

Requests for a Final Utility Bill shall be made in writing, on a form provided by the City, prior to the sale date of the property. The new property owner shall be billed on a prorated basis, based on the property's next utility meter read and the number of days for water and sanitary sewer and the number of days and extra collections for solid waste and recycling services.

The City Treasurer shall bill the property owner requesting the Final Utility Bill $30.00 at the time a request is received and the meter is read.

Section 13. **Leak Adjustments.** If a private water line, valve, fixture, or other appurtenance is verified to be leaking as a result of accidental damage or natural deterioration, the customer may apply for a leak adjustment credit on their current water and sanitary sewer bill. Applications must be submitted in writing on a form authorized by the City Manager or designee. The customer must include on the application receipts which document the repair of the leak which shall include all billings for goods, services, labor, and materials.

The leak adjustment credit shall be determined based on the consumption billed during the same bill period in the previous year; or, if the history is not available, in a method determined by the City Manager or designee which best estimates actual water use. In determining the credit, the City may also consider water consumption from the last meter reading date. The leak adjustment credit shall be applied to overage charges for water and sewer and shall be credited $1.81 (2011), $1.90 (2012) and $1.98 (2013) per overage unit for water and $4.78 (2011), $5.30 (2012) and $5.90 (2013) per overage unit for sewer. In no case may an account receive a leak adjustment credit for a private water line break or leak more than once in a two-year period regardless of property ownership.

Section 14. **Miscellaneous Fees.** The City Treasurer shall bill **for the following services:**

ITEM	DESCRIPTION	FEE
Late Fee	Payment not received two weeks after bill due date.	$20
Voluntary Turn Off Fee	Requests for water shut offs during regular business hours.	$30
Involuntary Shut Off Fee	Involuntary shut offs made for non-payment.	$40
Unauthorized Turn On Fee	Service resumption made without authorization from the City, including destruction of locking mechanisms.	$50
After Hours Voluntary Shut Off	Voluntary service disconnections requested after regular business hours.	$100
Meter Accuracy Testing	Requests to verify meter accuracy after dual meter reads have already been made.	$40

Section 15. **Repeal of Previous Resolution.** Resolution 1248 is hereby repealed, consistent with the effective dates of this Resolution as set forth in Section 2 above. Repeal of Resolution 1248 shall not affect monies charged or due for utility services provided or charges due during the effective period of Resolution 1248.

Section 16 **Publication.** This resolution shall be published in summary in the official newspaper designated by the City following adoption of this resolution.

PASSED by the City Council and **APPROVED** by the Mayor this 7th day of December, 2010.

CITY OF SNOHOMISH

By_____
Karen Guzak, Mayor

Attest:

By_____
Torchie Corey, City Clerk

Approved as to form:

By_____
Grant K. Weed, City Attorney

CITY OF SNOHOMISH
Snohomish, Washington

RESOLUTION 1347

A RESOLUTION OF THE CITY OF SNOHOMISH STATING A POLICY FOR THE FUTURE CLOSURE OF ITS WATER TREATMENT PLANT AND THE REMOVAL OF ITS WATER SUPPLY INTAKE AND DIVERSION DAM ON THE PILCHUCK RIVER CONDITIONED ON SEVERAL OUTCOMES INCLUDING THE INTENT TO PROTECT AND PRESERVE ITS WATER RIGHTS IN THE PILCHUCK RIVER SYSTEM

WHEREAS, the City of Snohomish (City) currently serves the northern half of the City with water purchased from the City of Everett (Everett) and supplied from Everett's No. 5 water transmission line running through the City north of Blackmans Lake; and

WHEREAS, the City supplies most of the southern half of the City with water supplied by the City's water treatment plant originally constructed in 1981, and located approximately 9 miles outside the City limits and outside the City's Urban Growth Area northeast of the City, just north of Lake Roesiger; and

WHEREAS, the City's supply for the treatment plant is provided through a diversion dam and water intake structure which was constructed beginning in 1932 on the Pilchuck River which is also several miles outside the City limits and the City's Urban Growth Boundary; and

WHEREAS, the City's water is conveyed through a 14.6 mile water transmission main originally constructed in 1912 and replaced in 1981. The main supplies a City reservoir located near the intersection of Pine Avenue and 13th Street; and

WHEREAS, the City's 14.6 mile water transmission main has a limited number of years of useful life and has the potential in the future to fail and cease to meet standards which could cause interruption of service and extraordinary costs to remedy; and

WHEREAS, the 14.6 mile water transmission main serves approximately 76 metered customers who are outside the City limits and outside of the City's Urban Growth boundary; and

WHEREAS, the City completed the *Water Treatment Plant and Water Supply Study* in May 2009 *(2009 Study)* which examined the City's existing Pilchuck River water treatment plant and alternative sources of water supply; and

WHEREAS, changes in projected population growth and cost assumptions have occurred since the 2009 Study was completed. Said changes may result in different cost projections for supply of water to customers. Some of the changes since the 2009 study include:

- The City of Everett's 2014 Amendment to the 2007 Water Comprehensive Plan which was approved by the State of Washington Department of Health on April 9, 2015. This amendment is to remain in effect until April 9, 2021;

- Despite improvements in water production and optimization at the City's water treatment plant over the last 7.5 years, the plant faces continued limits on total water production, especially during the winter months, due to the new Washington State Department of Health (DOH) regulations on filtered water turbidity; and

- Significant reduction of the City's population projections for 2025 (interpolated) and 2035 based on revised County planning targets for the 2015 to 2035 planning period; and

WHEREAS, the City Council deems it to be in the public interest to declare its policy and intent to protect and preserve its water rights in the Pilchuck River system to the greatest extent possible for current, near term, and long term water planning purposes and to forecast its plans for addressing the water treatment facilities and 14.7 mile water transmission pipeline; and

WHEREAS, the City Council held workshops on March 4, 2014, and November 4, 2014, regarding the City's water supply and water treatment options; and

WHEREAS, at the August 4, 2015, City Council meeting, the Council unanimously approved Resolution 1331 to explore other sources of water supply, including but not limited to City of Everett water, Snohomish County PUD water and ground water as alternatives to its Pilchuck River treatment plant source, and continue planning and take necessary steps to fully protect and preserve its water rights in the Pilchuck River, and to advance other related planning actions; and

WHEREAS, at the September 15, 2015, City Council meeting, the Council authorized the City Manager to enter into an agreement with FCS Group, Inc. for a Water Rate Update and Area Specific Charge Study; and

WHEREAS, on May 3, 2016, the City Council held a workshop to review the results on the water rate study and to consider the basic procedures for working with the Washington State Department of Ecology for "banking" of the City's water right;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SNOHOMISH, WASHINGTON AS FOLLOWS:

Section 1. City Customer Water Supply from the City of Everett.
The City of Snohomish will pursue measures that would result in a course of action to obtain all of its City water supply for customers within the City's Retail Water Service Area (both the north and southern zones) from the City of Everett.

Section 2. Transmission Main Customers.
The City will continue to explore options, including, but not necessarily limited to the decommissioning, rehabilitation, retrofitting, transfer, lease or sale of its existing 14.6 mile water transmission line which serves customers outside the City limits and outside the City's Urban Growth Area and which runs between its treatment plant and the City reservoirs. For the near-term, the City will pursue the action to supply the transmission main customers with water from Snohomish PUD and/or the City of Everett. Subject to available utility funding and budget restrictions, the City will endeavor to develop a program to reimburse a portion of the costs for

existing transmission main customers to directly connect at their cost to another water purveyor (typically Snohomish PUD) or to install private groundwater wells. The purpose and objective of a possible reimbursement program will be to remove all customers from the lower section of the transmission main in order to ultimately abandon this portion of the main before the end of its useful life.

Section 3. Treatment Facilities.
The City will pursue a course of action to decommission its existing intake, diversion dam and water treatment facilities. Subject to the additional actions set forth in Section 4 below, the objective will be to shut down operations at the water treatment plant and the withdrawal of water from the Pilchuck River in about 18 to 36 months. The intake and diversion dam removal schedule will be determined by environmental permitting constraints, the availability of federal and state grants, and additional funding by stakeholders.

Section 4. Additional Actions before Treatment Facilities Decommissioned.
The water treatment plant will not be decommissioned and the City will keep both the City of Snohomish and Everett sources of supply until the following are completed and approved to the satisfaction of the City Council:

1) **Meeting with Transmission Line Customers:** A notice and scheduling of a separate meeting with transmission line customers will be held in order to go over the details of the proposed plan and provide follow-up by City staff;

2) **Planning for Removal of the Existing Dam and Intake Structure on the Pilchuck River:** City staff will work with the Tribes, Washington Water Trust, State agencies and other stakeholders on a Memorandum of Understanding regarding financial grants, outside funding, payments or reimbursements to the City, and schedule for removal of the existing dam and intake structure. The objective is to facilitate, to the greatest extent possible, a significant amount of the decommissioning work to be paid for by federal and state grants, with local funds coming from non-profits, environmental groups, and other local and regional stakeholders who are interested in the Pilchuck River system;

3) **Water Right Banking Agreement:** Staff and legal counsel will work with the Washington State Department of Ecology on a draft water right banking agreement for Council review and consideration;

4) **Snohomish PUD Water Supply Agreement:** Staff and legal counsel will work with the Snohomish PUD on a wholesale supply agreement for supplying water to the transmission line customers and future conversion of some of the parcels to the PUD for direct service.

Section 5. Perfect and Protect the City's Water Rights.
Notwithstanding sections 1-4 above, the City will continue planning and taking necessary steps to fully protect and preserve its water rights in the Pilchuck River. Options include, but are not limited to, sale, lease or transfer to another agency or non-profit, trust water donation, transfer of the water intake and place of withdrawal downstream, or future expansion of the existing or a new plant.

Section 6. Coordination with Other Parties.
The City Council finds that examination of the foregoing matters, exploration of options and potential partners, and analysis of potential risk factors are complex and interrelated and will involve other parties. Accordingly, the Council directs staff to conduct outreach to other parties and stakeholders who could participate in building solutions to the City's long term water supply issues, including state agencies, cities, special purpose districts, Native American tribes, conservation and environmental similar organizations. The Council further directs staff to undertake the examination and exploration of the various alternatives and related considerations together so as to enable comprehensive review and analysis by the Council.

Section 7. Varying Cost of Service.
To the extent legally and financially feasible, the City's policy will be to promote a water supply to customers that is supported by rates and fees that reflect the varying cost of service and the need for future water utility improvements to the different areas served by the utility, both within and outside the City limits and outside the Urban Growth Area.

Section 8. Comprehensive Plans.
At the time of the next update to the City's Comprehensive Land Use Plan and Water Comprehensive Plan, this Resolution and any amendments thereto may be reviewed, revised and incorporated into and made a part thereof.

Section 9. Previous Resolutions Withdrawn.
All prior Resolutions or parts thereof which are inconsistent with this Resolution are hereby withdrawn and replaced by this Resolution.

PASSED by the City Council and **APPROVED** by the Mayor this 21 day of June, 2016.

CITY OF SNOHOMISH

By _____
Karen Guzak, Mayor

Attest:

By _____
Pat Adams, City Clerk

Approved as to form:

By _____
Grant K. Weed, City Attorney

City of Snohomish
Water System Plan
Storage Facilities Data

Reservoir Data

Reservoir Name	Approximate Location	Pressure Zone	Year Const.	Material	Capacity (MG)	Dimensions (feet)	Overall Height (feet)	Base Elv (feet)	Overflow Elv (feet)
Reservoir No. 2	Pine Ave and 13th St	218 Zone	1953	Concrete	5.00	282 x 198 (Ground Level)	20.9	197.4	218.2
Reservoir No. 3	1701 Terrace Ave	362 Zone	1991	Steel	2.52	81 (Diameter)	65.5	296.5	362.0

Storage Data

Reservoir Name	Max Water Height (feet)	Volume Per Foot (gallons)
Reservoir No. 2	218.2	Varies
Reservoir No. 3	362.0	38,473

Level Control Data

Reservoir Name	Controlled Supply Facility	Reservoir Have Telemetry	Normal Operating Range (feet)
Reservoir No. 2	Reservoir No. 2 PRV	Yes	210.9
Reservoir No. 3	Terrace Avenue Intertie	Yes	345.5

City of Snohomish
Water System Plan
Pressure Reducing Station Data

Station Data

PRV Name	Location	Upper Pressure Zone	Lower Pressure Zone	Ground Elevation (feet)	Normal Outlet Pressure (psi)	Station Operation Status
PRV No. 1 (Machias and Dubuque)	South Machias Road and Dubuque Road	338 Zone	286 Zone	80	89	Active
PRV No. 2 (OK Mill and Machias)	OK Mill Road and Russell Road	471 Zone	338 Zone	135	88	Active
PRV No. 3 (OK Mill and Newberg)	OK Mill Road and Newberg Road	471 Zone	471 Zone	267	N/A	Inactive
PRV No. 4 (OK Mill and Creswell)	OK Mill Road and Creswell Road	471 Zone	471 Zone	320	N/A	Inactive
9th Street and Avenue A PRV	9th Street and Avenue A	362 Zone	218 Zone	116	40	Active
10th Street and Avenue D PRV	10th Street and Avenue D	362 Zone	218 Zone	113	44	Active
Reservoir No. 2 PRV	Reservoir No. 2 Site	362 Zone	218 Zone	197	10	Active
Bickford Avenue PRV	Bickford Avenue and 19th Street	384 Zone	384 Zone	177	N/A	Inactive

PRV Set Point Data

PRV Name	Description	Valve Size (inches)	Valve Mfgr	Valve Model	Valve Set Point (psi)	Valve Set Point (feet H.E.)
PRV No. 1 (Machias and Dubuque)	Small PRV	3	Cla-Val	90G-01AS	89	286
	Large PRV	12	Cla-Val	90G-01AB		
PRV No. 2 (OK Mill and Machias)	Small PRV	3	Cla-Val	90G-01AS	88	338
	Large PRV	12	Cla-Val	90G-01AB		
PRV No. 3 (OK Mill and Newberg)	Small PRv	3	Cla-Val	90G-01AS	Inactive	
	Large PRV	12	Cla-Val	90G-01AB		
PRV No. 4 (OK Mill and Creswell)	Small PRV	3	Cla-Val	90DG-01ABCS	Inactive	
	Large PRV	12	Cla-Val	90DG-01ABCS		
9th Street and Avenue A PRV	Small PRV	3	Cla-Val	90G-01AS	40	208
	Large PRV	12	Cla-Val	90G-01AB	35	197
10th Street and Avenue D PRV	Small PRV	2	Cla-Val		44	215
	Large PRV	6	Cla-Val		39	203
Reservoir No. 2 PRV	Small PRV	3	Cla-Val	93EG-01BCSVYKCO	10	220
	Large PRV	8	Cla-Val	93EG-01BCSVYKCO	10	220
Bickford Avenue PRV	Small PRV		Cla-Val		Inactive	
	Large PRV		Cla-Val			

City of Snohomish
Water System Plan
Intertie Data

Intertie Data

Intertie Name	Location	Pressure Zone	Capacity (Existing) (gpm)	Capacity (Future) (gpm)	Master Meter Size (Inches)	PRV Size (Inches)
Bickford Avenue Intertie	Bickford Ave and 52nd St SE	384 Zone	4,900	4,900	10	10, 6, and 2
King Charley's Intertie	Lake Ave and 56th St SE	438 Zone	1,600	3,100	8	8 and 4
Park Avenue Intertie	Approx. Park Ave and Rainbow Pl	450 Zone	3,500	4,900	10	10 and 3
Terrace Avenue Intertie	2014 Terrace Ave	362 Zone	4,900	4,900	8	10 and 6
	2014 Terrace Ave	425 Zone	1,500	1,500		8 and 3
NEPA Pallet Intertie	Three Lakes Rd and Highway 2	278 Zone	1,200	1,200	4	4
PUD Intertie	Robe Menzel Rd, S of 36th St NE	Transmission Main (471 Zone)	95	210	2	2

Station Data

Intertie Name	Upper Pressure Zone	Lower Pressure Zone	Ground Elevation (ft)	Normal Outlet Pressure (psi)	Station Operation Status
Bickford Avenue Intertie	Everett	384 Zone	199	71	Active
King Charley's Intertie	Everett	438 Zone	261	61	Active
Park Avenue Intertie	Everett	450 Zone	233	68	Active
Terrace Avenue Intertie	Everett	362 Zone	262	43	Active
	Everett	425 Zone	262	60	Active
NEPA Intertie	Everett	278 Zone (NEPA)	60	94	Active
PUD Intertie	PUD	Transmission Main (471 Zone)	425	20	Active

PRV Set Point Data

PRV Name	Description	Valve Size (inches)	Valve Mfgr	Valve Model	Valve Set Point (psi)	Valve Set Point (feet H.E.)
Bickford Avenue Intertie	Small PRV	2				
	Small PRV	6	Cla-Val	90G-01AB	71	363
	Large PRV	10	Cla-Val	90G-01ABCD	66	351
King Charley's Intertie	Small PRV	4	Cla-Val		61	402
	Large PRV	8	Cla-Val		61	402
Park Avenue Intertie	Small PRV	3	Cla-Val	90G-01AS	68	390
	Large PRV	10	Cla-Val	90G-01AB	63	379
Terrace Avenue Intertie	Small PRV	6	Cla-Val		43	361
	Large PRV	10	Cla-Val		38	350
Terrace Avenue Intertie	Small PRV	3	Cla-Val	93EG-01ABCS	60	401
	Large PRV	8	Cla-Val	93EG-01ABCS	55	389
NEPA Intertie	Small PRV	4			94	277
PUD Intertie	Small PRV	2	Wilkins	Model NR3	20	471