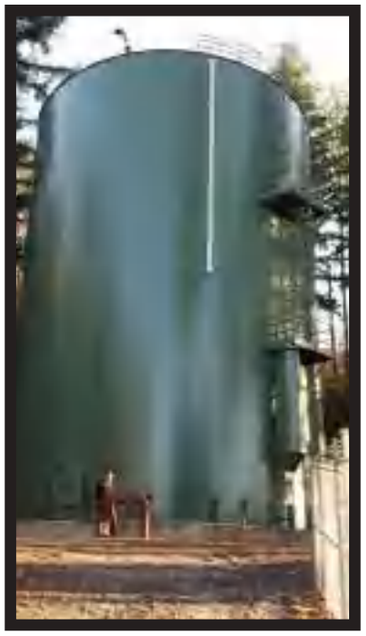
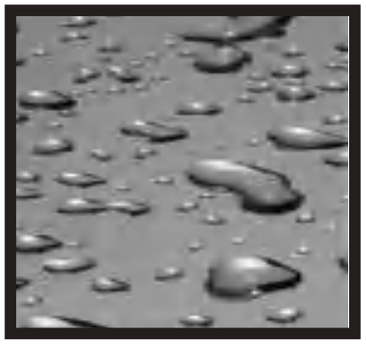
2015 Comprehensive Water System Plan





CITY OF CARNATION

2015 COMPREHENSIVE WATER SYSTEM PLAN
APPROVED
JULY 2018

Prepared for:
City of Carnation
4621 Tolt Avenue
PO Box 1238
Carnation, WA 98014-1238
(425) 333-4192
www.carnationwa.gov

City Council:
Kimberly Lisk, Mayor
Dustin Green, Deputy Mayor
Jim Berger, Councilmember
Jim Ribail, Councilmember
Ernest Fix, Councilmember

City Manager:
Amy Arrington
amy.arrington@carnationwa.gov

Prepared by:
Stantec Consulting Services, Inc.
11130 NE 33rd Place, Suite 200
Bellevue, Washington 98004
Telephone: (425) 869-9448
Fax: (425) 869-1190

FCS Group, Inc.
7525 166th Ave NE, Suite D-215
Redmond, WA 98052
Telephone: (425) 867-1802
Fax: (425) 867-1937

CERTIFICATION

This Water Comprehensive Plan for the City of Carnation was prepared by Stantec Consulting Services, Inc., under the direction of the individuals listed below. Those responsible staff members who are registered engineers are licensed in the State of Washington.

Laurie Fulton, P.E.

Stephanie Ard, E.I.T.

Pamela-Rae Cobley, Project Manager

APPROVAL

Reviewed by Washington State Department of Health in accordance with the provisions of WAC 246-290-100 and approved on July 12, 2018.

Approved by KC Ordinance No. 18765 on July 13, 2018.

Approved by the City of Carnation through City Resolution No. 423 on March 20, 2018.

TABLE OF CONTENTS

CHAPTER 3 – BASIC PLANNING DATA AND WATER DEMAND FORECASTS

CHAPTER 4 – SYSTEM ANALYSIS

CHAPTER 8 – IMPROVEMENT PROGRAM

CHAPTER 9 – FINANCIAL PROGRAM

LIST OF TABLES

LIST OF FIGURES

APPENDICES

EXECUTIVE SUMMARY

INTRODUCTION

The City of Carnation's 2015 Comprehensive Water System Plan outlines the City's planning strategy for the next 20 years. The Plan is in accordance with the Revised Code of Washington (RCW) Title 57.16 and supersedes the 2008 Water Comprehensive Water System Plan. The Plan analyzes the City's existing water system, provides guidance to evaluate the impacts of future growth, and recommends necessary improvements to the water system to ensure the City continues to provide high-quality, reliable water service to its current and future customers.

The Plan establishes the following goals for water service:

1. Provide safe, reliable, and timely water service to City consumers at a fair and reasonable price.
2. Ensure that water service is available to support development that is consistent with the City's policies and standards as well as the current land use plans and development regulations of the state of Washington, King County, and the City.
3. Protect the natural environment with design, construction, operational, and conservation procedures.

HISTORICAL BACKGROUND

The City of Carnation has supplied drinking water to the community for close to one hundred years. During the early development of the City, the source of water was from Springs located in a wooded sixteen acre tract of the Weyerhauser Timber Company. The City continues to get water from the Springs.

Some years later the City purchased the original 16-acres plus an additional 64 acres from Weyerhauser. These 80 acres currently constitute the Springs site and the City's protected watershed.

The original water distribution system was developed by extending water mains as needed to serve the City's growth. Over time the original wood stave pipes, usually made from split and hollowed cedar and wrapped with galvanized wire, were replaced with steel and asbestos cement pipe. Today the City standard for water mains is ductile iron. The current water system consists of approximately twelve miles of water lines and over 400 valves. There is a storage reservoir at the springs and two at the City Shop property. A well is also installed at Loutsis Park and serves as a backup water supply.

IMPROVEMENTS SINCE THE 2008 PLAN

Since the last Plan, the City has completed several major projects that have significantly improved the water system. The City constructed two new storage tanks, giving the City 714,000 gallons of additional storage capacity. One of the new tanks is a 605,000 gallon steel tank built

at the existing reservoir site near the City Shop, and the other new tank is a 109,000 gallon steel tank built near the Springs.

The City also replaced approximately 2,400 feet of transmission main from the Springs source to 344th Avenue. The old transmission main had minimum to no cover or was elevated in/near the stream, leaving the City's primary transmission main vulnerable. By replacing this section of the transmission main with more accessible main with proper soil cover, the City has increased the reliability of its water system.

Approximately 9,840 feet of water main were installed within the City limits since the last Plan, of which approximately 3,820 feet were installed by the City and approximately 6,020 feet were installed by developments. Developments included developer extension projects, replacement of old and under-sized water mains, and the installation of new water main to improve looping and hydraulic conditions within the City.

The increased storage capacity, coupled with new water mains, significantly improved the available fire flow within the City limits. The City can now support 2,500 gpm commercial fire flow within the City's commercial district which was not the case in 2008.

The City also focused on improving its distribution system leakage (DSL). Projects such as the new source meter, water meter inspection and replacement program, and leak detection program helped to reduce the DSL. Between 2008 and 2015, the City decreased its DSL from approximately 42% to under 10%.

POLICIES, CRITERIA AND STANDARDS

The City's policies, criteria, and standards are grouped into the following major categories:

- Service Area, Extension, and Service Ownership
- System Reliability and Emergency Management Plan
- Fire Protection
- Coordination and Cooperation with Other Agencies
- Water System Planning, Design, and Construction
- Environmental Stewardship
- Water Use Efficiency
- Greenhouse Gas Emission Reduction
- Operational

These policies, criteria, and standards provide the essential framework for the City to follow in the planning, design, operation, and management of its water system.

BASIC PLANNING DATA AND WATER DEMAND FORECASTS

Basic planning data is evaluated for the purpose of estimating future water demands for which the City's water system will be required to provide. Evaluated planning data includes:

- Current land use and zoning
- Water source production
- Historical City population
- Historical water use and connections

Future forecasts are also made for population, households, and employment. The following table summarizes the population forecasts in terms of inside and outside the Urban Growth Area:

Projected Population Forecast

Population Inside UGA Boundary				
	Planning Year	**6-yr Planning**	**10-yr Planning**	**20-yr Planning**
	2015	**2021**	**2025**	**2035**
Single-Family	1,692	2606	2,940	3,396
Multifamily	300	423	559	696
Total	1,992	3029	3,499	4,092
Population Outside UGA Boundary				
	Planning Year	**6-yr Planning**	**10-yr Planning**	**20-yr Planning**
	2015	**2021**	**2025**	**2035**
Single-Family	484	518	552	558
Multifamily	14	55	55	55
Total	498	573	607	613
Total Population				
	Planning Year	**6-yr Planning**	**10-yr Planning**	**20-yr Planning**
	2015	**2021**	**2025**	**2035**
Single-Family	2,176	3124	3,492	3,954
Multifamily	314	478	614	751
Total	2,490	3602	4,106	4,705

Based on these forecasts, the number of future water connections and their predicted water demand (i.e., water usage) is estimated. For convenience, these demand forecasts are presented in terms of Equivalent Residential Units (ERUs). Average day and maximum day demands are developed on a per ERU basis and used to estimate projected average day and maximum day demands for the 20 year planning period. The average day demand, multiplied by 365 day per year, also is used to develop a projected annual demand in terms of millions of gallons (MG) per year presented in the following table:

Projected Annual Demand (in MG per Year)

	Planning Year	6-yr Planning	10-yr Planning	20-yr Planning
	2015	2021	2025	2035
Single-Family	48.8	70.1	78.4	88.7
Multifamily	6.61	10.0	12.9	15.8
Commercial	20.3	23.6	27.6	31.6
Authorized Consumption	1.51	2.08	2.38	2.72
Distribution System Leakage	7.57	10.4	11.9	13.6
Total	75.7	103.7	118.9	136.1

SYSTEM ANALYSIS

Water quality from both the Springs and well sources is excellent and consistently meets or exceeds all state and federal water quality standards. Chlorination is provided for the Springs and is proposed in the future for the well source.

A hydraulic analysis of the City's water system facilities is an integral part of the comprehensive planning process. The analysis evaluated the system's ability to supply water to the City's customers, and identifies any deficiencies in meeting DOH and City standards. The analysis then suggested and evaluated improvements to resolve the identified deficiencies. The scope of the hydraulic analysis included the following:

- Perform a storage analysis of the system based on existing and future demand conditions.
- Assign demands to the model based on the existing and future system.
- Evaluate system performance compared to DOH and City criteria and identify deficiencies.
- Compare various improvement alternatives.
- Identify selected improvements to resolve existing deficiencies.
- Document any special operational requirements.

The City's hydraulic model uses the H2OMap Water GIS version 10.0 (by Innovyze) software program.

Per DOH requirements, the evaluation simulates the following scenarios for each planning period:

- Minimum pressures
- Maximum velocities
- Maximum pressures
- Fire flow conditions

Where model results identify deficiencies in meeting the specified criteria, alternative system improvements are identified, input to the model, and analyzed to verify compliance with the criteria. All recommended improvements are listed in the Capital Improvement Program.

The modeling showed that maximum velocity and maximum pressure criteria are met throughout the 20-year planning period (2035).

The minimum pressure criterion of 30 psi residual (DOH criterion) is also satisfied throughout the planning period. However, the City is adopting a policy of providing a system pressure of between 40 and 80 psi within the City limits, and ideally would like to provide pressures above 40 psi. There are areas of lower pressure, as identified by hydraulic modeling, at higher ground elevations. As a result, no improvements are needed to remedy pressures less than 40 psi. A small area east of the City Shops would require the installation of a booster pump station to maintain pressure above 42 psi during low pressure scenarios.

In addition to the distribution system modeling, an analysis of the City's storage facilities was conducted using DOH criteria. The analysis showed that the City has surplus storage capacity through the 20-year planning period.

WATER USE EFFICIENCY

In 2003, the Washington legislature passed a law to address the increasing demand on the state's water resources. As a result of this legislation, the DOH adopted an enforceable Water Use Efficiency (WUE) program which became effective in January 2007.

In 2004, the City had established a conservation goal of 1% per year for 6 years. The City's 2008 WUE program continued this conservation goal.

The City has historically had excessive water leakage, estimated as 42% in 2007. Implementing the 2004 and 2008 conservation measures with a combination of more accurate source metering (at the Springs), an active program of locating and fixing leaking water mains, an on-going program of replacing older customer service meters, public education, and other actions: the average annual leakage is now less than 10%.

The 2015 WUE program will continue the implementation of these and other measures and provides the foundation for using water wisely and reducing waste.

In conjunction with the WUE assessment, the City's water rights for its 2 water sources, the Springs and the well, were reviewed. Both the annual and instantaneous water rights from the combined Springs and well water rights are sufficient to meet projected 2035 maximum day demands.

SOURCE WATER PROTECTION

The City's existing source water protection plan states that the well and the Spring sources each have protection plans in place to minimize any potential contamination. The original is DOH Ground Water Contamination Susceptibility Assessment Forms for each source are included in an Appendix.

The Springs are monitored by the City and is inspected by the DOH. A review of the existing (2015) for this Plan did not identify changes to the conditions at the Springs.

However, it is recommended that a new Wellhead Protection Plan (WHPP) be prepared with the necessary revisions, as funding allows, in order that a compliant WHPP can be submitted to the DOH. The WHPP is applicable to both sources.

OPERATION AND MAINTENANCE PROGRAM

The City's operation and maintenance program, staffing and operator certifications, emergency response plan, water quality monitoring and records, and cross-connection control program are reviewed.

The City currently has a full-time staff of five maintenance personnel, including three who are certified water system operators. The Public Works Superintendent is responsible for the day-to-day supervision of the system operations.

IMPROVEMENT PROGRAM

The City has identified $15.5 million in capital projects to be constructed over the next 20 years (2035). These costs are based on 2016 dollars and actual cost should be adjusted to account for inflation and changing market conditions at the time of construction. Projects related to new developments are not included in the Improvement Program, as they are developer funded.

The projects are broadly categorized into 2 groups: Water Mains and Non-Pipe Projects.

Water Mains projects are further grouped as follows:

- New mains
- Replacement mains
- Spring Source Transmission

Non-Pipe Projects are further classified as follows:

- Spring-related improvements
- Well-related improvements
- Other (system-wide improvements relating to operations, maintenance, and management activities)

Excluding new and replacement mains, the projects include (with estimated implementation dates):

- Spring Source Transmission Main – 2 pipe segment replacements scheduled for 2030 and after
- Spring Source Meter Replacement – 2025
- Source Study – study Springs catchment capacity - 2035
- Chlorination Facilities for Well – 2017
- Well Generator – for backup power supply scheduled for 2017
- Well Head Protection Plan - 2025

- New Telemetry System – 3 phased implementation beginning in 2019, the 3rd phase would be for the integration of the sewer system
- New Booster Pump Station – 2028
- Existing PRV/PSV Replacement (at the highway bridge) – 2018
- Multi-Year Projects – annual replacement of water meters, leak detection program, valve replacements
- Future Comprehensive Plans: 2025 and 2035

These costs are based on 2016 dollars and actual cost should be adjusted to account for inflation and changing market conditions at the time of construction. Projects related to new developments are not included in the CIP, as they are developer funded.

FINANCIAL PROGRAM

The City has identified a financial program that allows the water utility to remain financially viable during the execution of the CIP. This program is based on a viability analysis which considers the historical financial condition of the utility, the sufficiency of utility revenues to meet current and future financial and policy obligations, and the financial impact of executing the CIP. The water system's rate structure is also reviewed with respect to adequacy, equity, conservation promotion, and customer affordability.

A financial forecast is developed from the City's adopted 2016 budget along with other factors and assumptions to depict the water utility's financial obligations. The forecast covers the six year planning period through 2022.

The financial forecast presents a rate strategy to smooth the needed rate increases over time in order to avoid rate spikes due to CIP financing, and to mitigate longer term impacts even in the event future growth occurs at one-half what is currently projected.

A table of current and proposed rates are shown for the years 2016 through 2022 with a 3% increase annually to the regular rate and 6% annually to the capital surcharge. During the next several years, the timing for significant capital projects should be clarified and a new rate evaluation should be performed. For the longer planning period, the 3% rate increase could be continued until 2025. If the lower rate increase continues through 2025, significant rate increases will be needed in subsequent years through the planning period. The table formatted based on existing customer classifications, e.g., single-family residential, and water meter sizes.

THIS PAGE INTENTIONALLY BLANK

1.0 CHAPTER 1 - DESCRIPTION OF WATER SYSTEM

1.1 INTRODUCTION

The City of Carnation, Washington (City) is located in East King County, and is completely surrounded by unincorporated King County. The City of Carnation's Water System provides potable water to properties inside the City Limits as well as some portions of neighboring unincorporated King County. The City of Carnation is located within the boundary of the East King County Coordinated Water System Planning Area (CWSP).

The water system is split into two hydraulic pressure zones, the North (229) Zone and the South (328) Zone. The North Zone contains the City of Carnation and its Potential Annexation Area (PAA) to the north of the City. The South Zone contains neighboring unincorporated King County located to the south. In total, the water system serves more than 800 customers, and expects to exceed 1,000 customers in the next five years.

The City completed its new sewer system in 2008, which allowed for development to occur. Unfortunately, due to the "Great Recession" starting in 2008, no development occurred until 2013. The City currently has several development projects in progress, and growth is expected to be robust in the next 10 years.

Since the last 2008 Comprehensive Water Plan (2008 Plan), the City has increased focus on reducing distribution system leakage, and promoting water use efficiency. These efforts have led to a significant decrease in water use per equivalent residential unit (ERU). Additionally, the City substantially invested in improving fire flow capabilities and system reliability through several capital improvement program (CIP) projects, including two new water reservoirs.

1.2 PURPOSE AND SCOPE

The City of Carnation's 2015 Comprehensive Water System Plan (Plan) has been prepared according to the Washington State Department of Health (DOH) Regulations (WAC 246-290). These regulations require the City to update and submit a water system plan for approval to DOH every six years. This Plan updates and supersedes the 2008 Plan, approved by DOH in July 2009.

The 2008 Plan was very ambitious, proposing solutions for a water system with significant needs for facility upgrades and replacements. Many projects were completed between then and now and the City can now confidently provide fire flow to commercial establishments and reliability to its customers. Details of the major changes are described later in this Chapter.

This Plan establishes the City's water utility policies, analyzes the existing water system, and recommends improvements to correct deficiencies and meet future service needs. The Plan provides the City with a guide for evaluating the impacts of future land use and development on the water system. Furthermore, it assists the City in making decisions regarding increasingly complex federal, state, and local regulations. The scope of this Plan is as follows:

- Describe existing service areas, types of uses and designated planning areas within the City. Evaluate the planned service area characteristics including population, water supply and service area policies.
- Describe and inventory the existing water system facilities. Evaluate the existing system's performance and identify problem areas.
- Evaluate historical growth and projected future growth of the City's service area. Identify future growth areas and analyze future impacts and demands on the City's water supply to assist in an orderly growth of the City and its water service area.
- Describe the Wellhead Protection Program for the springs and well location.
- Describe existing water rights for the well and spring site sources.
- Evaluate water conservation program, cross-connection program, well and spring contamination susceptibility and water quality.
- Develop a CIP for the City which recommends system improvements to maintain current health and industry standards and meet proposed City growth.
- Develop a plan to meet existing & future water supply needs, as well as monitoring and reporting requirements of the State Board of Health in coordination with the CWSP.
- Prepare a financial plan for the utility.

City staff met with DOH representatives on July 21, 2014, to discuss the priorities to be addressed in this Water System Plan. Subsequently, a variety of unanticipated City staffing issues delayed initiation and progress on completing this Plan.

1.3 APPROVAL PROCESS

This Plan complies with the requirements of the Department of Health (DOH) and Department of Ecology (Ecology) as set forth in the Washington Administrative Code (WAC) 246-290 and Revised Code of Washington (RCW) 35.58.220 and 70.116. This Plan is also consistent with King County Code (KCC) 13.24, with respect to water system planning.

When the Plan is complete, the City will adopt an agency review draft for distribution. The Plan will be submitted for comments and approval to the State of Washington DOH, and the King County Utilities and Technical Review Committee (UTRC). The City will also submit the Plan to adjacent utilities and local governments having jurisdiction to assess its consistency with ongoing and adopted planning efforts within their jurisdictions. Comments must be obtained in writing from all agencies within ninety days of receipt of the Plan or if requested, an extended time, up to an additional sixty days to complete an adequate review. The Department of Ecology also reviews and comments on the Plan, which is accomplished through the DOH.

The UTRC provides review of each proposed comprehensive plan prior to submitting it to the King County Council (Council) with a recommendation for approval. The UTRC has a procedure and set of guidelines established by ordinance passed by the Council and set forth in King County Code Title 13, Chapter 24 for approving plans.

The City Council will adopt the final 2015 Comprehensive Water System Plan following all review and approval processes by other applicable agencies.

1.4 SEPA REQUIREMENTS

The Plan is categorically exempt, per WAC 197-11-845(2), from SEPA since the system has fewer than 1,000 connections.

1.5 GENERAL WATER SYSTEM INFORMATION

1.5.1 Water System History

The City's water system developed organically as the City developed. The original source of water was a spring located in a 16-acre tract of the Weyerhauser Timber Company. Later the City purchased the original 16 acres plus an additional 64 acres from Weyerhauser. These 80 acres currently constitute the spring site.

The original water distribution system was developed by extending water mains as needed to serve the City's growth. Over time, the City gradually replaced the old wood stave pipes with steel and asbestos cement pipe. The City is now replacing these steel and asbestos cement pipes with ductile iron pipes, as necessary.

Over time the City's water system has grown to include approximately 819 service connections. The system serves customers within the City limits and in the neighboring nearby unincorporated King County. The majority of the connections are single-family and multifamily residential (approximately 89%), but the system also has commercial, industrial, and institutional connections (approximately 11%).

In 2014, the City completed the consolidation of three previous franchise agreements with King County into a single franchise. The franchise allows the City to construct, operate and maintain a water system outside the current City limits. The franchise is numbered 17850 and will expire in 2039. A copy of the Franchise Agreement is included in **Appendix C**.

1.5.2 OWNERSHIP AND MANAGEMENT

The City of Carnation owns and operates a municipal "Group A" water system with fewer than 1,000 existing service connections. The water system includes three (3) reservoirs, the springs sources, the well source, and the transmission and distribution network. It is managed by the City

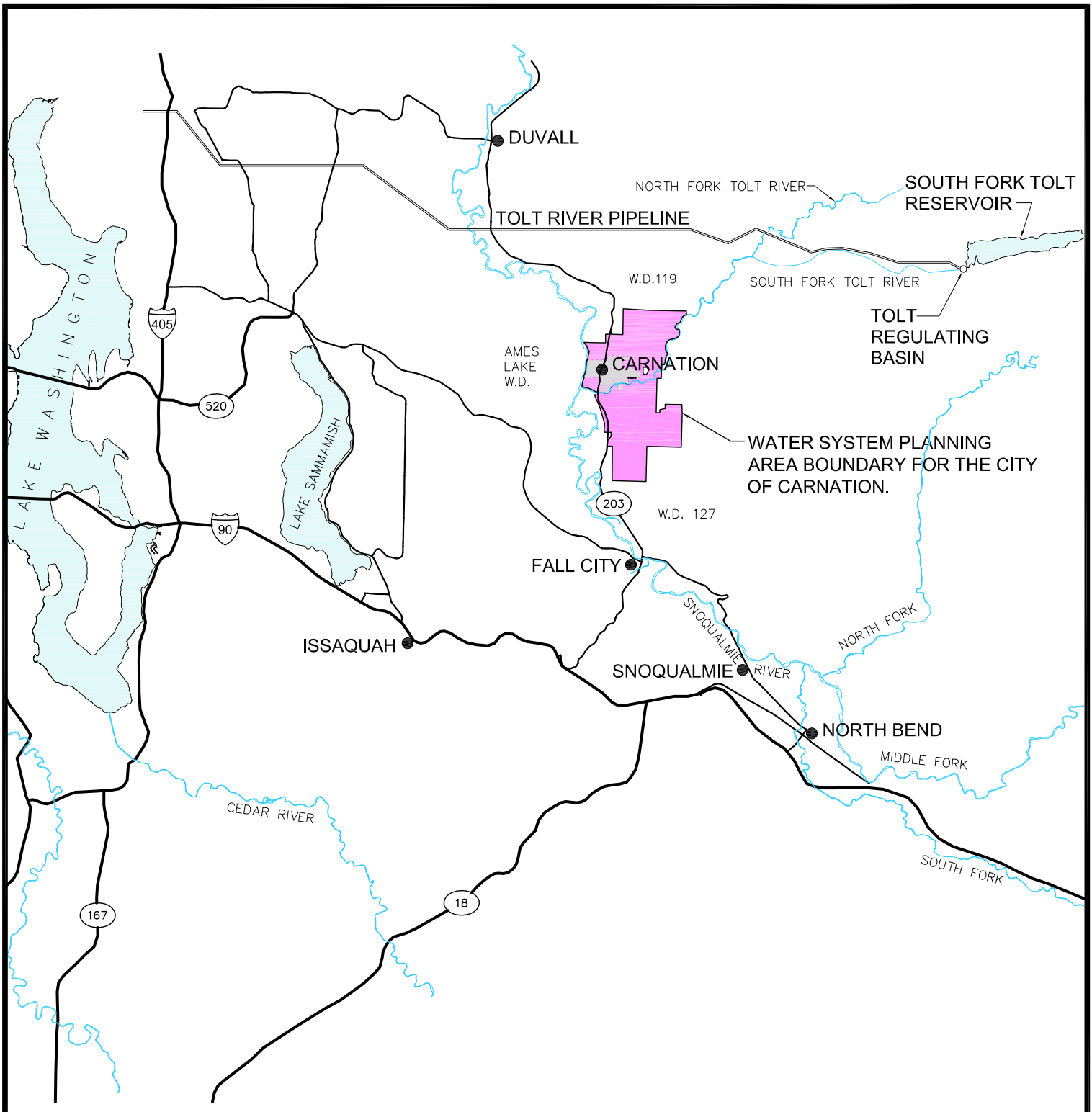
of Carnation Public Works Department. The Department is responsible for day-to-day operations and for the implementation of this Comprehensive Water System Plan.

1.5.3 PLANNING AREA

The City of Carnation Planning Area lies within the critical water supply area, as outlined in the CWSP and is shown on the Vicinity Map (**Figure 1.1**). During the 2008 Plan, the City reduced its planning area from 21 square miles to the existing 9 square miles. The City made this reduction because much of the previous planning area was not feasible to serve. Some of the land was too steep in topography to develop, or was across the Snoqualmie River, which is a significant geographic impediment. Additionally, some of the previous planning area was designated for forest resources, which did not require water service. The rest of the previous planning area was not economically feasible to serve. The current boundaries of the "Planning Area" encompasses approximately 9 square miles. The existing planning area was adopted by the City Council in July 2009 with the 2008 Plan, and is shown in **Figure 1.2**.

1.5.4 ADJACENT PURVEYORS

The City's 9-square-mile planning area consists of the City of Carnation and neighboring unincorporated King County. The only adjacent water purveyor is Ames Lake Water District to the west of the City; however, the Snoqualmie River separates them. Nearby water purveyors include Water District 119 to the north and Fall City to the south. There are no municipal purveyors in the vicinity east of the planning area. No municipal water purveyor is close enough to consider interties.



2 MI. 0 2 MI. 4 MI.

SCALE IN FEET

CITY OF CARNATION
KING COUNTY

2015 WATER SYSTEM PLAN
FIGURE 1.1
VICINITY MAP

DECEMBER 2015

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 11/23/2015 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: V:\2002\active\200200372B\plan\Figures\Figure 1-1 VICINITY-MAP.dwg

THIS PAGE INTENTIONALLY BLANK

NTS

WATER DISTRICT 119

AMES LAKE WATER DISTRICT

HORSESHOE LAKE

TOLT RIVER

SNOQUALMIE RIVER

DECLINED TO SERVE

CITY OF CARNATION PLANNING AREA

LANGLOIS LAKE

FALL CITY WATER DISTRICT 127

LEGEND

- CITY LIMITS
- URBAN GROWTH BOUNDARY
- CURRENT WATER PLANNING AREA
- RETAIL WATER SERVICE AREA
- WATER PIPES

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 1.2
EXISTING PLANNING AREA

DECEMBER 2015

PLOTTING DATE: 12/3/2015 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: V:\2012\active\201203728\plan\Figures\Figure 1-2 Existing Planning Area.dwg

THIS PAGE INTENTIONALLY BLANK

1.8 INVENTORY OF EXISTING WATER SYSTEM

The purpose of this section is to give an overview of the existing water system. More specific system information, system minimum design criteria, analyses and specific issues associated with meeting the needs of the current and future populations of the City are presented in other sections of the Plan. A system map indicating primary system facilities is provided in **Figure 1.3A** and **Figure 1.3B** while detailed system improvement information is in **Chapter 8**, **Figure 8.1**. The Water Facilities Inventory (WFI) Form from DOH is in **Appendix D**.

The following is a brief summary of the main components of the City of Carnation's water system. More detail for each component is included in the following sections.

- **The Well:** Current Supplemental Water Permit for 800 gpm and current capacity of 700 gpm
- **The Springs:** Current Water Right Claim of 628 gpm and current capacity of 350 gpm
- **The Springs Horizontal Wells:** Two wells installed downstream of the existing spring intake system connected via a 6-inch HDPE pipe which connects via a tee and gate valve to the transmission line.
- **The Springs Tank (Pressure Zone 328):** Volume 109,000 gallons.
- **The Entwistle Tanks (Pressure Zone 229):** Original concrete tank volume is 222,000 gallons, but this tank is currently offline. New steel tank volume is 605,000 gallons. Total potential storage volume in Zone 229 is 827,000 gallons, but only 605,000 gallons are currently in use.
- **The Pressure Reducing/Pressure Sustaining Valve:** The pressure reducing valve (PRV) at Tolt River: pressure reducing function set at 77 psi and pressure sustaining function set at 93 psi.
- **The Pipe Transmission/Distribution Network:** 11.8 miles. The piping ranges in size from 2 inches to 12 inches

1.8.1 WATER SOURCES

The City of Carnation's water system is considered a multiple source system with the springs as the primary source and the well as the secondary source. Both sources are described in more detail below.

1.8.1.1 Springs Sources

The springs are the primary source of water supply for the City's system. They are situated in an 80-acre tract owned by the City in the south half of the southeast quarter of Section 23-25-7 (about 2.5 miles southeast of the City center). The springs watershed is in the City's jurisdiction, but is surrounded by unincorporated King County. The source of the springs is water fed by an unnamed aquifer flowing through pre-Frasier deposits of sand and gravel. The water from the aquifer surfaces from the ground to form a natural spring at the location of the intake manifolds near the center of the property.

In the early 1980s, the City constructed a three-manhole intake system at the springs to increase the available water capacity. The spring intake system consists of a series of collection piping

serving as a manifold which intercepts subsurface (ground) water. The water is directed to an intake structure, which is a baffled, 72-inch manhole with an 8-inch overflow and an 8-inch intake pipe. The spring source can now provide up to 350 gpm.

A new source meter was installed in late 2007. The meter was designed to flow full in order to provide a more accurate reading. At the same time, another flow meter was installed on the overflow line from the meter vault to record the amount of flow which is returned to the stream unutilized (and un-chlorinated). The sum of the flows from the two meters (the source meter and the overflow meter) provides the City with a good quantitative estimate of the total flow that the spring intake system captures.

The springs have been determined to be not under the direct influence of surface water and are not a groundwater source under the influence of surface water (GUI).

1.8.1.1.1 Source Verification

In 1993, Cadman, Inc., proposed the development of the sand and gravel mining operation on the Ben Jones property located 1,000 feet west of the City's springs site. As part of the SEPA review process, Cadman, Inc., performed a hydrogeologic evaluation to study any potential impacts the proposed gravel mining operation may have on the City's spring source.

The "Hydrogeologic Evaluation of the Ben Jones Property and the City of Carnation Springs Carnation" December 1, 1993 study, performed by Hart Crowser, included a collection of all available data on the geology, groundwater conditions, existing water supply users in the area, and the completion of a field exploration program to fill any data gaps in existing information. The study included six borings which were drilled to access, collect and analyze subsurface conditions beneath the gravel resource. Four of these borings included monitoring wells. Two of these wells, Monitoring Well MW-1 and MW-2, were located within the City of Carnation Springs Property, 300 feet and 550 feet respectively, uphill from the spring intake.

The evaluation of the wells MW-1 and MW-2 soil boring logs showed that pre-Frasier deposits comprised the aquifer supplying water to the City of Carnation springs. These deposits were typically weathered, often orange-brown sand and gravel, over 100 feet thick and located beneath Vashon Till.

The report concluded that the source of the springs is groundwater supplied from an aquifer. The evaluation of the soils data and the monitoring results of the ground water levels at the spring and various well locations found that the ground water monitoring wells and the water serving the springs are on the same hydraulic gradient and supplied from the same source aquifer. A copy of the report was provided with the 2000 Water System Plan.

1.8.1.2 Springs Horizontal Wells

In addition to the new intake system, the City has two horizontal wells to supplement the aging spring intake system. Wells are tied into existing systems and are on-line. Information (from January 2008) show they are producing approximately 55 gpm.

1.8.1.3 Well

The well is located in Loutsis Park near the intersection of Entwistle Street and Milwaukee Avenue and was constructed in April, 1978. The well's pump has a rated capacity of 700 gpm, and is activated when pressures in the system drop below a pre-determined level. A digital totalizer meters the pump's total volume and a seven-day chart recorder monitors the system's pressure at the pump house. The well has historically only been activated during peak usage periods to replenish low reservoir levels, or to provide adequate pressure and flow during fire flow situations.

1.8.2 Storage Tanks

In 1990, the City constructed the 222,000-gallon reservoir (tank) off of Tolt River Road, ¾ of a mile east of SR 203. In 2012, the City constructed a new steel storage tank alongside the existing tank. The new tank has a storage capacity of 605,000 gallons. Since the 2008 Plan, the City took the older 222,000 gallon tank offline due to the reduced ERU consumption value. Removing the tank from service has also improved water quality. Hydraulically, the two tanks operate together when both tanks are online, effectively providing approximately 827,000 gallons of storage. These two tanks are now referred to as the Entwistle Tanks.

Another steel storage tank was also constructed in 2012 at the spring source site, and hence is referred to as the Springs Tank. This tank provides the ability to take the spring source off line for maintenance or connections without losing system pressure. The tank also provides some standby storage. It has a storage capacity of approximately 109,000 gallons. The tank is "inline" with the new transmission main (discussed later in this chapter), i.e., the transmission main inlets into the tank, and the outlet from the tank comprises the continuation of the main downstream.

The City currently maintains a maximum total of 0.94 million gallons (MG) of water storage with these 3 tanks (reservoirs). **Table 1.1** summarizes the physical characteristics of these storage tanks.

Table 1.1 Existing Storage Facilities

Name & Location	Date Constructed	Total Capacity (MG)	Height (feet)	Diameter (feet)	Overflow Elevation (feet)	Type
Entwistle Tank No. 1 NE 45th Street and 333nd Avenue NE	1990	0.222	58	26	229.3	Reinforced Concrete Standpipe
Entwistle Tank No. 2 NE 45th Street and 333nd Avenue NE	2012	0.605	60	43.5	229.3	Steel Standpipe
Springs Tank City Watershed (Springs) SE of City Limits	2012	0.109	19.75	36	332.96	Low Level Steel Reservoir
Total	--	0.94	--	--	--	--

The two Entwistle Tanks provide storage for the City's primary service area which is located north of the Tolt River and supplied through the PRV (see below). Filling the two tanks is accomplished by pressure within the City's system and a separate altitude valve for each tank to control the tank "Full" cutoff point. The tanks are normally interconnected and thus control the HGL together.

Because the Springs Tank is located "inline" with the transmission main downhill from the springs intake, the level of the tank fluctuates in response to the flow rate of water incoming from the springs intake and the outgoing system demand. The overflow elevation of 332.96 feet is set 0.4 feet higher than the overflow elevation at the springs intake so that no chlorinated water can physically overflow from the tank. At the 332.96 elevation, the theoretical maximum capacity of the tank would be approximately 109,000 gallons.

1.8.3 Pressure Reducing Valve/Pressure Sustaining Valve (PRV/PSV)

The PRV/PSV is located just east of the bridge crossing the Tolt River and divides the system into two pressure zones. The system north of the PRV (Tolt River) operates at a pressure setting of about 77 psi or a HGL of 229 feet (NAVD 88) while the system south of the PRV operates at a variable pressure of zero at the springs to 94psi at the PRV. The PRV is set to maintain the hydraulic grade line (HGL) within the City at elevation 229. This is the "Full" level of the Entwistle Tanks.

As water demands increase within the City, flows from the reservoirs and springs increase to meet this demand. All demands south of the PRV are met by the springs. Should the demand

by the City exceed the springs supply and the reservoirs cannot maintain a "Full" position, the water level in the tanks may drop. Elevation 210 feet is equivalent to a pressure of 53 psi at the well pump house. The well pump is turned on when the pressure drops below 53 psi. The well pump will continue pumping until the water level inside the tanks reaches elevation 222 feet. When the pressure reaches 59 psi, the well pump shuts off.

The remainder of water in the reservoirs from elevation 222 feet to elevation 229 feet is filled by the springs as demand and spring supply allow, thereby conserving energy and equipment. The altitude valves function as a safety cut-off valve to prevent overfilling/overflowing the tanks either from high gravity flows from the springs or should there be a malfunction of the well pump pressure "Off" switch.

1.8.4 DISTRIBUTION SYSTEM

1.8.4.1 Transmission Main

The City's system has one primary transmission main that runs from the spring source in the South Zone, through the PRV/PSV station, to the north City limit in the North Zone. See Figures 1.3A and Figure 1.3B for the extents of the transmission main.

The original transmission main at the spring site was constructed of steel and in service for many years (since at least prior to 1964). The upper reach of it was installed alongside or in a tributary to the Tolt River. The old main was also near ground level and, in some places, was constructed on elevated wooden structures. Consequently, the old main was at risk for potential washouts, falling trees, etc.

The City replaced the original transmission main in 2011 with a ductile iron main that was rerouted away from the stream. The new main extends from the spring source westerly downhill to the chlorination facility, and then all the way to 344th Avenue NE (approximately 2,400 feet), and is primarily located in the site's access road.

1.8.4.2 Distribution Network

The water mains in the system include newer 12-and 8-inch mains and older 6-inch and 4-inch piping, and some very old, small diameter pipes. Most of the 8-inch main is ductile iron pipe and all of the 4-inch piping material is steel. Historical City Council meeting minutes indicate the dates of approval for the purchase of some of these steel materials; some mains are in excess of 50 years old. The minutes do not indicate the location where the pipe was installed.

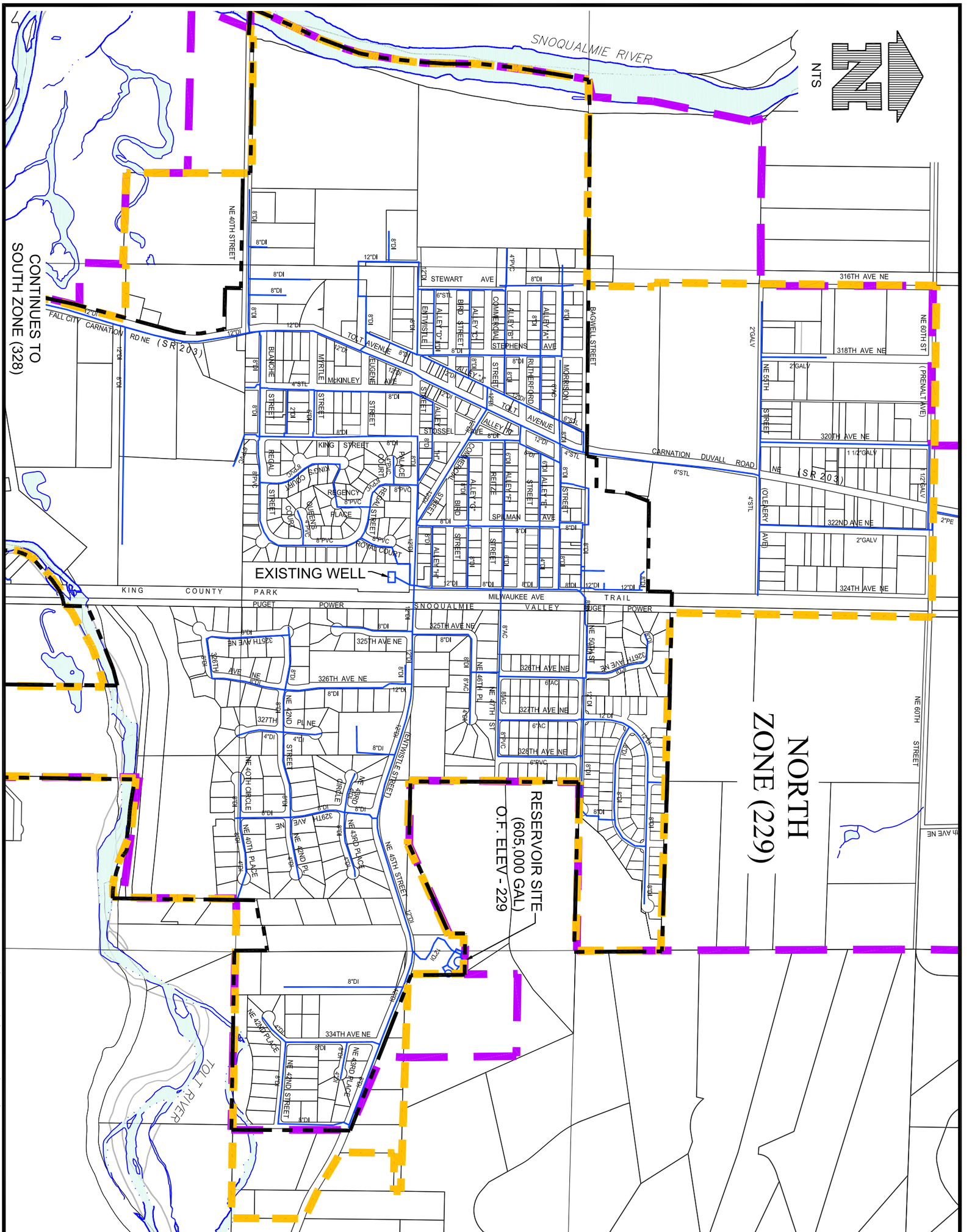
Since the 2008 Plan, there have been both extensions to the distribution network and replacement of existing pipe segments with larger diameter pipes. The following **Table 1.2** summarizes these improvements. The lengths are approximate and do not necessarily include short pipe segments which were installed to make connections to the existing system. All

installed pipe was DI. All pipes represent extension of the existing system unless otherwise noted as "replacement".

Table 1.2 Improvements to Distribution System

Project Location or Name	Year of Construction	Lineal Footage and Pipe Diameter
Blanche Street	2008	800 LF of 8-inch replacing 6-inch between Tolt and King Street (Stossel Avenue) 50 LF of 8-inch replacement of 4-inch 120 LF of 8-inch south on McKinley
Stossel Avenue	2009	1220 LF of 8-inch between Blanche and Entwistle of which 380 LF was replacement of 6-inch between Myrtle and Eugene
SR 203 Crossing	2012	150 LF of 12-inch on Commercial Street from the east side of SR 203 (Tolt Avenue) westerly to Alley "J"
Spillman	2016	1,100 LF of 8-inch on Spillman Avenue from Entwistle Street to Morrison Street, which replaced an existing 6-inch main.
The Estates (Development)	2016	325 LF of 12-inch on NE 50th between 326th and 327th Avenues NE 720 LF of 8-inch on NE 50th easterly from 327th Avenue 80 LF of 8-inch on 327th Avenue NE southerly from NE 50th Street 760 LF of 12-inch on 327th Avenue NE between NE 50th and NE 52nd. 1100 LF of 12-inch on NE 52nd Street easterly from 327th Avenue NE 130 LF of 8-inch on 328th Avenue NE northerly from NE 52nd Street 1090 LF of 8-inch on NE 51st Street looped to NE 52nd at both ends 120 LF of 8-inch on easement southerly from NE 51st Street
Tolt Meadows (Development)	2016	570 LF of 12-inch and 910 LF of 8-inch on 333rd Avenue NE south to Tolt River Road (NE 45th Street) 215 LF of 8-inch of NE 42nd.

Figure 1.3 shows the distribution network of the City's existing system and estimated sizes.



LEGEND

- RETAIL WATER SERVICE AREA
- PRESSURE ZONE BOUNDARY
- CITY LIMITS
- URBAN GROWTH BOUNDARY
- WATER MAIN

CITY OF CARNATION
KING COUNTY

2015 WATER SYSTEM PLAN
FIGURE 1.3A
EXISTING WATER SYSTEM MAP
(NORTH ZONE (229))

DECEMBER 2015

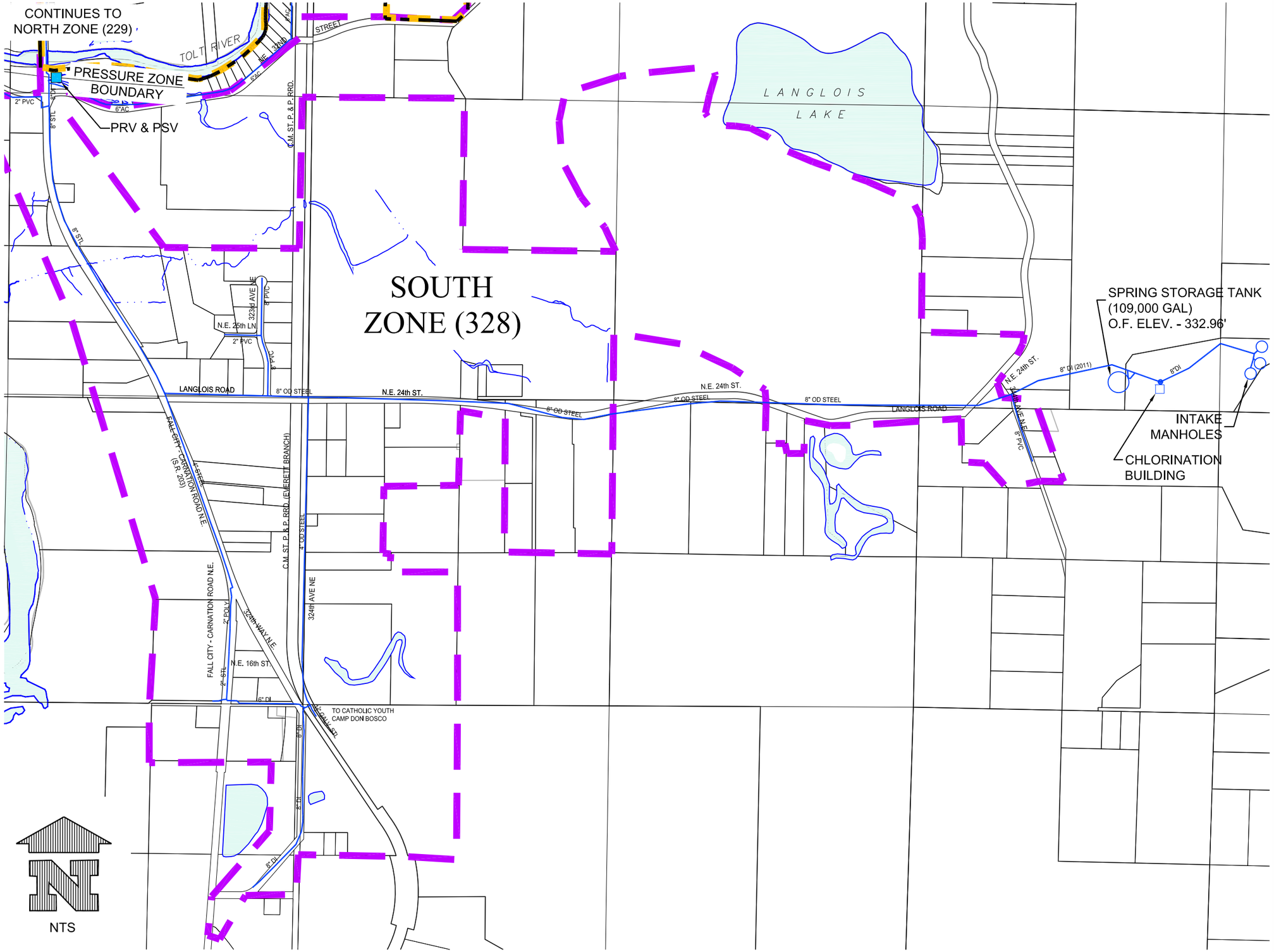
Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 7/29/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: V:\2082\active\208208728\plan\Figures\Figure 1-3 Existing System-MAP.dwg

THIS PAGE INTENTIONALLY BLANK

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 1.3B
EXISTING WATER SYSTEM MAP
(SOUTH ZONE (328))

DECEMBER 2015



LEGEND

- RETAIL WATER SERVICE AREA
- PRESSURE ZONE BOUNDARY
- CITY LIMITS
- URBAN GROWTH BOUNDARY
- WATER MAIN

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 889-9468 www.stantec.com

PLOTTING DATE: 7/29/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: V:\2002\active\200200372B\plan\Figures\Figure 1-3 Existing System-MAP.dwg

THIS PAGE INTENTIONALLY BLANK

1.9 WATER QUALITY AND TREATMENT

As previously discussed, the City has two sources of groundwater. The first source is the springs located about 2.5 miles southeast of the City and includes the horizontal wells. The water from the springs is chemically treated by a gaseous chlorinator installed adjacent to the 12-inch pipeline in a building. The chlorination building is located approximately 950 feet downstream of the spring intakes.

The second source is a non-chlorinated well located within City limits. Since the well and springs are tied into the same piping network, the water system has a residual chlorine content that normally varies from 0.2 to 0.4 mg/l. In general, water from the springs and well are of excellent quality.

1.10 WATER RIGHTS

The City of Carnation maintains active water rights and permits from the Washington State Department of Ecology for both the well and the springs as shown in **Table 1.3**.

Table 1.3 - Carnation Water Rights

Source	Water Resource Document	Priority Date	Document No.	Instantaneous Rate Q_i (gpm)	Annual Rate Q_a (acre-ft per year)
Springs	Water Right Claim	Dec. 1916 June 14, 1974	S1-117902CL	628	1000
Well	Certificate of Water Right	April 4, 1977	G1-22827C	800	538

Appendix D contains copies of the water resource documentation for both the well and springs.

1.11 SERVICE CONNECTIONS

The City serves water customers both inside and outside the City limits and all customers are on metered services. Monthly billing records show the type of accounts and whether they are inside or outside the City limits. These billing records also delineate customers according to the number and type of service connections.

For end of 2014, the number of connections for each customer category is as follows:

- Single-Family Residential Dwelling Accounts: 708 – 539 in City and 169 are outside City
- Multifamily Accounts: 22 with 64 total apartments – 21 inside City and 1 outside City
- Commercial/Business Accounts: 89 – 80 inside, 9 outside (includes farms)
- Total Units: 819

The City's water system services are primarily single-family residential, with 708 out of 819 (86%) customers. Multifamily units are close to 100% occupied and are assumed fully occupied for this study.

1.12 LIST OF ACRONYMS

AC	Asbestos Cement
ADD	Average Day Demand
AF/Y	Acre-Feet Per Year
APWA	American Public Works Association
AWWA	American Water Works Association
BMP	Best Management Practices
CBD	Central Business District
CCL	Contaminant Candidate List
CCP	Cross-Connection Control Program
CCR	Consumer Confidence Report
CCS	Cross-Connection Specialist
CDC	Center for Disease Control and Prevention
CDL	Commercial Driver's License
CERB	Community Economic Revitalization Board
CFR	Code of Federal Regulations
CI	Cast Iron
CIP	Capital Improvement Program
CMC	City of Carnation Municipal Code
CPR	Conservation Planning Requirements
CPR	Cardiopulmonary Resuscitation
CT	Concentration of Chlorine in mg/l multiplied by disinfectant contact time in minutes
CWSP	Coordinated Water System Plan
D/DBP	Disinfectants and Disinfection By-Products
DNR	Department of Natural Resources
DOE	Department of Ecology
DOH	Department of Health
DI	Ductile Iron
DSL	Distribution System Leakage
EFR	Eastside Fire and Rescue
EKCRWA	East King County Regional Water Association
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ERU	Equivalent Residential Unit
ESA	Endangered Species Act
FACA	Federal Advisory Committee Act
FPS	Feet Per Second
FY	Fiscal year
GFC	General Facilities Charge

GIS	Geographic Information System
GMA	Growth Management Act
GOB	General Obligation Bonds
GPM	Gallons Per Minute
GUI	Groundwater Under the Influence of Surface Water
GWI	Groundwater Under the Influence of Surface Water
GWR	Groundwater Rule
HAAs	Haloacetic Acids (or HAA5)
HDPE	High Density Polyethylene
HGL	Hydraulic Grade Line
IBC	International Building Code
IDSE	Initial Distribution System Evaluation
IFC	International Fire Code
IOC	Inorganic Chemicals
LCR	Lead and Copper Rule
LFC	Local Facilities Charge
LID	Local Improvement District
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
M/DBP	Microbial/Disinfection By-Product
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons Per Day
Mg/l	Milligrams Per Liter
MMM	Multimedia Mitigation Program
MDWAC	National Drinking Water Advisory Council
NE	Northeast
OFM	Office of Financial Management
O&M	Operation and Maintenance
PAA	Potential Annexation Area
pCi/L	PicoCuries Per Liter
PHD	Peak-Hour Demand
PRV	Pressure Reducing Valve
PSI	Pounds Per Square Inch
PWS	Public Water System
PWTF	Public Works Trust Fund
Qa	Annual Quantity
Qi	Instantaneous Quantity
RCW	Revised Code of Washington
ROE	Report of Examination
RSA	Retail Service Area
SEPA	State Environmental Protection Act
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemicals
SR	State Route
THM	Trihalomethanes

UCM	Unregulated Contaminant Monitoring
UCMR	Unregulated Contaminant Monitoring Rule
UGA	Urban Growth Area
µG/L	Micrograms/liter
ULID	Utility Local Improvement District
USGS	United States Geologic Survey
UTRC	Utilities Technical Review Committee
VA	Vulnerability Assessment
VOC	Volatile Organic Compounds
WAC	Washington Administrative Code
WDM	Water Distribution Manager
WDM	Water Department Manager
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Plan
WLCAP	Water Loss Control Action Plan
WQMR	Water Quality Monitoring Report
WSDOT	Washington State Department of Transportation
WUE	Water Use Efficiency

2.0 CHAPTER 2 - POLICIES, CRITERIA, AND STANDARDS

2.1 INTRODUCTION

The City of Carnation manages and operates its water system in accordance with all known federal, state, and local regulations. The City guides the development and financing of the infrastructure required for water services, and ensures consistency in service levels and customer relations. While the City has some discretion in setting its performance and design standards for its water system, these standards must meet or exceed the minimum standards for public water supplies set by the DOH through Washington Administrative Code (WAC) 246-290 and the East King County (EKC) Coordinated Water Supply Plan (CWSP). Together, policies and standards provide direction on the desired level of services to utility customers.

The goal of these policies is to provide guidelines for all City customers and to document the City's commitment to its existing and potential water system customers.

Other publications, such as the City's Combined Water and Sewer Utility Technical Standards (Technical Standards) and the Carnation Municipal Code (CMC), document the design standards and procedures for development of the water system. The Technical Standards are included in **Appendix E**.

This Plan establishes the following goals for water service:

- **Goal 1:** Provide safe, reliable, and timely water service to City consumers at a fair and reasonable price.
- **Goal 2:** Ensure that water service is available to support development that is consistent with the City's policies and standards as well as the current land use plans and development regulations of the state of Washington, King County, and the City.
- **Goal 3:** Protect the natural environment with design, construction, operational, and conservation procedures.

The City's policies are grouped by the major categories listed below:

- Service Area, Extension, and Service Ownership
- System Reliability and Emergency Management Plan
- Fire Protection
- Coordination and Cooperation with Other Agencies
- Water System Planning, Design, and Construction
- Environmental Stewardship
- Water Use Efficiency
- Greenhouse Gas Emission Reduction
- Operational

2.2 SERVICE AREA, EXTENSION, AND SERVICE OWNERSHIP

2.2.1 Planning Area Boundary

The City's Planning Area was established in the 1980s as a result of the EKC CWSP. The City's 2008 Plan reduced the City's Planning Area to a more realistic area, by removing undevelopable areas such as areas that are too steep or are designated as forest reserve. Refer to **Figure 1.2** for current Planning Area Boundary.

2.2.2 Retail Water Service Area

The City's Retail Water Service Area (RWSA) is the area that the City's water system currently serves, or can serve in a timely and reasonable manner. The City will serve all customers within its RWSA per the standards and policies defined herein. Refer to **Figure 1.2** for the RWSA boundary.

2.2.3 Future Water Service Area

The City's Future Water Service Area (FWSA) is the area outside the RWSA but within the Planning Area. The City plans to eventually provide water services to its FWSA.

2.2.4 Local Government Consistency

This Plan complies with the requirements of the Department of Health (DOH) and Department of Ecology (Ecology) as set forth in the Washington Administrative Code (WAC) 246-290 and Revised Code of Washington (RCW) 35.58.220 and 70.116. This Plan is also consistent with King County Code (KCC) 13.24, with respect to water system planning. The City will submit this document to adjacent utilities and local governments having jurisdiction to assess this Plan's consistency with ongoing and adopted planning efforts within their jurisdictions.

2.2.5 Duty to Serve

The City is committed to providing retail water services to all properties within its defined RWSA in a timely and reasonable manner, consistent with applicable City codes and standards, the Municipal Water Law, Washington State Department of Health rules and regulations, and other applicable federal, state and local laws. Pursuant to RCW 43.20.260, as a municipal water supplier as defined in RCW 90.03.015, the City has a duty to provide retail water service within its RWSA if:

- City water service can be available in a timely and reasonable manner;
- The City has sufficient water rights and other sources of supply to provide the service;
- The City has sufficient capacity to serve the water in a safe and reliable manner as determined by DOH; and
- Service is consistent with the requirements of applicable comprehensive plans or development regulations adopted under chapter 36.70A RCW (GMA) or any other

applicable comprehensive plan, land use plan, or development regulation adopted by a city, town, or county for the service area.

The City defines "timely" as the availability of a retail water service consistent with the terms and conditions presented in applicable City codes and standards. For example, the owner(s) of properties that can connect to the City's existing water system without the need for a water main extension should be able to obtain water service within 120 days after the following steps are completed:

- The City has received an application for a water service.
- The property owner, who is requesting the water service, has complied with all applicable City water service policies and procedures.
- The property owner has paid all applicable meter, connection and administrative rates, fees and charges to the City.

The owner(s) of properties that require an extension of the City's existing water system before water service is available to the property should be able to obtain water service after the following steps are completed, all in accordance with the terms and conditions of an agreement and permits in compliance with applicable City codes and standards:

- The City has received owner's application for all applicable permits.
- The owner's engineer has prepared the design for the required extension to connect the property to the City's existing water system.
- The City has approved of the design for the water main extension.
- The owner's contractor has finished constructing the water main extension.
- The owner has paid all applicable City developer, meter, connection, and administrative rates, fees, and charges to the City.
- The owner has transferred ownership of the water main extension to the City.

The party entering into the extension agreement with the City has one year from the date of the mutual execution of the extension agreement to complete this process to obtain retail water service from the City to the property.

The City defines "reasonable" retail water service as follows:

- Water service that is consistent with applicable local land use plans and development regulations;
- The conditions of water service and associated fees, costs and charges are consistent with the conditions of service described in this Plan and applicable adopted City code, policies and standards; and
- The conditions of service and associated fees, costs and charges are consistent with the City's requirements applied to other property owners requesting water service who are similarly situated and are requesting the same type or level of water service from the City.

As addressed in **Chapter 6** of this Plan, the City has sufficient water rights to provide retail water service within its RWSA.

In the event an individual applicant for water service or a party seeking a developer extension contends that the availability of City water service is not "timely and reasonable," the applicant shall request that the City consider the applicant's complaint. Then the applicant be given a hearing with the City's Utility Hearing Board to present the applicant's evidence that City water service is not available on a "timely and reasonable" basis consistent with applicable code, policies and procedures and applicable state law. Decisions by the Utility Hearing Board may be appealed to the Hearing Examiner by filing a written request with the City Clerk within five business days of the date of the Board's written decision. The Hearing Examiner shall review the appeal in a closed-record proceeding with no new factual information allowed and with no oral argument. Applicants shall be required to utilize and exhaust this City administrative hearing procedure as a precondition to requesting that anybody on behalf of the EKC CWSP or King County consider any appeal or contention that City retail water service is not available to the applicant's property on a "timely and reasonable" basis.

2.2.6 Developer Improvements

It is standard City policy that the costs for all new water main extensions and appurtenances required to serve a development must be paid for by the developer. The owner must hire a professional engineer, licensed in the state of Washington, with relevant experience to prepare the construction plans for the water system improvements. System design must meet established minimum City standards, and be reviewed and approved for construction by the City Engineer. Installation is performed by a City approved contractor. Once construction is completed to the City's satisfaction, the improvements are conveyed by Bill of Sale to the City. The City design standards require that the new water mains be extended to the extreme end of the property being developed, unless waived by the City due to site constraints.

The City will entertain a "Latecomers Agreement" with a developer who paid the initial water main improvement cost for any property which could receive service from the improvement at a later date. The agreement is typically for the maximum 15-year term allowed under state law.

2.2.7 Satellite System Management

The EKC CWSP outlines a Satellite System Management Program, under which an established water purveyor can provide operation and management services to small water systems servicing properties outside the purveyor's boundaries. The City currently is not, and does not intend to become, a DOH "approved" satellite system management agency, which would allow it to operate small Group B water systems outside of the City's water service area.

If a proposed water system is located less than 1,000 feet from an existing water main, the City will require service to the area with a direct water main extension. Developments may be proposed in locations where service is not available from the existing City water system because

of location or special land use requirements. At this point, the City will not be providing service to these individual property owners or water systems. A letter of service declination will be prepared for these instances, and has been used in the last several years.

2.2.8 Wholesaling of Water

The City does not currently wholesale water to other customers. Any future plan to wholesale water will be considered on a case-by-case basis, and shall comply with the City's water rights and other applicable regulations.

2.3 SYSTEM RELIABILITY AND EMERGENCY MANAGEMENT PLANNING

Service reliability policies and criteria define the City's standards to construct and maintain reliable water system infrastructure and equipment. The Emergency Management Plan states the City's responsibility to maintain an updated Emergency Response Plan and to take reasonable action in case of emergencies.

2.3.1 Security

The City shall make reasonable attempts to protect the security of its water system. The City shall determine what information about the system should remain unavailable to the public.

2.3.2 Emergency Response Plan

The City has an Emergency Response Plan (ERP) that focuses on problems created by major disasters (such as earthquakes, floods, or windstorms) as part of the City's operations program in conjunction with this Plan. The ERP addresses emergency provisions and procedures to be in place to operate the water system during emergencies. This ERP will be available as required by existing federal, state, and local regulations. A copy of the plan is included in **Appendix F**.

2.3.3 Cross-Connection Control Program

The City shall provide water that meets federal and state water quality standards to all water system customers during normal operations. The City shall take any necessary action to ensure that all water quality standards are met, which includes the implementation of its Cross-Connection Control Program. The Cross Connection Control Program will be updated on an as needed basis as laws or City requirements change.

2.4 FIRE PROTECTION

2.4.1 Fire Flow Requirements

The fire protection policies outline the City's fire flow capabilities and commitment to required system improvements.

The City will provide and plan to maintain the necessary system infrastructure to supply water for fire-fighting purposed to utility customers in the Urban Growth Area. Fire flow required to be provided to structures will be determined by the Fire Marshal in accordance with the International Fire Code (IFC).

The City's system provides a commercial fire flow of 2,500 gpm for two hours within the Central Business District (CBD). Within the City Limits, the City's system provides a residential fire flow of at least 1,000 gpm for two hours. The City's system cannot provide fire flow to its Potential Annex Area (PAA) because the water mains are undersized. Outside the UGA, the City's system can provide a fire flow of 1,000 gpm for two hours in some sections, but less than 500 gpm in other areas.

2.5 COORDINATION AND COOPERATION WITH OTHER AGENCIES

2.5.1 Coordination with Other Agencies

These policies summarize the City's willingness to coordinate and cooperate with other agencies.

The City will coordinate with adjacent jurisdictions to determine applicable regulatory requirements and opportunities for joint projects where it benefits the City. Inter-local agreements should be prepared between the pertinent parties on all joint projects.

2.5.2 Mutual Aid

The City will participate in mutual aid for its neighboring water systems. The Snoqualmie River separates the City's water system from the adjacent Ames Lake Water District, to the west of the City. Nearby water purveyors include Water District 119 to the north and Fall City to the south. There are no municipal purveyors in the vicinity east of the planning area.

2.5.3 Emergency Interties

Currently, there are no significant water systems adjacent to the City's RWSA or planned to be in the foreseeable future. No emergency interties are planned.

2.6 WATER SYSTEM PLANNING, DESIGN, AND CONSTRUCTION

2.6.1 Planning Objectives

Water system planning and design policies define the methods and procedures the City uses to determine what facilities are needed to meet anticipated growth.

The City will plan and design water system facilities that can deliver continuous and safe water supply to meet customer demand, and be consistent with applicable federal, state and local regulations. This objective will be accomplished through the development and review of this Plan along with the City's Technical Standards, included in **Appendix E**. Both this Plan and the Technical Standards will be updated and maintained as needed and as per state regulations.

2.6.2 System Planning

The City shall plan the construction of its infrastructure to accommodate growth while maintaining stable rates and charges.

2.6.3 Standby Storage and Fire Suppression Storage

The City's standby storage (SS) and fire suppression storage (FSS) is "nested," as permitted by the DOH. "Nesting" is the concept where the larger of the two volumes for SS and FSS is used for the total design volume, rather than the sum of the two volumes. In the urban area, FSS is provided to meet the IFC requirements and standards established in **Chapter 4**. In the rural area, fire suppression storage is not provided. In general, all storage volumes meet DOH standards. A detailed explanation of storage volume requirements is provided in **Chapter 4**.

2.6.4 Water System Standards

All improvements to the water system, whether accomplished by Developer Applications, Local Improvement Districts (LIDs), or other method are required to meet the minimum design and construction standards established by the City. The standards contained in the City's Technical Standards (provided in **Appendix E**) conform to the DOH standards, EKC CWSP, and the American Public Works Association (APWA) regulation. Work performed in unincorporated King County shall additionally comply with the King County Road Standards, latest version.

2.6.5 Industry Standards

Except where the standards provide otherwise, all materials and methods of construction are required to conform to the latest edition of the "Standard Specifications for Road, Bridge and Municipal Construction" prepared by the Washington State Department of Transportation (WSDOT) and the Washington Chapter of APWA, the American Water Works Association (AWWA) and EKC CWSP standards as amended by the City in writing and through the City's Technical Standards, provided in **Appendix E**.

2.6.6 System Pressures

DOH standards state that system pressures should be maintained between 30 and 100 psi. The City exceeds this requirement by maintaining a system pressure between 40 and 80 psi, within the City Limits. If system pressures are greater than 80 psi, customer-owned pressure reducing valves are required per the plumbing code.

2.6.7 Velocity Criteria

The City has established a system-wide velocity criterion that pipe velocities shall not exceed 8 feet per second during peak hourly demand conditions and 10 feet per second during maximum day demand conditions with fire flow.

2.6.8 Pipe Sizing

All water mains are to be sized using the current edition of "Sizing Guidelines for Public Water Supplies" published by DOH or by an acceptable hydraulic analysis submitted by a professional engineer, licensed in the state of Washington. Water main size shall be adequate to provide maximum instantaneous demand flows plus the required fire flow while maintaining minimum system pressures. The required minimum residual pressure for fire flow at the hydrant shall be 20 psi with 20 psi maintained throughout the system per DOH requirements.

Future extension of the main must be considered in the sizing of new lines unless otherwise directed by the City. In general, the minimum diameter of any new pipe that serves a fire hydrant or is likely to be extended in the future is 8 inches. Smaller pipes are allowed on a case-by-case basis, such as into cul-de-sacs where it is unlikely that the system can or will be extended. In no case will the pipe be allowed to be less than 4 inches. Refer to the City's Technical Standards in **Appendix E** for additional details.

2.6.9 Looping of Mains

The ultimate capability and reliability of any public water system depends on the amount of looping in the system. The City requires all developers to extend any new water main to the end of their property and to install tees, valves, and blow-off assemblies or hydrants where future extension of the main is expected. All piping shall be looped except where an exemption is granted by the City Engineer.

2.6.10 Fire Hydrants

Except where the standards provide otherwise, at least one hydrant shall be installed at all intersections and fire hydrants are to be located at a maximum spacing of 600 feet for residential areas or as required by the fire marshal.

2.6.11 Gate Valves

The City requires gate valves at all crosses and tees, in a configuration which allows isolation of any connecting line. In general, this requires the number of valves to be one less than the number of connecting lines. In addition, all mains shall have isolation valves at City block intersections and at a maximum spacing of 600 feet or as directed by the City of Carnation.

2.6.12 Air and Vacuum Release Valves

Air and vacuum release valves shall be installed at all local high points in the water main and shall be in conformance with the Technical Standards, provided in **Appendix E**.

2.6.13 Water Meters

All service connections to the system shall be metered. Size of the meter shall be determined by the flow demands of the connection. The service shall conform to the Technical Standards, provided in **Appendix E**.

2.6.14 Source Meters

All active water sources shall be metered and shall be calibrated every five years.

2.6.15 Wholesale Meters

Wholesale meters to customers will be considered on a case-by-case basis where legally allowed if a wholesale agreement is in place.

2.6.16 Blow-Offs

A blow-off assembly is required on all dead end runs and at points of low elevation in the distribution system. The blow-off shall conform to Technical Standards, provided in **Appendix E**.

2.6.17 Water Main Placement

Water mains are to be installed in a location which is compatible with the existing distribution system, the terrain, and the location of other utilities. All mains, hydrants, valves, meters, and other appurtenances are to be installed within a public right-of-way or dedicated utility easements. Easements are required to be at least 15 feet in width unless a reduction is granted by the Public Works Director with the main installed no closer than 5 feet from the easement's edge. Typically, mains are located on the north and east side of the right-of-way. There may be special circumstances, such as conflicts with other utilities, where the City will allow other water main locations.

Minimum cover for water mains from top of pipe to finish grade shall be 36 inches for 8-inch diameter and smaller mains and 48 inches for 12-inch diameter and larger mains. Water mains designed with greater than 60 inches cover must be approved by the City.

2.6.18 Dechlorination of Flush Water

For all sterilization of water mains, the Contractor shall be responsible for disposal of treated water flushed from mains. At no time shall chlorinated water from a new main be flushed into a body of fresh water, including lakes, rivers, streams, storm drainage systems, and any and all other waters where fish or other natural water life can be expected. The method of dechlorination shall provide finished, dechlorinated water with a pH that shall not adversely affect the receiving waters or system.

2.7 ENVIRONMENTAL STEWARDSHIP

The environmental stewardship policies outline the City's dedication to protecting the environment.

2.7.1 Wastewater Reuse

The City is committed to wastewater reuse. Reuse can serve as cost-effective and environmentally beneficial sources of water for industrial processes, sanitation, and irrigation thereby increasing the security and reliability of the drinking water supply.

The City in coordination with King County, as part of the City's sewer treatment plant, is enhancing the Chinook Bend Natural Area with reclaimed wastewater. The City may investigate potential reuse opportunities in the future.

2.7.2 Water Resource Protection

The City shall protect water sources within the City from degradation related to its actions, facilities, or programs.

2.7.3 Endangered Species Act Compliance

The City recognizes that several fish species native to the Puget Sound region in which Carnation is located have been listed as either Threatened or Endangered under the Endangered Species Act (ESA). With this in mind, the City will implement those Best Management Practices (BMPs) it deems necessary to prevent, or minimize risk of, an unauthorized "take" of a protected species when maintaining and operating the water system, replacing existing water facilities, and constructing new water facilities.

2.8 WATER USE EFFICIENCY

The water use efficiency policies summarize the City's responsibility to continue promoting programs that address using water efficiently.

The City will continue its Water Use Efficiency (WUE) goal to reduce water usages by 1% per ERU per year for six years. For additional information, refer to **Chapter 5** of this Plan.

2.8.1 Distribution Leakage Standard

The City will be diligent in its goal to maintain a three year average distribution system leakage (DSL) of less than 10%.

2.9 GREENHOUSE GAS EMISSION REDUCTION

In an effort to reduce greenhouse gas emissions and save energy, the City is committed to reduction of greenhouse gas emissions. The City has set out to protect the environment and better serve its customers by controlling greenhouse gas emissions. The City will consider in the reduction of greenhouse gasses the following items:

- Use of available technologies
- Energy audits of District facilities and evaluations of potential conservation measures
- Purchase of Energy Star rated equipment and appliances
- Weatherization programs for existing City buildings
- Energy conservation practices in buildings by raising the awareness of energy use
- Telecommuting options
- Use of cleaner fuels and vehicles
- Flex-time schedules
- Solid waste strategy through recycling and reuse
- Recycling programs and purchasing policies to reduce the amount of waste produced
- Water conservation/use efficiency program
- Water efficient irrigation

A copy of the City's Greenhouse Gas Emission Reduction Policy is included in **Appendix G**.

2.10 OPERATIONAL

The operational policies summarize the City's commitment to resolving customer complaints, and providing a safe work environment, training, and certification opportunities for its employees.

2.10.1 Customer Complaints

The City is committed to resolving customer complaints. All complaints are recorded and forwarded to the public works staff for resolution.

2.10.2 Employee Safety

The City is committed to providing safe and healthy working conditions at all facilities and complying with rules, laws, and regulations pertaining to the safety and health of employees

2.10.3 Employee Training

The City encourages participation in workshops, seminars, and other education programs to improve job skills.

2.10.4 Employee Certification

The City will pay fees and employee's time for the required certification continuing education classes, testing, as well as required annual renewal fees.

3.0 CHAPTER 3 - BASIC PLANNING DATA AND WATER DEMAND FORECASTS

3.1 INTRODUCTION

This chapter estimates future water demand and supply needs for the City's water system from historical data and future population forecasts. The analysis uses historical data to develop the value of the average equivalent residential unit (ERU) and the maximum-day peaking factor for the system. It then uses this data along with the population forecasts to project average and maximum day water demands for the six, ten, and twenty year planning periods. The following chapters use these projected water demands to establish criteria for the hydraulic analysis of the system and to develop the recommended Capital Improvement Program.

3.2 CURRENT LAND USE AND ZONING

Land use and zoning designations and regulations are important factors in determining future water requirements. These designations regulate the area available for various types of development including single-family and multifamily residential development, commercial, and other types of land use. Knowing how the land can be developed allows us to estimate future population and resulting water demands. **Figure 3.1** and **Figure 3.2** show the current zoning map and future land use map, respectively, for the City's water service area.

3.2.1 Current Land Use

Carnation's Water Service Area (WSA) consists of a "rural city" (the City of Carnation and adjacent unincorporated Urban Growth Area). It is located along State Route (SR) 203 in east King County, and is surrounded by rural lands in Unincorporated King County. The City of Carnation adopted its first Comprehensive Land Use Plan in accordance with the Growth Management Act (GMA) statute (RCW 36.70A) in February of 2005. Since its adoption, the City has amended it several times, most recently in August 2015.

The primary land use within the WSA is single-family residential, although other uses within City limits include a limited number of multifamily, commercial, and light industrial uses, plus several public uses such as an elementary school, middle school, library, etc. Outside the Urban Growth Area (UGA), the primary land use is rural residential with some agricultural. Non-residential development outside the UGA is limited, although there are two privately-owned camps.

The City has land use authority including zoning and permitting for the parcels within the City limits. King County has land use jurisdiction for the parcels outside the City limits which includes the City's Potential Annexation Area (PAA) and land outside the UGA but within the WSA.

3.2.2 Zoning

The City's UGA consists of the current City limits plus the PAA, which may be annexed into the City in the future. In accordance with the state GMA statute (RCW 36.70A) lands outside the UGA must remain rural, as Carnation is east of the King County urban growth boundary.

The City's zoning map is adopted based on the land use designations developed as part of the Land Use Plan and map. The City amended the Comprehensive Zoning Plan several times since its creation in 2005, mostly recently in September 2011 with Ordinance No. 797. The latest amendment revised the zoning code nomenclature and revised the zoning map to slightly increase density in the older portion of the City.

Zones within the City limits include single-family residential use at densities ranging from approximately 2.5 units per acre to approximately 6 units per acre; multifamily zones that allow 12 or 24 units per acre; a residential mobile home park zone; mixed use zones that allow single-family, multifamily and commercial uses, several commercial zones, light industrial zones, public use zones, park zones, and an agri-tourism zone.

Within the PAA, most of the land area is zoned for single-family and multifamily residential use, with the rest zoned for mixed and public uses.

Outside the UGA, the King County zoning consists of rural single-family residential zones and agricultural zones with parcels of five (5), 10 or 35 acres. The GMA defines this area as "rural," which limits both agricultural and residential densities. Two existing camps are in this area, and are the only uses that could be considered commercial. The existing zoning will not allow new commercial uses in this area.

CITY OF CARNATION
KING COUNTY

2015 WATER SYSTEM PLAN
FIGURE 3.1
EXISTING ZONING MAP

DECEMBER 2015

1000 0 1000 2000
SCALE IN FEET

LEGEND:

- CITY LIMITS
- URBAN GROWTH BOUNDARY
- RETAIL WATER SERVICE AREA

CITY ZONING:

- R2.5, RESIDENTIAL 2.5
- R3, RESIDENTIAL 3
- R4, RESIDENTIAL 4
- R6, RESIDENTIAL 6
- R12, RESIDENTIAL 12
- R24, RESIDENTIAL 24
- RMHP, RESIDENTIAL MOBILE HOME PARK
- CBD, CENTRAL BUSINESS DISTRICT
- SC, SERVICE COMMERCIAL
- MC, MIXED USE
- LI/M, LIGHT INDUSTRIAL / MANUFACTURING
- HC, HORTICULTURAL COMMERCIAL
- AGI, AGRI-TOURISM & INDUSTRIAL
- PU, PUBLIC USE
- PR, PARKS

COUNTY ZONING:

- RURAL AREA - 5- SPECIAL OVERLAY
- RURAL AREA - 5
- RURAL AREA - 10
- AGRICULTURE - 10
- AGRICULTURE - 35

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 12/15/2015 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: V:\2002\active\202003728\plan\Figures\Figure 3-1 Existing Zoning Map.dwg

THIS PAGE INTENTIONALLY BLANK

CITY OF CARNATION
KING COUNTY

2015 WATER SYSTEM PLAN
FIGURE 3.2
FUTURE LAND USE MAP

DECEMBER 2015

1000 0 1000 2000
SCALE IN FEET

LEGEND:

- CITY LIMITS
- URBAN GROWTH BOUNDARY
- RETAIL WATER SERVICE AREA

CITY LAND USE:

- LOW DENSITY RESIDNTIAL
- MEDIUM DENSITY RESIDNTIAL
- HIGH DENSITY RESIDENTIAL
- MOBILE HOME PARK
- LOW INTENSITY COMMERCIAL
- MEDIUM INTENSITY COMMERCIAL
- HIGH INTENSITY COMMERCIAL
- INDUSTRIAL
- PUBLIC LAND

COUNTY LAND USE:

- RURAL RESIDENTIAL
- OPEN SPACE
- MINING
- AGRICULTURE

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 12/15/2015 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: V:\2002\active\202003728\plan\Figures\Figure 3-2 Future Land Use.dwg

THIS PAGE INTENTIONALLY BLANK

3.3 WATER SOURCES

The City of Carnation produces its water from a spring source augmented by a well source, as described further in **Chapter 6**. **Table 3.1** summarizes the annual quantity of water produced. The City measures and records the water usage at each source daily. **Appendix H** contains a more detailed record of water produced monthly by each source.

Table 3.1 Total Water Production

	2009	2010	2011	2012	2013	2014
Spring Source (MG)	96.8	89.2	95.7	80.0	67.5	72.3
Well Source (MG)	5.01	0.42	1.00	0.10	0.00	0.04
Total Annual Production (MG)	101.8	96.7	96.7	80.1	67.5	72.3

3.4 HISTORICAL CITY POPULATION

Table 3.2 depicts the average annual population growth within the City limits for each decade between 1990 and 2015. This information is reported by the Office of Financial Management (OFM), not the City, and therefore exact number may differ slightly from information presented later in this Chapter.

From 1990 to 2000, the City experienced significant annual growth. However, this growth pattern stopped in 2000, and between 2000 and 2010, the City experienced slightly negative growth, which was mostly attributed to the lack of a sewer system for most of that decade. The City finished installing the sewer system in 2008, but the "Great Recession" continued to stall growth until approximately 2013. The City has experienced increased interest in development since 2013, so it expects significant population growth in the next 10 years.

Table 3.2 Historical Population: City of Carnation

Average Yearly Growth by Decade	
1990-2000	3.91%
2000-2010	-0.42%
2010-2015	0.00%

Source: Washington State Office of Financial Management

3.5 HISTORICAL WATER USE AND CONNECTIONS

As of the end of 2014, the City's water system provided water to 819 retail customers. The City reads customer meters on a monthly basis. Over the last six years, the City's water system has experienced minimal growth, with the number of connections increasing by less than one percent (1%) per year. During this period total water consumed has remained relatively constant.

3.5.1 Retail Customer Classes

Single-family residences accounts for 86% of system connections and an average of 64% of the total metered water use from 2009 to 2014. These statistics are consistent over the history of the system. Since 2008 the City has added three new single-family connections.

The City's system currently has 22 multifamily accounts, which is three percent (3%) of the total system connections. No new accounts have been added since 2008. Over this time period, the multifamily accounts have averaged nine percent (9%) of the total metered water use.

The City's system currently has 89 commercial and irrigation accounts, which make up just 11% of the total system connections. These accounts have averaged 27% of the total water usage from 2009 to 2014. Over this time period, the system has added two new commercial connections.

Figure 3.3 shows the average annual water use for each customer class as a percentage of the total metered water use.

Figure 3.3 – Average Water Use by Retail Customer Class (2009-2014)

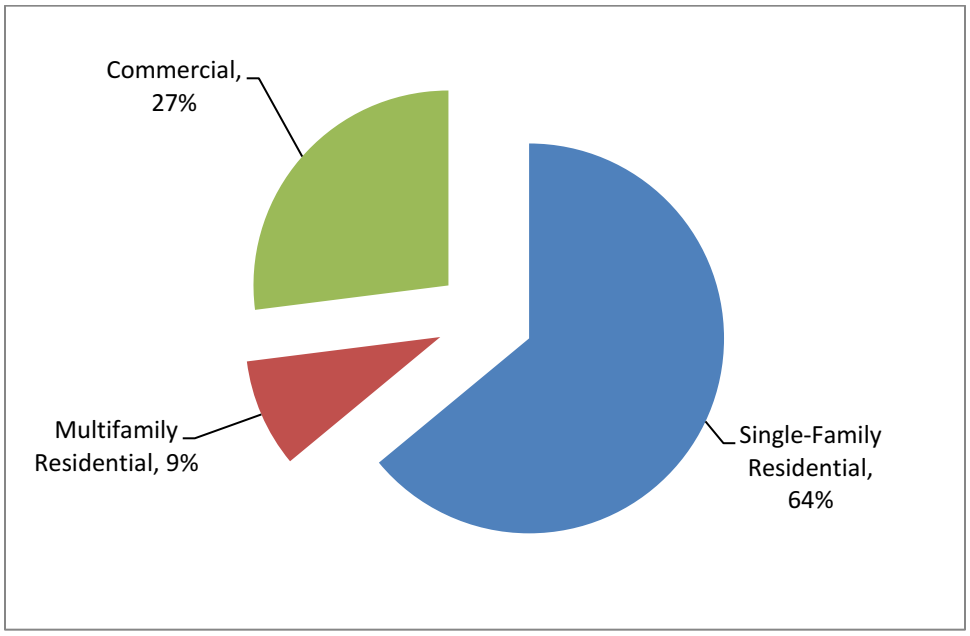
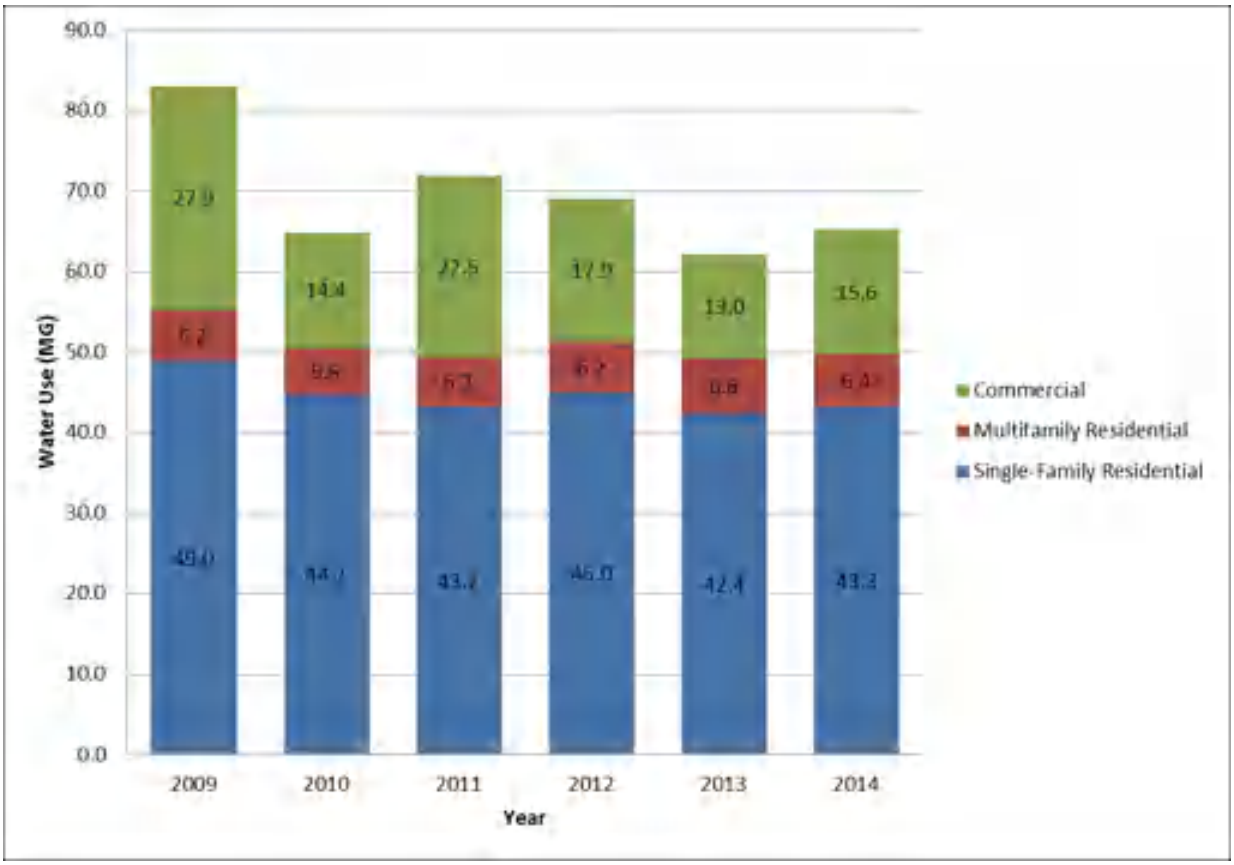


Figure 3.4 shows the historical number of customers, by customer class, and **Appendix H** contains a table detailing the number of connections by year.

Figure 3.4 Historical Number of Connections by Customer Class

Figure 3.5 summarizes the last six years of water usage by customer class. Variations between years typically reflect changes in customer demands, which are based on a variety of factors such as seasonal weather patterns, growth within the service area, state of the economy, interest rates, and City policies. The City replaced numerous commercial meters in 2011, which led to a more accurate record of commercial water use. **Appendix H** has a table detailing water consumption by customer class in millions of gallons per year (MG).

Figure 3.5 Historical Water Use by Customer Class



3.5.2 Equivalent Residential Units (ERUs)

This Plan expresses the demand of each customer class in terms of Equivalent Residential Units (ERUs). One ERU is defined as the average quantity of water used by one typical, full-time, single-family residence. **Table 3.3** shows the historical annual average water consumption by customer classification, and the average ERUs for each customer classification.

Based on the last six years, the average number of gallons per day per ERU is equal to 172 gallons/day. However, because water use varies from year to year, this Plan uses an ERU planning value of 174 gallons/day for demand forecasts. The number of ERUs for multifamily and commercial accounts is calculated by dividing the 2015 Comprehensive Plan number shown in

Table 3.3 by the planning ERU value of 174 gallons per day. The numbers of ERUs per account for multifamily and commercial classes are 4.5 and 3.5, respectively.

The average daily consumption for a single-family account used in the 2008 Comprehensive Water System Plan was 225 gallons. The current ERU planning value of 174 gallons/day/ERU is a reduction of 23% from that number, and is a credit to the City's efforts to reduce unaccounted for water usage.

Table 3.3 Historical Average Day Demand Water Consumption by Customer Class (gpd)

Classification	2009	2010	2011	2012	2013	2014	6-yr Average	2015 Comp Plan	ERUs Per Account
Single-Family Residential	190	173	167	174	164	167	172	174	1.0
Multifamily Residential	772	724	770	772	843	794	787	785	4.5
Commercial	878	452	701	550	402	482	578	615	3.5

3.5.3 Peaking Factors (Demand Factors)

The maximum day demand (MDD) Factor for a year (i.e., Demand Ratio) equals the MDD for the year (the day with the most water consumption for the year as reported by the City) divided by the Average Day Demand (ADD) for the year. Determination of MDD is critical because it is the benchmark utilized by a number of the water system design criteria discussed in **Chapter 2**. Supply capability, pump station discharge rates, reservoir capacity and pump sizes are all determined from MDD data along with required fire flow.

For a conservative calculation of MDD, this analysis uses the maximum day demand from the summer of 2015. The summer of 2015 was the driest summer on record with record-setting heat waves that stressed the City's water system. The MDD for 2015 took place on July 20 with a daily demand of 457,867 gallons. The analysis compared the 2015 MDD to the ADDs of the past six years. Based on this comparison, the analysis determined a MDD Factor of 2.50, which this Plan uses for future planning. This MDD factor is the same one used in the 2008 Plan.

Similar to the MDD Factor, the Peak Hourly Demand (PHD) Factor theoretically equals the PHD in a given year divided by the MDD for the same year. Due to the lack of PHD data from the City, this analysis calculated the PHD from the DOH's 2009 Water System Design Manual, Equation 5-1. This calculation determined a PHD Factor of 1.84.

3.6 FUTURE FORECASTS

The City performed population, household, and employment forecasts for current Retail Service Area (RSA). The City based these forecasts on local knowledge of upcoming developments and trends, the current City zoning parameters, the current King County zoning of the area outside the UGA, and the expected zoning that would be in effect upon City annexation of its PAA. These forecasts expect the population in the City's WSA to grow significantly over the next 20 years. The followings sections discuss the forecasted growth for the areas inside and outside the City's UGA in more detail. Additional information about the planning projections is included in **Appendix I**.

3.6.1 Growth Forecasts Inside the Urban Growth Area

Carnation's available land for residential development is limited. Approximately 75 acres are considered vacant and re-developable within the residential zones. The City based the projected growth rates, shown in **Table 3.4,** on the assumption that these parcels will quickly develop, as seen by the City's current growth pattern. The forecast also assumes some of the larger parcels will be subdivided for residential use.

Table 3.4 Forecasted Growth Rates Inside UGA

Time Period	No. of Years	Compound Annual Growth Rate
2015 to 2021	6	7.23%
2021 to 2025	4	3.67%
2025 to 2035	10	1.58%

Infill development will cause a portion of the growth in new households because the "new" sewer system allows smaller lots than have been typical within some areas of the City, most notably the older platted portion. The growth forecasts, shown in **Table 3.4**, expect infill development to occur at a fairly steady rate over the next ten years. After the ten year planning period, the lack of developable and re-developable land will limit the growth within the City's current limits.

Growth within the PAA will be minimal until annexation occurs, which the City expects to be at least 10 years out. After annexation, the City expects growth to be substantial. Residential development will occur in the medium and high density residential zones. The forecast estimates new households by the number of lots that could be developed in the medium density residential zone, plus an estimate of new households that might be developed in the high density residential zone. This estimation assumes that smaller lots such as townhouses or cottages will be developed in the high density zone.

Once annexation occurs, the City should review the current Water System Plan, and should prepare a separate addendum or new update because the resulting development will have a significant impact on the water system demands.

3.6.2 Growth Forecast Outside the Urban Growth Area

Zoning in the areas outside of the UGA are consistent with rural lands as defined by the GMA. Single-family residential and/or agriculture are the primary uses with minimum lot sizes varying from 5 acres to 35 acres. The area has only three non-residential uses, consisting of two camps, Girl Scout Camp and Camp Don Bosco, and a campground, the Tolt MacDonald Park Campground. The Girl Scout Camp receives water from the City's system, but also owns and operates a non-community public water system. Camp Don Bosco and the Tolt MacDonald Park Campground only receive water from the City's water system.

There are approximately 600 parcels that are within the City's WSA but outside the UGA; many of these parcels are vacant. Some of these parcels could be subdivided for future development under the existing zoning. In addition, numerous legal lots pre-date the zoning in this area, and these lots are legally developable with private septic systems for wastewater, assuming they have adequate area for the necessary drainfield. If these lots are over five acres, they can utilize private wells for potable water. If they are less than 5 acres, they must connect to a public water system before being developed. The forecast assumes that any parcel over one-half acre in size could develop if served by the City's water system.

Based on these assumptions, the total number of services outside the UGA could total approximately 210 service connections. Approximately 29 new connections outside the UGA are included in the 20-year planning period projection – see **Table 3.7**. The forecast predicts the growth rate to be mostly over the 10-year period, and then minimal growth for the following 10 years. These projections are shown in **Table 3.5**.

Table 3.5 Forecasted Growth Rates Outside the UGA

Time Period	No. of Years	Compound Annual Growth Rate
2015 to 2021	6	2.37%
2021 to 2025	4	1.45%
2035 to 2035	10	0.10%

3.6.3 Population Forecast

Table 3.6 shows the population forecasts for the water service area. The population forecasts are based on the number of dwelling units projected both within and outside the UGA, multiplied by the average persons per connection. The number of average persons per water service connection is different for single-family and multifamily. The forecast uses a multiplier of 2.83 persons per connection for single-family connections (from the 2010 Census data). The forecast uses a multiplier of 13.64 persons per connection for multifamily connections. This number was estimated from the City's 2015 population compared to the total number of connections.

Table 3.6 Population Forecasts

Population Inside UGA Boundary										
	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	1,525	1,692	1,845	1,998	2,154	2,309	2,462	2,606	2,940	3,396
Multifamily	286	300	327	341	368	382	409	423	559	696
Total	1,811	1,992	2,172	2,339	2,522	2,691	2,871	3,029	3,499	4,092
Population Outside UGA Boundary										
	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	478	484	490	495	501	507	512	518	552	558
Multifamily	14	14	14	14	14	14	14	55	55	55
Total	492	498	504	509	515	521	526	573	607	613
Total Population										
	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	2,003	2,176	2,335	2,493	2,655	2,816	2,974	3,124	3,492	3,954
Multifamily	300	314	354	368	409	423	464	478	614	751
Total	2,303	2,490	2,689	2,861	3,064	3,239	3,438	3,602	4,106	4,705

The 2035 population projected is approximately 4,705 with a projected number of households at 1,594. The forecast expects approximately 13.0% of the population growth to be outside the current City Limits. These projections are conservative compared to the City's new population forecast. The City has undertaken additional analysis since the development of this Plan and has determined these forecasts fall within the population growth range that the City is anticipating. The City's new forecasts are included in **Appendix I**.

3.6.4 Employment Forecast

The City based the employment forecasts on its knowledge of existing and future plans including four plats that were under development review in 2014 and 2015. Currently, the majority of employment in Carnation is from the restaurants and public schools near the main thoroughfare, Fall City Carnation Rd NE. Other areas of light industrial or commercial are scattered throughout the UGA. In total the UGA has approximately 296 jobs. Based on the City's forecasts, this number will increase to approximately 493 jobs by 2035.

The City does not expect new commercial development in the rural areas outside of the City of Carnation UGA, as the current zoning under King County only permits rural residential and agricultural uses.

3.6.5 Water Service Connection Forecast by Classification

Based on the population and employment forecasts by the City and discussed above, water service connections forecasts were performed for current Retail Service Area (RSA). **Table 3.7** shows the water service connection forecasts for the water service area broken down into customer classifications.

These forecasts show that a total of 1,384 households would be possible within the UGA given the current zoning limitations, and assuming that most parcels develop to the maximum extent possible. This estimate represents an additional 744 new dwelling units, and more than doubles the current number of connections within the UGA.

Table 3.7 Water Service Connections Forecasts

Service Connections Inside UGA Boundary										
	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	539	598	652	706	761	816	870	921	1,039	1,200
Multifamily	21	22	24	25	27	28	30	31	41	51
Commercial	80	82	85	87	90	92	95	97	115	133
Total	640	702	761	819	878	936	995	1,049	1,195	1,384
Service Connections Outside UGA Boundary										
	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	169	171	173	175	177	179	181	183	195	197
Multifamily	1	1	2	2	3	3	4	4	4	4
Commercial	9	9	9	9	9	9	9	9	9	9
Total	179	181	184	186	189	191	194	196	208	210
Total Service Connections										
	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	708	769	825	881	938	995	1,051	1,104	1,234	1,397
Multifamily	22	23	26	27	30	31	34	35	45	55
Commercial	89	91	94	96	99	101	104	106	124	142
Total	819	883	945	1,004	1,067	1,127	1,189	1,245	1,403	1,594

3.7 FUTURE WATER DEMANDS

Projecting future water demand is one of the key elements of the comprehensive water planning process. Identification of system improvements such as supply, pumping, storage and piping requirements are all related to demand forecasts.

This analysis uses the forecasted number of accounts, shown in the previous section, to estimate the system's future water demands. First the analysis converts the forecasted number of accounts to number of ERUs by using the ERUs per Account shown in **Table 3.3**.

Table 3.8 shows the projected number of ERUs for the City's Retail Water Service Area over the planning period. It does not include distribution system leakage or wholesale customer demand.

Table 3.8 Projected ERUs

	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Inside UGA										
Single-Family	539	598	652	706	761	816	870	921	1,039	1,200
Multifamily	95	99	108	113	122	126	135	140	185	230
Commercial	280	287	298	305	315	322	333	340	403	466
Sub Total	914	984	1,058	1,124	1,198	1,264	1,338	1,401	1,627	1,896
Outside UGA										
Single-Family	169	171	173	175	177	179	181	183	195	197
Multifamily	5	5	5	5	5	5	5	18	18	18
Commercial	32	32	32	32	32	32	32	32	32	32
Sub Total	206	208	210	212	214	216	218	233	245	247
Total										
Single-Family	708	769	825	881	938	995	1,051	1,104	1,234	1,397
Multifamily	100	104	117	122	136	140	153	158	203	248
Commercial	312	319	330	337	347	354	365	372	435	498
Total	1,120	1,192	1,272	1,340	1,421	1,489	1,569	1,634	1,872	2,143

The analysis then converts number of ERUs to ADDs by using the ERU planning value of 174 gallons/day, as discussed in **Section 3.5.2**. The projected ADD (in 1,000 gallons per day) for the entire system is shown in **Table 3.9**. Authorized Consumption is assumed to be 2.0% of consumed water and distribution system leakage (DSL) is assumed to be 10.0% or less. DSL is discussed in greater length in **Chapter 5**.

Table 3.9 Projected Average Day Demands (in 1,000 gallons per day)

	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	123	134	144	153	163	173	183	192	215	243
Multifamily	17.4	18.1	20.4	21.2	23.7	24.4	26.6	27.5	35.3	43.2
Commercial	54.3	55.5	57.4	58.6	60.4	61.6	63.5	64.7	75.7	86.7
Authorized Consumption	3.90	4.15	4.43	4.66	4.95	5.18	5.46	5.69	6.52	7.46
Distribution System Leakage	19.5	20.7	22.1	23.3	24.7	25.9	27.3	28.4	32.6	37.3
Total	218	232	248	261	277	290	306	318	365	418

Next, this analysis uses the MDD Factor of 2.5, discussed in **Section 3.5.3**, to calculate the MDD for the system. The projected MDD (in 1,000 gallons per day) for the entire system is shown in **Table 3.10**.

Table 3.10 Projected Maximum Day Demands (in 1,000 gallons per day)

	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	308	335	359	383	408	433	457	480	537	608
Multifamily	43.5	45.2	50.9	53.1	59.2	60.9	66.6	68.7	88.3	107.9
Commercial	136	139	144	147	151	154	159	162	189	217
Authorized Consumption	9.7	10.4	11.1	11.7	12.4	13.0	13.7	14.2	16.3	18.6
Distribution System Leakage	48.7	51.9	55.3	58.3	61.8	64.8	68.3	71.1	81.4	93
Total	546	582	620	653	692	726	765	796	912	1,045

Finally, the analysis multiplied the ADD by 365 days to calculate the forecasted annual water demand for the system. The forecasted annual water demand (in MG) is shown in **Table 3.11**.

Table 3.11 Projected Annual Demand (in MG per Year)

	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single-Family	45.0	48.8	52.4	56.0	59.6	63.2	66.8	70.1	78.4	88.7
Multifamily	6.35	6.61	7.43	7.75	8.64	8.89	9.71	10.0	12.9	15.8
Commercial	19.8	20.3	21.0	21.4	22.0	22.5	23.2	23.6	27.6	31.6
Authorized Consumption	1.42	1.51	1.61	1.70	1.80	1.90	1.99	2.08	2.38	2.72
Distribution System Leakage	7.11	7.57	8.08	8.51	9.03	9.46	10.0	10.4	11.9	13.6
Total	79.7	84.8	90.5	95.4	101.1	106.0	111.7	116.2	133.2	152.4

Table 3.12 summarizes the existing and forecasted ADD, MDD, and annual water demand with and without water use efficiency (WUE) efforts. The City set a WUE goal to reduce water usage by one percent (1%) per year. For more information about WUE, see **Chapter 5**.

Table 3.12 Projected Demands With and Without WUE

	Data Year	Planning Year	6-year Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Average Day Demands (in 1,000 gallons per day)										
ADD w/o WUE	218	232	248	261	277	290	306	318	365	418
ADD w/WUE	218	232	246	256	269	278	291	299	329	334
Maximum Day Demands (in 1,000 gallons per day)										
MDD w/o WUE	546	582	620	653	692	726	765	796	912	1045
MDD w/WUE	546	582	614	640	671	697	727	748	821	836
Annual Demands (in MG)										
Annual Demand (MG) w/o WUE	79.7	84.8	90.5	95.4	101.1	106.0	111.7	116.2	133.2	152.4

Annual Demand (MG) w/WUE	79.7	84.8	89.6	93.5	98.1	101.8	106.1	109.2	119.9	121.9

The ADD and MDD forecasts (without WUE reduction) were utilized in **Chapter 4**, System Analysis, and in **Chapter 6**, Source Water Protection. The identified deficiencies serve as the basis for a portion of the Capital Improvement Plan in **Chapter 7**. The distribution system leakage (DSL) and WUE forecasts are included in **Chapter 5** for the 6-year comprehensive planning period (2015 to 2021).

3.8 COMPARISON BETWEEN PLANNING ANALYSES IN THE 2008 AND 2015 WATER SYSTEM PLANS

The 2008 Plan used an ERU planning value of 225 gpd per ERU, while this Plan uses 174 gpd per ERU in the calculations. The reduction in the ERU planning value can be attributed to the increased water use efficiency within the City, new water meters, and repairing distribution system leaks. Technology in high efficiency water fixtures has continued to improve, contributing to the continually increasing water efficiency throughout the City.

Both the 2008 Plan and this Plan use the same MDD factor. This means that while projections are that people will use less water per capita on average, they will increase their peak water usage by the same ratio as before, so the total peak amount is lower for the system.

The 2008 Plan projected significant growth after the completion of the sewer system in 2008. However, the "Great Recession" hit soon after the sewer system was completed, causing the City to experience negligible growth between 2008 and 2015. Because of this lack of growth, the 2015 population is significantly less than the 2008 Plan expected. Similar to the 2008 Plan, the City expects significant growth in the next six years with growth tapering off after that. Some growth is already in process.

Because the ERU value is lower in this Plan and the population is less than forecasted, the demands are less than the 2008 demands. For example, the 2018 ADD forecast for the 2008 Plan was 486,000 gallons per day, without WUE, while the 2018 ADD forecast for this Plan is 277,000 gallons per day, without WUE. This is a reduction of 43% projected water use in 2018!

4.0 CHAPTER 4 - SYSTEM ANALYSIS

4.1 HYDRAULIC ANALYSIS

A hydraulic analysis of the City's water system facilities is an integral part of the comprehensive planning process. The analysis evaluates the system's ability to supply water to the City's customers, and identifies any deficiencies in meeting DOH and City standards. The analysis then suggests and evaluates improvements to resolve the identified deficiencies. The scope of the hydraulic analysis includes the following:

- Perform a storage analysis of the system based on existing and future demand conditions.
- Assign demands to the model based on the existing and future system, using the data developed in **Chapter 3**.
- Evaluate system performance compared to DOH and City criteria and identify deficiencies.
- Compare various improvement alternatives.
- Identify selected improvements to resolve existing deficiencies.
- Document any special operational requirements.

4.1.1 Hydraulic Model

The City's hydraulic model uses the H2OMap Water GIS version 10.0 (by Innovyze). H2OMap Water is a stand-alone GIS-based hydraulic model, and combines spatial analysis tools and mapping functions with water distribution network modeling.

The hydraulic model performs simultaneous pressure and flow calculations throughout the distribution system piping under varying demand conditions and operational scenarios. It evaluates the interaction between system demand (including potential fire flows), supply, storage, pumping, and distribution piping. Steady state (static) analyses are performed to identify areas of low or high pressure and excessive velocities and/or pressure loss in pipes. Extended period simulations are performed to evaluate operational characteristics such as the relationship between pump station operations and reservoir levels over a 24-hour (diurnal) period. The GIS integration allows for a graphical representation and interface with the water distribution system and analysis results data. Pipes can be color coded to identify physical characteristics such as pipe flow rates, velocities and head losses. Node data such as elevation, pressure, etc., can similarly be graphically represented.

Stantec created the model at the end of 2006 because the City did not have one, and has updated it to reflect all CIP projects and developer extensions since its creation. Updates are accomplished by manually inputting construction record drawing data into the model. Modeling data includes the following physical and operational characteristics:

4.1.2 Pipe Data

Pipe information includes diameter, length, Hazen Williams "C" value, material, and status (open or closed). The Hazen Williams "C" value is a measure of the friction resistance of the pipe. Pipe materials and "C" values are typically closely related. The model shows a skeletal version of the system's pipe network. It includes all looped portions of the system, and dead-end lines containing hydrants to verify fire flow adequacy. The model simulates closed valves by closing pipes.

4.1.3 Node Data/System Demands

Nodes are connection points created in the model, and include elevation and demand data (average day, maximum day, and peak hour) in the model. For the Comprehensive Plan model used for this analysis, updated system demands are input to the model based on water use and other planning data previously presented in **Chapter 3** of this document. The system demands in the model are input to match the current (2015), ten-year planning period (2025), and 20-year planning period (2035) demands. These demands are then globally multiplied by the Maximum Day Demand (MDD) Factor and the Peak Hour Demand (PHD) Factor described in **Chapter 3**, so that the model can simulate average day demand (ADD), maximum day demand (MDD), and peak hour demand (PHD) scenarios for the current, ten-year, and 20-year planning periods.

Discrete node water demands in the model are input as described below.

Separate residential water demands were calculated for the South (328) and North (229) Zones. For the South Zone, these residential demands are uniformly distributed between the nodes because the population is fairly evenly distributed. For the North Zone, slightly larger residential demands are applied to the newer developments in the eastern portion of the City. This is because some of the newer developments have larger lots than the rest of the City, and therefore, use more water for irrigation. The slightly smaller residential demands are applied to the remainder of the residential nodes in the North Zone.

For commercial nodes, all of which are located in the North Zone, the analysis assigns larger demands to the system's large users; for instance, schools, restaurants, etc., that are directly derived from the historical usage data for each site. The remainder of the commercial demand is uniformly distributed throughout the Central Business District, which lies along the Tolt Avenue corridor.

Future residential and commercial developments are represented by point loads (demands). These point loads are applied in areas that are expected to develop, mostly to the north and northeast of the City. Limited elevation verification is performed during model development.

4.1.4 Fire Flow Requirements

Fire flow requirements are assigned in the model based on the following categories:

- Single Family Residential: 1,000 gallons per minute (gpm) for two hours.
- Tolt Middle School: 1,000 gpm for two hours.
- Tolt Elementary School: 2,000 gpm for two hours.
- Commercial: 2,500 gpm for two hours.

4.1.5 Supply Data

The model represents the City's supply sources, the spring source and the well, as inflow nodes. Inflow nodes can be configured to vary flow with time as necessary to simulate actual conditions. The City's spring source is represented as a reservoir with a constant hydraulic gradeline and a flow control valve set to simulate a maximum output of 350 gpm, which was determined through review of the City's flow meter records. The well is represented as a node with a constant negative demand to simulate outflow when operational. This flow rate is manually adjusted as necessary for the various scenarios analyzed.

4.1.6 Storage Data

The system's storage is represented by the three existing tanks. Tank information in the model includes the physical configuration of the storage tank, such as the dimensions, base elevation, and minimum and maximum pumping level water elevations.

The system has two tanks in the North Zone. The original tank is a 222,000 gallon tank, and the new tank is a 605,000 gallon tank, adjacent to the original tank, and on the same hydraulic grade. The original tank is currently offline for water quality, and therefore, not included in the model simulations or the storage calculations. The system has one tank in the South Zone, which is a 109,000 gallon tank, near the spring site. The South Zone tank provides operational and standby storage only; fire flow storage is provided in this tank only as may happen to be available in the event of a fire.

4.1.7 Pump Data

Well pumps or pump stations with multiple pumps can be represented in the model. Pumps can be assigned pump curves or can be defined as constant supply nodes. If pump curves are used, the pump status can be automatically controlled by operational conditions such as storage tank level or node pressure. Supply nodes can be utilized to input nominal flow rates for water supplied to the system, if desirable, or if pump curves are unavailable.

The City does not currently operate any booster pump stations, but does own and operate a well pump station. The well pump is turned on or off in the model based on system pressure at the well and discharges at an assumed constant flow rate.

4.1.8 Pressure Reducing Valve (PRV) and Pressure Sustaining Valve (PSV) Data

Pressure Reducing Valves (PRVs) are designed to limit the pressure on the downstream end to not exceed a pre-set value when the upstream pressure is above this setting. PRVs are characterized in the model with a downstream pressure setting, head loss through the valve, elevation and the valve diameter. PRV stations usually consist of a smaller, normal duty valve and a larger valve set to open at a lower pressure that supplies peak, fire, or emergency flows.

Pressure Sustaining Valves (PSVs) are designed to maintain a minimum pressure on their upstream end when the downstream pressure is below that value. A PSV is characterized in the model with an upstream pressure setting and a valve diameter.

The City has one combination PRV/PSV station located at the boundary between the South (328) and North (229) Zones, at the intersection of Fall City-Carnation Road and NE 32nd Street. The PRV station is simulated by setting the larger valve at the normal pressure setting and ignoring the smaller valve. The PRV is modeled as an 8-inch diameter valve with a downstream pressure setting which would limit the pressure to the North Zone to approximately 78 psi. The PSV is modeled to maintain a minimum pressure of approximately 94 psi in the South Zone.

4.1.9 Model Calibration

Verification of the accuracy of the Model is an essential step in the hydraulic analysis process. The DOH Water System Design Manual (December 2009) stipulates that:

> Engineers often use hydraulic analyses on existing water systems when values for pipe roughness are uncertain or the location and operation of valves or pipes are not clear. The calibration process involves comparing modeled or predicted results with field measurements. This process is necessary for the computer model to provide accurate and reliable results (Section 8.2.2).

City staff and engineering representatives developed a calibration process and conducted hydrant flow tests at seven locations throughout the City. The locations were selected so as to establish appropriate Hazen-William's "C" values for each of the different types of pipe material within the water service area. The results were used to update the appropriate variables in the Model to bring the model-predicted performance of the system close to the measured system performance. Pressures (before, during, and after flow testing) were recorded for each test location. Demands were assumed to be average day conditions in the model. Comparison of the test results with the model results indicated that generally the model accurately reflected conditions in the existing system. Elevations were updated in a small number of locations in the model, and Hazen Williams "C" values were adjusted as necessary based on possible deterioration of the water main due to age, until the model pressures correlated to the field pressure test data. "C" values were generally assigned to the model as follows:

Ductile Iron:	130
Asbestos Cement:	120
Steel:	100
PVC:	140
Galvanized Iron:	100

These "C" values are assumed valid for future conditions scenarios as well. Some increase in roughness (decrease in "C" value) may occur but it is not expected to be significant over the planning period. As can be deduced by these values, the steel and galvanized steel mains have reduced capacity due to tuberculation and other reasons.

4.2 EVALUATION OF DISTRIBUTION SYSTEM

The calibrated model with updated model system demands is used to perform a comprehensive evaluation of the distribution system. The evaluation consists of performing a series of model simulations, under varying system demands and operational parameters, to determine compliance with DOH and City criteria and standards. DOH requires analysis of the existing system, and the six-year and 20-year projections (three timeframes total). With this Plan, an optional ten-year timeframe was suggested by DOH in order to be eligible to obtain a ten-year plan approval from DOH. Since the ten-year case would stress the system more than the six-year case, the six-year case (2021) evaluation was not completed. The system was evaluated under several conditions for each of three timeframes: existing - 2015, ten-year - 2025, and 20-year - 2035.

Per DOH requirements, the evaluation simulates the following scenarios for each planning period:

1. Minimum pressures
2. Maximum velocities
3. Maximum pressures
4. Fire flow conditions.

As part of these simulations and to address deficiencies, the evaluation manipulates the operational parameters of the model including initial tank levels, well pump status and settings, status of valves, and various piping configurations.

Where model results identify deficiencies in meeting the specified criteria, alternative system improvements are identified, input to the model, and analyzed to verify compliance with the criteria. A generalized discussion of the analysis for each main scenario, as well as identified deficiencies and improvements are included below. All recommended improvements are listed in the Capital Improvement Program in **Chapter 8**.

4.3 2015 SYSTEM ANALYSIS

The distribution system for this analysis represents the existing system as described in **Chapter 1** and 2015 (existing) ADD, MDD, and PHD scenarios described in **Chapter 3**. Reservoir settings for the analysis are determined based on existing equalizing, fire flow, and standby storage volume requirements shown in the 2015 storage analysis (further discussed later in this chapter).

4.3.1 Minimum Pressure Analysis

Per DOH requirements, minimum service pressures must be greater than 30 psi during PHD conditions, with tank elevations set at the bottom of equalizing storage levels. Model results indicate that all service pressures meet this criterion, so no improvements are required. See the results in **Figures 4.1A and B**.

The City is adopting a policy of maintaining a minimum domestic pressure of 40 psi within the City limits, and ideally would like to maintain a minimum pressure of 50 psi. During this simulation a few sections of the City's system drop below 45 psi due to relatively high elevations. In particular, the section of the system that is directly east of the reservoir site drops to approximately 42 psi during low pressure situations.

4.3.1.1 Suggested Improvement Discussion

To improve the water pressure, the City could construct a pump station immediately east of the reservoir. This station would need to be sized for a 1,750 gpm flow to support a fire flow, and a head of between 18 feet (to provide 50 psi) and 42 feet (to provide 60 psi).

As an alternative to this large Booster Pump Station, the City could install a smaller station that would be sized to meet operational demand, and in the case of a fire, fire flow would bypass the booster pump station through a hydraulic control valve(s). For this alternative, the booster pump station would be sized to meet the future build-out peak hour demand. This means sizing the system for 100 gpm flow and a head of between 18 feet (to provide 50 psi) and 42 feet (to provide 60 psi).

4.3.2 Maximum Velocity Analysis

Per DOH requirements, maximum velocities in distribution mains must not exceed 8 feet per second (fps) during PHD conditions, with tank elevations set at the bottom of equalizing storage levels. Model results indicate that all distribution main velocities meet this criterion, so no improvements are required.

4.3.3 Maximum Pressure Analysis

Per DOH requirements, maximum system pressures should not exceed 100 psi during ADD conditions, with tank levels set at full. Model results indicate that all service pressures meet this criterion, so no improvements are required. See the results in **Figures 4.2 A and B**.

4.3.4 Fire Flow Analyses

Per DOH recommendations, residual pressures must not drop below 20 psi and velocities must not exceed 10 fps during fire flow conditions. All fire flow analyses are simulated in conjunction with the MDD conditions, and tanks are set at the bottom of the larger of either standby storage or fire flow storage, per DOH recommendations. The DOH requires that fire flow analyses are performed with the assumption that the largest water source is unavailable; therefore, the well pump is turned off for all fire flow analyses.

This evaluation reviews two system-wide fire flow analyses: a 1,000 gpm fire flow analysis for nodes located in residentially zoned areas and a 2,500 gpm fire flow analysis for nodes located in commercially zoned areas. These two fire flow analyses are simulated separately because each fire flow rate requires different tank level settings. The required fire flow duration for all fire flows (residential and commercial) less than 3,000 gpm is two hours.

Nodes at the well, spring, and reservoir sites as well as nodes on dead-ends without fire hydrants do not have a requirement for fire flow, and therefore, are not tested for fire flow capabilities.

The Model performs fire flow analyses by applying the specified flow individually to each node identified for analysis. For higher flow rates, the fire flows are manually re-simulated, assigning an equal portion of the total required fire flow to each of the adjacent node (hydrant) locations. This is due to the fact that the Model cannot automatically split the fire flow rate between multiple hydrants as part of its analysis routine, and the output from a single hydrant is limited.

Although the velocity is checked during the automated fire flow, per DOH criteria, the simulation output does not identify every section of pipe that may exceed velocity requirements. Because of this, the velocities are re-examined during the manual simulation. The process of checking fire flow velocities is expedited, however, by knowing that certain pipe configurations convey adequate fire flow rates with acceptable velocities. For example, a six-inch dead-end line will not convey a 1,000 gpm flow rate without violating the velocity criteria but an eight-inch dead-end line will.

The results of the 2015 Fire Flow Analyses are presented in **Figures 4.3A and B** and **Figure 4.4**, using colors to differentiate results.

Model results for the 1,000 gpm residential fire flow indicate the system is generally adequate to provide the required fire flow. There are localized deficiencies throughout the system. These deficiencies occurred mostly in undersized pipes (2-, 4-, and 6-inch pipes). The majority of the

improvements required consist of replacing these mains with larger diameter pipe, or looping where feasible, as further discussed in **Chapter 8**.

Model results for the 2,500 gpm commercial fire flow indicate that the system can provide the required commercial fire flow (2,500 gpm) throughout the majority of the commercial zone. However, there is one localized deficiency on the southern end of the commercial zone. This deficiency occurs because of a short section of undersized (8-inch) pipe, and the suggested remedy, listed below, is to upsize this short section of pipe with a 12-inch pipe.

4.3.4.1 Required Improvement Discussion

The deficiencies identified vary in severity. If a pipe/area is slightly deficient and is not an imminent health threat, it may not make sense to remedy the situation immediately but wait until a cost effective solution can be implemented. More severe deficiencies rate as higher priorities to remedy in the near term. The prioritization methodology is addressed in **Chapter 8**.

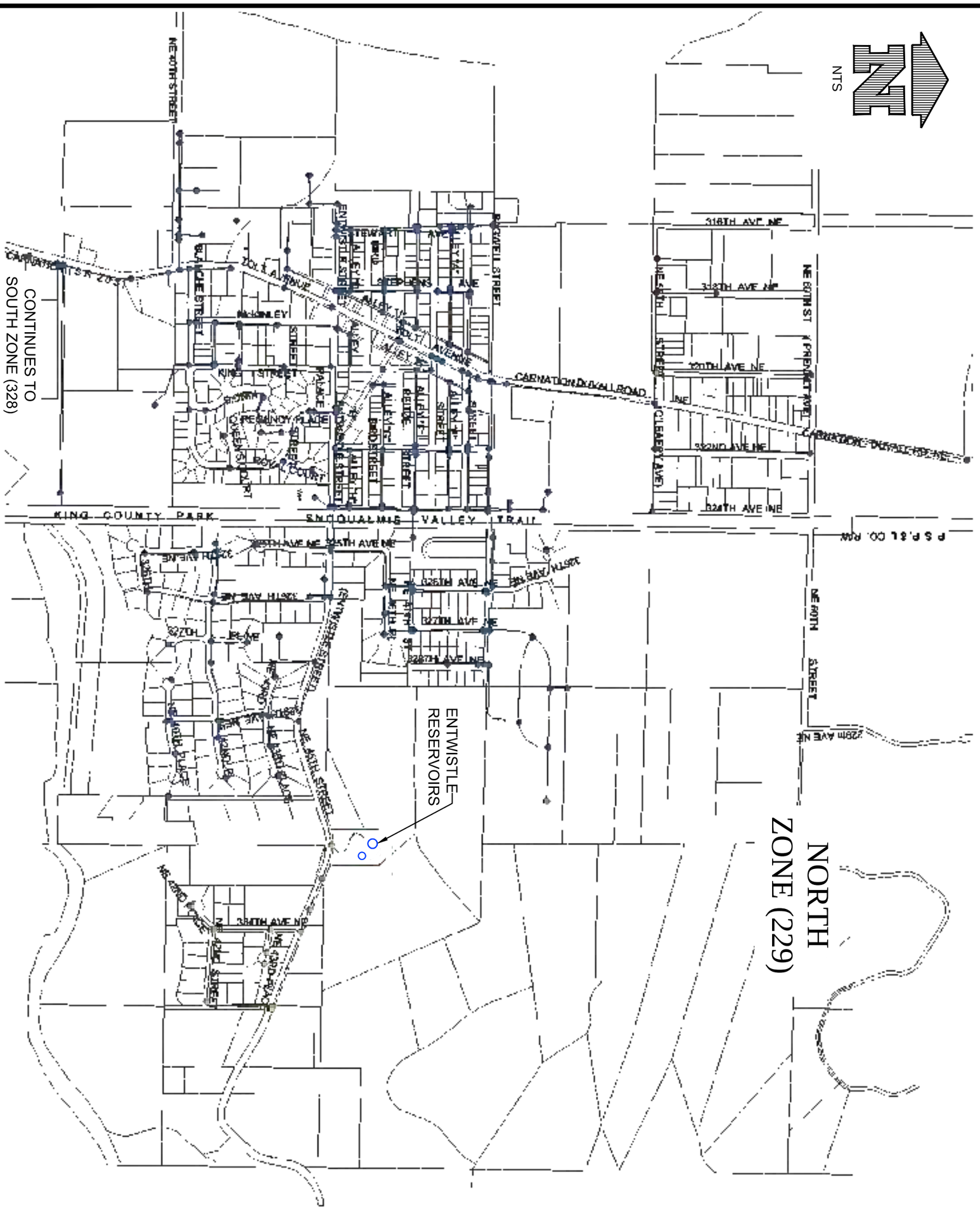
The following improvements are required in order to resolve the deficiencies determined through the 2015 residential fire flow analysis.

- Upsize the existing 2-inch water main on 318th Avenue NE, 320th Avenue NE, and 322nd Avenue NE between NE 55th Street and NE 50th Street to 8-inch pipe, and upsize the existing 2-inch water main on NE 55th Street between 318th Avenue NE and 324th Avenue NE (not yet scheduled).
- Upsize the existing 4-inch water main on McKinley Avenue between Blanche Street and Eugene Street to 8-inch pipe.
- Upsize the existing 4-inch water main in Alley "J" between Alley "A" and Bagwell Street and the existing 4-inch water main in Bagwell Street between Alley "J" and Tolt Avenue to 12-inch pipe.
- Upsize the existing 4-inch water main on Carnation-Duvall Road (SR 203) between Morrison Street and Bagwell Street to 12-inch pipe (currently planned improvement).
- Upsize the existing 6-inch water main on Carnation-Duvall Road (SR 203) between Bagwell Street and NE 55th Street to 12-inch pipe (currently planned improvement).

The following improvement is required in order to resolve the deficiency determined through the 2015 commercial fire flow analysis.

- Upsize the existing 8-inch water main on Stephens Avenue between the Alley "J" and Entwistle Street.

Figure 4.3 shows the Residential 2015 Fire Flow Analysis with the recommended improvements.



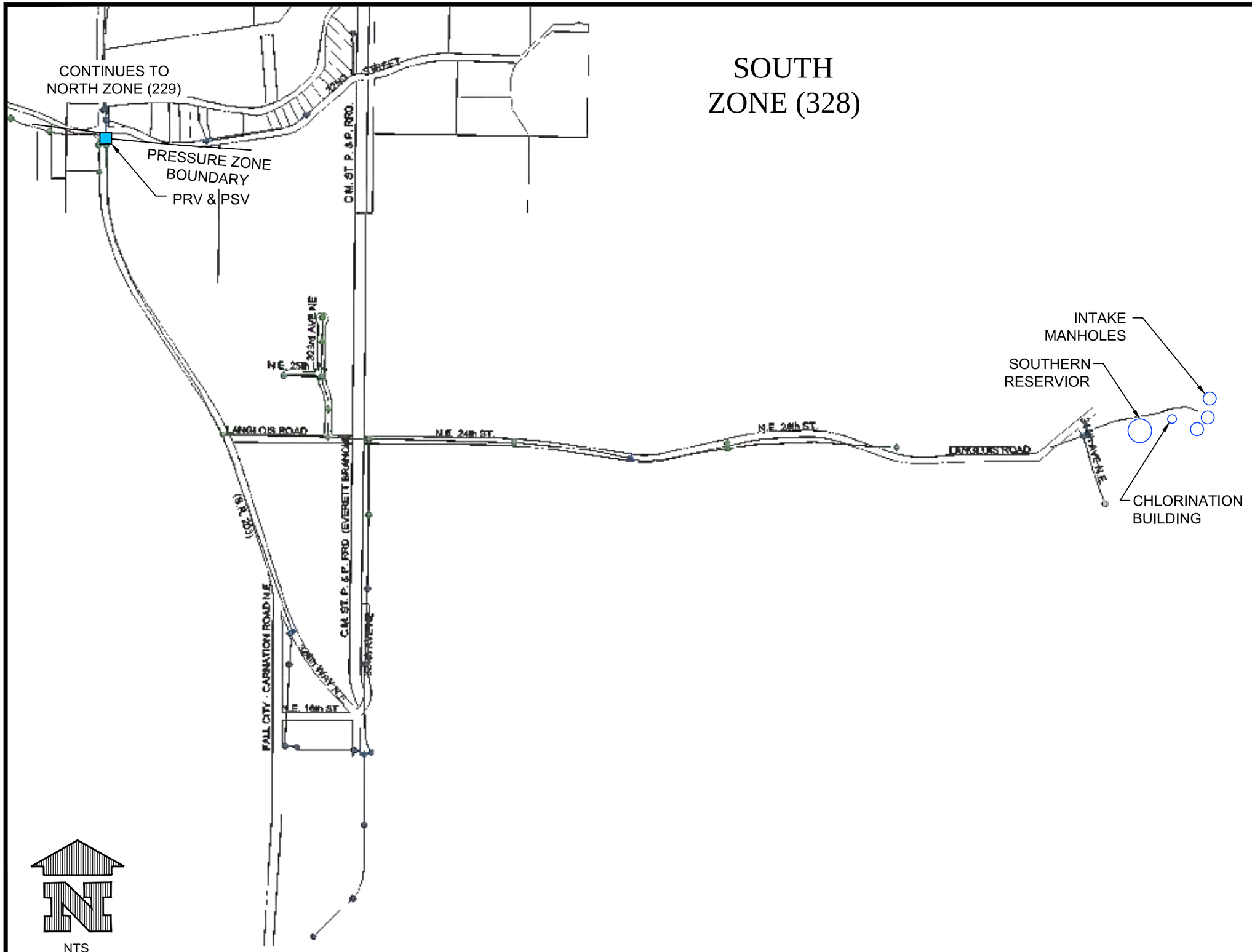
MINIMUM PRESSURE (PSI)
- LESS THAN 30
- 30–50
- 50–80
- 80–100
- WATER MAIN

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 4.1A
CURRENT (2015) MINIMUM PRESSURE SCENARIO
DECEMBER 2015

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 1/14/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:_VA\2002\active\2002003728\gis\Figures\Figure 4-1 2015 Min. Pressure.dwg

SOUTH ZONE (328)



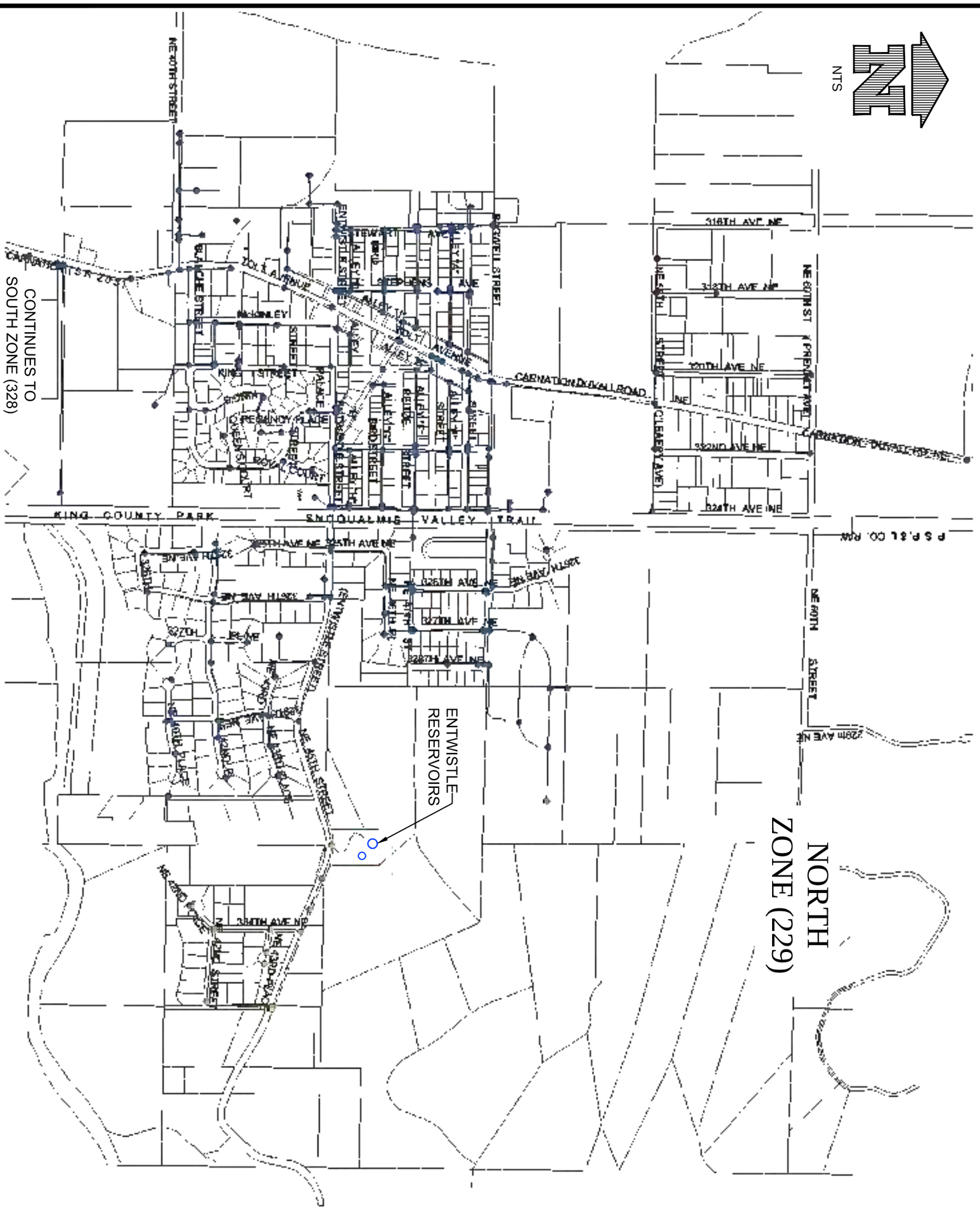
NTS

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 4.1B
CURRENT (2015) MINIMUM PRESSURE SCENARIO
DECEMBER 2015

MINIMUM PRESSURE (PSI)
- LESS THAN 30
- 30–50
- 50–80
- 80–100
- WATER MAIN

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 1/14/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:\V:\2002\active\200200372B\plan\Figures\Figure 4-1 2015 Min Pressure.dwg



CITY OF CARNATION
KING COUNTY

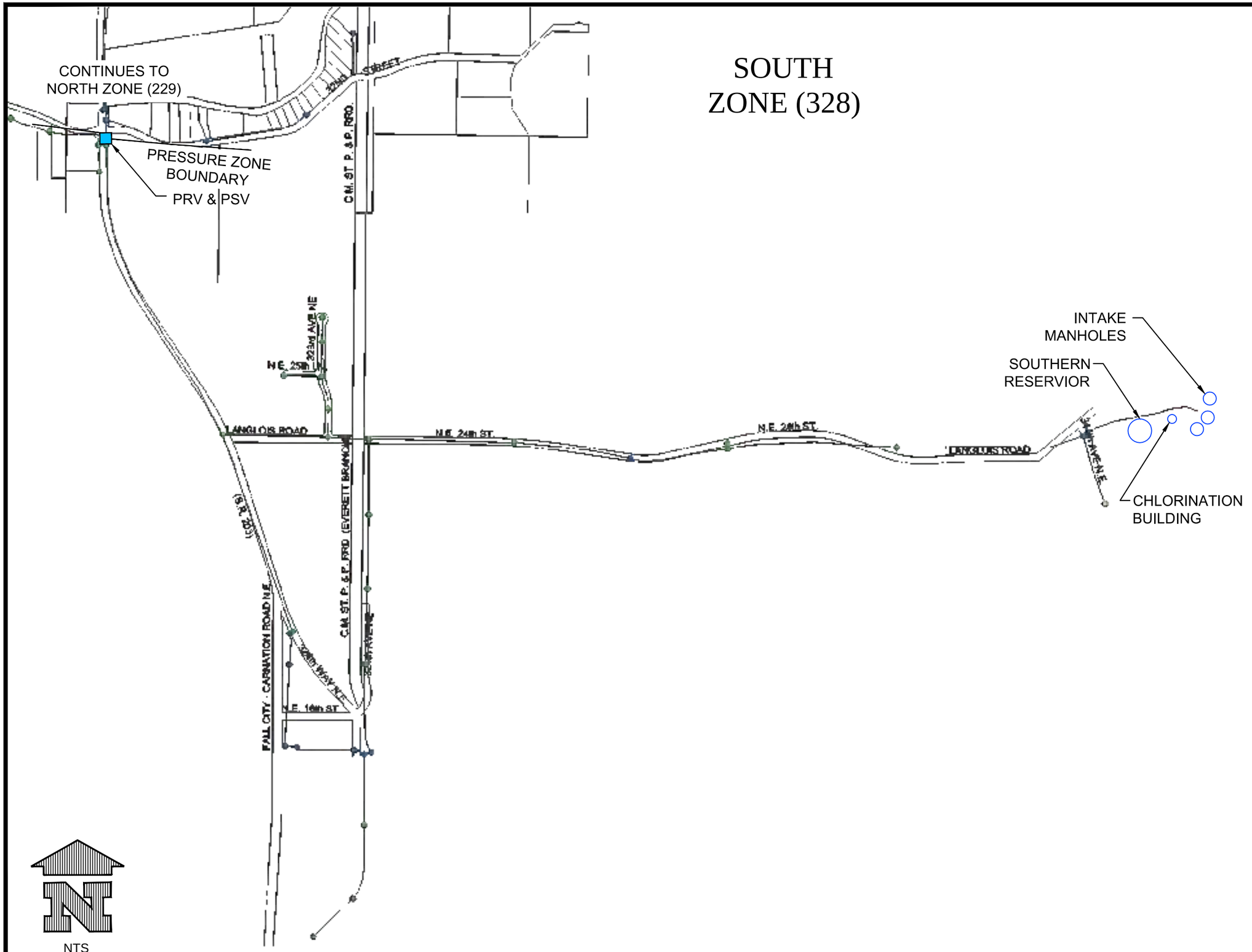
2015 WATER SYSTEM PLAN
FIGURE 4.2A
CURRENT (2015) MAXIMUM PRESSURE SCENARIO

DECEMBER 2015

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 1/14/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:_VA\2002\active\2002003728\plan\Figures\Figure 4-2 2015 Max Pressure.dwg

SOUTH ZONE (328)



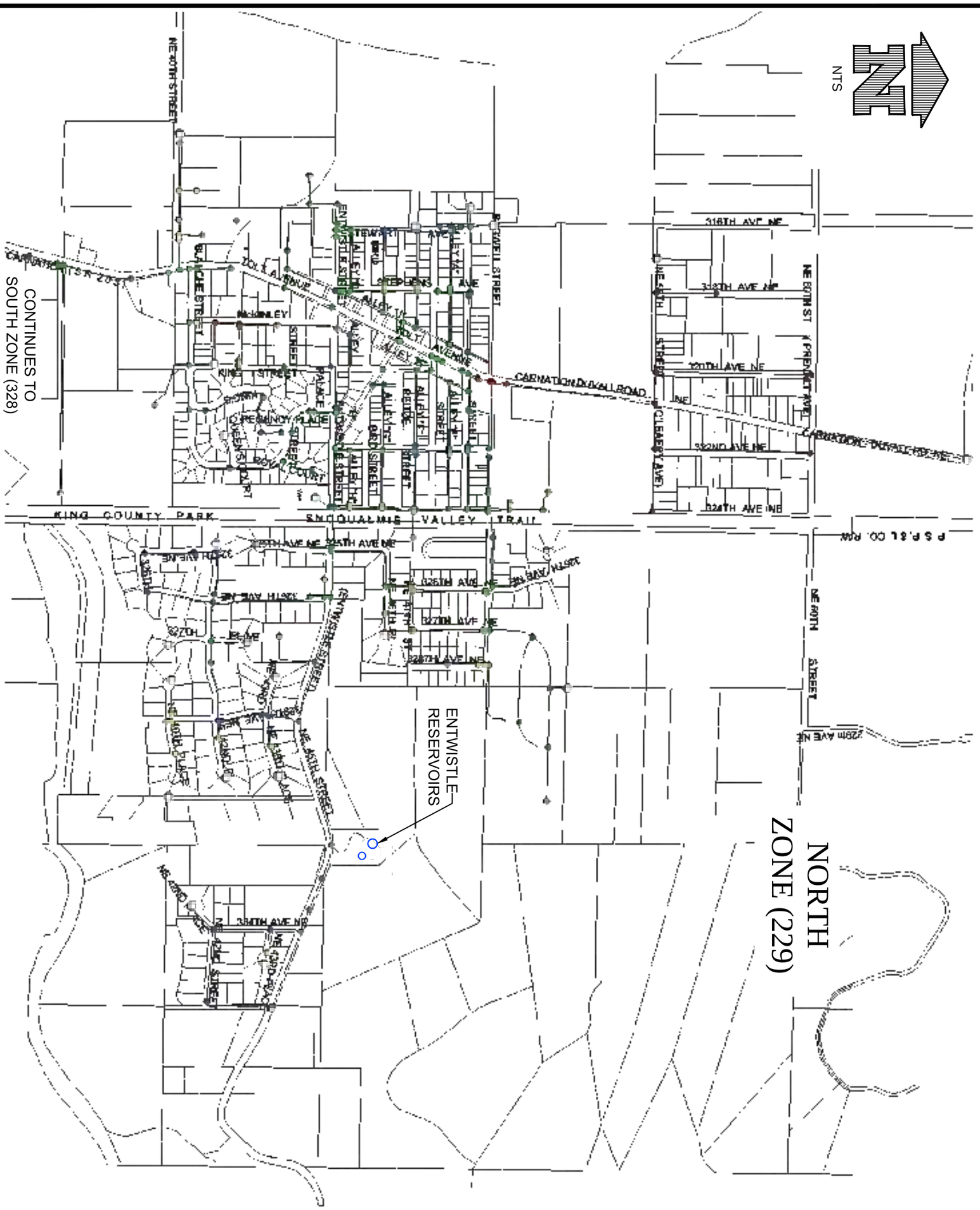
NTS

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 4.2B
CURRENT (2015) MAXIMUM PRESSURE SCENARIO
DECEMBER 2015

MINIMUM PRESSURE (PSI)
- LESS THAN 30
- 30–50
- 50–80
- 80–100
- WATER MAIN

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 1/14/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:\V:\2002\active\200200372B\plan\Figures\Figure 4-2 2015 Max Pressure.dwg



AVAILABLE FIRE FLOW (GPM)

- LESS THAN 1,000
- 1,000–1,750
- 1,750–2,500
- GREATER THAN 2,500
- NON–FIRE NODE
- WATER MAIN

CITY OF CARNATION
KING COUNTY

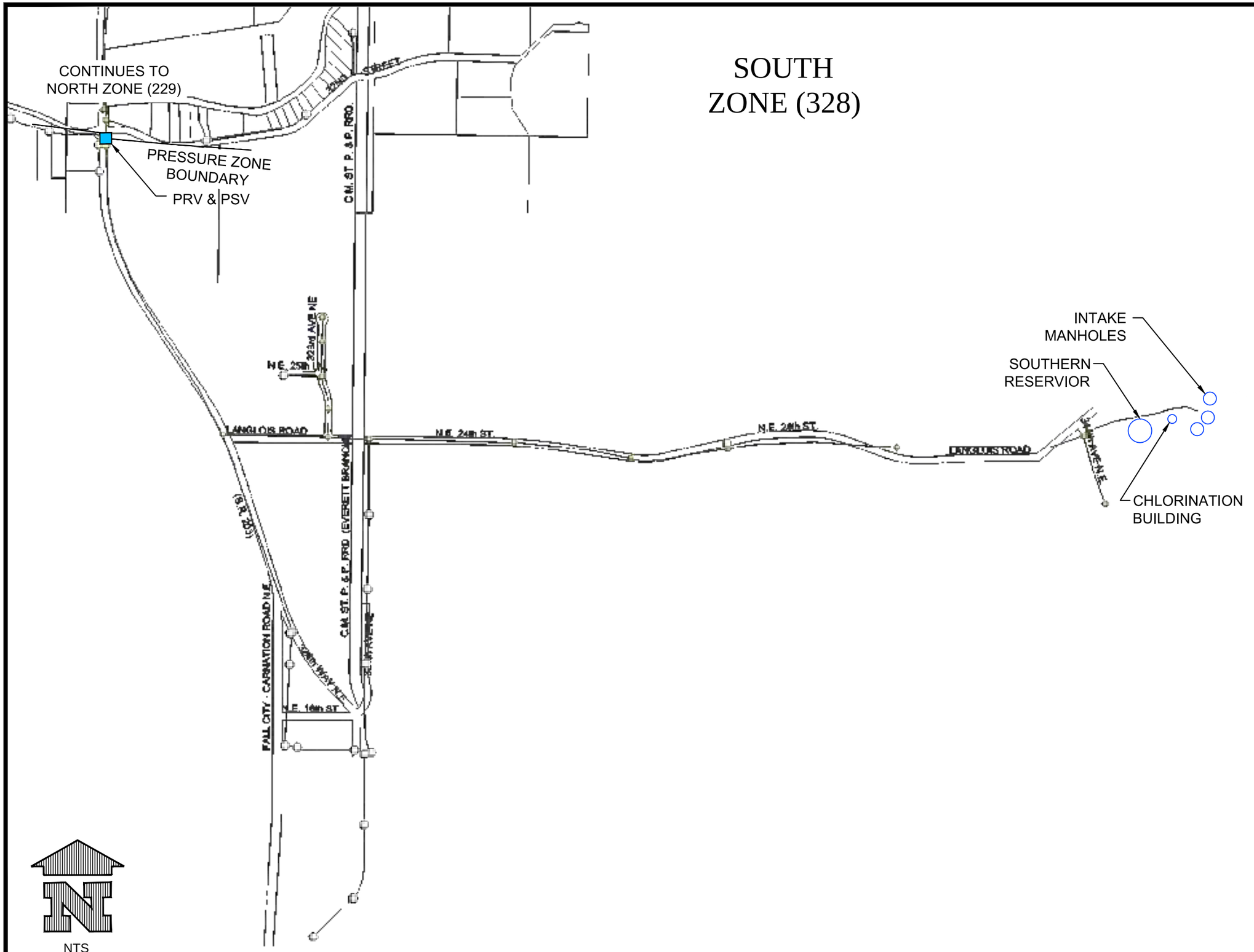
2015 WATER SYSTEM PLAN
FIGURE 4.3A
CURRENT (2015) AVAILABLE RESIDENTIAL FIRE FLOW

DECEMBER 2015

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 1/14/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:_VA\2002\active\2002003728\plan\Figure\Figure 4-3 2015 Fire Flow.dwg

SOUTH ZONE (328)



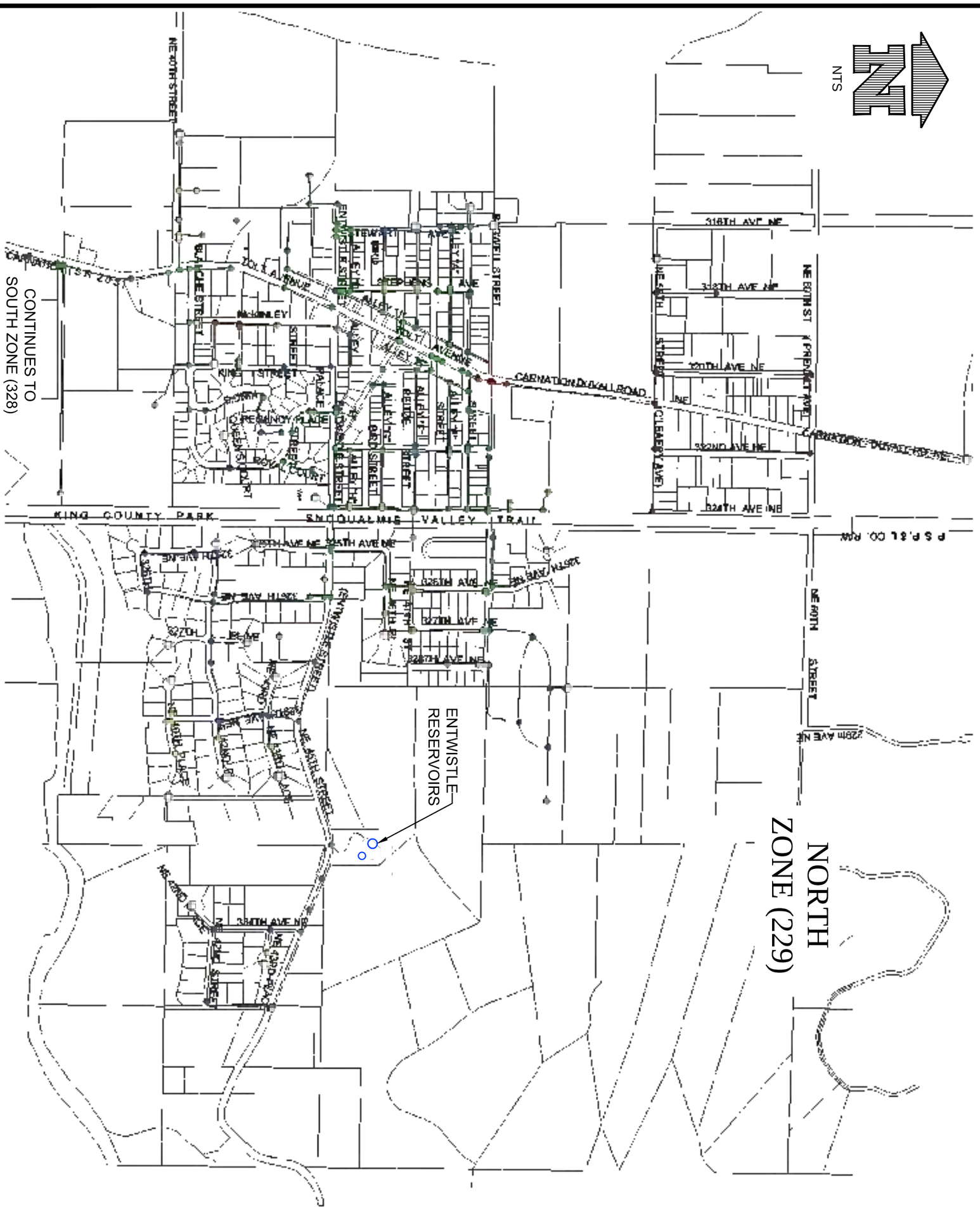
NTS

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 4.3B
CURRENT (2015) AVAILABLE RESIDENTIAL FIRE FLOW
DECEMBER 2015

AVAILABLE FIRE FLOW (GPM)
- LESS THAN 1,000
- 1,000–1,750
- 1,750–2,500
- GREATER THAN 2,500
- NON–FIRE NODE
- WATER MAIN

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 1/14/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:\V:\2002\active\200200372B\plan\Figures\Figure 4-3 2015 Fire Flow.dwg



AVAILABLE FIRE FLOW (GPM)

- LESS THAN 1,000
- 1,000–1,750
- 1,750–2,500
- GREATER THAN 2,500
- NON–FIRE NODE
- WATER MAIN

CITY OF CARNATION
KING COUNTY

2015 WATER SYSTEM PLAN
FIGURE 4.4
CURRENT (2015) AVAILABLE COMMERCIAL FIRE FLOW

DECEMBER 2015

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 1/14/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:_VA\2002\active\2002003728\gis\Figures\Figure 4-4_2015 Commercial Fire Flow.dwg

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 4.5
REQUIRED IMPROVEMENTS
DECEMBER 2015

NTS

NORTH ZONE (229)

8-Inch DI

12-inch DI

12-Inch DI

8-Inch DI

INDIVIDUAL BOOSTER PUMPS

EXISTING RESERVOIRS

BOOSTER PUMP STATION

12-Inch DI PARALLEL PIPE

EXISTING WELL

12-Inch DI

8-Inch DI

8-Inch DI

NEW ZONE (247)

NE 60TH ST (PRENALT AVE)

NE 60TH STREET

NE 55TH STREET

(O'LEARY AVE)

NE 50TH ST

NE 47TH ST

NE 46TH PL

NE 45TH STREET

(ENTWISTLE STREET)

NE 43RD PLACE

NE 42ND PL

NE 42ND STREET

NE 40TH PLACE

NE 40TH CIRCLE

NE 40TH STREET

RAGWELL STREET

MORRISON STREET

RUTHERFORD STREET

COMMERCIAL STREET

BIRD STREET

ENTWISTLE STREET

EUGENE STREET

MYRTLE STREET

BLANCHE STREET

REGAL STREET

PALACE COURT

REGAL PLACE

ROYAL COURT

KINGS COURT

QUEENS COURT

ALLEY "A"

ALLEY "B"

ALLEY "C"

ALLEY "D"

ALLEY "E"

ALLEY "F"

ALLEY "G"

ALLEY "H"

316TH AVE NE

318TH AVE NE

320TH AVE NE

322ND AVE NE

324TH AVE NE

325TH AVE NE

326TH AVE NE

327TH AVE NE

328TH AVE NE

334TH AVE NE

STEWART AVE

STEPHENS AVE

TOLT AVENUE

STOSSEL AVE

SPILMAN AVE

MILWAUKEE AVE

VALLEY AVE

DUVALL ROAD

CARNATION FALL CITY RD NE (SR 203)

NE (SR 203)

TRAIL

POWER

PUGET

SNOQUALMIE

KING COUNTY PARK

TOLT RIVER

LEGEND

- RETAIL WATER SERVICE AREA
- CITY LIMITS
- URBAN GROWTH BOUNDARY
- WATER MAIN
- 2015 ANALYSIS IMPROVEMENTS
- 2025 ANALYSIS IMPROVEMENTS
- 2035 ANALYSIS IMPROVEMENTS

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 8/2/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:\VA2002\active\200200372B\plan\Figures\Figure 4-5 CIP-MAP_Model Analysis.dwg

4.5 2025 SYSTEM ANALYSIS

The 2025 analysis involves modifications of the 2015 model to simulate 2025 ADD, MDD, and PHD scenarios. The 2025 model includes all system improvements identified as required to resolve deficiencies in the 2015 conditions hydraulic analysis. These improvements include upsizing and replacing existing pipes, and constructing a new pump station. Known developer extension projects are also included in the 2025 model. Tank settings for this scenario are based on year 2025 equalizing, fire flow, and standby storage volume requirements (discussed in this chapter).

4.5.1 Minimum Pressure Analysis

The minimum pressure analysis is similar to the 2015 analysis. The simulation uses the forecasted 2025 PHD conditions, with tank elevations set at the bottom of equalizing storage levels, per the 2025 storage analysis. Model results indicate that all service pressures are above the DOH's required minimum of 30 psi, and almost all service pressures are above the City's desired minimum of 50 psi. The cul-de-sac at the Estates development drops to approximately 47 psi during this simulation. Based on these results, no improvements are required.

4.5.2 Maximum Velocity Analysis

The maximum velocities analysis is similar to the 2015 analysis. The simulation uses the forecasted 2025 PHD conditions with tank levels set at the bottom of equalizing storage levels, per the 2025 storage analysis. Results indicated no pipe velocities that exceed 8 fps under these conditions, so no improvements are required.

4.5.3 Maximum Pressure Analysis

The maximum pressure analysis is similar to the 2015 analysis. The simulation uses the forecasted 2025 ADD conditions with tank levels set as full. Results indicated no pressure nodes exceed 100 psi under these conditions, so no improvements are required.

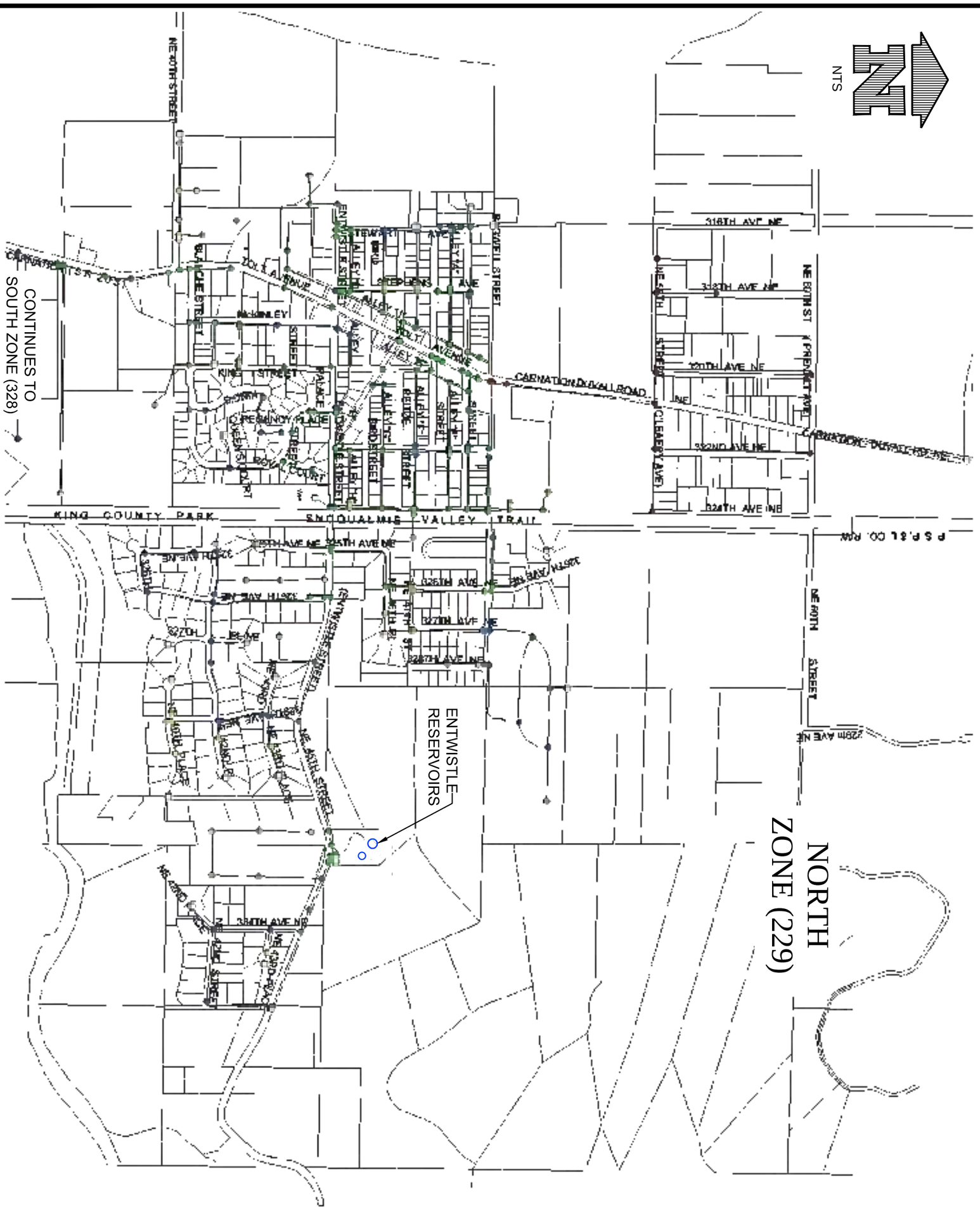
4.5.4 Fire Flow Analysis

The fire flow simulation uses the forecasted 2025 MDD conditions. Tank elevations are set at the bottom of minimum standby storage, since the minimum standby storage volume was larger than the fire suppression storage volume for both the 1,000 gpm for two hours and the 2,500 gpm (see storage analysis later in this chapter). Methodologies used for the 2025 analysis are the same as those described under the 2015 analysis.

The results of the 2025 Fire Flow Analysis are presented in **Figure 4.6A and B**, using colors to differentiate results.

Model results for the 1,000 gpm residential fire flow indicate some deficiencies within the system, almost exclusively outside the City limits. These deficiencies are addressed in projects included in the CIP that can be found in Chapter 8, Improvement Plan, of this Plan.

Model results for the 2,500 gpm commercial fire flow indicate that the system can provide the required commercial fire flow (2,500 gpm) in its commercial zones. Therefore, no improvements are included in the CIP to address these pipes.



AVAILABLE FIRE FLOW (GPM)

- LESS THAN 1,000
- 1,000–1,750
- 1,750–2,500
- GREATER THAN 2,500
- NON–FIRE NODE
- WATER MAIN

CARNATION

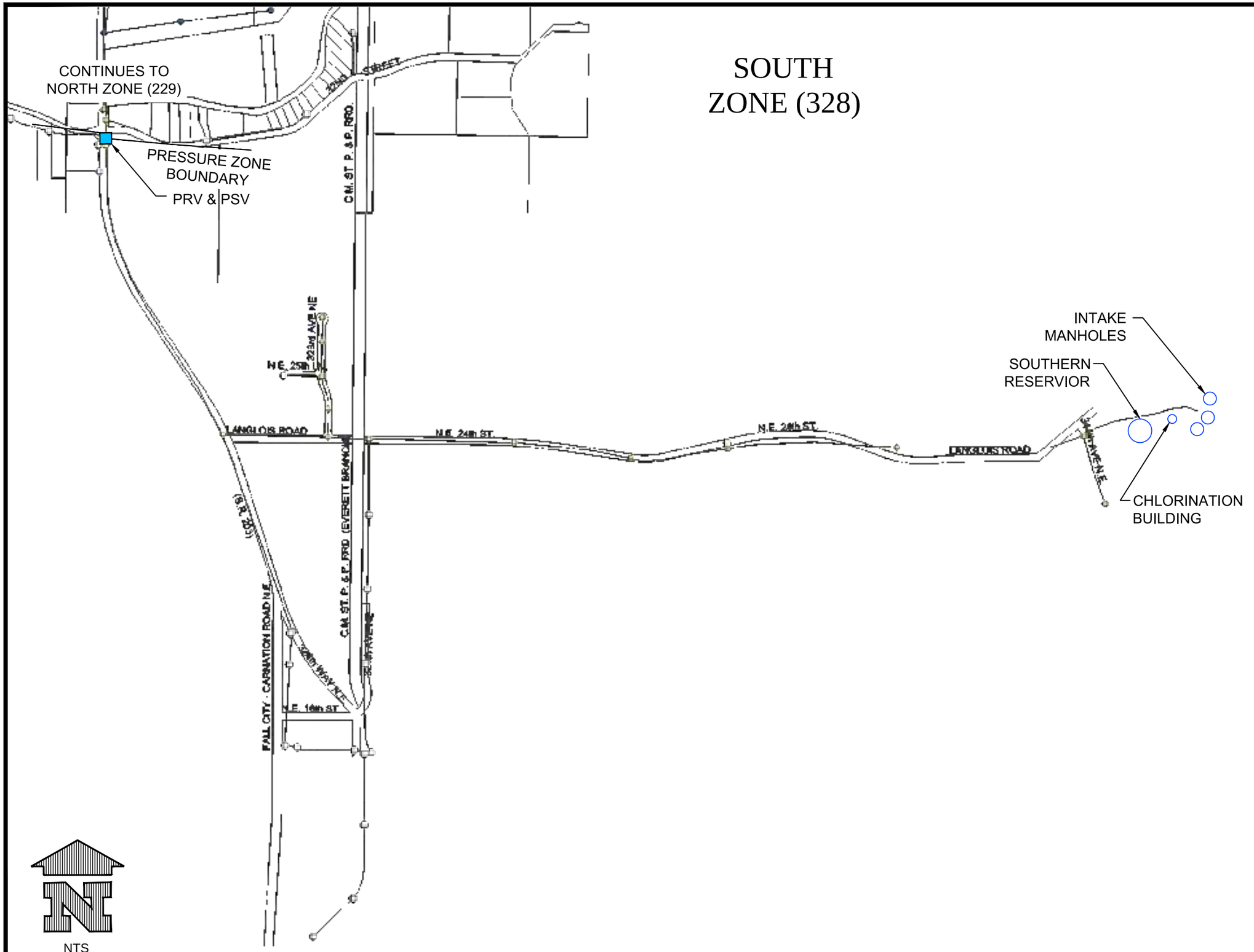
CITY OF CARNATION
KING COUNTY

2015 WATER SYSTEM PLAN
FIGURE 4.6A
2025 AVAILABLE FIRE FLOW

DECEMBER 2015

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 8/9/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:_VA\2002\active\2002003728\plan\Figures\Figure 4-6_2021 Fire Flow.dwg



CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 4.6B
2025 AVAILABLE FIRE FLOW

DECEMBER 2015

AVAILABLE FIRE FLOW (GPM)

- LESS THAN 1,000
- 1,000–1,750
- 1,750–2,500
- GREATER THAN 2,500
- NON–FIRE NODE
- WATER MAIN

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 8/9/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:\V:\2002\active\200200372B\plan\Figures\Figure 4–6 2021 Fire Flow.dwg

4.6 2035 SYSTEM ANALYSIS

The 2035 analysis involves modification of the 2025 model to simulate 2035 ADD, MDD, and PHD scenarios. Tank settings for this scenario are based on year 2035 equalizing, fire flow, and standby storage volume requirements (discussed in this chapter). Projected developments are also included in the 2035 model.

4.6.1 Minimum Pressure Analysis

The minimum pressure analysis is similar to the 2025 analysis. The simulation uses the forecasted 2035 PHD conditions, with tank elevations set at the bottom of equalizing storage levels. Model results indicate that all service pressures are above the DOH's required minimum of 30 psi, and almost all service pressures are above the City's desired minimum of 50 psi. The cul-de-sac at the Estates development drops to approximately 43 psi, and the neighborhoods along 329th Avenue NE, just west of the reservoir site, drops to approximately 48 psi during this simulation. Based on these results, no improvements are required.

Four parcels east of the reservoir site were recently added to the UGA. The City expects these parcels to be developed in the 20-year planning period. These parcels have a steep slope with high elevations on the northern border of each parcel. Depending on the layout of these developments, there is a potential for pressures around or below 30 psi. These parcels will likely require individual booster pumps when they are developed.

4.6.2 Maximum Velocity Analysis

The maximum velocities analysis is similar to the 2025 analysis. The simulation uses the forecasted 2035 PHD conditions, with tank levels set at the bottom of equalizing storage levels, per the 2035 storage analysis. Results indicated no pipe velocities that exceed 8 fps under these conditions, so no improvements are required.

4.6.3 Maximum Pressure Analysis

The maximum pressure analysis is similar to the 2025 analysis. The simulation uses the forecasted 2035 ADD condition, with tank levels set as full. Results indicate no pressure nodes exceed 100 psi under these conditions, so no improvements are required.

4.6.4 Fire Flow Analysis

The fire flow simulation uses the forecasted 2035 MDD conditions. Tank elevations are set at the bottom of minimum standby storage, since the minimum standby storage volume is larger than the fire suppression storage volume for both the 1,000 gpm for two hours and the 2,500 gpm for two hours fire flows (see storage analysis later in this chapter). Methodologies used for the 2035 analysis are the same as those described under the 2015 analysis.

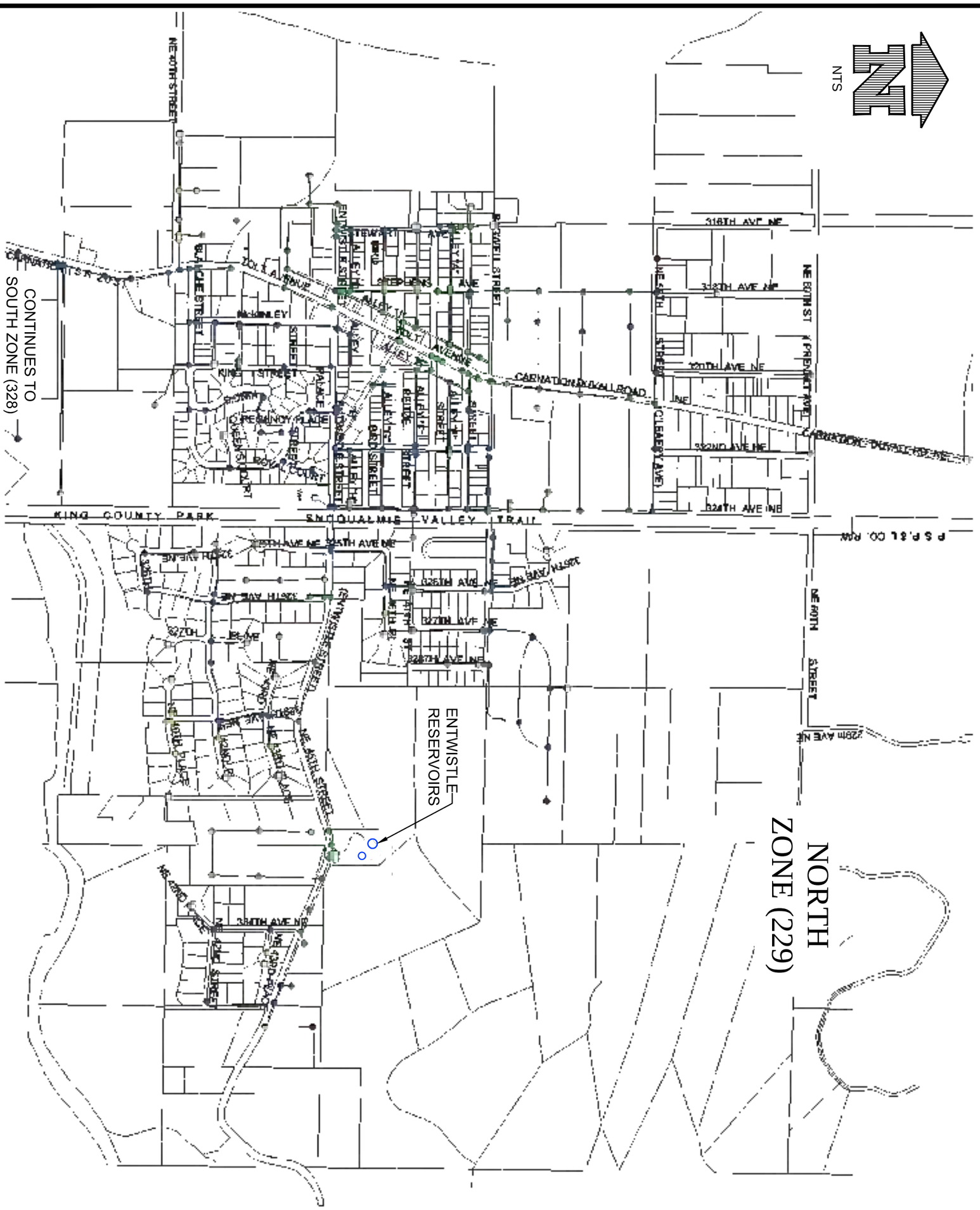
The results of the 2035 Fire Flow Analysis are presented in **Figures 4.7A and B**, using colors to differentiate results.

Model results for the 1,000 gpm residential fire flow indicate the system is generally adequate to provide the required fire flow. There are localized deficiencies throughout the system. These deficiencies occurred because of undersized pipes and areas of high elevation.

In order to resolve the deficiencies determined through the 2035 analysis, the following improvements, which are shown in **Figure 4.5** were modeled:

- Install individual booster pumps (if needed) for the few lots in the elevated cul-de-sac in the Estates.

Model results for the 2,500 gpm commercial fire flow indicate that the system can provide the required commercial fire flow (2,500 gpm) in its commercial zones. Therefore, no improvements are included in the CIP to address these pipes.



AVAILABLE FIRE FLOW (GPM)

- LESS THAN 1,000
- 1,000–1,750
- 1,750–2,500
- GREATER THAN 2,500
- NON–FIRE NODE
- WATER MAIN

CITY OF CARNATION
KING COUNTY

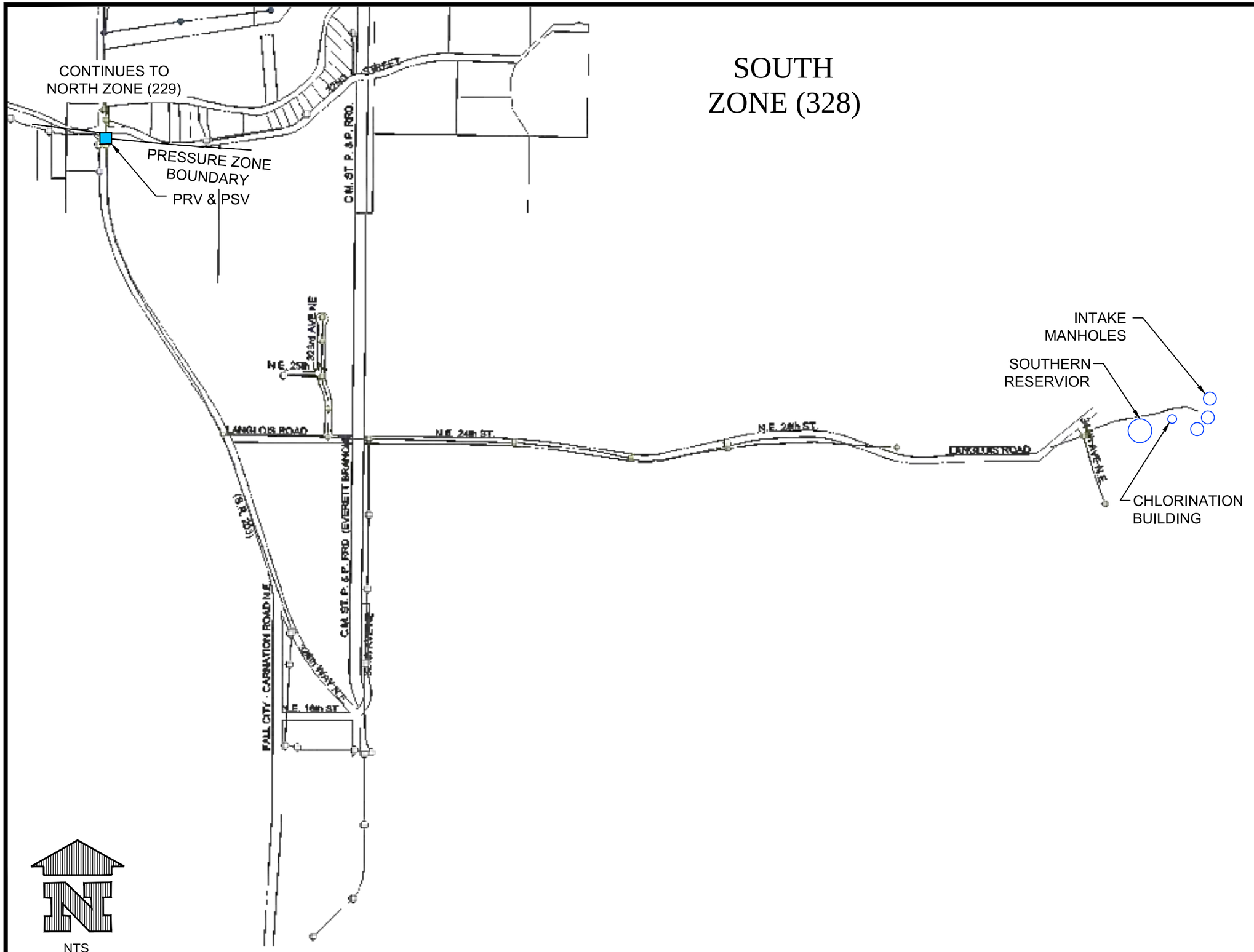
2015 WATER SYSTEM PLAN
FIGURE 4.7A
2035 AVAILABLE FIRE FLOW

DECEMBER 2015

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 8/9/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:_VA\2002\active\2002003728\gis\Figures\Figure 4-7 2035 Fire Flow.dwg

SOUTH ZONE (328)



NTS

CITY OF CARNATION
KING COUNTY
2015 WATER SYSTEM PLAN
FIGURE 4.7B
2035 AVAILABLE FIRE FLOW

DECEMBER 2015

AVAILABLE FIRE FLOW (GPM)
- LESS THAN 1,000
- 1,000–1,750
- 1,750–2,500
- GREATER THAN 2,500
- NON–FIRE NODE
- WATER MAIN

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

PLOTTING DATE: 8/9/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: F:\V:\2002\active\200200372B\plan\Figuras\Figure 4-7 2035 Fire Flow.dwg

4.7 STORAGE ANALYSIS

The City's storage facilities are evaluated for their capacity to provide the required volumes of water at appropriate pressures for various demand conditions. The City's water system is divided into the South (328) and North (229) Pressure Zones. Storage for the North Zone is provided by two storage tanks as described in **Chapter 1**. The South Pressure Zone contains a single storage facility near the spring.

4.7.1 Definitions and DOH Criteria

The volume available from each storage facility is defined as the total existing storage, less any dead storage that may result from the configuration of the tank. The following is a brief definition of the types of storage required for a storage facility.

Operational Storage (OS) is the volume of the reservoir dedicated to supply the water system under normal operating conditions with all sources of supply turned off. The OS is calculated as physical volume between the elevation of the "Pump On" set point and the invert elevation of the tank's overflow pipe.

Equalizing Storage (ES) is the volume of the reservoir used when source pumping capacity cannot meet the periodic peak demands placed on the water system. ES must be available at 30 psi to all service connections. It is calculated using the DOH call-on-demand formula, which uses 150-minute duration.

Standby Storage (SB) is the volume of the reservoir that provides a measure of reliability in case sources fail or unusual conditions impose higher demands than anticipated. The recommended volume is different for systems with a single source than for systems with multiple sources. For this analysis the SB volume is calculated based on DOH formula for multiple sources, which is two days of average demand in the system minus one day of supply without the largest source.

Minimum Standby Storage is the recommended minimum volume of SB for a system, and is calculated by multiplying 200 gallons by the total number of ERUs, per the DOH.

Fire Suppression Storage (FSS) is the volume of the reservoir devoted to supplying adequate fire flow, as determined by the local fire protection authority, to the system. It is calculated by multiplying minimum flow rate by the minimum duration requirement for the largest fire volume requirement in the zone or sub zones.

Dead Storage (DS) is an inherent property of each tank and is determined by the configuration and elevation of a tank. Generally, any volume of water that cannot be supplied from the tank by means of gravity flow at a pressure above the District's minimum pressure criteria is dead storage. It is calculated as physical volume between bottom of tank and elevation of 20 psi HGL for PHD flow rate (standby storage component) or fire flow rate. For tanks in which 20 psi HGL is

at or below bottom of a tank, the top of dead storage is assumed to be 1.5 feet above tank bottom elevation.

Total Required Storage is the total volume required to reliably meet the needs of the system. It is the sum of the dead storage, equalizing storage, and operational storage plus the largest of three other storage types: standby storage, minimum standby storage, or fire suppression storage.

4.7.2 Existing Storage Data

Table 4.1 shows tank elevations, pump set points, and total volumes (all elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88)).

Table 4.1 – Tank Elevations, Pump Set Points, and Total Volume

Tanks	Base Elevation	Pump On Elevation Set Point	Overflow Elevation	Volume in gallons per foot	Total Volume in gallons
North Zone - Old	172.60	225	229.3	3,972	222,000
North Zone - New	174.75	225	229.3	11,117	605,000
South Zone - New	318.60	328	332.96	7,614	109,000

The tank in the South Zone does not provide fire flow storage, and the North Zone Old Tank is currently offline. The required fire flow storage for the whole system is provided by the North Zone New Tank. The maximum fire flow volume requirement is 2,500 gpm for 2 hours.

During normal operating conditions the spring source, located in the South Zone, feeds both the North and South Zones. The well source, located in the North Zone, is only used during peak operating conditions. The spring has a maximum instantaneous flow of 628 gpm, and the well has a maximum instantaneous flow of 800 gpm.

The highest point in the system is approximately 130 feet above sea level (NAVD 88).

4.7.3 Existing Supply Sources

The spring source tap was assumed to be open. It is the primary supply source and can deliver an estimated maximum flow rate of 628 gpm. During periods of low and average demand, the spring source supply is able to maintain the volume in the tanks at maximum level. The maximum flow rate occurs when tanks levels are lower, during higher demand conditions.

The well located in Loutsis Park was assumed to be closed (off). This well is a secondary supply source to the system and has settings such that it is only operational when the tanks' levels drop

below 52 feet. This generally occurs during large demand or emergency conditions. The well is more frequently used during the summer.

4.7.4 Storage Analysis Results

Table 4.2 summarizes the storage analysis for the City's existing facilities and identifies the projected storage surpluses by pressure zone for the years 2015, 2025, and 2035. The City's sources and storage facilities are projected to remain unchanged from 2015 to 2035. Two scenarios are shown for the North Zone, one with the old, concrete tank and one without the old, concrete tank. As mentioned previously, the old tank is currently offline to improve the City's water quality by limiting the amount of water that is stagnant. However, the City could bring the old, concrete tank back online if the need arose or for temporary use during maintenance of the larger tank.

Table 4.2 Storage Analysis

Tank	OS	ES	SB	Minimum SB	FSS	Total Required	Total Capacity	Surplus (Deficit)
2015 Storage Analysis*								
North Zone w/ Concrete Tank	60,196	46,815	414,816	238,400	300,000	521,827	827,000	305,000
North Zone w/o Concrete Tank	46,693	46,815	414,816	238,400	300,000	508,324	605,000	97,000
South Zone	37,767	N/A	0	41,600	N/A	79,367	109,340	29,974
*Assumes that the system functions as a single source system.								
2025 Storage Analysis*								
North Zone w/ Concrete Tank	60,196	1,918	199,308	404,200	300,000	466,314	827,000	361,000
North Zone w/o Concrete Tank	46,693	1,918	199,308	404,200	300,000	452,810	605,000	153,000
South Zone	37,767	N/A	0	46,600	N/A	84,367	109,340	24,974
*Assumes that a generator has been installed at the well site allowing the system to function as a multi-source system								

Tank	OS	ES	SB	Minimum SB	FSS	Total Required	Total Capacity	Surplus (Deficit)
2035 Storage Analysis*								
North Zone w/ Concrete Tank	60,196	10,763	0	428,600	300,000	499,559	827,000	327,000
North Zone w/o Concrete Tank	46,693	10,763	0	428,600	300,000	486,055	605,000	118,945
South Zone	37,767	N/A	0	49,400	N/A	87,167	109,340	22,174
*Assumes that the system functions as a multi-source system.								

The SB, Minimum SB, and FSS are nested in this analysis, so only the largest of these three volumes is included in total required volume. In 2015 the largest of these three volumes was the calculated SB because the system is operating as a single source system, and therefore, more standby storage is required. In 2025 and 2035 the Minimum SB was the largest of the three nested volumes because of the increase in the number of ERUs in the City.

This analysis shows that the City has surplus storage capacity through 2035 in both the North and South Zones. Therefore, no storage facility improvements are required to meet the DOH requirements.

4.8 WATER QUALITY

The water quality within Carnation's water system is excellent from both the well and spring sources. The City works hard to continually meet or exceed all state DOH and federal water quality standards.

4.8.1 Well Water

The well water quality information is provided in **Appendix J**. The well water meets all regulations without treatment. The well is not currently chlorinated. The well is planned to be upgraded to provide a chlorination system. See **Chapter 8** for further discussion.

4.8.2 Spring Water

Water from the spring is also of excellent quality. The spring water is classified as a groundwater source. Water quality information is attached in **Appendix J**. Gaseous chlorine is provided for disinfection purposes.

4.8.3 Water Quality and Sampling

A summary of the City's water quality sampling is given below. A more detailed review of water quality sampling and requirements is given later in this section.

Two bacteriological samples are taken for analysis on a monthly basis at sampling sites specified in the Coliform Monitoring Plan as required by WAC (see **Appendix L**).

Daily samples are taken at the spring for water temperature, pH value and conductivity.

Chemical sampling is performed per the DOH's Water Quality Monitoring Schedule (WQMS), as follows:

- Annual sampling for nitrates is taken from both spring and well.
- Other inorganic chemicals are sampled every 9 years; the last sampling was in 2015 at the well.
- VOCs are sampled every six years. Samples were last taken in 2010.
- SOCs are sampled every nine years. Samples were last taken in 2012.
- Lead and copper sampling is done very two years. The City sampled for these in 2011 and 2013.
- Asbestos sampling will be performed in 2019.
- DBPs were sampled in 2013 and 2014.

4.8.4 Applicable Drinking Water Quality Regulations

Table 4.3 lists the existing drinking water regulations applicable to water utilities using groundwater as the source of supply. The WAC contains regulations for bacteriological contaminants, inorganic chemicals (IOCs), physical parameters, volatile organic compounds (VOCs), synthetic organic chemicals (SOCs), radionuclides, disinfectants and disinfection by-products (D/DBP). A discussion of each of the existing rules follows **Table 4.3**.

Table 4.3 Summary of Existing Drinking Water Quality Regulations Relevant to Carnation

Rule	Target Constituents	Monitoring Required by City of Carnation
Total Coliform Rule	Total Coliform, E. coli, Fecal Coliform	Yes
Primary Inorganics	Antimony, asbestos, barium, beryllium, cadmium, chromium, cyanide, mercury, nickel, nitrate, nitrite selenium, sodium, thallium	Yes
Arsenic Rule	Arsenic	Yes
Lead and Copper Rule	Lead and Copper	Yes

Rule	Target Constituents	Monitoring Required by City of Carnation
Fluoride Rule	Fluoride	No
Radionuclide Rule	Alpha particles, beta particles and photon emitters, radium-226 and 228, uranium	Yes
Volatile Organic Chemicals	21 VOCs	Yes
Synthetic Organic Chemicals	33 SOCs	Yes
Disinfectants Disinfection Byproducts Rule, Stage 2	Disinfectant residuals, total trihalomethanes, five haloacetic acids	Yes
Groundwater Rule	Virus	Yes
Secondary chemical and physical substances	Chloride, color, hardness, iron, manganese, specific conductivity, silver, sulfate, total dissolved solids, and zinc	Yes

The City is required to conduct distribution system monitoring for bacteriological contaminants, chlorine residual, radionuclides, inorganic and organic chemicals, asbestos content, lead and copper, and DBPs.

4.8.5 Existing Drinking Water Quality Standards

The 1974 Safe Drinking Water Act (SDWA) and its 1986 and 1996 amendments established specific legislation for regulation of public water systems by federal and state governments. The federal government, specifically the U.S. Environmental Protection Agency (USEPA), is authorized to develop national drinking water regulations and oversee implementation of the SDWA. Once federal regulations are promulgated, the state of Washington must adopt regulations at least as stringent as the federal regulations and accept the primary responsibility for implementing and enforcing the regulations, according to a given schedule.

Primary MCLs are based on chronic and/or acute human health effects. Secondary MCLs are based on factors other than health effects, such as the aesthetic quality of the water. Public water purveyors must meet the requirements of the regulations on a day-to-day basis. Monitoring requirements are often established for regulated contaminants to verify that water systems demonstrate compliance with MCLs or treatment technique requirements. Public water suppliers are also required to retain certain records and submit reports to the DOH.

4.8.5.1 Bacteriological

Many serious diseases are caused by bacteria. Indicator organisms are often used to monitor the bacteriological quality of drinking water. Total coliform, which includes fecal coliform and E. Coli bacteria, are used as indicator organisms in drinking water systems. The Total Coliform Rule was developed with the purpose of improving public health protection by reducing fecal pathogens to low levels by control of total coliform bacteria. The Total Coliform Rule established an MCL based on the presence or absence of total coliforms.

The City is required to prepare a coliform monitoring plan, which must be approved by DOH and available for inspection upon request. The City's Coliform Monitoring Plan is included in **Appendix L**. The City currently collects two coliform samples per month.

Violations of bacteriological MCLs are categorized as follows (WAC 246-290):

4.8.5.2 Disinfection By-Products, Stage 2

Trihalomethanes (THMs) and haloacetic acids (HAAs) are disinfection byproducts (DBPs) formed when organics in the water react with chlorine. The Stage 1 D/DBP Rule established MCLs for THMs and the sum of five of HAAs on a system-wide running annual average basis.

The Stage 2 D/DBP Rule created more stringent standards for THMs and HAAs by requiring systems to meet MCLs at each sampling location in the distribution system, as opposed to a system-wide average.

The City adds chlorine (gaseous) to the water at the spring source for disinfection purposes. The well is planned to be chlorinated in the future.

4.8.5.3 Disinfectant Residual

If chlorine products are used for disinfection, water entering the distribution system must contain a residual disinfectant concentration of free chlorine of at least 0.2 mg/l. Distribution system residual disinfectant concentrations measured as free chlorine must be detectable in at least 95% of the samples taken each calendar month. Groundwater systems are required to provide a CT (concentration of chlorine in mg/l multiplied by disinfectant contact time in minutes) of six, in accordance with WAC 246-290-451. Residual disinfectant concentration within the distribution system is measured at the same time and location that routine coliform samples are collected.

4.8.5.4 Asbestos

Because the City distribution system contains asbestos cement (AC) water lines, it must monitor for asbestos in accordance with 40 CFR 141.23(b). One sample in an area with AC pipe is required every nine years. The MCL for asbestos is 7 million fibers/liter for fibers longer than 10 microns. Testing for asbestos is on a 9-year compliance cycle. The City will take samples in 2019.

4.8.5.5 Lead and Copper

The purpose of the Lead and Copper Rule (LCR) is to protect public water system consumers from exposure to lead and copper in drinking water. Elevated levels of lead and copper are usually due to corrosion of copper or brass plumbing lines and fixtures. Short Term Revisions to the LCR (aka LCR-STR) went into effect October 1, 2011. These revisions pertained to customer notification, new sources and long-term treatment changes, compliance and monitoring, and providing information in the Consumer Confidence Report.

The LCR has four basic requirements for water suppliers: (1) to optimize their treatment systems to control corrosion in customers' plumbing; (2) to determine tap water levels of lead and copper for customers who have lead service lines or lead-based solder in their plumbing systems; (3) to rule out the source water as a source of significant lead levels; and (4) if lead action levels are exceeded, to implement public notices and public education programs to educate customers about lead and suggest actions they can take to reduce their exposure to lead

4.8.5.6 Inorganic Chemicals, Volatile Organic Compounds and Synthetic Organic Chemicals

The state of Washington has adopted federal MCLs and monitoring regulations for IOCs and physical parameters, VOCs, and SOCs. The federal standards were originally promulgated in the Phase I Rule and updated in the Phase II/V Rules, also called the Chemical Contaminant Rules. These regulations apply to the City.

4.8.5.7 Radionuclides

According to WAC 246-290-300(8), community water systems must monitor for Radium 226, Radium 228 every 48 months unless the gross alpha particle activity is less than 5 pCi/L.

4.8.5.8 Arsenic Rule

The Arsenic Rule sets an MCLG of zero and lowered the enforceable MCL from 0.05 mg/l to 0.01 mg/l (10 µg/l).

4.8.5.9 Groundwater Rule

As stated in DOH Publication 331-447, the Groundwater Rule (GWR) builds on the Total Coliform Rule (TCR) by addressing the health risks of fecal contamination in groundwater sources. The basic requirements are:

- Source water monitoring (Triggered Source Water Monitoring when a routine distribution sample is total coliform positive).
- Compliance monitoring to confirm the effectiveness and reliability of the system's treatment.
- Periodic sanitary surveys of groundwater systems.

- Corrective actions for any system with a significant deficiency or when a source sample is E. Coli positive.
- Public notifications for several types of violations.

4.8.5.10 Consumer Confidence Reports

The primary purpose of the Consumer Confidence Report (CCR) is to inform consumers about their drinking water. The CCR lists the contaminants that are in the drinking water, if any, and explains how these contaminants may affect their health. The CCR lists all regulated contaminants that have been detected in any amount, not just those concentrations that exceed state or federal standards. All Group A community water systems are required to produce and distribute an annual CCR to customers by July 1 each year to present information pertaining to the previous calendar year. A "customer" is anyone who regularly drinks water from the system. Water systems are also required to provide a copy of their CCRs to the Department of Health Office of Drinking Water (ODW) by July 1, and a completed CCR certification form no later than October 1, every year.

4.8.6 Anticipated Future Drinking Water Regulations

The only anticipated future drinking water regulation of known relevance to the City is the Revised Total Colifrom Rule described below.

4.8.6.1 Revised Total Coliform Rule

The federal Revised Total Coliform Rule (RCTC) became effective on April 1, 2016. The timeline for the DOH's projected effective date is November, 2016. A number of changes are proposed including:

- Eliminating the total coliform maximum MCL, and maintaining the E. Coli MCL
- Changing the reporting and recordkeeping requirements
- Changing the public notification and consumer confidence requirements

4.9 WATER QUALITY MONITORING AND ANALYSIS

This section provides an analysis of the water quality testing performed by the City. The City is required to perform bacteriological, lead and copper, chlorine residual, DBP, IOCs, radionuclides, VOC/SOC, and asbestos testing.

DOH performed a sanitary survey with the City in August 2007. The most major issue in the report was the vulnerability of the water supply line from the springs to the City. Other than that, minor issues need to be taken care of and the City was commended for its dedication to safe drinking water. The report resulting from the survey is included in **Appendix K**. The City's water quality monitoring report for the year 2014 is also included in **Appendix J**.

4.9.1 Results of Water Quality Monitoring by the City of Carnation

The results of the water quality monitoring completed by the City are discussed in the following sections.

4.9.1.1 Bacteriological

The City monitors for bacteriological contaminants in accordance with its Coliform Monitoring Plan, which is included in **Appendix L**. The City collects two samples monthly.

As of December 2015, the City has had no coliform violations in its records - for at least the last ten years - and has remained in compliance with DOH monitoring and reporting requirements.

4.9.1.2 Lead and Copper

Lead and copper testing is completed every two years. The City sampled for these elements in 2011 and 2013. All results were below the action levels of 0.015 mg/L and 1.3 mg/L for lead and copper, respectively. The next sampling will be in 2016.

4.9.1.3 Chlorine Residual

Chlorine residual is sampled daily at both the spring site and the reservoir site. During the last year sample results ranged from approximately 0.6 mg/L to 0.2 mg/L. Sample results for 2010 through 2015 are included in **Appendix J**.

4.9.1.4 DBPs

The City collected samples for THM in September 2013 and in August 2014. Total THM was below 0.5 µg/L in 2013 and measured as 1.8 µg/L in 2014. Both values are below the MCL of 80 µg/L.

The City also collected samples for HAA5 in August 2013 and August 2014. In 2013, HAA5 was below 1.0 µg/L and in 2014 the measured result was 1.4 µg/L. Both values are below the MCL of 60 µg/L.

Collecting samples in August and September is consistent with the DOH requirement to obtain samples when the water temperature is warmest.

4.9.1.5 Radionuclides

Radionuclide samples were collected at the well in 2010 and tested for Radium-228 and Gross Alpha samples. The Radium -228 sample result was 0.5 µg/L, which is below the MCL of 5 µg/L. The Gross Alpha sample result was 0.7 µg/L, which also is below the MCL of 15 µg/L. Radionuclide samples were scheduled for testing in June 2016 at both the well and the springs source.

4.9.1.6 SOCs

SOCs were sampled at the Springs Source in July 2012 for these compounds. None of the regulated SOCs were detected. The City has a nine year waiver, and will sample for these compounds again in July of 2021.

4.9.1.7 VOCs

The City collects one VOC sample from each source every six years based upon a state waiver. Samples were last taken in June 2010. No VOCs were detected in the samples collected in 2010. The City will collect a VOC sample again in June of 2016.

4.9.1.8 IOCs

The City tests for the presence of IOCs, as required by DOH. The City collects annual nitrate samples from the well and spring every year. For the years 2010 through 2014, the nitrate level has always been <1.0 mg/L, which is below the MCL of 10 mg/L.

A complete inorganic chemical analysis is completed every nine years. The last testing was completed in September 2015 at the well source. The only analyte detected for which a MCL has been established was Nitrate. The measured result for Nitrate was 0.78 mg/L, which is below the MCL of 10 mg/l.

4.9.1.9 Asbestos

Because the City's distribution system contains asbestos-cement (AC) pipes, it must monitor asbestos levels in the distribution system once every nine years. The City will perform sampling for asbestos in 2019.

THIS PAGE INTENTIONALLY BLANK

5.0 CHAPTER 5 - WATER USE EFFICIENCY

5.1 REGULATORY HISTORY

The Washington State Legislature (Legislature) declared East King County, in which the City is located, a Critical Water Supply Service Area (CWSSA) in 1985. In 1989, the East King County Regional Water Association (EKC RWA) was formed to develop a Coordinated Water System Plan (CWSP). The CWSP included a water conservation element outlining regional and local conservation objectives, including a target reduction in water use of 6.5% by the year 2000, for purveyors serving 500 or more customers. An update to the CWSP occurred in 1996, which included water demand forecasts, boundaries among utilities, conservation programs, etc. No major update to the CWSP has occurred since 1996.

The Washington Water Utilities Council, and the Washington State Departments of Health (DOH) and Ecology (DOE) jointly developed the Conservation Planning Requirements (CPR) *Guidelines and Requirements for Public Waters Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Program*. Interim guidelines were first established in 1990, and were finalized and approved in 1994. The CPR included guidelines for public water systems in preparing conservation plans and programs, to monitor water use and to implement the programs. The CPR suggested that a conservation plan include three components:

1. Water use data collection
2. Demand forecasting
3. Conservation program development

DOH approval of a conservation plan was based upon review of all three components.

In 2003, the Legislature passed Engrossed Second Substitute House Bill 1338, better known as the Municipal Water Law, to address the increasing demand on our State's water resources. The law established that all municipal water suppliers must use water more efficiently in exchange for water rights certainty and flexibility to help them meet future demands. The Legislature directed the DOH to adopt an enforceable Water Use Efficiency (WUE) program, which became effective on January 22, 2007. The WUE program replaced the CPR. The new WUE requirements, updated in January 2011, emphasized the importance of measuring water usage and evaluating the effectiveness of the WUE program.

5.2 HISTORICAL WATER CONSERVATION PROGRAM

The City's 2008 WUE Program was the implementation of regional goals and requirements, as well as the continued implementation of the City's 2004 program. Starting in 2004, the City established a conservation goal of 1% per year for six years. The 2008 WUE continued this conservation goal for an additional six years, as well as added the goal to reducing DSL to 10%

(from over 42%) by 2028. The City's 2008 WUE endeavored to provide comprehensive guidelines and action plans that encouraged both the City and its customers to increasingly use available water supply more efficiently.

5.2.1 Historical Required WUE Measures

The WUE required the City to implement the following measures. Because these measures were mandatory they were not counted toward program measures:

1. Install production (source) meters
2. Install consumption (service) meters
3. Perform meter calibration
4. Implement a Water Loss Control Action Plan (WLCAP) to control leakage for systems with over 10% distribution system leakage (DSL)
5. Educate customers about water use efficiency practices

Municipal water suppliers not meeting the distribution system leakage standard of 10% were required to develop and implement a WLCAP, which identified the steps and timelines for reducing leakage. Although DSL was not considered a WUE measure, it was a significant element of the WUE requirements. It was calculated as shown below.

Volume of DSL = Total Water Produced – Authorized Consumption

At implementation of the 2008 Plan, the City had a DSL of over 42% for the previous three years. The City developed a WLCAP, and worked with the DOH to implement a strategy for a DSL reduction and compliance with current requirements.

5.2.2 Historical WUE Program Measures

The WUE required Carnation's water system to implement four water use efficiency measures in addition to the required measures discussed above. If the City implemented a specific WUE measure for different customer classes, it counted as multiple measures. The City decided to implement two additional measures for a total of six measures. The 2008 WUE program contained the following measures:

Measures 1 & 2. The City added consumption history to water bills for residential, industrial, commercial, and institutional customers. This counted towards the implementation of two measures.

Measures 3 & 4. The City continued its conservation rate structure. This was evaluated as needed. This counted towards the implementation of two measures.

Measure 5. Demonstration garden – The City used Tolt Commons which already had Xeriscaping to teach the citizens about low water use landscaping.

Measure 6. The City's municipal code encouraged all new developments to use planting materials that required only temporary irrigation systems. Such systems were encouraged to be removed after 24 months or two growing seasons, whichever occurs first, providing that the plantings were established.

5.2.3 Historical Monitoring and Evaluating WUE Measures

Monitoring and evaluating the individual conservation measures during and after implementation of the WUE Program was essential for determining the effectiveness of the Program. The City performs a year-end evaluation of the conservation measures. The City took factors such as growth rate, water usage, and conservation budget expenditures into account. Considering changes in population and growth rates helped determine the effect of the changes on the water demand.

5.2.4 Historical Water Loss Control Action Plan

To be in compliance with the distribution leakage standard, the City had to implement a Water Loss Control Action Plan (WLCAP). The standards required that the City perform the highest level of WLCAP because it had a DSL of over 30%.

This high DSL required an aggressive action that implemented control methods within six months. Because of the excessive DSL, the City thought that achieving a 10% DSL target within the six-year WUE program was not a realistic goal, and the DOH agreed to extend the deadline to 2028. DOH accepted a reduction to 10% by 2028. The following steps were identified to achieve the target reduction:

1. Assess data accuracy
2. Assess data collection methods and errors
3. Implement field activities to reduce leakage within 12 months
4. Implement additional water loss control methods to reduce leakage

Under this WLCAP, the City far exceeded its goal by reducing the three year average from 42% in 2007 to 8% in 2014. The measures used for this reduction are discussed below.

5.2.4.1 Water Loss Control Action Plan Results

To improve data accuracy, the City implemented a meter replacement program to improve the accuracy of the retail water usage. Water meters slow down with time and report lower volumes of water. During preparation of the last Comprehensive Plan, it was estimated that water meters were reporting approximately 3% less water usage than what was actually being consumed. A meter replacement project began in 2005. The City continued to replace a number of its meters each year, focusing primarily on the oldest part of the water system, and commercial meters. It was observed that recorded water use significantly increased for some commercial customers, revealing a source of previous non-revenue water.

Also to improve data accuracy, the City replaced the source meter at the spring source at the end of 2007. Stantec discovered that the meter was not submerged, leading constantly to erroneous overestimated flow readings, and therefore was not measuring source production accurately. It was reading higher than actual production. After a new meter in a correct design configuration (always submerged) was installed, the recorded volume of water supply significantly decreased.

To improve data collection methods, the City went from weekly source meter logging to daily logging. This change allows the City to spot large leaks (supply or demand side) more promptly. The new source meter along with daily logs provide a more accurate accounting of water supplied to the system

In order to reduce leaks, the City implemented a rigorous leak detection and repair program. Most water mains in the City's distribution system were between 45 and 70 years old. The mains were, therefore, susceptible to frequent leaks. In 2004, the City began a Water Line Leak Location Program to identify major leaks within the distribution system. Small leaks were found and fixed each year. During 2011, three large leaks were detected and repaired, significantly decreasing the City's DSL.

Table 5.1 summarizes the water used by retail customers, accounted for non-revenue uses, and distribution leakage. Overall, the data indicates that actual distribution leakage has significantly decreased from 2009 to 2014.

Table 5.1 Estimated Distribution System Leakage (MG)

Water Use (MG)	2009	2010	2011	2012	2013	2014
Retail Customer Usage	83.09	64.85	71.91	69.07	62.21	65.28
Authorized Consumption	0.31	0.04	0.19	2.90	0.51	1.87
Distribution System Leakage	18.38	24.74	24.62	8.15	4.79	5.18
Total Produced	101.78	89.63	96.73	80.12	67.51	72.33
3-year Rolling Average						
% of Total Supply	18%	28%	25%	10%	7%	7%

The significant decrease in distribution leakage in **Table 5.1** above, illustrates that the WLCAP has been very successful. Between 2011 and 2012, the distribution leakage dropped from 24.62 MG to 8.15 MG, a 67% decrease in volume. This drop was primarily caused the repair of the three major leaks in 2011. For the last three consecutive years (2012-2014), the City maintained a distribution leakage of 10% or below. The current three-year average distribution leakage is eight percent (8%), below the required 10% limit.

5.2.5 Historical Water Consumption

The City set a goal to reduce consumption by 1% per year starting in 2004. To reach this goal, the City implemented an aggressive conservation rate structure in 2010 and has continued to publish educational material for its customers. Between 2009 and 2014 the number of water services and population remained relatively constant. A more detailed breakdown of historical water consumption by customer class is provided in **Chapter 3**.

Table 5.2 shows the demand from 2009 to 2014. Retail customers include single family, multifamily, and commercial connections. Non-revenue consumption includes uses such as fire protection, flushing, construction, and other maintenance and operations practices. Most years, non-revenue consumption is less than 1% of total water used.

Table 5.2 Demand Conservation

	2009	2010	2011	2012	2013	2014	Average
Retail Customer Consumption (MG)	83.09	64.85	71.91	69.07	62.21	65.28	69.40
Non-Revenue Consumption (MG)	0.31	0.04	0.19	2.90	0.51	1.87	0.97
Total Consumption (MG)	83.40	64.89	72.10	71.97	62.72	67.15	70.37
% Conserved from Previous Year	--	28.5%	-10.0%	0.2%	14.7%	-6.6%	N/A

Table 5.2 shows that the demand has gone up and down on a year-to-year basis, but generally declined over the time frame. Many factors influence the annual water consumption including weather and local economy. For example, the unusually dry summer of 2014 combined with an uptick in the economy created an increase in the water consumption as compared to the prior year. In general, the City has successfully met its goal to reduction water consumption by 1% per year.

5.3 2015 WATER USE EFFICIENCY PROGRAM

The continued implementation of the City's WUE program is the foundation for using water wisely and reducing waste. The 2015 WUE program is a continuation of the 2008 WUE program, with specific enhancements to the program to comply with current regulations and create an emphasis on efficient water usage rather than only conservation.

This WUE program serves as both a chapter in this Plan and as an independent document outlining current and future conservation measures.

As noted earlier, DOH published the Third Edition of the WUE Guidebook in January of 2011. This publication provided additional steps to meet the conservation goals and continue the reforms outlined in the 2003 Municipal Water Law.

The City of Carnation's 2015 WUE program strives to meet these new requirements. The WUE requirements emphasize the importance of measuring water usage and evaluating the effectiveness of the City's program. The three fundamental elements of a WUE Program are listed below.

- **Planning Requirements**
  Municipal water suppliers are required to collect historical data, forecast demand, and calculate DSL, as done in **Chapter 3**. Municipal water suppliers are required to evaluate previous WUE measures, as done previously in this chapter.
- **Distribution Leakage Standard**
  Municipal water suppliers are required to meet a DSL standard to minimize water loss from their distribution system.
- **Goal Setting and Performance Reporting**
  Municipal water suppliers are required to set WUE goals through a public process every 6 years and report annually to customers and DOH.

To meet these fundamental elements, the Carnation WUE program includes the following sections:

- **Required WUE measures**
  The WUE Guidebook requires each municipal water supplier to implement or evaluate required WUE measures. Required measures do not count towards the minimum number of measures that must be implemented. The majority of the WUE measures focus on supply side measures that the water supplier implements to better understand and control leakage.
- **WUE Program measures**
  In addition to the required WUE measures, each municipal water supplier must implement or evaluate a specified number of program measures, based on the total number of connections in the system. Program measures typically promote reduced consumption among the water customers. This Plan categorizes these program measures by the customer class they impact.
- **Monitoring and Evaluating of measures**
  The WUE Guidebook encourages each municipal or water supplier to regularly evaluate its program measures. The effectiveness of a program measure can change for many reasons, including drought, budget constraints, and changes in the demographics. Regular evaluations of the measures promote an economical and effective WUE program.
- **Distribution System Leakage (DSL)**
  The WUE Guidebook requires each municipal water supplier to report the DSL for the previous 6 years. DSL is a significant element of the WUE requirement. The WUE Rule requires that the three-year average of distribution leakage be maintained at less than 10 percent of the supply (WAC 246-290-810(4)(i)(ii)).

- **Water Demand Forecasting by Customer Class**
  The WUE Guidebook encourages each municipal water supplier to perform a demand forecast in the WUE Plan. Demand forecasts included in this Plan show the water demand with and without the WUE goal.
- **Cost Analysis**
  The WUE Guidebook encourages each municipal water supplier to perform a cost analysis to assure that the program can be implemented and maintained.
- **Source Analysis**
  The WUE Guidebook encourages each municipal water supplier to perform a source analysis with a WUE Plan to show that the supplier can meet the forecasted demands.

The City has created its goal which will target to reduce ERU consumption by 1% per year. This goal was confirmed at a public meeting on September 6, 2016, and is reaffirmed herein. The City's public process has been met as part of this Water Comprehensive Plan. A copy of the public notice is included in **Appendix M**.

5.3.1 Required WUE Measures

As mentioned above, the WUE requires that the City implements the following required WUE measures. Because these are mandatory, the City cannot count them toward its program measures:

1. **Install production (source) meters**
   The City will continue to meter all source connections. The City replaced the master meter at the spring source at the end of 2007. The City will continue daily source meter logging, along with periodic testing and repair, in order to spot large leaks promptly.
2. **Install consumption (service) meters**
   The City will continue to require all water to be metered at the point of use. The City will continue to replace meters on a regular schedule based on the size and age of the meter. Any persons who desire to use City water from an unmetered source must rent a meter and pay for water used.
3. **Perform meter calibration**
   Source and service meters will be selected, operated, calibrated, and maintained according to generally accepted industry standards and manufacturing information. The City will require annual testing of large meters, and will replace them as necessary.
4. **Educate customers about water use efficiency practices**
   The City will continue to educate customers on water use efficiency practices with informational pieces which may include utility inserts, newsletter articles, flyers, information on the Consumer Confidence Report (CCR), or other avenues. Informational brochures will remain available at the City Hall for customers.

The WUE also requires the City to evaluate the following WUE measures. Because only an evaluation of these measures is required, their actual implementation can be counted as a WUE program measure.

5. **Evaluate rates that encourage water demand efficiency**
   To encourage conservation, the City maintains a tiered rate structure for both residential and commercial customers. This tiered structure is shown in **Table 5.3**.
6. **For water systems with 1,000 or more connections, evaluate reclamation opportunities**
   The City does not currently have 1,000 or more connections, so it is not required to evaluate reclamation opportunities. However, the City expects to exceed 1,000 connections during the 10-year planning period, so it is currently evaluating reclamation opportunities. The King County Waste Water Treatment Plant (KC WWTP) runs a reclaimed water program using the effluent produced by the City's residents and businesses. The City staff may also investigate and recommend proposed changes to the City's development and service policies and regulations that would promote reclamation programs and technologies. The City perceives the most likely user of reclaimed water to be the irrigation customer class, although there is little irrigation in the City so that is not a near term possibility.

Table 5.3 Tiered Rate Structure

Tiered Rate Structure			
Monthly Cost of Service Charges – Single Family Residential			
Meter Size		Inside	Outside
5/8 inch		$15.73	$23.60
¾ inch		$15.73	$23.60
1 inch		$35.79	$53.69
1½ inch		$68.87	$103.31
Monthly Cost of Service Charges – Commercial & Restaurants			
Meter Size		Inside	Outside
5/8 inch		$16.60	$24.90
¾ inch		$16.60	$24.90
1 inch		$37.97	$56.96
1½ inch		$73.23	$109.85
2 inch		$116.37	$174.56
3 inch		$224.43	$336.65
4 inch		$367.35	$551.02
6 inch		$723.94	$1,085.91
Monthly Cost of Service Charges – Multifamily Residential			
Meter Size		Inside	Outside
5/8 inch		$22.87	$34.31
¾ inch		$22.87	$34.31
1 inch		$53.66	$80.49
1½ inch		$104.60	$156.90
2 inch		$166.57	$249.86
3 inch		$318.56	$477.84
INSIDE CITY LIMITS			
Volume Charges	0-300	400-1700	1800+
RESIDENTIAL	$3.10	$3.58	$4.79
COMMERCIAL		all usage	$4.32
RESTAURANT		all usage	$3.30
MULTIFAMILY		all usage	$3.43
OUTSIDE CITY LIMITS			
Volume Charges	0-300	400-1700	1800+
RESIDENTIAL	$4.65	$5.37	$7.19
COMMERCIAL		all usage	$5.15
MULTIFAMILY		all usage	$6.48

5.3.2 WUE Program Measures

Per the WUE Guidelines, the City categorizes its 2015 WUE Program measures into three categories: indoor residential (residential), outdoor (irrigation), and industrial/commercial/institutional (commercial). These program measures are essential for the City to achieve its water use efficiency goal.

The WUE Guidelines require the City's water system to implement four WUE program measures because the City has less than 1,000 connections. If a specific WUE measure is being implemented for different customer classes, it counts as multiple measures. As mentioned previously, these program measures are in addition to the required measures discussed above.

The City has decided to exceed the required number of program measures and implement five measures. The proposed program contains the following measures:

5.3.2.1 Residential and Commercial Measures

Measures 1 & 2. The City will continue to add consumption history to water bills for residential, industrial, commercial, and institutional customers. This will count towards the implementation of two measures.

Measures 3 & 4. The City will continue its conservation rate structure, and will re-evaluate as needed. This will count towards the implementation of two measures.

5.3.2.2 Outdoor Measures

Measure 5. The City's municipal code encourages all new developments to use planting materials that require only temporary irrigation systems. Such systems are encouraged to be removed after 24 months or two growing seasons, whichever occurs first, providing that the plantings are established.

5.3.3 Monitoring and Evaluating WUE Measures

Monitoring and evaluating the individual conservation measures during and after implementation of the WUE Program are essential for determining the effectiveness of the program.

It is important to develop reliable data to use in analyzing the actual water use to identify whether goals and objectives are being met. The City should perform a year-end evaluation of the conservation measures. At a minimum, factors such as growth rate, water usage, and conservation budget expenditures should be taken into account. Considering changes in population and growth rates will help determine the effect of the changes on the water demand.

Applicable monitoring data should be kept for each WUE measure including, but not limited to:

- The type of measure implemented, level of implementation, duration and date of implementation.
- The number of customers affected by the measure in each category.
- The expected amount of water savings from each measure.
- The average water used in a specific activity, by category, before and after implementation of conservation measure.

5.3.4 Distribution System Leakage (DSL)

DSL is a significant element of the WUE requirements. Water is a precious and limited resource. The City takes steps to minimize leakage through the following annual programs and activities:

- **Leak detection and repair program.** The City actively looks for leaks from both the supply and demand side, and it fixes any leaks it finds in a timely manner.
- **Pipe replacement projects.** Large sections of City have water pipes that are 45 to 70 years old. These old pipes are prone to leaks. The City is replacing these old pipes as quickly as the budget allows.
- **Meter replacement program.** The City tests and replaces a number of old and large commercial meters each year. This program helps to accurately account for all water used.
- **Daily Logging of the Source Meter.** Logging the data from the source meter daily allows the City to quickly spot large leaks.
- **Annual DSL Reporting.** DSL standards are based on a three year rolling average. The City annually calculates this average and submits it to the DOH.

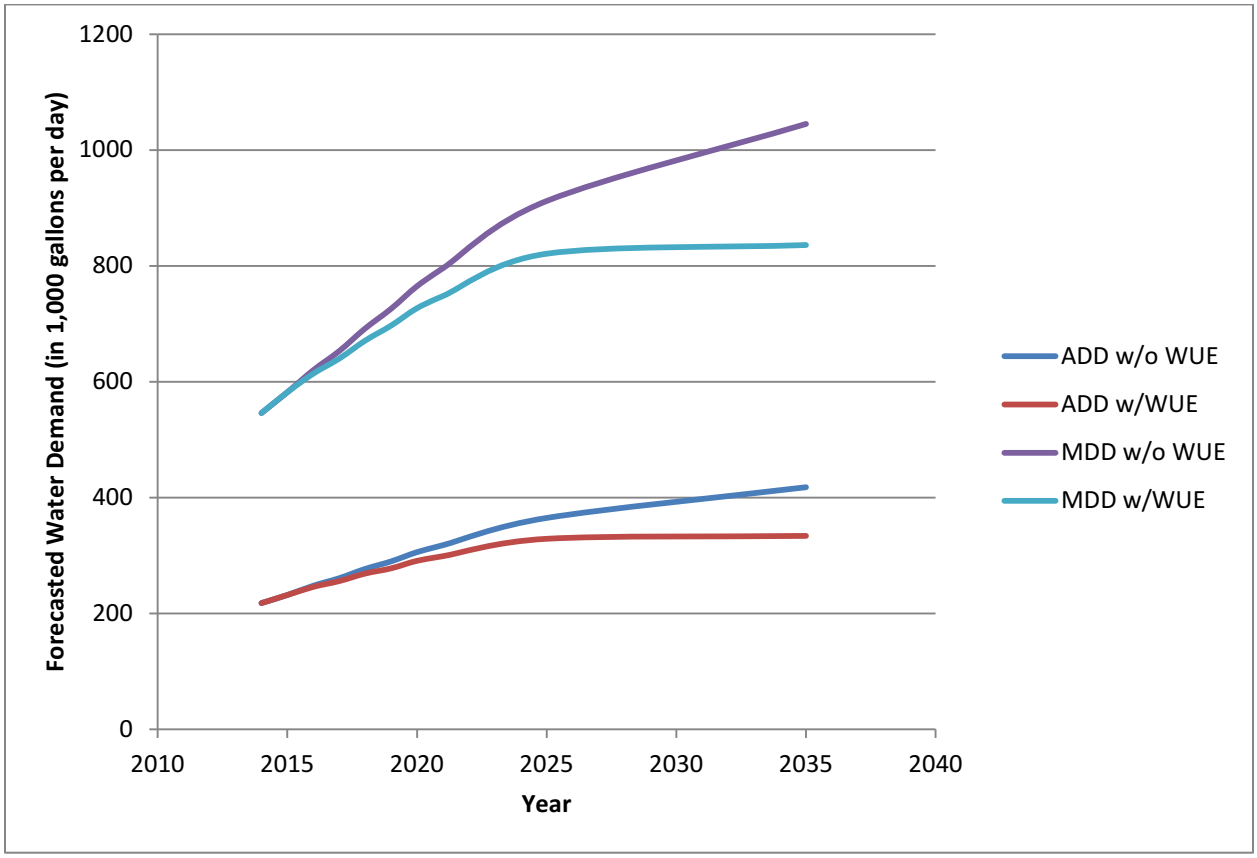
5.3.5 Water Demand Forecasting by Customer Class

Chapter 3 of this Plan provides a detailed analysis of water demands forecasts for the 6-year, 10-year, and 20-year planning periods. It evaluates past water demand patterns to create a planning ERU value and MDD Factor. It also uses local knowledge to develop population and water service connection forecasts. The analysis then uses this information to create future water demand forecasts for average day and maximum day conditions for each planning period. However, the forecasts in **Chapter 3** did not factor in WUE measures. **Table 5.4** summarizes the ADD, MDD, and annual demand forecasts with and without WUE. **Figure 5.1** then shows these demands graphically.

Table 5.4 Summary of Water Demand Forecast

	Data Year	Planning Year	6-yr Planning Period						10-yr Planning	20-yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Average Day Demands (in 1,000 gallons per day)										
ADD w/o WUE	218	232	248	261	277	290	306	318	365	418
ADD w/WUE	218	232	246	256	269	278	291	299	329	334
Maximum Day Demands (in 1,000 gallons per day)										
MDD w/o WUE	546	582	620	653	692	726	765	796	912	1045
MDD w/WUE	546	582	614	640	671	697	727	748	821	836
Annual Demands (in MG)										
Annual Demand (MG) w/o WUE	79.7	84.8	90.5	95.4	101.1	106.0	111.7	116.2	133.2	152.4
Annual Demand (MG) w/WUE	79.7	84.8	89.6	93.5	98.1	101.8	106.1	109.2	119.9	121.9

Figure 5.1 ADD and MDD with and without WUE



5.3.6 Cost Analysis

The City currently budgets approximately $500 annually for their WUE program. This budget includes cost such as printing and mailing educational packets. The City also budgets $2,500 annually for its leak detection program, and $5,000 annually for its meter replacement program. Both of these programs help to keep the DSL below the standard. The City plans to continue to allocate similar budget resources to each of these WUE categories in future years.

The WUE also costs the City money in loss of potential water revenue. The projected water savings range from approximately 0.8 MG in 2016 to 6.4 MG in 2021. This water saving is expected to cost the City approximately $6,000 in 2016 and approximately $48,000 in 2021.

The water savings will reduce the amount of water the City needs to produce, saving the City expenditures for power and chemical costs. The City currently primarily receives water from the spring source with a secondary well source for peak days and emergencies. The City estimates that it costs approximately $160 per MG, marginal cost, to produce water from the City's sources. For purposes of this analysis, marginal costs for water produced by the City's spring and well include only the power and chemicals consumed plus 20% for labor. Debt service,

depreciation or mechanical replacement costs were not included in the estimated marginal costs for water produced. The water savings will save the City approximately $100 in 2016 and $1,000 in 2021.

Including program costs, lost potential revenue, and marginal water costs, the program lost the City approximately $14,000 in 2016 and losses increase to approximately $55,000 in 2021.

While the projected cost analysis would suggest that conservation is not necessarily an initiative that is supported by the immediate economics of the City, the Council has fully supported conservation initiatives, and will continue to promote conversation with their customers. Their priority to manage the resource over the immediate cost impacts will continue.

5.3.7 Source Analysis

The City currently receives water from two sources. The primary source is the spring source, and the seasonal source is the well source. A more detailed breakdown of available water sources for the City is provided in **Chapter 6**. At present, the City's available water rights are in excess of its existing and projected demands.

5.3.7.1 Current Sources

The City of Carnation currently holds two water rights: a groundwater certificate for the City's water well and a water right claim for the City's spring source. The claim for the spring source authorizes the City to annually withdraw a total of 1,000 acre-feet (325 million gallons per year) with a maximum instantaneous withdrawal of 628 gallons per minute (0.9 MGD). The certificated water right for the well authorizes the City to withdraw 538 acre-feet per year (175 million gallons per year) with a maximum instantaneous withdrawal of 800 gpm (1.1 MGD). The water rights documents for the well and spring sources and Department of Health (DOH) Water Rights Self Assessment forms are included in **Appendix D**. **Table 6.1,** in **Chapter 6** shows the water rights held by the City.

5.3.7.2 Water Rights Assessment

The City's water right claim for the spring source, S1-117902CL, was granted by Ecology under a "grandfather use" clause in 1974. In 1978, Ecology and the City of Carnation agreed to cancel one of the City's surface water permits (S1-15903P) in order to secure water rights for a groundwater source in what is now known as Nick Loutsis Park. After construction of the well in April of 1978, a permit and, finally, a water right certificate for non-additive groundwater withdrawal was granted. The City's water right certificate and the attached Report of Examination (ROE) detailing the conditions of the water right have certain provisions attached for the use of the well.

5.3.7.3 Projected Demands

The supply requirements for the City are based on population projections, projected number of ERUs, and historical demand data provided in **Chapter 3**. The supply demand projections for the City are presented in **Chapter 3**. The DOH supply criteria used, if no historical data is available, are shown for reference purposes only in the right-hand column.

Table 5.5 Maximum Supply Requirements

Year	Year Description	Projected # of Connections* (C)	No. of ERUs	Maximum Day Demand (MGD)	Total Inst. Supply (MGD)	Total Supply Surplus (MGD)	DOH (800GDP/C) (MGD)
2014	Data Yr	819	1,120	0.55	2.06	1.51	0.66
2015	Planning Yr	883	1,192	0.58	2.06	1.48	0.71
2021	6yr Projection	1,245	1,634	0.80	2.06	1.26	1.00
2025	10yr Projection	1,403	1,872	0.91	2.06	1.15	1.12
2035	20yr Projection	1,594	2,143	1.05	2.06	1.01	1.28

*Based on the Maximum Day Demand (MDD) projections shown in **Table 5.4**, the City's supply capabilities exceed the projected demand through the 20-year planning period.

THIS PAGE INTENTIONALLY BLANK

6.0 CHAPTER 6 - SOURCE WATER PROTECTION

6.1 WATER RIGHTS

The City of Carnation currently holds two water rights: a groundwater certificate for the City's water well and a water right claim for the City's spring source. The claim for the spring source authorizes the City to annually withdraw (Q_A) a total of 1,000 acre-feet (325 million gallons per year) with a maximum instantaneous (Q_i) withdrawal of 628 gallons per minute (0.9 MGD). The certificated water right for the well authorizes the City to annually withdraw (Q_A) 538 acre-feet per year (175 million gallons per year) with a maximum instantaneous withdrawal (Q_i) of 800 gpm (1.1 MGD). The water rights documents for the well and spring sources and Department of Health (DOH) Water Rights Self-Assessment forms are included in **Appendix D**. **Table 6.1** summarizes the water rights held by the City.

Table 6.1 City of Carnation Water Rights Summary

Source	WR Document	Ecology ID	Priority Date	Qi (gpm)	Qa (AF/Y)
Spring	Claim	S1-117902CL	Dec. 1916	628	1000
Well	Certificate	G1-22827C	April 4, 1977	800	538

The City filed a water right claim for the spring source, S1-117902CL, under a "grandfather use" clause in 1974. DOE erroneously stated in the Report of Examination (ROE) for the Certificate that the City did not timely file its claim for the spring source in June of 1974. Because of this incorrect statement, the ROE indicated that the City had no water rights to the spring that would survive the development of a secondary source.

In 1978, Ecology and the City of Carnation agreed to cancel one of the City's surface water permits (S1-15903P) in order to secure water rights for a groundwater source in what is now known as Nick Loutsis Park. After construction of the well in April of 1978, DOE granted the City a water right certificate. The City's water right certificate and the attached ROE detailed the conditions of the water rights attached to the use of the Well. The DOE's ROE included following items:

- The well is limited to a maximum instantaneous withdrawal (Q_i) of 800 gpm.
- The City's well is "supplemental" to any other water right the City holds. The total annual use (Q_A) shall not exceed 538.0 acre-feet per year (AF/Y) less any amount utilized under other rights.
- The City's well must not interfere with the neighboring Hull well, which has a superior (older priority date) water right. The City must adjust their pumping rates, if needed, to avoid interference.

- The City must also maintain access ports and measure water levels, static and pumping, at least monthly.
- Lastly, the City must maintain a Water Use Efficiency (WUE) plan as approved by DOH.

As the City did timely file the claim for the spring source in June of 1974, it retains the water rights to both the spring and the well, and considers the water rights from both sources as additive. For water planning purposes the City will plan and forecast based on the authorized 1,428 gpm and an annual limitation of 1000 afy. Nothing in the Plan is intended to accept Ecology's interpretation, or waive any rights or arguments as to Ecology's interpretation of G1-22827C.

6.2 SUPPLY ANALYSIS

At present, the City's available water rights are in excess to its forecasted instantaneous and annual demands. **Chapter 3** of this Plan uses existing water use data and local knowledge of future develops to forecast future water use demands for the City's system. **Table 3.12** summarizes these forecasted average day, maximum day, and annual demands for the six- (6-), 10-, and 20-year planning periods.

Table 6.2 and **Table 6.3** compare the forecasted MDD and annual demands for each planning periods to the City's existing water rights without WUE measures and with WUE measures, respectively. The DOH Water Rights Self Assessment forms, located in **Appendix D**, provide a more detailed comparison between forecasted demands and existing water rights.

Table 6.2 Quantitative Supply Analysis Without Water Use Efficiency

	Instantaneous rate (gpm)	Annual supply (AF/Y)
Well 1 pumping capacity	700	-
Available spring supply	350	-
MDD and annual production - 2014	404	270
Projected MDD and annual production - 2021	553	357
Projected MDD and annual production - 2025	633	408
Projected MDD and annual production - 2035	726	468
Water right claim / Spring	628	1,000
Water right certificate / Well 1	800	538
Total authorized water supply	1,428	1,538*

* For Water System Planning purposes only, the City will plan based on 1,000 afy. Nothing in this Plan waives any claims that the City's water rights are additive and total 1,538 afy.

Table 6.3 Quantitative Supply Analysis With Water Use Efficiency

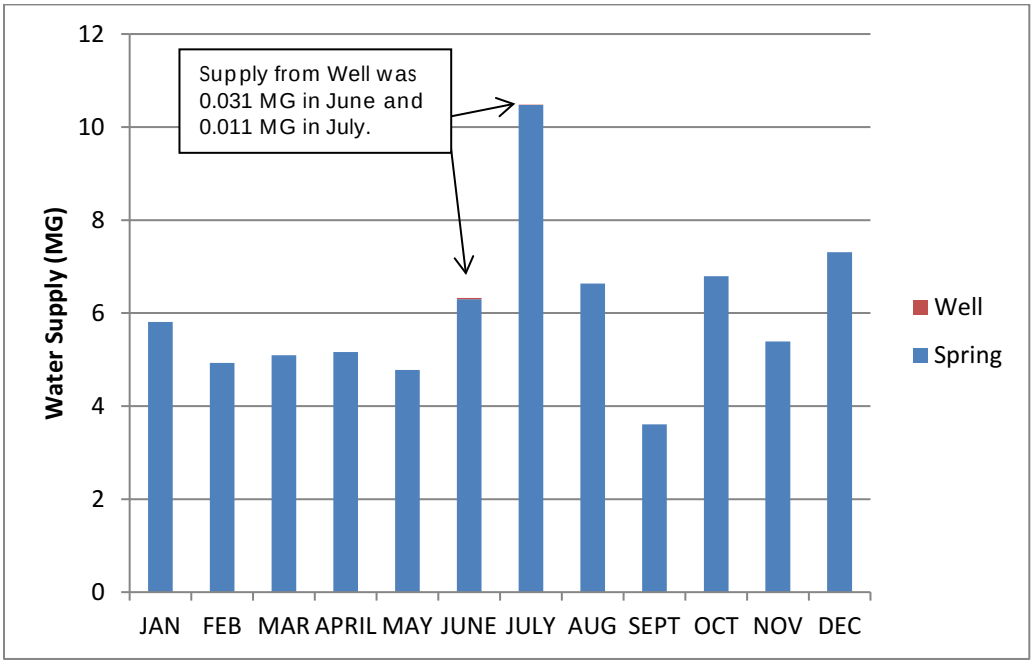
	Instantaneous rate (gpm)	Annual supply (AF/Y)
Well 1 pumping capacity	700	-
Available spring supply	350	-
MDD and annual production - 2014	404	270
Projected MDD and annual production - 2021	519	335
Projected MDD and annual production - 2025	570	368
Projected MDD and annual production - 2035	581	374
Water right claim / Spring	628	1,000
Water right certificate / Well 1	800	538
Total authorized water supply	1,428	1,538*

* For Water System Planning purposes only, the City will plan based on 1,000 afy. Nothing in this Plan waives any claims that the City's water rights are additive and total 1,538 afy.

Historically, the City's supply strategy has relied on its spring source. In 2008 the City installed an overflow meter on the pipe that takes the unused water supply and diverts it to the adjacent stream. The overflow meter allows the City to measure the additional available flow at the spring source, which usually ranges from zero overflow on high demand days during hot, dry summers to over 300 gpm on rainy, spring days with snow melt. The City relies on the well source to supplement the spring source during those high demand summer days.

Figure 6.1 illustrates this pattern. It shows the water supply data from 2014. The well was only used to supplement the spring source during June and July. Very little water was needed in 2014; therefore, the well usage in red is small and difficult to see. The notation in the graph shows the actual well usage numbers for clarity.

Figure 6.1 2014 Source Supply Data



As Carnation grows, the well source will become a more vital water source for the system. Currently, the well provides the City with a backup source in the event of a failure with the spring distribution system. The well pump is capable of producing 700 gpm. MDDs are not projected to exceed 700 gpm in the next 20 years, so the well should be capable of providing all of the City's requirements for the foreseeable future.

6.3 SOURCE WATER PROTECTION

The City's existing source water protection plan, provided in **Appendix O**, states that the well and the spring sources each have protection programs in place to minimize any potential contamination. These activities include frequent physical inspections and analytical testing of the source water itself. Additionally, the City adopted a Wellhead Protection Plan (WHPP) in 1999 as part of a previous Water Comprehensive Plan.

From a source water protection standpoint, the City's water system has not significantly changed since 1978, when the well source was constructed in Nick Loutsis Park. The original DOH Ground Water Contamination Susceptibility Assessment Survey Forms for each source are located in **Appendix O**.

The City's water sources have maintained an excellent water quality record. Analytical testing for bacteria count is performed on a monthly basis. Testing is described in **Chapter 4**. According to the analytical results, the City's water system has not experienced a significant water quality issues. For more information about the system's water quality, see **Chapter 4**.

The City's most important water resource, the spring, is enclosed by a 200-foot radius fence to prevent intrusion from large animals and to deter people from trespassing. The source of the springs is an aquifer located on an unpopulated upland 1.5 miles southeast of the City. The aquifer is protected by an overlying layer of semi-permeable glacial till. The springs are continually monitored by the City and inspected by the DOH. No source of contamination is allowed to be constructed, stored, disposed of, or applied within the sanitary control area of the spring.

According to a spring water temperature study performed in 1994 and current analytical testing results, there have been no indications of rapid shifts in temperature or other parameters, such as turbidity, conductivity or pH. Also, continuous sampling and testing has shown no significant occurrence of insects or other macro organisms, algae or large-diameter pathogens. For these reasons, the springs are not considered to be groundwater under the influence of surface water (GWI).

The well source is located in Nick Loutsis Park, a 6-acre park owned by the City. The City continually monitors by well site, and DOH regularly inspects it for possible source contamination. A locked structure protects the wellhead, itself. According to the well construction records, a well seal was installed to 18 feet below ground surface. It is not known if the screened interval of the well is located in a confined aquifer. The original well construction report was not available from the City or from DOE files. However, the geologic log for a test well drilled in Nick Loutsis Park in 1995 shows varying degrees of silt in the alluvial sediments overlying the completion zone of Well 1 – indicating a semi-confining unit may be present which helps protect the source water from potential surface contamination.

6.3.1 Wellhead Protection Planning

DOH regulations require that Group A water systems using groundwater sources develop and implement a Wellhead Protection Plan (WHPP) (WAC 246-290-135). The objective is to prevent releases of contaminants to groundwater in areas that contribute water to the public supply systems. This objective is accomplished by providing management zones around public wells, identifying existing groundwater contamination sources, and managing potential sources of groundwater contamination prior to their entry into the drinking water system. Under the WAC, local public water systems have the primary responsibility for developing and implementing local Wellhead Protection Plans (WHPPs).

The basic elements of a WHPP include:

- Assessment of initial groundwater susceptibility for each water supply source
- Delineation of the wellhead protection area (WHPA) that directly contributes groundwater to each water supply well
- Inventory of land uses and identification of potential sources of contamination within each WHPA

- Documentation of notification to owner/operators of known or potential risk to the City's WHP areas
- Development of spill prevention plans and water contingency plans that minimize or eliminate the possibility of contamination to the groundwater supply and also development of options for maintaining water supply in the event the aquifer contributing to a source is contaminated

The State of Washington WHP program applies to the City's well and spring sources. The previous WHPP was issued as a part of a previous Water Comprehensive Plan and is reprinted here as **Appendix O**.

6.3.2 Recommendations

A new WHPP should be prepared, as funding allows, in order to update the previous WHPP. The main consideration for developing a new plan is to fully revise and complete the hazard inventory, spill response, and contingency plans. There are no known changes in hazards near the watershed from the time of the initial evaluation.

The City should consider replacing the calculated fixed radius method to estimate the zone of contribution around the City well and springs. This method does not take into account any physical boundaries to the aquifers, ground water flow directions, or aquifer characteristics which would result in a change in the shape and direction of the zone of contribution for each well. A more detailed analysis of the zone of contribution is recommended so that potential contaminant sources up gradient of each source can be properly identified and accounted for in the Wellhead Protection Plan.

7.0 CHAPTER 7 - OPERATION AND MAINTENANCE PROGRAM

7.1 INTRODUCTION

This section of the report discusses the City's operation and maintenance program, staffing and operator certification, emergency response plan, water quality monitoring and records, and cross-connection control. It covers the water treatment and well/springs transmission pipelines and the City's water distribution system.

7.2 STAFFING AND OPERATOR CERTIFICATIONS

The City of Carnation currently has a full-time staff of four maintenance personnel responsible for day-to-day operation and maintenance of the water system. Public works staff report to the City Manager, who then reports directly to the City Council.

7.2.1 Operations Personnel

7.2.1.1 William Ferry, Public Works Superintendent, 425-333-4192

The City Public Works Superintendent is responsible for the day-to-day supervision of the system operations, and oversees any and all maintenance projects.

Certifications: WDM II, WTPO II, CCS

7.2.1.2 Vacant, Public Works Field Supervisor, 425-333-4192

The Public Works Field Supervisor maintains all systems, spring, well and pump, pipes, storage tank, and the chlorination system, in addition to reading meters, repairing pipes and installing water meters.

Certification: Water Distribution Manager – II (WDM-II)

7.2.1.3 Carl Mueller, Journeyman Public Works Maintenance Worker, 425-333-4192

The Journeyman Public Works Maintenance Worker assists the Public Works Field Superintendent in the above tasks including maintaining all system components, meter reading, leak repair and water meter installation.

Certification: WDM-II, CCS

7.2.1.4 Public Works Maintenance Worker, Kellen Maggard, and Mike Mckee

The Public Works Maintenance Workers assist the Public Works Field Supervisor in the above tasks including maintaining all system components, meter reading, leak repair and water meter installation.

Certification: Water Distribution Manager – I (WDM-I) within 1 year of hire.

7.2.1.5 City Clerk, 425-333-4192

The City Clerk handles the daily administration of the water system. She prepares all vouchers and water bills, and receives inquiries or service complaints from water system customers.

7.2.2 Utilities and Public Facilities Committee

The City Council appoints two councilmembers to the "Utilities and Public Facilities Committee" in January of each year. The committee is responsible for studying issues related to the water system and presenting recommendations to the City Council.

7.3 SYSTEM OPERATION AND MAINTENANCE

The City's Public Works Department has developed a systematic operations and maintenance program for its water transmission and distribution system. Prompt and regular maintenance has helped maintain reliable system operations.

7.3.1 New Water System Installation

The City of Carnation's "Combined Water and Sanitary Sewer Utility Technical Standards" Manual provides the specific standards for repairs of the existing system and for the installation of water system expansions.

The requirements for the Water Distribution System, including water main extensions are contained within the Manual.

7.3.2 Existing Water System Repairs and Leak Detection

Undetected leaks have been a major source of water loss from the City's system. Leak detection programs were performed in 1993 and were again performed in 2004 through 2006. Leak detection was not continued in 2007 due to the City-wide construction of a sewer distribution system but will be performed in 2008. Fifty-eight distribution system leaks have been repaired between 2003 and the present, and approximately 15,000 linear feet of water mains have been replaced in that time-frame. However, unaccounted for water remained over 40% and the City began a program of service meter replacement in 2006, with a goal of replacing approximately 8% per year. As unaccounted for water still remained high, further analysis revealed that the source meter at the spring was not accurately measuring water use. A project

to replace the source meter at the spring was completed in December 2007. Early data from the new source meter indicates that the previous meter was reading approximately 25% high compared to actual water use.

7.3.3 Inventory

The City maintains an inventory of materials necessary to install new water services, and maintain and make necessary repairs to the system. Corporation stops, meters and meter setters are stored for the purpose of installing new water services. Materials are kept in inventory for purposes of insuring proper operation of the disinfection system. Pipes, fitting and bedding materials are also part of the inventory for maintenance of the distribution system. The materials are stored at the maintenance shop and the inventory is managed by the Public Works Superintendent. Additional items are ordered as necessary.

The major vehicles owned by the City for the water system and their replacement costs and dates are shown in Table 7.1.

Table 7.1 Equipment Replacement

Item	Acquired	Life	Actual Cost	Replacement Cost	Replacement Year
Backhoe – CAT	2001	20	$66,510	$70,000	2024
Pickup Truck Dodge	2014	20	$30,000		2034
Chevy Dump Truck*	1981	15			
Pickup Truck Chevy	2008	20			2028
Pickup Truck - Chevy	1994	10	$7,493	$16,000	2008
Pickup Truck - Dodge	1998	10	$16,780	$16,000	2018
Pickup Truck - Ford	2003	10	$9,000	$16,000	2016

* The Chevy Dump Truck is still used by the City staff, but the City does not plan on replacing it.

7.3.4 Routine Operations, Water Quality Monitoring and Notification

The City maintains a regular schedule for system operation, water quality monitoring, testing and routine operation procedures. Sampling intervals and monitoring is performed per WAC 246-290-300 and includes bacteriological, inorganic and physical testing. Sampling results included in **Appendix J** show that both the spring and well are in compliance with state requirement and that the quality of water is excellent.

The City's typical maintenance schedule includes the following:

7.3.5 Routine Operation Procedures

- Daily: record production volume at spring, inspect and make adjustments to the chlorination system as needed.
- Weekly: check well and well pump and record production, if any.
- Daily: check storage tank and measure draw down.
- Prior to peak demand season, drawdown the storage tank and discharge water in order to maintain water quality.
- Continuously, check for line leaks.

7.3.6 Preventative Maintenance Procedures

- Check condition of flow meters, chlorinator equipment and well pump.
- Keep vegetation trimmed from hydrants and other water system facilities, and to maintain access to operating valves.
- Keep vegetation trimmed along access road in watershed.
- Monitor system for leaks and check for vandalism.
- Perform internal inspection of storage tank per AWWA recommendations.
- Perform yearly leak detection on system. This system includes checking approximately 60% of the system every year, including valves and fire hydrants.

7.4 SAFETY PROCEDURES

Awareness of potentially hazardous conditions and adherence to safe practices are essential in the workplace. A major element of the safety program for the City of Carnation public works department is to talk with every employee about safety issues they encounter on a regular basis at work, on the road, or in the field.

- Public Works Field Safety Officer conducts a monthly safety meeting with operations staff to discuss various topics throughout the year and or as job requires.
- Public Works Supervisor and operations staff attend annual training provided by Evergreen Rural Water of Washington and Washington Environmental Training Center.
- Training topics include Electrical Safety and Operations, Confined Space Entry, Trenching Safety and Procedures, Asbestos Pipe Handling, Chemical Storage and Handling Procedures, and the correct use or Personal Protection Devices.
- The City requires all Public Works Personal holding a CDL are subject to random drug and or alcohol testing.
- The City requires all Public Works Personal to receive training and carry a current card in First Aid, CPR, Traffic Flagging, including a Class B-CDL license.

7.5 WATER QUALITY AND SAMPLING

The operations staff routinely monitors water quality from its source and throughout the distribution system.

- Four bacteriological samples are taken for analysis on a monthly basis at sampling sites specified in the Coliform Monitoring Plan and required by WAC 246-290-300.
- Daily samples are taken at the spring for water temperature, pH value and conductivity.
- Daily samples are taken for chlorine residual.
- Chemical sampling is performed per the Water Quality Management Report (WQMR), as follows:
  - Annual sampling for nitrates is taken from both spring and well.
  - Other inorganic chemicals are sampled every 9 years; the last sampling was in 2015 at the well.
  - VOCs are sampled every six years. Samples were last taken in June of 2010 due in June of 2016 at the Springs and July of 2019 at the Well.
  - SOCs are sampled every nine years. Samples were last taken in 2012.
  - Lead and copper sampling is done very two years. The City sampled for these in 2011 and 2013.
  - DBP were sampled in 2013 and 2014.
  - Inorganic chemicals, herbicides, and other sampling and testing parameters may be found in **Appendix L**.

7.5.1.1 Coliform Monitoring Plan

The City has prepared a Coliform Monitoring Plan which is included in **Appendix L**. The City takes five samples per month from various areas of the City. Locations of the sample sites are included in the Coliform Monitoring Plan.

7.6 EMERGENCY RESPONSE PLAN

The City has prepared an Emergency Plan which includes implementation measures that will be followed if an event impacts any of the water system components. Potential events include natural disasters, such as floods or earthquakes, and human-caused disasters such as vandalism or hazardous substance release. The most common disaster experienced is loss of electrical power.

The City's water supply system is unusual in that the delivery of water for domestic use is not affected by power outages unless the outage occurs in the summer during peak demand. In general, power outages occur during the winter months due to windstorms. The system is gravity fed from the springs and would continue to provide reliable water delivery to customers during periods of extended power outages. The exception to this reliable supply is the chlorination system which does require power with the result that the system may be unchlorinated during an

extended power outage without a generator. The City recently bought a generator that could be used to power the chlorination system, among other things, during a power outage.

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 requires community water systems serving more than 3,300 people to perform a Vulnerability Assessment (VA), therefore, the City is not required, at this time, to perform a VA.

The loss of service due to breaks in water mains constitutes a more realistic emergency situation for the City.

7.6.1 Contact Information for Emergencies

One of the following personnel is on duty or on-call at all times. They can be reached by telephone during working hours at 425-333-3192 or after hours at the emergency on-call phone number, 425-765-0508.

William Ferry, Public Works Superintendent
office 425-333-4192
cell 425-691-8353

Public Works Maintenance Worker
office 425-333-4192
cell 425-765-0508

For extended outages or major failures, contact the following:

King County Department of Health – 1-253-395-6750
After Hours – 1-877-481-4901
Washington State Department of Health – 1-206-418-5400 (day) or 1-877-4901 (after hours)

The following text describes the public notification procedures in the event that test results exceed the standards for Maximum Contaminant Levels (MCls) for drinking water.

7.6.1.1 Public Notification Procedures

Per WAC 246-290-71001, Public Notification, the purveyor shall notify the water system users when the system violates a National Primary Drinking Water Regulation and when any of the situations listed in Table 1 of 40 CFR 141.201 occur, except for (3)(b). Public notifications for violations and other situations are categorized into Tiers in accordance with the following:

(a) Tier 1 as described in Table 1 of 40 CFR 141.202(a); or
(b) Tier 2 as described in Table 1 of 40 CFR 141.203(a); or
(c) Tier 3 as described in Table 1 of 40 CFR 141.204(a).

Additionally, the purveyor shall notify the water system users when the system:

(a) Is issued a departmental order; or
(b) Fails to comply with a departmental order; or
(c) Is issued a category red operating permit.

Purveyor will seek immediate input from and work with state and local health agencies to accurately communicate and properly mitigate potential health effects resulting from any public health impact.

The City has many forms of communication available to notify its customers in the event of a public health risk. Methods of communication include:

- City Staff Direct Communication
- City of Carnation Web Site, www.carnationwa.gov
- Where customers cannot be contacted immediately, purveyor will place a written notice on the front door handle, and a follow-up visit will be made to confirm that the customers received notice.
- Local media and newspapers
- Posting signs

7.6.2 Water Main Breaks

Water main breaks immediately affect customer services and the City has worked hard to keep these disruptions to a minimum. Water main construction specifications include installation of sets of three valves in a cluster at intersections to isolate breaks. Most of the system is looped to provide service while sections of pipe are repaired. The combination of loops and the valve system helps to minimize the loss of service to customers during main breaks.

In the event of an extended loss of water service or possible contamination of the water supply caused by breaks, the City is required to notify the Department of Health, Office of Drinking Water. The City also notifies the affected customers and instructs them to disinfect water (boil water advisory) or to conserve water until water supply and/or quality is restored.

7.7 CROSS-CONNECTION CONTROL PROGRAM

In compliance with WAC 246-290-490, the City passed an ordinance on January 17, 1995 addressing cross-connection issues. In 2008 the City adopted Ordinance No. 743 which updated Title 13 CMC. Cross-connections are addressed in Division VI 13.105 of this Code. The code requires annual testing of all backflow preventers and cross-connection devices. A Cross-Connection Control Program (CCP) has been developed for the City. A copy of the CCP and the ordinance addressing cross-connection control are included in **Appendix P**.

The purpose of the CCP is to protect the health of water consumers and the potability of the City water system by assuring the inspection and regulation of plumbing in existing and

proposed piping networks and the proper installation and surveillance of backflow prevention assemblies when actual or potential cross-connections exist and cannot be eliminated.

The City also requires the installation of backflow and cross-connection devices on new construction of the following:

- New meter setters
- Replacement of existing meter setters
- All irrigation systems
- All sprinkler systems

The CCP includes a process for evaluating backflow requirements for new and existing customers. New residential services within the service area are required by the CCP to provide appropriate backflow assembly for special plumbing such as lawn sprinkler system, or for hazardous water use on premise. New non-residential services are required to provide the appropriate backflow assembly based on the hazard assessment performed by the Cross-Connection Specialist.

Existing non-residential customers are required to submit an evaluation by the CCS of the hazards posed by their plumbing system. Existing residential customers will required to submit a questionnaire that will indicate special plumbing or water use on premises. If customers fail to submit the required information, the City has the option to require an assessment by the CCS, require installation of a Reduced Pressure Backflow Assembly or take other actions.

7.8 CUSTOMER COMPLAINT RESPONSE PROGRAM

The City maintains a record of complaints with work orders. In addition, complaints which are filed by customers who attend Council Meetings are logged in the meeting minutes of the meeting.

Complaints are responded to appropriately by City staff that determine if the issue can be easily resolved or additional work is necessary. Once work is completed a record of the work is documented. Multiple complaints which arise from maintenance activities are not individually documented, such as dirty water complaints, which often occur after water is run through hydrants.

Should a customer believe the complaint has not been adequately addressed, they have an opportunity to appeal the decision with the City Council. This appeal will be heard during a regular meeting and a final decision and determination of action will be rendered.

7.9 RECORDKEEPING AND REPORTING

The Public Works Superintendent is responsible for reporting all system issues, and oversees system operations and maintenance projects. The City Clerk is responsible for maintaining all

records pertaining to water usage, billings, receipts, and water utility financial records. In addition, the City Clerk also maintains records regarding the system facilities, utility locate requests, repairs, and water quality monitoring and reporting.

The City will maintain Construction Completion Reports in project files and are available for review upon request of the City Clerk.

7.10 OPERATION AND MAINTENANCE IMPROVEMENTS

The City strives to provide the best available tools to assist its staff with the management, maintenance and operations of the City's system. The City's current operation programs are included in Capital Improvements Program listed in **Chapter 8**. The City will review its operation and maintenance programs as needed and update when appropriate.

THIS PAGE INTENTIONALLY BLANK

8.0 CHAPTER 8 - IMPROVEMENT PROGRAM

8.1 SUMMARY

A number of capital projects have been identified to address the requirements of the City of Carnation (City), Washington State Department of Health (DOH), the East King County Coordinated Water System Plan (EKC CWSP), and other jurisdictions and agencies. The City is planning to focus on improving its system through replacing of old/undersized piping; adding looping for redundancy, water quality and fire flow; providing a phased telemetry system to allow staff to monitor its remote sites; addressing the vulnerability of its transmission main from the spring source to the City, and potentially building a new pump station to raise pressures in a portion of the City. Piping improvements are meant to enhance fire flow to urban areas or replace old, leaking, and undersized pipes. The hydraulically required improvements are addressed within a 6 year window (2021) to address deficiencies. Other improvements have been identified by staff because of operation and maintenance issues, or items determined by WSDOT that need to be addressed as part of the follow-up to a sanitary survey. See **Appendix K.**

The identified future piping additions to the system are schematic only. Refer to **Figure 8.1** Water System CIP Map in this chapter. Configuration of facilities and water mains may change as development occurs and land use policies change. Additional capacity improvements may be needed if development occurs more rapidly than predicted.

8.2 REVIEW OF 2008 IMPROVEMENT PROGRAM

Since the last Plan, the City has completed several major projects that have significantly improved the water system. The City constructed two new storage tanks, giving the City 714,000 gallons of additional storage capacity. One of the new tanks is a 605,000 gallon steel tank built at the existing reservoir site in the North Zone, and the other new tank is a 109,000 gallon steel tank built near the springs sources in the South Zone.

The City also replaced approximately 2,400 linear feet of transmission main from the springs source to 344th Avenue. The old transmission main had minimum to no cover or was elevated in/near the stream, leaving the City's primary transmission main vulnerable. By replacing this section of the transmission main with more accessible piping largely located away from the stream and along the access road main with proper soil cover, the City has increased the reliability of its water system. On addition to being more accessible, the new transmission main alignment is much less susceptible to damage from falling trees, erosion, and ground slides.

Approximately 9,840 linear feet of water main were installed within the City limits since the last Plan, of which approximately 3,820 linear feet were installed by the City and approximately 6,020 linear feet were installed by developments. Developments include developer extension

projects, replacement of old and under-sized water mains, and the installation of new water main to improve looping and hydraulic conditions within the City.

The increased storage capacity, coupled with new water mains, significantly improved the available fire flow within the City limits. At the time of the 2008 Plan, the City could not support a commercial fire flow within the City. The City can now support 2,500 gpm commercial fire flow within the City's commercial district. This increase in available fire flow shows how successful these projects were in improving the City's infrastructure capability and reliability.

The City also focused on improving its distribution system leakage (DSL). Projects such as the new source meter, water meter inspection and replacement program, and leak detection program helped to reduce the DSL. Several commercial meters were replaced and some showed a significant increase in water usage after being replaced. Between 2008 and 2015, the City decreased its DSL from approximately 42% to under ten percent (10%). The huge decrease in DSL reflects an improved attention to this issue.

8.3 PRIORITIZATION

In order to develop a prioritized list of capital projects, all potential projects were evaluated using relevant criteria. The projects are prioritized based on the following criteria which are listed in order of decreasing importance:

- DOH Requirements
- System Wide Benefits
- Fire Flow in the Urban Area
- Multiple Leaks/Pipe Condition
- Looping
- Hydraulic Capacity Outside of the Urban Area
- Level of Service Expectation

DOH Requirements: These projects include disinfectant installation at the well site and new water mains for fire flow purposes, and the first phase of the telemetry system to monitor gaseous chlorine levels at the chlorination building.

A generator is required to be installed at the well in order to be in line with our assumptions in the calculations. This project is a City priority. Installation of the generator is necessary for the storage calculations used to design the tanks to be valid.

System-Wide Benefit: These projects include new installation and replacement of water mains or other improvements that provide improvement to all or a significant portion of the water system (e.g., more than just one street).

Fire Flow in the Urban Area: Projects identified in this category include installation of improvements to solve an existing fire flow deficiency in a location or area within the Urban Growth Boundary.

Multiple Leaks/Pipe Condition: These projects include the replacement of leaking steel and AC water mains throughout the City.

Looping: These projects include the installation of water mains to improve water quality and hydraulics of the water system for specific streets and/or neighborhoods.

Hydraulic Capacity Outside of the Urban Area: These projects include new installation and replacement of water mains to improve hydraulic capacity of specific streets and/or neighborhoods in the rural area.

Level of Service Expectation: These projects include a new pump station and the installation and replacement of water mains to increase pressures on specific streets and/or neighborhoods within the urban area.

Most projects have applicability to more than one of these criteria. Because the overall list of improvement projects is not extensive, a formal procedure for prioritizing the projects is not employed, but priorities were discussed jointly with the City to determine the priority and schedule of improvements.

8.4 CAPITAL IMPROVEMENT SCHEDULING

The City scheduling of identified projects is based upon priority within annual budgetary limitations. For more on the financial program, refer to **Chapter 9**. For projects outside of the City's limits, the City checks with the King County Department of Transportation and Washington State Department of Transportation (WSDOT) to verify their intended roadway improvements and to schedule any necessary water facility construction in advance to avoid conflict with any of the County's or State's. Inside the City's limits, the City staff reviews the upcoming City street improvements, if any, to schedule the water portion of the projects jointly as appropriate to minimize the cost to the ratepayers.

The City endeavors to utilize all sources of outside funding which may be available in order to finance its capital improvement projects.

The City's policies for developer extensions dictate that where projects identified in the Comprehensive Plan are adjacent to a proposed development, the developer shall construct those facilities. The improvements are included as part of the developer's overall construction responsibilities to build a project in the City. For more information, refer to the policy described in **Chapter 2** of this Plan.

8.5 IDENTIFIED IMPROVEMENTS

All identified capital improvements are summarized in the Capital Facilities Plan - **Table 8.1** (at the end of this chapter). Each project is identified with a 'key' composed of a letter followed by a number. The letter designates the type of project (see below) while the number is simply a listing within each letter category. All projects that have an identifiable site or sites associated with them are shown on **Figure 8.1**. At the appropriate geographical location, the figure shows the number 'key' from the table so that the projects listed in **Table 8.1** can be identified on the figure.

Associated with each improvement listed in **Table 8.1** is a projected cost and a start (implementation) year. The year designation is an indication of the project's priority relative to other improvements.

8.5.1 Water Mains

Water mains are grouped into three types in **Table 8.1**:

Water main Improvements designated by the letter 'N' for new mains and the letter 'R' for replacement mains. Additionally, the spring source transmission main related improvements are designated by the letter 'S'.

8.5.2 Non-Pipe Projects

Identified source, pressure, and other major capital improvement projects are also listed in **Table 8.2** as Miscellaneous Improvements and shown on **Figure 8.1** where applicable. The following letter designations are used:

- 'S' – Spring-related improvements
- 'W' – Well site-related improvements
- 'O' – Other (these are system-wide projects relating to operations, maintenance, and management activities)

It should be noted that the improvements listed in **Table 8.1** represent tentative priorities. It is difficult to prioritize projects into year-by-year categories because it may be necessary to reprioritize particular items as circumstances dictate. For example, this might result from changes in land use designations or development patterns.

8.6 MAJOR PROJECT CATEGORIES

8.6.1 Water Source Improvements

8.6.1.1 Spring Source Transmission Main

The City plans to replace the necessary sections of the existing 8-inch diameter steel transmission main in NE 24th Street between 344th Avenue NE and Fall City Carnation Road (SR 203) (S1) and in Fall City Carnation Road (SR 203) between NE 24th Street and Tolt Middle School (S2). The sections of the steel pipe that have been removed in the past have been in good condition, so the City does not deem it necessary to replace the whole transmission main. However, the City knows that sections of the main need to be replaced.

At a minimum, the City will replace the known sections of transmission main that have minimal or no cover, especially at the two stream crossings where the stream jumps the pipe, and at sections of the main that are not easily accessible for maintenance. The City will also further investigate the condition of the whole transmission main and replace any section found to be in poor condition.

8.6.1.2 Source Meter Replacement

The City replaced the existing Source Meter at the Springs source 2007. The typical life span of a source meter/technology is about 15 years. Therefore, the City should plan on replacing its existing source meter (S3) by 2025.

8.6.1.3 Source Study

A source study (S4) will be conducted in advance of when the City needs additional supply. The study will evaluate the catchment supply at the springs source. The study will be performed by a hydro-geological consultant. The purpose of the study will be to analyze the existing and potential capacity of both the original springs water source and the two more recent horizontal wells. If the supply capacity can be increased, the study will recommend the necessary physical and regulatory improvements to implement this supply improvement.

8.6.1.4 Well Source

Three projects are identified for the City's well.

A new chlorination system (W1) will be installed. Initial alternative analysis performed in 2007 recommended a dry tablet system using calcium hypochlorite. The equipment would include an Accutab Model 3075 (or equal) with a capacity of 5 to 50 pounds per day, a 22 gallon solution tank, a manual flow controller based on flow rate pumped from the well, electrical wiring, and other appurtenances.

The installation of a backup power generator at the well site (W2) would allow the well pump to be used in the event of an electrical power outage. This project is required in order for the assumptions used in the storage analysis to be valid. Neither the size nor type of generator has been finalized but the capacity is preliminarily estimated at 75 kilowatts and the generator fuel will probably be either diesel or propane.

A wellhead protection study (W3) will evaluate the boundaries of the wellhead protection area as an update to the Wellhead Protection Plan. This study will improve the accuracy of the City's wellhead protection plan and review any new sources of potential contamination and mitigation for them.

The study will model the underground water in the area to produce a more accurate time of travel boundary for the well source. The Wellhead Protection Plan should be updated based on the results of this study.

8.6.2 Miscellaneous Capital Improvements

8.6.2.1 Telemetry System

Design and Installation of a telemetry system will improve the safety and operation and maintenance capabilities of the water system. The telemetry system will allow the City to eventually operate and monitor its whole water system from a centralized location. Telemetry equipment would be installed at the springs source site, the reservoir site, and the well site. With the telemetry system, alarms would notify City personnel if a problem arises at any of these sites. The City's vacuum sewer system could also be connected to the same telemetry system.

To make the telemetry system more affordable for the City, it is planned to be implemented in phases. During the first phase (O1-1), the City would design and install the necessary equipment at the master site and the telemetry system at the springs source site to monitor gas chlorination levels and other operational parameters. This is required by WSDOH. The springs source site is the highest priority because it would provide an alarm for the chlorination system, and is the most remote site.

In the second phase (O1-2) the City would add telemetry equipment at the reservoir sites. The final stage (O1-3) would be to connect the sewer system controls to the telemetry system and is not a water CIP project cost.

8.6.2.2 Multi-Year Projects

Annual replacement of water meters (O2) is shown as a multi-year improvement. This is required because the City has many meters older than 15 years. Typically meters are on a 15 year replacement cycle, so that would be an average of 55 meters per year. The level of activity is dictated by the allocated funding of $15,000 annually.

The City will continue the leak detection program, which has been partly responsible for decreasing the DSL. Since the leak detection program has proven effective, the City will continue to implement it in order to maintain a low DSL (O3). This is another on-going, multi-year activity.

As described earlier, the City strives to utilize outside funding sources whenever feasible. The cost of identifying and acquiring funding assistance, O4, is an on-going, multi-year activity.

In order to properly operate and maintain its water system, the City needs to replace valves on a regular basis. In order to keep up with these repairs, the City has created a valve replacement program (O5). The City will replace these valves on an as needed basis, and plans on spending approximately $15,000 per year.

8.6.2.3 Future Comprehensive Plans

Comprehensive plan updates are likely extended from a 6-year interval to a 10-year interval. Plan updates are budgeted for 2025 (O6) and 2035 (O7), and are included in **Table 8.1**.

8.6.2.4 New Booster Pump Station

A new Booster Pump Station (O8) is being proposed to increase the pressure in the section of the system directly east of the North Zone reservoir site. During the 2015 hydraulic system analysis, the low pressure scenario for this part of the system dropped to about 42 psi. The City has adopted a standard domestic pressure of 40 psi within the City limits, which exceeds DOH's domestic pressure requirement of 30 psi. To ensure that the City continues to meet this standard, the City proposes to install a booster pump station at the existing shop building. This station would need to be sized for a 1,750 gpm flow to support fire flow requirements, and a head of between 18 feet (to provide 50 psi) and 42 feet (to provide 60 psi).

An alternative to this large Booster Pump Station, the City could install a smaller station (O8-A) that would be sized to meet operational demand, and in the case of a fire, fire flow would bypass the booster pump station through a hydraulic control valve(s). For this alternative, the booster pump station would be sized to meet the future build-out peak hour demand. This means sizing the system for 100 gpm flow and a head of between 18 feet (to provide 50 psi) and 42 feet (to provide 60 psi). A predesign study is recommended as a first step to further define costs, options and limitations.

8.6.2.5 Existing PRV/PSV Replacement

The existing PRV/PSV station should be replaced in the next five years (O9). The station is reaching the end of its useful life, and has an old, removable aluminum plate cover that exposes the station to vandalism/contamination. The replacement would include replacement of both the PRV/PSV and the valve vault.

8.6.3 Water Main Improvements

As shown in **Table 8.1**, water main improvements not related to the existing transmission mains from the springs are categorized as being either new or replacement pipes. The proposed improvements have been identified to address the prioritization criteria listed at the beginning of this chapter. Except for replacement mains needed solely to replace existing pipe materials with long-term leakage problems, all of the water main improvements intended to meet hydraulically based criteria have been analyzed using the City's hydraulic model which is discussed in **Chapter 4**.

There are new water main projects and replacement projects of various lengths ranging from 50 to 4,200 lineal feet for the years 2017 to 2035. The proposed diameter of all the water mains is 8 inches except where a larger pipe is required, potentially strategic sections of pipe including along SR 203.

8.6.3.1 New Water Main Projects

The new water main projects shown on the CIP list and map include constructing a new transmission main along the King County Park Trail. This additional transmission main will provide redundancy and additional looping to the system. For planning purposes, the new transmission main has been divided into three phases, based on likely construction sequence.

The first phase of the new transmission main (N1) would connect the dead-end cul-de-sac of 326th Avenue NE with the proposed development on the Earth-to-Earth property. In total, this project would include approximately 1,150 linear feet of new water main.

The second phase of the new transmission main (N2) would consist of approximately 4,200 linear feet of new water main within the King County Park Trail, and would connect the North Zone to the South Zone. In conjunction with the construction of this project, the City would need to construct a new PRV station (O10).

The final phase of the new transmission main (N3) would consist of approximately 1,700 linear feet of new water main within the King County Park Trail, running from 326th Avenue NE (the northern edge of N1) north to NE 45th Street (or Entwistle Street). This final phase would provide additional looping to the system but is a low priority improvement.

8.6.3.2 Replacement Water Main Projects

The replacement water main projects shown on the CIP list are needed for three reasons: to replace undersized mains; to replace old, leaking mains; and to replace all asbestos concrete mains.

Projects R1 through R11 are replacement main projects within the City boundary. Because it is important that the City continues to maintain a strong water system within the City limits, most of

these projects should be completed in the next 10 years. The City is currently starting the planning and design phase for Project R1.

Projects R12 through R19 are replacement main projects located outside of the City boundary, but within the Urban Growth Boundary. Most of these mains are severely undersized and are prone to leaks. Replacing and upsizing these pipes could significantly decrease the City's distribution system leakage and allow the City to provide this area with adequate fire flow. Because of the extremely bad condition of the majority of these pipes, these projects are a high priority to the City and should be completed as soon as possible. Projects R12 and R19 should relocate the existing pipe in Carnation Duvall Road (SR203) to outside of WSDOT right of way in private property. This will improve the accessibility of the main and safety for operations staff, and is likely a lower cost installation.

Projects R20 and R21 are replacement main projects located outside of the urban growth boundary. Both of these projects would replace severely undersized water mains in order to allow the City to protect this rural area with fire flow. King County does not currently require the City to provide fire flow to this area, and all fire hydrants along these mains should be bagged and not used since they do not meet fire flow requirements. These projects should be completed within the next 20 years.

8.6.4 Opinion of Probable Project Costs

Water main project costs other than the transmission main from the springs and selected short footage projects that will be more expensive per foot, are estimated as $250 per linear foot for 8-inch mains including trench patch and $235 per linear foot where no paving is required. A value of $265 per linear foot was used for 12-inch mains. The 12-inch mains are thought to be able to be installed outside of the pavement, in most cases. All costs are in 2016 dollars. These values were developed from a review of historical contract costs for similar projects in the rural King County area and in the City itself, and include construction costs, engineering (design and construction inspection/administration), surveying, taxes, and City administration. Additional costs relating to any land purchase, easements or unanticipated site-specific costs are considered to be speculative and not included. Costs shown are considered as preliminary and a project-specific opinion of probable construction cost should be prepared prior to initiating any specified project.

The springs source transmission main projects (S1 & S2) are anticipated to have costs higher than those for other mains. There are some sensitive area and permitting hurdles to go through with those projects. These items tend to increase cost and delay project schedules (therefore also increasing costs).

Costs shown for other items are anticipated based on the information known today without doing preliminary studies on all of the projects. The projected costs are shown in **Table 8.1**.

Table 8.1 Water System CIP Improvements

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
Source Improvements								
- Spring related								
S1	NE 24th Street (Langlois Road)	344th Ave	SR 203	8	12	TBD	$2,500,000	2030
S2	Fall City Carn Rd. (SR 203)	NE 24th St (Langlois Rd)	Tolt Middle School	8	12	TBD	$2,700,000	2035
S3	Source Meter Replacement	--	--	--	--	--	$20,000	2025
S4	Study of Spring Catchment Capacity	--	--	--	--	--	$90,000	2035
- Well related								
W1	Well Chlorination	At well site	--	--	--	--	$71,000	2017
W2	Well Generator - 75KW?	At well site	--	--	--	--	$111,000	2017
W3	Well Source Protection Boundary	--	--	--	--	--	$30,000	2025
Misc CIP Improvements								
O1-1	Telemetry Control and Reporting - Phase 1	Master Site Set-up and Spring Source Site		--	--	--	$40,000	2021
O1-2	Telemetry Control and Reporting - Phase 2	Reservoir Site and Well Site		--	--	--	$30,000	2022
O1-3	Telemetry Control and Reporting - Phase 3	Connecting to Sewer System		--	--	--	$0	2022
O2	Water Meter Replacements ($15,000/yr for 20 yrs)	--		--	--	--	$300,000	Multi Yr
O3	Leak Detection Studies ($5,000/yr for 20 yrs)	--		--	--	--	$100,000	Multi Yr
O4	Funding Assistance (10 yrs)	--		--	--	--	$100,000	Multi Yr

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
O5	Valve Replacements ($15,000/yr for 20 yrs)	--		--	--	--	$300,000	Multi-Yr
O6	2025 Water Comprehensive Plan	--		--	--	--	$175,000	2025
O7	2035 Water Comprehensive Plan	--		--	--	--	$225,000	2035
O8	New Booster Pump Station (w/ Fire Flow)	Shop Building at reservoir site (includes 12" parallel pipe)		--	--	--	$770,000	2028
O8-A	Alternative Booster Pump Station (Res. Flow)	Shop Building at reservoir site (includes 12" parallel pipe)		--	--	--	$570,000	2028
O9	Existing PRV/PSV Replacement (including vault)	At existing PRV/PSV site		--	--	--	$100,000	2020
O10	New PRV station - part of the N2 project	--		--	--	--	$100,000	2030
Water Main Improvements								
N1	King County Park Trail	326th Avenue NE	Earth-to-Earth Develop.	N/A	12	700	$245,000	2022
N1	Looping Connection	326th Avenue NE	Trail	N/A	8	300	$105,000	2022
N1	Looping Connection	Earth-to-Earth Develop.	Trail	N/A	8	150	$52,500	2022
N2	King County Park Trail	Earth-to-Earth Develop.	NE 24th St (Langlois Rd)	N/A	12	4200	$1,470,000	2030
N2	Looping Connection	NE 32nd Street	Trail	N/A	8	150	$52,500	2030
N3	King County Park Trail	NE 45th Street	326th Avenue NE	N/A	12	1700	$595,000	2035
R1	Bagwell Street	Alley "J"	SR 203 (W edge of R/W)	6	12	100	$26,500	2019

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
R1	Alley "J"	Bagwell St.	Morrison	6	12	200	$53,000	2019
R1	Morrison Street	Stephens Ave	Alley "J"	6	8	500	$125,000	2019
R1	Crossing of Carn. Duvall Rd NE (SR 203)	At Bagwell Street		4	12	50	$50,000	2019
R2	Tolt Avenue	Morrision St	Bagwell St	4	12	200	$70,000	2020
R3	Alley "J"	Alley "A"	Morrison	6	12	200	$53,000	2019
R4	Alley "E"	SVT	Alley K	4	8	450	$112,500	2030
R5	Alley "E"	Alley K	Spillman	6	8	550	$137,500	2030
R6	326th Ave.	47th St.	50th St.	6	8	600	$150,000	2027
R6	327th Ave.	47th St.	50th St.	6	8	600	$150,000	2027
R6	328th Ave.	47th St.	50th St.	6	8	600	$150,000	2027
R6	47th St.	327th Ave.	328th Ave.	6	8	300	$75,000	2027
R6	47th St.	326th Ave.	327th Ave.	8	8	300	$75,000	2027
R6	47th St.	SVT	326th Ave.	8	12	700	$185,500	2027
R7	Stewart Avenue Replacement	Entwistle St.	Alley "B"	6	8	700	$175,000	2028
R8	Alley "J" (as stand alone)	Entwistle St.	Stephens Ave.	8	12	50	$25,000	2019
R9	McKinley Avenue Replacement	Blanche	Eugene	4	8	800	$200,000	2019
R10	Myrtle Street	McKinley	King	6	8	350	$87,500	2025
R11	Alley Between Myrtle and Blanche	King St.	McKinley	2	8	350	$87,500	2030
R12	SR 203 Main Replacement	Bagwell St.	NE 55th St.	6	12	1400	$350,000	2025
R13	NE 55th Street Replacement	324th Ave.	318th Ave.	4	8	1800	$450,000	2018
R14	NE 55th ST. - West Stub	318th	west 300 ft	2	8	300	$75,000	2018

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
R15	318th Avenue Replacement	55th St.	57th St	2	8	500	$125,000	2018
R16	320th Avenue Replacement	55th St.	60th St.	1.5	8	1300	$325,000	2017
R17	NE 60th Street Replacement	320th Ave.	322nd Ave.	1.5	8	650	$162,500	2017
R18	322nd Avenue Replacement	55th St.	60th St.	2	8	1300	$325,000	2017
R19	Carn. Duvall Rd NE (SR 203)	60th	Carnation Farm Rd.	2	8	1800	$450,000	2035
R20	Fall City Carn Rd.	Langlois/ NE 24th	324th Way NE	4	8	1800	$450,000	2035
R21	324th Avenue NE	Langlois/ NE 24th	NE 16th	4	8	2300	$575,000	2035
	TOTAL						**$15,697,500**	

Table 8.2 shows the improvements in another view. The improvements are shown by year for the first six years and then grouped into two other schedule groups – projects anticipated in year 7-10 and therefore eligible for GFC calculation, and projects anticipated in years 11-20. These projects will be reviewed and likely reprioritized in the next update of the Water Comprehensive Plan. These improvements are shown in 2016 dollars.

Table 8.2 CIP Improvements Schedule

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
Multi-Year Projects								
O2	Water Meter Replacements ($15,000/yr) - 20 yrs	--		--	--	--	$300,000	Multi yr
O3	Leak Detection Studies ($5,000/yr) - 20 yrs	--		--	--	--	$100,000	Multi yr
O4	Funding Assistance - 10 yrs	--		--	--	--	$100,000	Multi yr
O5	Valve Replacements ($15,000/yr) for 20 yrs	--		--	--	--	$300,000	Multi-Yr
High Priorities (2016 to 2021)								
R16	320th Avenue Replacement	55th St.	60th St.	1.5	8	1300	$325,000	2017
R17	NE 60th Street Replacement	320th Ave.	322nd Ave.	1.5	8	650	$162,500	2017
R18	322nd Avenue Replacement	55th St.	60th St.	2	8	1300	$325,000	2017
W1	Well Chlorination	At well site		--	--	--	$71,000	2017
W2	Well Generator	At well site		--	--	--	$111,000	2017
R13	NE 55th Street Replacement	324th Ave.	318th Ave.	4	8	1800	$450,000	2018
R14	NE 55th ST. - West Stub	318th	west 300 ft	2	8	300	$75,000	2018
R15	318th Avenue Replacement	55th St.	57th St	2	8	500	$125,000	2018
R1	Bagwell Street	Alley "J"	SR 203 (W edge of R/W)	6	12	100	$26,500	2019
R1	Alley "J"	Bagwell St.	Morrison	6	12	200	$53,000	2019
R1	Morrison Street	Stephens Ave	Alley "J"	6	8	500	$125,000	2019
R1	Crossing of Carn. Duvall Rd NE (SR 203)	At Bagwell Street		4	12	50	$50,000	2019

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
R3	Alley "J"	Alley "A"	Morrison	6	12	200	$53,000	2019
R8	Alley "J" (as stand alone)	Entwistle St.	Stephens Ave.	8	12	50	$25,000	2020
R9	McKinley Avenue Replacement	Blanche	Eugene	4	8	800	$200,000	2019
O9	Existing PRV/PSV Replacement (including vault)	At existing PRV/PSV site		--	--	--	$100,000	2020
R2	Tolt Avenue	Morrision St	Bagwell St	4	12	200	$70,000	2020
Medium Priorities (2022 to 2025)								
O1-1	Telemetry Control and Reporting – Phase 1	Master Site Set-up and Spring Source Site		--	--	--	$40,000	2021
O1-2	Telemetry Control and Reporting	Reservoir Site and Well Site		--	--	--	$30,000	2022
O1-3	Telemetry Control and Reporting	Connecting to Sewer System		--	--	--	$0	2023
N1	King County Park Trail	326th Avenue NE	Earth-to-Earth Develop.	0	8	700	$245,000	2022
N1	Looping Connection	326th Avenue NE	Trail	0	8	300	$105,000	2022
N1	Looping Connection	Earth-to-Earth Develop.	Trail	0	8	150	$52,500	2022
S3	Source Meter Replacement	--		--	--	--	$20,000	2025
W3	Well Source Protection Boundaries	--		--	--	--	$30,000	2025
O6	2025 Comprehensive Plan	--		--	--	--	$175,000	2025
R10	Myrtle Street	McKinley	King	6	8	350	$87,500	2025

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
R12	PAA/SR 203 Main Replacement	Bagwell St.	NE 55th St.	6	12	1400	$350,000	2025
Low Priorities (2026 to 2035)								
R6	326th Ave.	47th St.	50th St.	6	8	600	$150,000	2027
R6	327th Ave.	47th St.	50th St.	6	8	600	$150,000	2027
R6	328th Ave.	47th St.	50th St.	6	8	600	$150,000	2027
R6	47th St.	327th Ave.	328th Ave.	6	8	300	$75,000	2027
R6	47th St.	326th Ave.	327th Ave.	8	8	300	$75,000	2027
R6	47th St.	SVT	326th Ave.	8	12	700	$185,500	2027
R7	Stewart Avenue Replacement	Entwistle St.	Alley "B"	6	8	700	$175,000	2028
O8	New Booster Pump Station (w/ Fire Flow)	At reservoir site (includes 12" parallel pipe)		--	--	--	$770,000	2028
O8-A	Alternative Booster Pump Station (Res. Flow)	At reservoir site (includes 12" parallel pipe)		--	--	--	$570,500	2028
S1	NE 24th Street (Langlois Road)	344th Ave	SR 203	8	12	TBD	$2,500,000	2030
O10	New PRV station - part of the N2 project	--		--	--	--	$100,000	2030
N2	King County Park Trail	Earth-to-Earth Develop.	NE 24th St (Langlois Rd)	0	12	4200	$1,470,000	2030
N2	Looping Connection	NE 32nd Street	Trail	0	12	150	$52,500	2030
R4	Alley "E"	SVT	Alley K	4	8	450	$112,500	2030
R5	Alley "E"	Alley K	Spillman	6	8	550	$137,500	2030
R11	Alley Between Myrtle and Blanche	King St.	McKinley	2	8	350	$87,500	2030

Key	On	From	To	Old Pipe Size	New Pipe Size	Pipe Length	Project Budget (2016 Dollars)	Projected Start Year
S4	Study of Spring Catchment Capacity	--		--	--	--	$90,000	2035
O7	2035 Comprehensive Plan	--		--	--	--	$225,000	2035
N3	King County Park Trail	NE 45th Street	326th Avenue NE	0	12	1700	$595,000	2035
R19	Carn. Duvall Rd NE (SR 203)	60th	Carnation Farm Rd.	2	8	1800	$450,000	2035
R20	Fall City Carn Rd.	Langlois/ NE 24th	324th Way NE	4	8	1800	$450,000	2035
R21	324th Avenue NE	Langlois/ NE 24th	NE 16th	4	8	2300	$575,000	2035
S2	Fall City Carn Rd. (SR 203)	NE 24th St (Langlois Rd)	Tolt Middle School	8	12	TBD	$2,700,000	2035
	TOTAL						**$15,697,500**	

NTS

NORTH
ZONE (229)

SOUTH
ZONE (328)

NEW ZONE (250)

RESERVOIR SITE
(605,000 GAL)
O.F. ELEV. - 229'

EXISTING
WELL

PRESSURE ZONE
BOUNDARY

PRV & PSV

SPRING TANK
(109,000 GAL)
O.F. ELEV. - 333'

CHLORINATION
BUILDING

INTAKE
MANHOLES

LANGLOIS
LAKE

TOLT RIVER

CARNATION FARM RD.

NE 60TH STREET

NE 40TH STREET

NE 50TH ST

NE 47TH ST

NE 46TH PL

NE 45TH STREET

NE 55TH STREET

BAGWELL STREET

(ENTWISTLE STREET)

LANGLOIS ROAD

N.E. 24th ST.

N.E. 16th ST.

FALL CITY - CARNATION ROAD N.E.

TO CATHOLIC YOUTH
CAMP DON BOSCO

CARNATION
ELEMENTARY SCHOOL

VALLEY
MEMORIAL PARK

TOLT MIDDLE
SCHOOL

EVERETT BRANCH C.M. & ST. P. RRD R.S.P.& L.CO. R/W

C.M. ST. P. & P. RRD. (EVERETT BRANCH)

S. R. 203 (S.S. HWY. NO 2)

CARNATION - DUVALL RD NE (S.R. 203)

FALL CITY - CARNATION RD NE (S.R. 203)

DUVALL RD NE (O'LEARY AVE)

316TH AVE NE

318TH AVE NE

320TH AVE NE

322ND AVE NE

324TH AVE NE

325TH AVE NE

326TH AVE NE

327TH AVE NE

328TH AVE NE

328th AVE NE

323rd AVE NE

334TH AVE NE

MILWAUKEE VALLEY

SNOQUALMIE POWER PUGET TRAIL

COUNTY PARK KING

STEPHENS AVE

STEWART AVE

TOLT AVENUE

MORRISON

RUTHERFORD

REITZE

BIRD STREET

ENTWISTLE

EUGENE

MYRTLE

BLANCHE

PALACE COURT

REGAL STREET

ROYAL COURT

REGENCY PLACE

KINGS COURT

QUEENS COURT

NE 43RD PLACE

NE 42ND PL

NE 42ND PLACE

NE 42ND STREET

NE 40TH CIRCLE

NE 40TH PLACE

ALLEY "A"

ALLEY "B"

ALLEY "C"

ALLEY "D"

ALLEY "E"

ALLEY "F"

ALLEY "G"

ALLEY "H"

COMMERCIAL STREET

R-1 R-2 R-3 R-4 R-5 R-6 R-7 R-8 R-9 R-10 R-11 R-12 R-13 R-14 R-15 R-16 R-17 R-18 R-19 R-20 R-21

N-1 N-2 N-3

S-1 S-2 S-3 S-4

O-8 O-9 O-10

W1 W2 W3

8"DI 6"DI 12"DI 4"DI 8"PVC 4"PVC 6"PVC 8"AC 6"AC 4"AC 8"STL 6"STL 4"STL 2"GALV 1 1/2"GALV 8" OD STEEL 4" OD STEEL 8" PVC 2" PVC 2" POLY 6" DI 8" DI (2011)

LEGEND

- WATER MAIN (8"DI)
- CITY LIMITS
- URBAN GROWTH BOUNDARY
- PLANNING AREA
- NEW PRESSURE ZONE
- CIP PROJECTS - REPLACE WATER MAIN
- CIP PROJECTS - NEW WATER MAIN
- FUTURE WATER MAIN (DEVELOPMENT/LOOPING)
- (R-18) PROPOSED PROJECT NUMBER
- PUMP STATION
- WELL
- STORAGE TANK / INTAKE MANHOLE
- PRESSURE REDUCING STATION

Stantec
11130 NE 33rd Place, Bellevue WA 98004
phone: (425) 869-9448 www.stantec.com

CITY OF CARNATION
KING COUNTY

2015 WATER SYSTEM PLAN
FIGURE 8.1
CAPITAL IMPROVEMENT PROJECTS (CIP) MAP

JUNE 2016

PLOTTING DATE: 8/1/2016 USER: ARD, STEPHANIE VERSION: 2014 FILE NAME: V:\2002\active\200200372B\plan\Figures\Figure 8-1 CIP-MAP.dwg

THIS PAGE INTENTIONALLY BLANK

9.0 CHAPTER 9 - FINANCIAL PROGRAM

The purpose of this financial chapter is to provide a financial program that allows the water utility to remain financially viable during execution of the Capital Improvement Program (CIP) identified in this Plan. This viability analysis considers the historical financial condition of the utility, the sufficiency of utility revenues to meet current and future financial and policy obligations, and the financial impact of executing the CIP. Furthermore, this chapter provides a review of the utility's current rate structure with respect to rate adequacy, equity, promotion of water conservation and customer affordability.

9.1 HISTORICAL FINANCIAL CONDITION

The City's enterprise funds operate on a cash basis, thus annual balance sheets and income statements are not prepared. **Table 9.1** summarizes the available level of financial detail for the previous six years (2010 through 2015) as reported by the City on Statement C-4, "Fund Resources and Uses Arising From Cash Transactions." The table reflects Fund 401 which includes both water and sewer activity. The City no longer tracks water and sewer activities separately in the historical financial statements, as it is no longer required.

Table 9.1 Historical Financial Detail by Year

City of Carnation - Statement C-4		2010	2011	2012	2013	2014	2015
Beginning Cash and Investments		**$ 1,778,496**	**$ 1,897,802**	**$ 2,086,913**	**$ 2,244,025**	**$ 2,367,224**	**$ 2,407,862**
Operating Revenues							
310	Taxes	$ -	$ -	$ -	$ -	$ -	$ -
320	Licenses and Permits	$ 1,350	$ -	$ 230	$ -	$ 2,200	$ 11,600
330	Intergovernmental Revenues	$ 10,632	$ 100	$ -	$ -	$ -	$ 55,000
340	Charges for Goods and Services	$ 1,483,264	$ 1,374,099	$ 1,428,426	$ 1,470,018	$ 1,601,220	$ 2,149,518
350	Fines and Penalties	$ -	$ -	$ -	$ 3,844	$ 2,353	$ 3,032
360	Miscellaneous Revenues	$ 14,298	$ 18,988	$ 19,352	$ 21,635	$ 22,090	$ 18,899
Total Operating Revenues:		**$ 1,509,545**	**$ 1,393,187**	**$ 1,448,008**	**$ 1,495,497**	**$ 1,627,863**	**$ 2,238,048**
Operating Expenditures:							
510	General Government	$ -	$ 5,646	$ 10,146	$ 39,247	$ 7,656	$ 27,506
520	Public Safety	$ -	$ 968	$ 519	$ 827	$ 879	$ 723
530	Utilities	$ 1,085,602	$ 1,069,175	$ 1,132,981	$ 1,132,686	$ 1,140,668	$ 1,293,565
Total Operating Expenditures:		**1,085,602**	**1,075,789**	**1,143,646**	**1,172,759**	**1,149,202**	**1,321,794**
Net Operating Increase (Decrease):		$ 423,943	$ 317,398	$ 304,362	$ 322,738	$ 478,660	$ 916,254
Nonoperating Revenues							
370,380,395,398	Other Financing Sources	$ 332,307	$ 1,375,472	$ 1,463,813	$ 240,033	$ 242,395	$ 243,989
391-393	Debt Proceeds	$ -	$ -	$ -	$ 2,481,748	$ 43,320	$ 50,412
397	Transfers-In	$ -	$ -	$ -	$ 91,700	$ -	$ -
Total Nonoperating Revenues:		**$ 332,307**	**$ 1,375,472**	**$ 1,463,813**	**$ 2,813,481**	**$ 285,715**	**$ 294,401**
Nonoperating Expenditures							
580,596,599	Other Financing Uses	$ 320,673	$ 366,080	$ 373,077	$ -	$ -	$ -
591-593	Debt Service	$ 68,801	$ 303	$ 301	$ 2,660,768	$ 644,918	$ 618,315
594-595	Capital Expenditures	$ 227,467	$ 1,136,863	$ 1,237,685	$ 230,553	$ 48,819	$ 209,504
597	Transfers-Out	$ 20,000	$ -	$ -	$ 121,700	$ 30,000	$ 30,000
Total Nonoperating Expenditures:		**$ 636,942**	**$ 1,503,246**	**$ 1,611,063**	**$ 3,013,021**	**$ 723,737**	**$ 857,819**
Increase (Decrease in Cash and Investments)		$ 119,307	$ 189,624	$ 157,112	$ 123,199	$ 40,638	$ 352,836
Total Ending Cash and Investments:		**$ 1,897,803**	**$ 2,087,426**	**$ 2,244,025**	**$ 2,367,224**	**$ 2,407,862**	**$ 2,760,698**

During the historical 2010 to 2015 time period, annual Charges for Goods and Services (rate revenue) have increased 45%, which represents an approximate $666,000 increase. Total annual operating expenditures (which includes debt service but not capital outlays) have increased 168% in this same period, representing approximately a $786,000 increase. About 70% of the dollar increase came from debt service, with the remaining 30% coming from increases to non-debt related operating expenditures.

9.2 OUTSTANDING DEBT PRINCIPAL

Table 9.2 outlines the City's outstanding debt principal as of the end of 2015, specific to the water utility. The water utility has two outstanding loans with a total principal balance of just over $2.6 million.

Table 9.2 Outstanding Water Debt Principal, Including 2016

Outstanding Debt Principal, Including 2016		
Debt Description	**Principal Outstanding**	**Maturity Year**
Revenue Bond (Replaced Rural Development Loan)	$ 2,298,615	2053
PWTF: PR09-951-010	$ 350,878	2029
Total	**$ 2,649,493**	

9.3 AVAILABLE CAPITAL FUNDING RESOURCES

Feasible long-term capital funding strategies should be defined to ensure adequate resources are available to fund the CIP identified in this Plan. In addition to the utility's resources such as accumulated cash reserves, capital revenues, and general facility charges, capital needs can also be met from outside sources such as grants, low-interest loans, and bond financing. The following is a summary of Internal Utility Resources, Government Programs and Resources, and Public Debt Financing.

9.3.1 Internal Utility Resources

Internal utility resources appropriate for funding capital needs include accumulated cash in the capital fund, policy-based system reinvestment funding from rates, additional transfers from operating revenue surplus, and capital revenues such as general facility charges or local facilities charges. These resources are discussed below.

9.3.1.1 Utility Funds and Cash Reserves

User charges (rates) paid by the utility's customers are the primary funding source for all utility activities. The rates cover total annual costs associated with operating and maintaining the water system. Rates can pay for capital improvement projects in two ways: either paying for debt service or directly paying for capital projects. Although funding the capital costs directly through rates does not result in the additional interest expense associated with issuing debt, this approach can cause large and/or volatile rate increases.

For the City of Carnation, utility resources also include the Water System Capital Improvement Surcharge ("capital surcharge"). The revenue generated from the capital surcharge is explicitly ear-marked for the Fund 402 Water Capital Replacement Fund.

9.3.1.2 General Facility Charges

A general facility charge (GFC), as provided for by RCW 35.92.025, refers to a one-time charge imposed on new customers as a condition of connection to the utility system. The purpose of the GFC is two-fold: (1) to promote equity between new and existing customers; and (2) to provide a source of revenue to fund capital projects. Equity is served by providing a vehicle for new customers to share the cost of infrastructure investment. GFC revenues provide a source of cash flow used to support utility capital needs; revenue can only be used to fund utility capital projects or to pay debt service incurred to finance those projects.

In the absence of a GFC, growth-related capital costs would be borne in large part by existing customers. In addition, the net investment in the utility already collected from existing customers, whether through rates, charges and/or assessments, would be diluted by the addition of new customers, effectively subsidizing new customers with prior customers' payments. To establish equity, a GFC should recover a proportionate share of the existing and future infrastructure costs from a new customer. From a financial perspective, a new customer should become financially equivalent to an existing customer by paying the GFC.

The following table summarizes the City's adopted 2017 water GFC schedule.

Table 9.3 Schedule of GFCs by Meter Size

General Facilities Charge Schedule	
Meter Size	**Charge**
5/8 or 3/4-inch	$9,145
1-inch	$22,861
1 1/2-inch	$45,723
2-inch	$73,156
3-inch	$146,313
4-inch	$228,613
6-inch	$457,227
8-inch	$731,563
10-inch	$1,051,621

9.3.1.3 Local Facilities Charge

While a GFC is the manner in which new customers pay their share of general facilities costs, local facilities funding is used to pay the cost of local facilities that connect each property to the system infrastructure. Local facilities funding is often overlooked in a rate forecast since it is funded upfront by either connecting customers, developers, or through an assessment to properties - but never from rates. Although these funding mechanisms do not provide a capital revenue source toward funding CIP costs, a discussion of these charges is included in this chapter because of their impact on new customers, if such charges are implemented.

There are several mechanisms that can be considered toward funding local facilities. One of the following scenarios typically occurs:

- The utility charges a connection fee based on the cost of the local facilities (under the same authority as the GFC);
- A developer funds extension of the system to their development and turns those facilities over to the utility (contributed capital); or
- A local assessment is set up called a Utility Local Improvement District (ULID/LID) which collects tax revenue from benefited properties.

While the City does not impose these mechanisms, they are discussed in this section as information only.

A Local Facilities Charge (LFC) is a variation of the connection charge authorized through RCW 35.92.025. It is a city-imposed charge to recover the cost related to service extension to local properties. Often called a front-footage charge and imposed on the basis of footage of main "fronting" a particular property, it is usually implemented as a reimbursement mechanism to a city for the cost of a local facility that directly serves a property. It is a form of connection charge and, as such, can accumulate up to 10 years of interest. It typically applies to instances where no developer-installed facilities are needed through developer extension due to the prior existence of available mains already serving the developing property.

The Developer Extension is a requirement that a developer install onsite and sometimes offsite improvements as a condition of extending service. These are in addition to the GFC required and must be built to City standards. The City is authorized to enter into developer extension agreements under RCW 35.91.020. Part of the agreement between the City and the developer for the developer to extend service might include a late-comer agreement, resulting in a late-comer charge to new connections to the developer extension.

Latecomer Charges are a variation of developer extensions whereby a new customer connecting to a developer-installed improvement makes a payment to the City based on their share of the developers cost (RCW 35.91.020). The City passes this on to the developer who installed the facilities. This is part of the developer extension process, and defines the allocation of costs and records latecomer obligations on the title of affected properties. No interest is

allowed, and the reimbursement agreement is in effect for a period of 20 years, unless a longer duration is approved by the City.

LID/ULID is another mechanism for funding infrastructure that assesses benefited properties based on the special benefit received by the construction of specific facilities (RCW 35.43.042). Most often used for local facilities, some ULIDs also recover related general facilities costs. Substantial legal and procedural requirements can make this a relatively expensive process, and there are mechanisms by which a ULID can be rejected by a majority of property ownership within the assessment district boundary. If parcels are already served, this mechanism cannot be used for upgrades.

9.3.2 Government Programs and Resources

9.3.2.1 Grants and Low Cost Loans Overview

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs. Remaining miscellaneous grant programs are generally lightly funded and heavily subscribed. Nonetheless, even the benefit of low-interest loans makes the effort of applying worthwhile. Grants and low-cost loans for utilities are available from various Washington State Departments, and some select options are described in greater detail below.

The following document, developed annually by the Department of Commerce, provides additional funding and eligibility details as well as contact information for staff representatives of each program: http://www.infrafunding.wa.gov/downloads/FundingProgramSummary7-22-16.pdf.

Note that the City has done a good job in securing low cost water-related state loans in the past, and the City currently has a Public Works Trust Fund loan at a 1% interest rate. The Drinking Water State Revolving Fund and U.S. Department of Agriculture Rural Development program are the most likely future state loans for the City of Carnation.

9.3.2.2 Public Works Trust Fund (PWTF)

Cities, counties, special purpose districts, public utility districts, and quasi-municipal governments are eligible to receive loans from the PWTF. Eligible projects include repair, replacement, and construction of infrastructure for domestic water, sanitary wastewater, stormwater, solid waste, road, and bridge projects that improve public health and safety, respond to environmental issues, promote economic development, or upgrade system performance. Currently the Public Works Board has suspended the non-Construction Programs and significantly reduced funding to the construction loan program. The Public Works Board website notes that the next funding cycle is to be determined by funding levels in early 2016-17. In addition to lack of PWTF funding over the last few years, the board must implement policies and procedures designed to

maximize local government use of federal funds to finance local infrastructure including, but not limited to, drinking water state revolving funds (DWSRF) operated by the state departments of health and ecology. No loans have been available through the PWTF for several years for water projects. The money was diverted to other state programs.

Projects that are eligible for drinking water state revolving funds are not eligible for public works board construction loans. Under this requirement, there are three ways in which a project can be considered eligible for a DWSRF loan:

- Projects that have applied to the state revolving funds and are awaiting a funding decision;
- Projects that have been rejected for funding solely due to not meeting readiness requirements; and
- Projects that have not applied, but would likely be eligible if the project applied and met the project readiness requirements.

According to information from the Public Works Board website, nearly $100 million of funding is available. During this current lending cycle, PWTF loans may be available at an interest rate of 1.66 percent with a twenty year term. Adjusted rates and terms are available for projects located in "distressed" communities. All loan terms are subject to negotiation and Board approval. Currently no local match is required and the maximum loan amount is $10 million per jurisdiction per biennium. Information regarding the application process as well as rates and terms is posted on the PWTF website in early spring. The current application deadline was August 18th, 2016 and the next cycle deadline is unknown at this time. Further detail is available at http://www.pwb.wa.gov and http://www.pwb.wa.gov/Documents/PWB-Applications-Available-Handout-07-20-2016.pdf.

9.3.2.3 Drinking Water State Revolving Fund (DWSRF)

Drinking Water State Revolving Fund (DWSRF) Loan Program – DWSRF funding historically targets protection of public health, compliance with drinking water regulations and assistance for small and disadvantaged communities. Terms are up to 20 years, and in some cases, provide partial loan forgiveness. Interest rates are 1.0 - 1.5 percent, there is a 1 percent loan fee, and no local match is required. Applicants need an approved water system plan, or plan amendment, containing the DWSRF project prior to submitting an application. All public water systems that receive a DWSRF loan must undergo an environmental review, a cultural review, and an Investment Grade Efficiency Audit (IGEA). The IGEA is an effort to apply energy efficiency to water systems and may be financed as part of the DWSRF loan. The Fall 2016 application cycle began August 1st, 2016 and will conclude September 30, 2016. Nearly $35 million is expected to be available this cycle. DWSRF takes applications annually in the Fall. Further detail is available at http://www.doh.wa.gov.

9.3.2.4 Community Economic Revitalization Board

Community Economic Revitalization Board (RCW 43.160): A federal program administered by the State Department of Community Trade and Economic Development, this program provides grants and loans for infrastructure improvements including utility projects. It prioritizes projects that create or retain jobs for low and moderate-income residents.

9.3.2.5 Infrastructure Assistance Coordinating Council

Infrastructure Assistance Coordinating Council: The Infrastructure Assistance Coordinating Council (Council) is comprised of state and local agencies whose function is to provide funding for infrastructure repair and development. Its purpose is to assist local governments in coordinating funding efforts for infrastructure improvements, and can be a valuable resource to provide awareness of any new funding opportunities.

9.3.2.6 Community Development Block Grant (CDBG)

The purpose of the CDBG is to assist with final design and construction of wastewater, drinking water, side connections, stormwater and other projects serving economic development. These projects must principally benefit low to moderate income people in non-entitlement cities and counties. Cities or towns must have a population fewer than 50,000 people and counties must have a population fewer than 200,000 people. The 2016 CDBG funding cycle is closed. Pending CDBG funding, 2017 applications will be due in June 2017. More information can be found at www.commerce.wa.gov/cdbg. The City has taken advantage of this program in the past for several projects. However, the rules have changed so it is less likely that the City will qualify for future grants.

9.3.2.7 U.S. Department of Agriculture Rural Development

U.S. Department of Agriculture Rural Development – Rural Utilities Service – Water and Waste Disposal Direct Loans and Grants: The U.S. Department of Agriculture Rural Development loans and grants provide pre-construction and construction loans and grants associated with building, repairing or improving drinking water, solid waste facilities and wastewater facilities. Cities or towns with fewer than 10,000 people as well as counties and special purpose districts unable to get funds from other sources at reasonable rates. Loans can be structured with terms up to 40 years and interest rates between 1.625-2.75%. Applications are accepted year-round on a fund-available basis. More information can be found at www.rurdev.usda.gov/wa.

9.3.3 Public Debt Financing

9.3.3.1 General Obligation Bonds

General obligation (G.O.) bonds are bonds secured by the full faith and credit of the issuing agency, committing all available tax and revenue resources to debt repayment. With this high level of commitment, G.O. bonds have relatively low interest rates and few financial restrictions.

However, the authority to issue G.O. bonds is restricted in terms of the amount and use of the funds, as defined by Washington constitution and statute. Specifically, the amount of debt that can be issued is linked to assessed valuation.

> RCW 39.36.020 states:
>
> "(ii) Counties, cities, and towns are limited to an indebtedness amount not exceeding one and one-half percent of the value of the taxable property in such counties, cities, or towns without the assent of three-fifths of the voters therein voting at an election held for that purpose.
>
> (b) In cases requiring such assent counties, cities, towns, and public hospital districts are limited to a total indebtedness of two and one-half percent of the value of the taxable property therein."

While bonding capacity can limit availability of G.O. bonds for utility purposes, these can sometimes play a valuable role in project financing. A rate savings may be realized through two avenues: the lower interest rate and related bond costs; and the extension of repayment obligation to all tax-paying properties (not just developed properties) through the authorization of an ad valorem property tax levy.

9.3.3.2 Revenue Bonds

Revenue bonds are commonly used to fund utility capital improvements. The debt is secured by the revenues of the issuing utility and the debt obligation does not extend to the City's other revenue sources. With this limited commitment, revenue bonds typically bear higher interest rates than G.O. bonds and also require security conditions related to the maintenance of dedicated reserves (a bond reserve) and financial performance (added bond debt service coverage). The City agrees to satisfy these requirements by ordinance as a condition of bond sale.

Revenue bonds can be issued in Washington without a public vote. There is no bonding limit, except perhaps the practical limit of the utility's ability to generate sufficient revenue to repay the debt and provide coverage. In some cases, poor credit might make issuing bonds problematic. The City has used revenue bond financing in the past and currently has one outstanding revenue bond.

9.3.3.3 Capital Resource Funding Summary

An ideal funding strategy would include the use of grants and low-cost loans when debt issuance is required. However, these resources are very limited and competitive in nature and do not provide a reliable source of funding for planning purposes. It is recommended that the City pursue these funding avenues but assume bond financing to meet needs above the utility's available cash resources. G.O. bonds may be useful for special circumstances, but since bonding capacity limits are most often reserved for other City (non-utility) purposes, revenue

bonds are a more secure financing mechanism for utility needs. The Capital Financing Strategy developed to fund the updated CIP follows the funding priority below:

1. Available grant funds and/or developer contributions
2. Interest earnings on allocated fund balances
3. Other miscellaneous capital resources
4. Annual revenue collections from general facility charges
5. Annual transfers of system reinvestment funding or excess cash (above minimum balance targets) from operating accounts
6. Accumulated capital cash reserves
7. Revenue bond financing

The 20-year CIP is expected to be funded from roughly 44% cash sources and 56% debt.

9.4 CURRENT FINANCIAL STRUCTURE

The City maintains a fund structure and implements financial policies that target management of a financially viable and fiscally responsible enterprise fund utility.

9.4.1 Funds

Separate accounting is provided for utility restricted and unrestricted cash reserves. Restricted reserves typically include funds set aside as part of revenue bond covenants or other loan covenants and cannot be used for purposes other than the final payment on outstanding restricted debt obligations. Unrestricted cash is maintained in the Water & Sewer Utility Fund (401) and the Water Capital Replacement Fund (402). Fund 401 resources are combined for the water and sewer utilities. The City does not track the funds separately by utility. For purposes of developing the financial forecast, the City has assumed that 50% of the balance is assigned to the water utility. Restricted funds related to outstanding debt include Fund 404 Water Bond Redemption and 405 Water Bond Reserve. The Operating Fund is where operating revenue deposits are made and operating expenses are withdrawn.

The Capital Fund receives capital revenue deposits such as general facility charges, grant funds, and debt proceeds, as well as interest earnings on the Fund balance. Capital reserves also include annual transfers from the Operating Fund for rate revenues designated for capital purposes (system reinvestment funding through the water capital surcharge) and any operating cash balances in excess of the recommended minimum target balance. Capital expenditures are paid from this fund. The fund balance at the end of 2015 had $745,379 in cash available for funding capital projects in 2016 and beyond.

9.4.2 Financial Policies

A brief summary of the key financial policies employed by the City, as well as those recommended and incorporated in the financial program are discussed below.

Minimum Fund Balances – Utility reserves serve multiple functions; they can be used to address variability and timing of expenditures and receipts; occasional disruptions in activities, costs or revenues; utility debt obligations; and many other functions. The collective use of individual reserves helps to limit the City's exposure to revenue shortfalls, meet long-term capital obligations, and reduce the potential for bond coverage defaults.

An operating reserve is designed to provide a liquidity cushion; it protects a utility from the risk of short-term variation in the timing of revenue collection or payment of expenses. Like other types of reserves, operating reserves also serve another purpose: they help smooth rate increases over time. Target funding levels for an operating reserve are generally expressed as a certain number of days of operating and maintenance (O&M) expenses, with the minimum requirement varying with the expected revenue volatility. Industry practice for utility operating reserves ranges from 30 days (8%) to 120 days (33%) of O&M expenses, with the lower end more appropriate for utilities with stable revenue streams and the higher end of the range more appropriate for utilities with significant seasonal or consumption-based fluctuations.

The financial plan incorporates a minimum balance target of 60 days of O&M, with a maximum target of 90 days of O&M. This approximately equates to between $90,000 and $130,000 based on the 2017 budget. This target range is prudent for a water utility, given the variability in revenue collections due to changing weather patterns that can affect revenue collections during the summer season.

A capital contingency reserve is an amount of cash set aside in case of an emergency should a piece of equipment or a portion of the utility's infrastructure fail unexpectedly. Additionally, the reserve could be used for other unanticipated capital needs including capital project cost overruns. Industry practice ranges from maintaining a balance equal to 1 to 2% of fixed assets, an amount equal to a multi-year rolling average of CIP costs, or an amount determined sufficient to fund an equipment failure (other than catastrophic failure).

The forecast assumes a minimum balance target of 1% of estimated fixed assets, which results in an average annual target of about $90,000 throughout the rate study period.

A bond / debt reserve – Bond covenants often establish reserve requirements as a means of protecting bondholders against the risk of nonpayment. Some state loans also have a reserve requirement. A reserve is typically funded at the time of borrowing as part of the debt principal. A reserve amount equal to annual debt service is used when the forecast assumes issuing revenue bonds. The City currently has a Water Bond Reserve Fund that it transfers money to each year, from the operating fund, until the City has one year's worth of bonded debt service.

System Reinvestment - The purpose of system reinvestment funding is to provide for the replacement of aging system facilities to ensure sustainability of the system for ongoing operation. Each year, the utility's assets lose value, and as they lose value they are moving toward eventual replacement. That accumulating loss in value and future liability is typically measured for reporting purposes through annual depreciation expense, which is based on the

original cost of the asset over its anticipated useful life. While this expense reflects the consumption of the existing asset and its original investment, the replacement of that asset will likely cost much more, factoring in inflation and construction conditions. Therefore, the added annual replacement liability is even greater than the annual depreciation expense.

The City already has a mechanism to plan for system reinvestment, which is the capital surcharge that generates revenue to be used specifically for capital projects. It is recommended that the City adopt a funding policy that sets the level of the surcharge to recover *estimated* deprecation, based on an assumed 50-year life for the system as a whole. Based on the City's available fixed asset information, depreciation expense is currently estimated at about $136,000, increasing to nearly $200,000 after the incorporation of planned capital expenditures over the 6-year planning period.

In addition to this minimum level of policy funding, cash in excess of the annual maximum operating fund target of 90 days of O&M is planned for transfer to the capital fund at year end, and made available for capital spending in subsequent years. Any surplus revenue generated from rate increases will be transferred to and accumulate in the capital fund, which lessens the amount that would otherwise need to be borrowed.

Debt Management –

Debt Service Coverage: There are two forms of debt service coverage: one applies to debt service from revenue bonds only, while the other applies to debt service on total debt, including state loans. Revenue bonds typically have a legal minimum coverage requirement of 1.25. State loans usually do not carry a minimum coverage requirement; however, based on industry standards, it is recommended that debt service coverage on total debt be at least 1.0. To be conservative, this review looks at coverage on total debt to ensure that it remains at or above 1.25 times. Throughout this forecast, the debt service coverage on total debt is expected to remain at or above 1.5 through 2022 as well as through 2035.

Capital Structure: Another useful measurement in assessing the debt burden of a utility is the capital structure, which is calculated with the following formula: Total Outstanding Debt Principal ÷ (Original Cost of Fixed Assets – Accumulated Depreciation). Since the City follows cash basis accounting, and therefore does not track accumulated depreciation, accumulated depreciation was estimated by assuming a 50-year life for all existing and future assets. A target capital structure of no more than 60% debt is considered appropriately conservative. A debt percentage lower than this suggests that the utility has the financial capacity to issue more debt if needed. The City's structure is currently estimated to be slightly above 60% debt in 2016. The debt percentage is expected to decrease to 41% by 2022, rise to 62% in 2030, and then decline to 59% by 2035.

9.5 FUNDING AND FINANCING THE CIP

The total CIP identifies $16 million ($23 million inflated) in project costs over the 20-year planning horizon. Capital expenditures for 2016 come from City staff estimates and expenditures for 2017-2035 come from costs developed specifically for this Plan. Costs are stated in 2016 dollars and are escalated to the year of planned spending at 3% per year. **Table 9.4** summarizes the annual costs associated with the 20-year CIP.

Table 9.4 20-Year CIP

Water CIP 2016-2035		
Year	**Current $**	**Inflated $**
2016	$ 305,347	$ 305,347
2017	$ 1,034,500	$ 1,065,535
2018	$ 690,000	$ 732,021
2019	$ 572,500	$ 625,586
2020	$ 210,000	$ 236,357
2021	$ 80,000	$ 92,742
2022	$ 472,500	$ 564,190
Subtotal	**$ 3,364,847**	**$ 3,621,778**
2023-2035	$ 12,458,000	$ 19,730,117
Grand Total	**$ 15,822,847**	**$ 23,351,895**

A capital funding plan is developed to determine the total resources available to meet the CIP needs and determine if new debt financing will be required. The capital reserve begins 2016 with $745,000 in cash reserves. GFC revenue collections are estimated to generate roughly $210,000 per year from 2016 through 2020. This is directly linked to the adopted GFC (plus annual inflation in 2018 and beyond) and a conservative estimate of customer growth.

Table 9.5 presents the 20-year Capital Financing Strategy. Cash resources, coupled with additional transfers from the Operating Fund and interest earnings are forecasted to fund approximately 44% of the 20-year CIP. Revenue bond proceeds of $13 million are assumed to fund remaining needs.

City Council instructed that the analysis for forecasting rate increases be limited to the near-term. However, to fully fund the 20-year capital program—and to stay within the recommended fiscal policies—this capital funding plan also considered the long-term. The following rate forecast strategy was developed for the regular rate: 3% annual rate increases through 2025 and 12% annual rate increases from 2026 through 2035. The capital surcharge is assumed to increase with depreciation, which equates to an approximate annual increase of 6% through 2025 and an annual increase of 10% from 2026 through 2035.

In the capital funding forecast, revenue bonds are assumed in order to be financially conservative, since revenue bonds typically have a higher interest rate than lower-cost state loans. However, the City should still strive to utilize low-cost loans when debt is necessary. While the forecast simply calculates necessary debt needed in each individual year, the City would likely group debt issues into two or three year increments.

Table 9.5 20-year Capital Financing Strategy

Capital Financing Plan					
Year	Capital Expenditures	Capital Expenditures Inflated	Net Revenue Bond Financing	Cash Funding	Total Financial Resources
2016	305,347	305,347	-	305,347	**305,347**
2017	1,034,500	1,065,535	-	1,065,535	**1,065,535**
2018	690,000	732,021	239,793	492,228	**732,021**
2019	572,500	625,586	219,799	405,788	**625,586**
2020	210,000	236,357	-	236,357	**236,357**
2021	80,000	92,742	-	92,742	**92,742**
2022	472,500	564,190	-	564,190	**564,190**
Subtotal	**3,364,847**	**3,621,778**	**459,591**	**3,162,187**	**3,621,778**
2023-2035	12,458,000	19,730,117	$ 12,566,515	7,163,602	**19,730,117**
Grand Total	**$ 15,822,847**	**$ 23,351,895**	**$ 13,026,106**	**$ 10,325,789**	**$ 23,351,895**

9.6 FINANCIAL FORECAST

The Financial Forecast, or revenue requirement analysis, forecasts the amount of annual revenue that needs to be generated by water rates. Based on City Council direction, the rate forecast period is assumed to span six years, 2016 – 2022. The analysis incorporates operating revenues, O&M expenses, debt service payments, system reinvestment funding needs, and any other identified revenues or expenses related to utility operations, and determines the sufficiency of the current level of rates. Revenue needs are also impacted by debt covenants (typically applicable to revenue bonds) and specific fiscal policies and financial goals of the utility.

The analysis determines the amount of revenue needed in a given year to meet that year's expected financial obligations. For this analysis, two revenue sufficiency criteria have been developed to reflect the financial goals and constraints of the utility: (1) cash needs must be met; and (2) debt coverage requirements must be realized. In order to operate successfully with respect to these goals, both tests of revenue sufficiency must be met.

9.6.1 Cash Test

The cash flow test identifies all known cash requirements for the utility in each year of the planning period. Capital needs are identified and a capital funding strategy is established. This may include the use of debt, cash reserves, outside assistance, and rate funding. Cash

requirements to be funded from rates are determined. Typically, these include O&M expenses, debt service payments, system reinvestment funding or directly funded capital outlays, and any additions to specified reserve balances. The total annual cash needs of the utility are then compared to projected cash revenues using the current rate structure. Any projected revenue shortfalls are identified and the rate increases necessary to make up the shortfall are estimated.

9.6.2 Coverage Test

The coverage test is based on a commitment made by the City when issuing revenue bonds and some other forms of long-term debt. For purposes of this analysis, revenue bond debt is assumed for any needed debt issuance. As a security condition of issuance, the City is required per covenant to agree that the revenue bond debt would have a higher priority for payment (a senior lien) compared to most other utility expenditures; the only outlays with a higher lien are O&M expenses. Debt service coverage is expressed as a multiplier of the annual revenue bond debt service payment. For example, a 1.0 coverage factor would imply no additional cushion is required. A 1.25 coverage factor means revenues must be sufficient to pay O&M expenses, annual revenue bond debt service payments, plus an additional 25% of annual revenue bond debt service payments. The excess cash flow derived from the added coverage, if any, can be used for any utility purpose, including funding capital projects.

9.6.3 Financial Forecast

The financial forecast is developed from the City's adopted 2017 budget along with other key factors and assumptions to develop a portrayal of the utility's annual financial obligations. The forecast covers the six year planning period through 2022. The following is a list of key revenue and expense factors and assumptions used to develop the forecast:

9.6.3.1 Revenue & Fund Balance Assumptions

- Customer Growth: The City estimates that roughly 180 single family customers will connect between 2017 and 2020. This annual connection projection was provided for this plan. However, in order to be financially conservative for the purposes of the rate strategy, it was assumed that only half of those connections would actually occur.
- Miscellaneous revenues are conservatively assumed to stay at their budgeted levels.
- Interest earnings assume a conservative rate of 0.25 percent applied to beginning of year cash balances based on recent historical Local Government Investment Pool rates.
- Fund balances are based on the estimated beginning balance in 2016 for Fund 401 Water & Sewer Utility Fund (assigned 50% to Water as previously discussed), Fund 402 Water Capital Replacement Fund, Fund 404 Water Bond Redemption Fund, and Fund 405 Water Bond Reserve Fund.

9.6.3.2 Expenditures and Other Miscellaneous Assumptions

- General operating expenses are escalated from the budgeted figures at 2.5 percent per year; labor costs increase at 3 percent per year; and benefits at 7 percent per year.
- Taxes owed are calculated based on prevailing rates: the state water public utility tax is 5.029%; the state business & occupation tax is 1.5%; and the City's water utility tax is 6.0%.
- Existing debt service schedules were provided by the City and annual debt service is approximately $133,000 per year as of 2016.

The rate strategy focuses on the 2016 through 2022 rate planning period. It is imperative that the City review the proposed rates and rate assumptions annually to ensure that the rate projections developed remain adequate. Any significant changes should be incorporated into the financial plan and future rates should be adjusted as needed.

Table 9.6 summarizes the annual revenue requirement through 2022 based on the forecast of operating revenues, expenditures, fund balances, fiscal policies, and capital funding.

This strategy includes a series of annual 3% increases to the regular rate through 2022. The capital surcharge is forecasted to increase with projected depreciation, which averages a 6% increase per year through 2022. The combined, weighted increase through 2022 is approximately 3.5% per year.

Table 9.6 Financial Forecast

Financial Forecast							
Revenue Requirements	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Assuming Existing Rates:							
Revenue							
Rate Revenues	$ 645,264	$ 674,009	$ 685,222	$ 696,435	$ 707,648	$ 718,861	$ 718,861
Non-Rate Revenues*	162,236	180,203	185,274	200,000	212,595	210,573	212,434
Total Revenue	**$ 807,500**	**$ 854,211**	**$ 870,496**	**$ 896,434**	**$ 920,242**	**$ 929,434**	**$ 931,295**
Expenses							
Cash Operating Expenses	$ 626,683	$ 538,642	$ 556,579	$ 577,294	$ 599,086	$ 608,326	$ 617,870
Existing Debt Service	132,769	132,519	132,268	132,017	131,767	131,516	131,265
New Debt Service	-	-	19,254	36,902	36,902	36,902	36,902
Rate Funded System Reinvestment	124,000	142,007	163,318	177,959	190,470	195,197	197,052
Total Expenses	**$ 883,452**	**$ 813,168**	**$ 871,419**	**$ 924,171**	**$ 958,225**	**$ 971,941**	**$ 983,090**
Cash Surplus / (Deficiency) Before Increases	$ (75,951)	$ 41,043	$ (923)	$ (27,737)	$ (37,983)	$ (42,508)	$ (51,795)
Increases to the Regular Rates (excluding capital surcharge)							
Annual Rate Adjustment	**0.00%**	**3.00%**	**3.00%**	**3.00%**	**3.00%**	**3.00%**	**3.00%**
Cumulative Annual Rate Adjustment	**0.00%**	**3.00%**	**6.09%**	**9.27%**	**12.55%**	**15.93%**	**19.41%**
After Rate Increases:							
Rate Revenues	$ 645,264	$ 694,229	$ 726,952	$ 761,013	$ 796,464	$ 833,357	$ 858,357
Net Cash Flow	$ (75,951)	$ 60,186	$ 38,582	$ 33,399	$ 46,099	$ 65,885	$ 80,266
Debt Service Coverage - Bonded Debt	1.90	3.40	3.01	2.83	3.02	3.21	3.33
Debt Service Coverage - All Debt	1.49	2.67	2.46	2.37	2.53	2.69	2.80

* Includes capital surcharge revenue, which has an average annual increase of 6% through 2022.

9.6.3.3 City Funds and Reserves Balances

Table 9.7 shows a summary of the projected ending City operating, capital and debt reserve balances through 2025. The operating reserve ends at 90 days of operating expenditures.

The capital reserve ends at $625,000 in 2025, which is above the minimum target of $100,000 in 2022. However, it's roughly on par with one year's worth of annual capital expenditures—which would be approximately $550,000.

The debt reserve ends at nearly $150,000 which is enough to cover one year of annual bonded debt service, including the City's existing revenue bond.

Table 9.7 Cash Balance Summary by Year

Cash Balance Summary							
Ending Reserves	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Operating	$ 150,414	$ 129,117	$ 133,540	$ 138,648	$ 143,628	$ 146,300	$ 148,653
Capital	1,213,314	581,207	501,023	522,243	744,873	912,403	625,459
Debt	57,174	67,674	97,428	125,576	136,076	146,576	146,576
Total	**$ 1,420,902**	**$ 777,999**	**$ 731,990**	**$ 786,467**	**$ 1,024,576**	**$ 1,205,279**	**$ 920,688**

9.7 EVALUATION OF CURRENT RATES AND CONSERVATION FEATURES

9.7.1 Existing Rate Structure

The City's current rate structure consists of a monthly fixed charge applicable to all customer classes (increasing with meter size, varying by customer class); a three-block increasing volume charge for residential customers (block one: 0-3 ccf; block two: 4-17 ccf; block 3: >17 ccf); and a class-specific single-block volume charge for multi-family and commercial customers. Customers that are outside of the city limits pay a policy-based multiplier of 1.5 times the inside city rates. The purpose of the outside city multiplier is to recover a reasonable rate of return for inside city customers for their contributions towards system assets and equity.

The City also imposes a water system capital improvement surcharge in addition to regular user rates. The surcharge in 2015 is $10 per month for single-family residential connections and all other connections pay $1.33 per 100 cubic feet of water consumption, with a minimum of $10 per month. The revenue generated from the surcharge is explicitly ear-marked for the Fund 402 Water Capital Replacement Fund.

The City offers a low-income rate discount of 50% on the fixed charges of qualified residential customers. Qualifying factors include 1) an individual residential unit that is served by a separate water meter; and 2) a combined household gross income that is no greater than fifty percent of the current median income in the Seattle-Bellevue Primary Metropolitan Statistical Area.

9.7.2 Cost of Service Analysis

A cost of service analysis was performed whereby the estimated cost to provide service to each customer class was compared with the estimated revenue currently generated by each class. All customer classes fell within the acceptable variance range of plus or minus 5% of the cost of service target. No cost-of-service adjustments are recommended at this time. The current rate structure appropriately addresses rate equity among the customer classes, and provides incentive for conservation.

9.7.3 Projected Rate Schedule

Table 9.8 presents a comparison of current and proposed rates. Indicated rate increases are applied "across-the-board" to the existing rate structure, meaning that all rate components, excluding the capital surcharge, would see an equal adjustment each year—3%. The capital surcharge is increased each year so that it is generating an amount approximately equal to estimated annual system depreciation.

Table 9.8 Current and Proposed Rates with Across the Board (ATB) Rate Increases

Total (excl. capital surcharge rates)			*3.00%*	*3.00%*	*3.00%*	*3.00%*	*3.00%*	*3.00%*
Across the Board Rate Schedule		**Existing 2016**	**ATB 2017**	**ATB 2018**	**ATB 2019**	**ATB 2020**	**ATB 2021**	**ATB 2022**
Single Family Residential								
Fixed Monthly Charge								
5/8"		$15.73	$16.20	$16.69	$17.19	$17.70	$18.24	$18.78
3/4"		$15.73	$16.20	$16.69	$17.19	$17.70	$18.24	$18.78
1"		$35.79	$36.86	$37.97	$39.11	$40.28	$41.49	$42.74
1 1/2"		$68.87	$70.94	$73.06	$75.26	$77.51	$79.84	$82.23
Variable Charge (per 100 cf)								
Block 1	(0-3)	$3.10	$3.19	$3.29	$3.39	$3.49	$3.59	$3.70
Block 2	(4 - 17)	$3.58	$3.69	$3.80	$3.91	$4.03	$4.15	$4.27
Block 3	(> 17)	$4.79	$4.93	$5.08	$5.23	$5.39	$5.55	$5.72
Multi Family								
Fixed Monthly Charge								
5/8"		$22.87	$23.56	$24.26	$24.99	$25.74	$26.51	$27.31
3/4"		$22.87	$23.56	$24.26	$24.99	$25.74	$26.51	$27.31
1"		$53.66	$55.27	$56.93	$58.64	$60.39	$62.21	$64.07
1 1/2"		$104.60	$107.74	$110.97	$114.30	$117.73	$121.26	$124.90
2"		$166.57	$171.57	$176.71	$182.02	$187.48	$193.10	$198.89
3"		$318.56	$328.12	$337.96	$348.10	$358.54	$369.30	$380.38
Variable Charge (per 100 cf)		$3.43	$3.53	$3.64	$3.75	$3.86	$3.98	$4.10
Commercial & Industrial								
Fixed Monthly Charge								
5/8"		$16.60	$17.10	$17.61	$18.14	$18.68	$19.24	$19.82
3/4"		$16.60	$17.10	$17.61	$18.14	$18.68	$19.24	$19.82
1"		$37.97	$39.11	$40.28	$41.49	$42.74	$44.02	$45.34
1 1/2"		$73.23	$75.43	$77.69	$80.02	$82.42	$84.89	$87.44
2"		$116.37	$119.86	$123.46	$127.16	$130.98	$134.90	$138.95
3"		$224.43	$231.16	$238.10	$245.24	$252.60	$260.18	$267.98
4"		$367.35	$378.37	$389.72	$401.41	$413.46	$425.86	$438.64
6"		$723.94	$745.66	$768.03	$791.07	$814.80	$839.24	$864.42
Variable Charge (per 100 cf)		$4.32	$4.45	$4.58	$4.72	$4.86	$5.01	$5.16
Restaurant								
Fixed Monthly Charge								
5/8"		$16.60	$17.10	$17.61	$18.14	$18.68	$19.24	$19.82
3/4"		$16.60	$17.10	$17.61	$18.14	$18.68	$19.24	$19.82
1"		$37.97	$39.11	$40.28	$41.49	$42.74	$44.02	$45.34
1 1/2"		$73.23	$75.43	$77.69	$80.02	$82.42	$84.89	$87.44
2"		$116.37	$119.86	$123.46	$127.16	$130.98	$134.90	$138.95
3"		$224.43	$231.16	$238.10	$245.24	$252.60	$260.18	$267.98
4"		$367.35	$378.37	$389.72	$401.41	$413.46	$425.86	$438.64
6"		$723.94	$745.66	$768.03	$791.07	$814.80	$839.24	$864.42
Variable Charge (per 100 cf)		$3.30	$3.40	$3.50	$3.61	$3.71	$3.83	$3.94
Water System Capital Improvement Surcharge								
Single Family Customers								
Flat per Account per Month		$10.00	$10.75	$11.75	$12.50	$13.50	$13.50	$14.00
Other Customers								
Charge per 100 cf of Consumption		$1.33	$1.43	$1.56	$1.66	$1.80	$1.80	$1.86
Minimum Charge		$10.00	$10.75	$11.75	$12.50	$13.50	$13.50	$14.00

9.7.4 Affordability & Sample Bills

The Washington State Department of Health and the State Public Works Board have historically used an affordability index to prioritize low-cost loan awards. The typical threshold looks at whether a system's rates exceed 1.5% to 2.0% of the median household income for the demographic area. As a result, if monthly bills are less than 1.5% of the median household income for the demographic area, they are generally considered affordable.

The median household income for Carnation, Washington is estimated to be just over $75,000 in 2016. This is based on a 2015 estimate from the Census Bureau, with one year of inflation added. Median income is forecasted to include a 2.5% annual escalation. **Table 9.9** presents an average single family bill with the projected annual rate increases for the forecast period, tested against the threshold. Applying the 1.5% to 2.0% test, the City's rates are forecasted to remain within the indicated affordable range through 2034, then slightly above in the last year.

Table 9.9 Affordability Test

Affordability Table				
Year	Inflation	Median HH Income	Projected Monthly Bill	% of Median HH Income
2016		$ 75,451	$ 50.41	0.8%
2017	2.50%	$ 77,338	$ 52.40	0.8%
2018	2.50%	$ 79,271	$ 54.69	0.8%
2019	2.50%	$ 81,253	$ 56.76	0.8%
2020	2.50%	$ 83,284	$ 59.12	0.9%
2021	2.50%	$ 85,366	$ 60.46	0.8%
2022	2.50%	$ 87,500	$ 62.38	0.9%
2023	2.50%	$ 89,688	$ 64.25	0.9%
2024	2.50%	$ 91,930	$ 66.18	0.9%
2025	2.50%	$ 94,228	$ 68.16	0.9%
2026	2.50%	$ 96,584	$ 76.34	0.9%
2027	2.50%	$ 98,999	$ 85.50	1.0%
2028	2.50%	$ 101,474	$ 95.77	1.1%
2029	2.50%	$ 104,010	$ 107.26	1.2%
2030	2.50%	$ 106,611	$ 120.13	1.4%
2031	2.50%	$ 109,276	$ 134.54	1.5%
2032	2.50%	$ 112,008	$ 150.69	1.6%
2033	2.50%	$ 114,808	$ 168.77	1.8%
2034	2.50%	$ 117,678	$ 189.02	1.9%
2035	2.50%	$ 120,620	$ 211.71	2.1%

Note: Assumes single family 3/4", 6.5 ccf per month.
Median Household Income Data from Census Bureau;
2011-2015 American Community Survey 5-Year Estimates.

9.8 CONCLUSION

The results of this analysis indicate that rate increases are necessary to fund and finance the CIP, along with funding ongoing operating needs. Implementation of the proposed rate increases should provide for continued financial viability, while maintaining generally affordable rates. It is recommended that the proposed rate increases be implemented and become effective January 1st of each year.

City Council directed a six-year study period in order to develop a rate increase strategy. This resulted in annual increases of 3% to the regular rate and 6% to the capital surcharge, through 2022. Ultimately, this plan also looked at the 20-year planning period and calculated what level of regular rates would be needed to fund the entire capital plan. Under the longer time period, 3% rate increases could be continued until 2025. At that point in time, in order to fully fund the capital program and stay relatively close to the recommended financial policies, annual rate increases of 12% for regular rates would be needed. The capital surcharge is assumed to increase with depreciation, with an annual increase of 6% through 2025 and an annual increase of 10% from 2026 through 2035.

Appendix A

Approvals

State of Washington
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310 • Kent Washington 98032-2388

July 12, 2018

WILLIAM FERRY
CITY OF CARNATION
PO BOX 1238
CARNATION WA 98014

RE: Carnation, City of, ID# 11200
King County
Water System Plan – 2017- APPROVAL
Sublog #17-0105

Dear Mr. Ferry:

The City of Carnation water system plan (WSP), received in this office on January 17, 2017, with a subsequent submittal on November 14, 2017, has been reviewed and in accordance with the provisions of WAC 246-290-100, is hereby **APPROVED**.

Approval of this WSP is valid as it relates to current standards outlined in Washington Administrative Code (WAC) 246-290 revised January 2017, WAC 246-293 revised September 1997, RCW 70.116, and is subject to the qualifications herein. Future revisions in the rules and statutes may be more stringent and require facility modification or corrective action. An approved update of this WSP is required on or before **July 12, 2028**, unless ODW requests an update or plan amendment pursuant to WAC 246-290-100(9).

APPROVED NUMBER OF CONNECTIONS

The analysis provided in this WSP shows the water system has sufficient capacity to meet the growth projections during this planning period. The City of Carnation water system can support an **"unspecified"** designation for its approved number of connections. A specific number of approved connections will not be applied at this time. Development may occur in compliance with the schedule and information provided in this WSP. This designation may be rescinded (and replaced with a specified number of approved connections) if ODW determines that the WSP is no longer representative of system activities.

LOCAL GOVERNMENT CONSISTENCY

This document meets local government consistency requirements for WSP approval pursuant to RCW 90.03.386 and RCW 43.20.

SERVICE AREA AND DUTY TO SERVE

Pursuant to RCW 90.03.386(2), the service area identified in this WSP service area map may now represent an expanded "place of use" for this system's water rights. Changes in service area should be made through a WSP amendment.

The City of Carnation has a duty to provide new water service within its retail service area. This WSP includes service policies to describe how your system plans to provide new service within your retail service area.

CONSTRUCTION WAIVERS

Standard Construction Specifications for distribution main extensions in this WSP are approved. Consistent with WAC 246-290-125(2), this system may proceed with the installation of distribution main extensions provided this system completes and keeps on file the enclosed construction completion report form in accordance with WAC 246-290-125(2) and WAC 246-290-120(5) and makes it available for review upon request by ODW.

WATER RESOURCES

Below is the general regulatory language that applies to all water system approvals:

The department's review of your water system plan will not confer or guarantee any right to a specific quantity of water. The approved number of service connections is based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represented, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

Thank you for your cooperation. King County is being notified of the terms and requirements of this approval and the determination of the approved number of connections. If you have any questions or wish to check our records, you may contact either of us at the numbers listed below.

Sincerely,

Brietta Carter

Brietta Carter, P.E.
Regional Engineer
(253) 395-6770

Richard Rodriguez

Richard Rodriguez
Regional Planner
(253) 395-6771

Encl: Construction Completion Report

cc: Steve Hirschey, King County UTRC
Seattle/King County Health
Ria Berns, Dept. of Ecology, NWRO
Pam Cobley, Stantec

CONSTRUCTION COMPLETION REPORT FOR DISTRIBUTION MAIN PROJECTS

In accordance with WAC 246-290-120(5), a *Construction Completion Report* is required for all construction projects. Under the submittal exception process for distribution main projects, designed by a professional engineer but not submitted to DOH for approval, the report does not need to be submitted. **However, the purveyor must keep the Construction Completion Report on file and make it available for review upon request by DOH in accordance with WAC 246-290-125 (2)(b).** Furthermore,

(1) The report form must bear the seal, date and signature of a professional engineer (PE) licensed in the state of Washington; and

(2) Per WAC 246-290-120(5)(c), the amount of change in the physical capacity of a system must be documented, if the project results in a change in physical capacity.

CARNATION WATER SYSTEM, CITY OF
Name of Water System

DOH System ID No.: **11200**

WILLIAM FERRY
Name of Purveyor (Owner or System Contact)

Date Water System Plan that includes Standard Construction Specifications Date Standard Specifications Approved by DOH: **7/12/2018**

PO BOX 0239
Mailing Address

CARNATION, WA 98014
City State Zip

PROJECT NAME AND DESCRIPTIVE TITLE:
(Include the name of any development project and number of services.)

Date Project or Portions Thereof Completed

PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT

The undersigned professional engineer (PE), or his/her authorized agent, has inspected the above-described project that, as to layout, size and type of pipe, valves and materials, and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures, pressure test results, and results of the bacteriological test(s) for this project and certify that they comply with the requirements of the construction standards/specifications approved by DOH.

P.E.'s Seal

Date Signed

Name of Engineering Firm

Name of PE Acknowledging Construction

Mailing Address

City State Zip

Engineer's Signature

State/Federal Funding Type (if any)

Please keep a completed, signed, and stamped copy on file.

☒ **NWRO Drinking Water**
Department of Health
20425 72nd Ave. S, Ste 310
Kent, WA 98032-2358
(253) 395-6750

☐ **SWRO Drinking Water**
Department of Health
PO Box 47823
Olympia, WA 98504-7823
(360) 236-3030

☐ **ERO Drinking Water**
Department of Health
16201 E Indiana Ave. Suite 1500
Spokane Valley, WA 99216
(509) 329-2100

For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

King County

1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

KING COUNTY

Signature Report

July 10, 2018

Ordinance 18765

Proposed No. 2018-0270.1 **Sponsors** Lambert

AN ORDINANCE approving the Carnation 2015 Comprehensive Water System Plan.

STATEMENT OF FACTS:

1. King County has adopted K.C.C. chapter 13.24, which requires approval of comprehensive plans for water utilities that distribute or obtain water in unincorporated King County as a prerequisite for operating in unincorporated King County, receiving approval for annexation proposals, being granted right of way franchises, and being given approval for right of way construction permits. K.C.C. 13.24.060 prescribes the requirements for approval of such plans, including consistency with state and local planning requirements.

2. The city of Carnation's previous water system plan was prepared in 2009. Both Washington state Department of Health and King County regulations require water system plans to be updated every six years.

3. The city's service area is within King County and the city has adopted a water system plan ("the plan").

4. King County has adopted a comprehensive plan that includes water supply policies in its provisions for facilities and services (policies F-101 through F-254) that call for consistency with other adopted plans, support

for regional water supply planning, pursuit of reclaimed water, water conservation and protection of water resources.

5. K.C.C. chapter 13.24 requires the utilities technical review committee to review and make a recommendation to the King County executive and council on the plan and the requirements under K.C.C. chapter 13.24 and consistency with the King County Comprehensive Plan. The utilities technical review committee has reviewed the planning data and city operations and has found:

a. The plan uses population and employment forecasts developed by the Puget Sound Regional Council for the city's service area;

b. Portions of the city's service area are in unincorporated King County;

c. The capital facility plan is adequate to meet anticipated facility and service needs;

d. The plan is consistent with applicable Washington state water quality laws; and

e. The plan is consistent with other pertinent county adopted plans and policies.

6. The Washington state Department of Health approval is pending upon King County's approval of the plan.

7. The city did not have to complete a State Environmental Policy Act review for the plan as the system has fewer than one thousand connections and is categorically exempt from review.

8. The city's operations and facilities meet multiple existing statutory,

administrative and planning standards. As the city's operations, facilities and planning meet the requirements of the King County Code and are consistent with the King County Comprehensive Plan, the utilities technical review committee has recommended approval of the plan.

BE IT ORDAINED BY THE COUNCIL OF KING COUNTY:

SECTION 1. The Carnation 2015 Comprehensive Water System Plan, Attachment A to this ordinance, is hereby approved as a water system plan.

Ordinance 18765 was introduced on 6/18/2018 and passed by the Metropolitan King County Council on 7/9/2018, by the following vote:

Yes: 9 - Mr. von Reichbauer, Mr. Gossett, Ms. Lambert, Mr. Dunn, Mr. McDermott, Mr. Dembowski, Mr. Upthegrove, Ms. Kohl-Welles and Ms. Balducci
No: 0
Excused: 0

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

Joseph McDermott, Chair

ATTEST:

Melani Pedroza, Clerk of the Council

APPROVED this 13 day of July, 2018.

Dow Constantine, County Executive

RECEIVED
2018 JUL 13 PM 4:22
KING COUNTY COUNCIL
CLERK

Attachments: A. 2015 Comprehensive Water System Plan - City of Carnation

MLM
03/12/18

RESOLUTION NO. 423

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CARNATION, WASHINGTON, ADOPTING THE 2015 COMPREHENSIVE WATER SYSTEM PLAN INCLUDING WATER USE EFFICIENCY GOALS TO REDUCE WATER USAGE BY 1% PER YEAR PER EQUIVALENT RESIDENTIAL UNIT FOR THE NEXT SIX YEARS, AND MAINTAIN A THREE-YEAR AVERAGE DISTRIBUTION SYSTEM LEAKAGE OF LESS THAN 10%.

WHEREAS, water purveyors including the City of Carnation are required by the State of Washington to prepare a Comprehensive Water System Plan; and

WHEREAS, the City of Carnation's engineering consultants have prepared the 2015 Comprehensive Water System Plan; and

WHEREAS, the State of Washington Departments of Health and Ecology as well as King County have completed their review and are recommending approval of the City of Carnation 2015 Comprehensive Water System Plan; and

WHEREAS, the public has had an opportunity to review the Comprehensive Water System Plan and the City Council held a public hearing on September 6, 2016, at which the City's water customers had an opportunity to make comments on the Plan; and

WHEREAS, the City of Carnation 2015 Water Comprehensive Plan sets the following goals for Water Use Efficiency: (1) reduce water usage by 1% per year per equivalent residential unit for the next six years, and (2) maintain a three-year average distribution system leakage of less than 10%, and these goals were presented at the public hearing of water customers; and

WHEREAS, the Plan includes a projection of the future demand for water within the City's water service area, an evaluation of the adequacy of the water system source, storage, treatment

and distribution to meet the future demand, and a program of capital improvements that are needed to address any inadequacies that are found; and

WHEREAS, the Plan includes methods to finance the needed capital improvements, including rates for existing customers and general facilities charges that will be paid by new development; NOW, THEREFORE,

THE CITY COUNCIL OF THE CITY OF CARNATION HEREBY RESOLVES AS FOLLOWS:

The document entitled, "City of Carnation 2015 Comprehensive Water System Plan" as prepared by Stantec Consulting Services, Inc. is incorporated herein by this reference as though fully set forth, and is hereby approved and adopted by the City of Carnation as its Comprehensive Water System Plan.

ADOPTED BY THE CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 20TH DAY OF MARCH, 2018.

CITY OF CARNATION

MAYOR, KIMBERLY LISK

ATTEST/AUTHENTICATED:

CITY CLERK, MARY MADOLE

RESOLUTION NO.:.....423

MLM
12/28/16

RESOLUTION NO. 413

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CARNATION, WASHINGTON, ADOPTING FOR AGENCY REVIEW THE 2015 COMPREHENSIVE WATER SYSTEM PLAN INCLUDING WATER USE EFFICIENCY GOALS TO REDUCE WATER USAGE BY 1% PER YEAR PER EQUIVALENT RESIDENTIAL UNIT FOR THE NEXT SIX YEARS, AND MAINTAIN A THREE-YEAR AVERAGE DISTRIBUTION SYSTEM LEAKAGE OF LESS THAN 10%.

WHEREAS, water purveyors including the City of Carnation are required by the State of Washington to prepare a Comprehensive Water System Plan every six years; and

WHEREAS, the State of Washington Departments of Health and Ecology as well as King County are required to review and approve the Comprehensive Water System Plan; and

WHEREAS, the City of Carnation's engineering consultants have prepared a draft of the 2015 Comprehensive Water System Plan; and

WHEREAS, the public has had an opportunity to review the Comprehensive Water System Plan and the City Council has held a public hearing at which the City's water customers have had an opportunity to make comments on the Plan; and

WHEREAS, the City of Carnation 2015 Water Comprehensive Plan sets the following goals for Water Use Efficiency: (1) reduce water usage by 1% per year per equivalent residential unit for the next six years, and (2) maintain a three-year average distribution system leakage of less than 10%, and these goals were presented at the public hearing of water customers; and

WHEREAS, the Plan includes a projection of the future demand for water within the City's water service area, an evaluation of the adequacy of the water system source, storage, treatment and distribution to meet the future demand, and a program of capital improvements that are needed to address any inadequacies that are found; and

WHEREAS, the Plan includes methods to finance the needed capital improvements, including rates for existing customers and general facilities charges that will be paid by new development; NOW, THEREFORE,

IT IS HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF CARNATION AS FOLLOWS:

> The document entitled, "City of Carnation 2015 Comprehensive Water System Plan" as prepared by Stantec Consulting Services, Inc. is incorporated herein by this reference as though fully set forth, and is hereby approved and adopted by the City of Carnation as its Comprehensive Water System Plan for review by the State of Washington Departments of Health and Ecology and by King County.

ADOPTED BY THE CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 3RD DAY OF JANUARY, 2017.

CITY OF CARNATION

MAYOR, JIM BERGER

ATTEST/AUTHENTICATED:

CITY CLERK, MARY MADOLE

RESOLUTION NO.: 413

Health

Local Government Consistency Review Checklist

Water System Name: City of Carnation PWS ID: 11200B

Planning/Engineering Document Title: 2015 Comprehensive Water System Plan Plan Date: Jan 2017

Local Government with Jurisdiction: City of Carnation

WAC 246-290-108 Consistency with local plans and regulations:
Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b (ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with local plans and regulations. This review must include specific elements of local plans and regulations, as they reasonably relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

Local Government Consistency Statement	Page(s) in Planning Document	Yes – No – Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the applicable service area.	3.1-3.6	Yes
b) The six-year growth projection used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	3.12-3.15	Yes
c) Applies to cities and towns that provide water service: All water service area policies of the city or town are consistent with the utility service extension ordinances of the city or town.	2.2-2.4	Yes
d) Service area policies for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area [City(ies), County(ies)].	2.7-2.9, Appendix E	Yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable, Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of Comprehensive plans.	Chapter 2	Yes

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: 1-9-17

Timothy S. Wilson — City Planner — City of Carnation
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, [a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the retail 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 non-community 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 per WAC 246-290110(4)(b)(ii).

A) Documenting Consistency: Municipal water suppliers must document all of the elements in a consistency review per WAC 246-290-108.

1 a) Provide 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 are related to water supply planning.

1 b) Include a copy of the **six-year growth projections** that corresponds to the service area. If the local population growth rate projections are not used, provide a detailed explanation on why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

1c) 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.

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

1 e) **Other relevant elements** related to water supply planning as determined by the department (DOH). 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 provide direction on how this inconsistency can be resolved.

C) Documenting Lack of Consistency Review by Local Government: 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 their review. Please include: name of contact, date, and efforts made (letters, phone calls, and e-mails). In order to self-certify, please contact the DOH Planner.

Appendix B

Agency Comments/Responses

Stantec Consulting Services Inc.
11130 NE 33rd Place Suite 200, Bellevue WA 98004-1465

November 3, 2017

State of Washington Department of Health
Northwest Drinking Water Regional Operations
20425 – 72nd Avenue South, Suite 310
Kent, WA 98032-2388

Attention: Richard Rodriguez and Brietta Carter, PE

Reference: Carnation, City of, ID# 11200
King County
Water System Plan – 2017
Submittal #17-0105

Dear Mr. Rodriguez and Ms. Carter,

Thank you for your comments, dated March 27, 2017, on the City of Carnation Comprehensive Water System Plan. We have reviewed the comments and offer the following responses:

Description of Water System

1. Please provide determinations of local government consistency from the City's Planning Department.

   Response

   The City's signed Local Government Consistency Review Checklist is included in Appendix A of the Plan

   No Comprehensive Plan modifications noted.

2. King County provided comments on your WSP on March 17, 2017. Please respond to their issues. Adequate response to their issues should be included in your final WSP submittal in order to receive a WSP Adoption Ordinance from King County.

Response

Responses have been provided to King County regarding their comments dated March 17, 2017. A copy of the King County response letter will be included in Appendix B of the final Plan and is attached herein for your convenience.

Comprehensive Plan modifications as noted.

Policies, Criteria and Standards

3. Section 2.6.14 indicates source meters "shall be calibrated every 5 years." Please clarify if this is an action the City takes, or if it is a recommendation.

Response

The City has not calibrated its meters in the last 10 years. The spring source meters were installed in within the last 10 years and the manufacturer recommended that calibration should be performed every 10-15 years. The well has not been used much recently so hasn't been a priority to calibrate. It is the City's intent to calibrate the source meters every 5 years going forward.

No Comprehensive Plan modifications noted.

Basic Planning Data

4. Table 3.8 Projected ERUs. Please include the authorized consumption and distribution system leakage.

Response

Tables 3.9 and 3.10 provide authorized consumption and distribution leakage.

No Comprehensive Plan modifications noted.

Operations & Maintenance

5. Thank you for the comprehensive Coliform Monitoring Plan (CMP) provided in Appendix L.

    a. The City typically collects four samples per month rather than the minimum two that are required. Consider stating this fact clearly in your CMP. This is excellent water quality surveillance.

    Response

Thank you for the comment. The City currently takes 5 samples per month in order to cover the entire system.

No Comprehensive Plan modifications noted.

b. The Revised Total Coliform Rule (TCR) no longer requires increased monitoring in the month following an unsatisfactory sample. It is great if the City wants to continue with such increased monitoring. If the City wants to simply comply with the minimum requirements of the RTCR pages 6 and 7 of the CMP can be deleted.

Response

Thank you for the comment. The City has removed pages 6 and 7 of the CMP and a revised version is included in the Appendix L of the final Plan.

No Comprehensive Plan modifications noted.

c. Please provide a larger map showing the routine sample site locations.

Response

A larger map will be included in the insert and replace packet that will be produced once a final plan is ready. The electronic version of the Plan that was included in the submittal includes the large map.

Comprehensive Plan modifications as noted.

d. We appreciate the City working on an *E. coli* response plan. Consider using the checklists for such planning that are on the Department of Health website in order to create a robust plan.

Response

Thank you for the comment. The City is planning to use the checklist provided by DOH in the future

No Comprehensive Plan modification noted.

e. Please provide standard operating procedures for coliform routine and repeat sampling in the appendix with the Coliform Monitoring Plan.

Response

An SOP will be added to the CMP in Appendix L in the final version of the Plan. If you have an example of an acceptable SOP, please provide to the City.

Comprehensive Plan modifications as noted.

6. Section 7.5 refers to collection of five bacteriological samples per month. However, the CMP in Appendix L indicates the City collects from four routine sample sites per month. Please verify and make appropriate corrections.

Response

Section 7.4, Water Quality and Sampling, first bullet will be modified to reflect four bacteriological samples taken in accordance with the Water Coliform Monitoring Plan located in Appendix L of the Plan.

Comprehensive Plan modifications as noted.

7. Section 7.6 incorrectly states that the vulnerability assessment (VA) requirement applies to systems with at least 3,300 connections. The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 requires community water systems serving more than 3,300 people to conduct a VA. Please correct the text.

Response

Section 7.6, third paragraph will be revised to state, "The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 requires community water systems serving more than 3,300 people to perform a Vulnerability Assessment (VA), therefore, the City is not required, at this time, to perform a VA."

Comprehensive Plan modifications as noted.

8. Section 7.7 refers to the cross-connection control program. How many high hazard cross-connections are there? Do these have reduced pressure backflow assemblies that are tested yearly?

Response

The City has 3 high hazard cross connections. King County Wastewater Facility, a laundromat, and a dentist office. They do have RP backflow assemblies installed, which are tested annually.

9. Please include Construction Completion Reports for all distribution main replacement and extension projects in the City's Recordkeeping and Reporting section.

Response

The City will maintain project record keeping to include all future Construction Completion Reports in the project files. Should there be a project completion report you would like to review, please contact City Hall with the request. The City's Recordkeeping and Reporting section has been modified to include the construction completion report information.

Comprehensive Plan modifications as noted.

10. How often does staff check integrity of reservoir seals and screens? The Department recommends a visit to each reservoir to check integrity of the hatch seal, vent, overflow screen and any other penetrations at least once or twice a year.

Response

The reservoir seals and screens are regularly checked. The City does check these monthly.

11. Utilities often find that components of pressure reducing valves (PRVs) deteriorate and need replacement sooner than the 15-year life span. Consider incorporating routine PRV inspection and repair in the Operation and Maintenance Program.

Response

The City only has one PRV Station. The City does inspect its PRV frequently. The PRV station was rebuilt in 2013 and adjusted most recently on in December 2015. The City will consider incorporating additional routine PRV inspections and repair in its Operation and Maintenance Program in the future. This addition is dependent on staffing availability.

No Comprehensive Plan modifications noted.

Distribution Facilities Design and Construction Standards

12. Thank you for submitting water distribution standard plans and specifications. We understand the City intends requests the project submittal exception to DOH for distribution main projects under WAC 246-290-125(2).

Response

The City is requesting the project submittal exception for distribution main projects and has included the updated City of Carnation Combined Water and Sewer Utility Technical Standards (Appendix E of the final Plan) as an attachment to this letter.

No Comprehensive Plan modifications noted.

13. DWG. No. W-7 – 2" temporary blow off assembly for testing. Please eliminate the drain hole from the blow off assembly design standard.

Response

The new DWG. No. W-7-c has been modified to eliminated the drain hole. The updated City of Carnation Combined Water and Sewer Utility Technical Standards (Appendix E of the final Plan) are included as an attachment to this letter.

Comprehensive Plan modifications as noted.

14. Please provide the Standard Specification for the hydrostatic test referred to on page 49 of Appendix E.

Response

The hydrostatic test referred to in the City's Combined Water and Sewer Utility Technical Standards pg. 49, Item EE, is WSDOT Standard Specifications item 7-09.3(23) in the 2016 edition. The City will add this citation to its standards.

Improvement Program

15. What is the cost of source meter calibration and repairs every five years? Where is this cost accounted for?

Response

This work has not been completed in the recent past. This cost will be included in the capital or operations and maintenance fund for the utility. Updated Improvement Program tables have been included as an attachment to this letter for your information.

No Comprehensive Plan modifications noted.

16. Consider adding the cost of PRV inspection and repair in the capital improvement program.

Response

PRV inspection is a maintenance activity and not something that should be in the capital improvement program. Major PRV repairs or upgrades can be considered for the CIP.

No Comprehensive Plan modifications noted.

Financial Planning

17. Consider adding discussion of how the water system plans to incorporate the goals presented in the Governor's Directive 16-06 (see attached). The Governor directed water utilities to locate lead service lines and lead components in the distribution system over the course of the next two years, and replace in the next 15 years. How does this change the capital improvement plan and financial plan?

Response

The City has reviewed its available records and information regarding its main replacement projects in the last 15+ years. The City is not aware of the presence of any lead service lines in its distribution system. The service lines are either galvanized steel or plastic.

Miscellaneous

18. The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the WSP, prior to DOH approval of the WSP.

    Response

    Resolution No. 413 included in Appendix A of the Plan outlines the steps the City took to comply with the WAC 246-290-100(8).

    No Comprehensive Plan modifications as noted.

19. Prior to DOH approval, the City's elected governing body must approve and adopt the WSP.

    Response

    The City will approve the final Plan through resolution once all comment/responses have been agreed to with the approving agencies. A copy of the Resolution will be included in Appendix A of the Plan upon approval and distributed in the final Plan version.

    Comprehensive Plan modifications as noted.

20. Please provide copies of any comments made by adjacent purveyors or other interested parties, along with the City's response to those comments.

    Response

    All comment letters received and responses will be included in Appendix B of the final Plan.

    Comprehensive Plan modifications as noted.

21. Is the City a member of WARN?

    Response

    The City is not currently a member of WARN. The City may consider membership in the future.

    No Comprehensive Plan modifications as noted.

During the comment review, the City modified some of the capital improvement priorities and timelines. The updated information is included in the attached Tables 8.1 Water System Improvements and 8.2 CIP Improvements Schedule and the final Plan will reflect these changes.

Thank you again for your comments. We believe these responses adequately address your concerns. The City is in the process of finalizing the Plan and will provide a final insert and replace packet along with an electronic version once all approvals have been received. Should you have additional questions, please feel free to contact me at (425) 289-7344.

Regards,

STANTEC CONSULTING SERVICES INC.

Laurie S. Fulton, P.E.
Senior Principal, Water
Phone: (425) 289-7344
Fax. (425) 869 1190
laurie.fulton@stantec.com

Attachment: City of Carnation Combined Water and Sewer Utility Technical Standards (Appendix E of the final Plan)
Tables 8.1 Water System CIP Improvements and 8.2 CIP Improvements Schedule (Chapter 8 – Improvement Program of the final Plan)
Copy of letter to King County Department of Natural Resources (dated November 3, 2017)

cc: Amy Arlington, Mary Maddie, Tim Woolett, Bill Ferry – City of Carnation
Steve Hirschey – King County
Pam Cobley, Stantec
File

Stantec Consulting Services Inc.
11130 NE 33rd Place Suite 200, Bellevue WA 98004-1465

November 3, 2017

State of Washington Department of Ecology
Northwest Regional Office
3190 – 160th Ave SE
Bellevue, WA 98008-5452

Attention: Jay Cook

Reference: City of Carnation - Draft 2015 Comprehensive Water System Plan
DOH System ID #11200, Review by Washington Department of Ecology

Dear Mr. Cook,

Thank you for your comments, dated April 14, 2017, on the City of Carnation Comprehensive Water System Plan. We have reviewed the comments and offer the following responses:

Water Rights

Comment 1

The WSP notes that Carnation holds two water rights. The older right is a surface water claim, S1-117902CL, for Carnations' springs source and has a priority date of December 1916. The junior right is a groundwater certificate, G1-22827C, with priority date of April 4, 1977, and authorizing withdrawal from Carnation's well source.

Response

The City acknowledges your comment. Thank you.

Comment 2

Surface Water Claim S1-117902CL claims an instantaneous rate of 1.4 cubic feet per second, equal to 628 gallons per minutes (gpm) and an annual quantity of 1,000 acre-feet per year (afy). No obvious issues are noted with the claim. However, it should be noted that the extent and validity of any claim can only be formally determined in an adjudication in Superior Court. Ecology does not anticipate a general adjudication of water rights in your watershed in the foreseeable future.

Response

The City acknowledges your comment. Thank you.

Comment 3

Groundwater Certificate G1-22827C authorizes withdrawal at a rate of 800 gpm and an annual quantity of 538 afy. Carnation's interpretation of the nature of this certificate appears erroneous. Language within previous documents, the Report of Examination (reviewing the original application) and the Permit (authorizing withdrawal), clearly states that the annual quantity of this water right was intended to be **"non-additive" to the senior right.** The language is as follows, ***"Issued as a supplemental supply to any other rights. The total annual use shall not exceed 538.0 acre-feet per year less any amount utilized under other rights."*** This means that any quantity withdrawn under the claim should be subtracted from the groundwater right.

This language is recognized within the WSP, however Carnation states that it "considers the water rights from both sources as additive."

The basis of Carnations' interpretation is uncertain. Ecology's interpretation is that although the language is not present in the Certificate, the intent within the Report of Examination and subsequent Permit is clear and does limit Carnation's withdrawal under this right. Based on the above, **Carnation's total authorized quantities include both sources are 1,428 gpm and 1,000 afy.**

Response

For water planning purposes the City will plan and forecast based on the authorized 1,428 gpm and an annual limitation of 1000 afy. Nothing in the Plan is intended to accept Ecology's interpretation, or waive any rights or arguments as to Ecology's interpretation of G1-22827C.

Future Growth

Comment 4

The 6-, 10-, and 20-year forecasts suggest that the total annual demand in 20 years (469 afy) will be significantly less than the 1,000 afy recognized above. However, for the instantaneous rate, Carnation suggests, in Table 3-10 and in their water rights self-assessment, that they would increase diversion from the springs source to meet demand. For the 10- and 20-year projections, the diversion rate would exceed the claimed rate of 628 gpm by 5 gpm and 98 gpm, respectively. **The claimed instantaneous rate for the springs is (628 gpm) is a limiting factor and cannot legally be exceeded.** It is expected that Carnation would activate the approved well source to help meet higher instantaneous demands when needed.

Response

Section 6.2 Supply Analysis, Tables 6.2 and 6.3, pages 6.2 and 6.3 respectively, have been updated as follows:

Table 6.2 Quantitative Supply Analysis With Water Use Efficiency

	Instantaneous rate (gpm)	Annual supply (AF/Y)
Well 1 pumping capacity	700	-
Available spring supply	350	-
MDD and annual production - 2014	404	270
Projected MDD and annual production - 2021	519	335
Projected MDD and annual production - 2025	570	368
Projected MDD and annual production - 2035	581	374
Water right claim / Spring	628	1,000
Water right certificate / Well 1	800	538
Total authorized water supply	1,428	1,538*

* For Water System Planning purposes only, the City will plan based on 1,000 afy. Nothing in this Plan waives any claims that the City's water rights are additive and total 1,538 afy.

Table 6.3 Quantitative Supply Analysis Without Water Use Efficiency

	Instantaneous rate (gpm)	Annual supply (AF/Y)
Well 1 pumping capacity	700	-
Available spring supply	350	-
MDD and annual production - 2014	404	270
Projected MDD and annual production - 2021	553	357
Projected MDD and annual production - 2025	633	408
Projected MDD and annual production - 2035	725	468
Water right claim / Spring	628	1,000
Water right certificate / Well 1	800	538
Total authorized water supply	1,428	1,538*

* For Water System Planning purposes only, the City will plan based on 1,000 afy. Nothing in this Plan waives any claims that the City's water rights are additive and total 1,538 afy.

These updated tables do not impact the response discussion herein.

Regarding the instantaneous rate referred to in chapter 3 tables, this rate of flow provided to customers is met through both supply sources and stored water in the City's storage tanks. There is equalizing storage designed to meet the difference between supply and maximum day demand. The instantaneous demand can be met without exceeding supply water rights through 2035 (without WUE), through a combination of both sources.

There is no consideration of "expanding the springs source diversion" capacity beyond the water right amount of 628 gpm.

Comprehensive Plan modifications as noted.

Service Area

Comment 5

RCW 90.03.286(2) requires that water systems be in compliance with the terms of their water system plan AND that any alteration of the place of use not be inconsistent with any comprehensive plans or development regulations. Carnation does not indicate any near-term plans to expand/alter their service area. An evaluation of any such change should be undertaken if/when an expansion plan is forthcoming.

Response

Per Chapter 2 – Policies, Criteria and Standards, page 2.2. Policy 2.2.3 – **Future Water** Service Area, "The City's **Future** Water Service Area (FWSA) is the area outside the RWSA but within the Planning Area. The City plans to eventually provide water service to its FWSA."

Thank you again for your comments. Should you have additional questions, please feel free to contact me at (425) 289-7344.

Regards,

STANTEC CONSULTING SERVICES INC.

Laurie Fulton

Laurie S. Fulton, P.E.
Senior Principal, Water
Phone: (425) 289-7344
Fax: (425) 869-1190
laurie.fulton@stantec.com

cc: Amy Arrington, Mary Maddale, Tim Woolett, Bill Ferry – City of Carnation
Zach Lell, Peter A. Fraley – Ogden Murphy Wallace P.L.L.C
Richard Rodriguez, Brietta Carter, PE – State of Washington Department of Health
Pam Cobley - Stantec
File

Stantec Consulting Services Inc.
11130 NE 33rd Place Suite 200, Bellevue WA 98004-1465

November 3, 2017

King County Department of Natural Resources
Utilities Technical Review Committee
201 South Jackson Street, Suite 512
Seattle, WA 98104-3855

Attention: Stephen Hirschey

Reference: City of Carnation draft 2015 Comprehensive Water System Plan

Dear Mr. Hirschey, Steve

Thank you for your comments, dated March 17,2017, on the City of Carnation Comprehensive Water System Plan. We have reviewed the comments and offer the following responses:

Comment 1

Clarify the projected growth of service connections outside the City's urban growth area but within the service area. Section 3.6.2 has a projection that, "approximately 210 new service connections could develop outside the UGA in the 20-year planning period". That is roughly 10 new connections per year. However, Table 3.7 provides a twenty-year projection of service connections outside the urban growth area of 2 connections over 20 years.

Response

Section 3.6.2 is a bit confusing. The City has as 181 existing connections outside the UGA (Table 3.7, column 2). The third paragraph, first sentence will be revised to the following: "Based on these assumptions, the total number of services outside the UGA could total approximately 210 service connections." A new sentence is proposed after this sentence: "Approximately 29 new connections outside of the UGA are included in the 20-year planning period projection -see Table 3.7."

Comprehensive Plan modifications noted.

Comment 2

Clarify, incorporate, and/or make reference to either the County's Growth Management Planning Council's (GMPC) growth target for the City (adding about 330 new housing units in the City and its UGA between now and 2031) or to the Puget Sound Regional Council's Land Use Vision forecast for the City within your forecast of residential connections.

Response

An area specific forecast was originally prepared that was based on the knowledge of proposed plats in the water system area or projects known to be planned, along with infill development. The Estates at SVT Plat has 76 homes, three other plats have a combined 54 homes that are anticipated to be sold by the end of 2018. These alone total 131 new connections since May of 2017. There are currently three other plats in process that will cumulatively create an additional 143 single family residential lots to the incorporated city limits. Based on this activity it is a near certainty that there will be no fewer than 290 new units within the next three years, and approximately 323 new units overall can realistically be expected within the 6-year planning period. The City's current projection is 493 units in the 10-year planning period with 189 additional units over the following 10-years for a total of 682 new units is nothing short of reality. As you are aware, there is a severe housing shortage in the area, and with a booming economy and flat, available land to develop, with sewer service available, the City is an attractive location to develop or redevelop.

As you may be aware, the City updated their Comprehensive Plan's growth projections in 2015. Subsequent to adoption and approval by the State, PSRC challenged the City's adopted projections and issued a conditional certification. Prior to the 2015 Comprehensive Plan amendment, the City's adopted growth targets stemmed from the Washington State OFM and PSRC's Vision 2040 Regional Growth Strategy, which was an additional 330 new households for the period between 2006 and 2031. The City's 2015 Comprehensive Plan update, which was challenged by the PSRC, provided that the actual growth in the 20-year planning horizon was projected to exceed the established target by an additional 587 households. As you can see by the numbers provided above, the City of Carnation is well on the path of achieving and exceeding those projections.

The included forecast is a revised version of the original forecast prepared prior to receiving the" in-process" PSRC forecasts during plan preparation. At the time that the City revised its forecast downward, it did not agree with PSRC numbers, because the City believes the PSRC numbers underestimate growth in this local community. The effect that the population/connection forecasts has on this Water Plan, is that lower forecasts would delay the need for improvements. The City did not want to be in a position of not having enough funds available for required improvements if the forecasts were closer to those expected by City staff. The City has dealt with its primary system-wide deficiency of storage so the remaining improvements required are rehabilitation/replacement, which is not as dependent on population forecasting.

No Comprehensive Plan modifications noted.

Comment 3

Clarify the City's service area policies for water service requests outside the city but within the retail water service area and more than 1000 feet from an existing water line. Does the 1000 feet apply to new development or an existing Group B that may desire direct service? Enclosed is a map of the Group A and B public water systems within the City's service area for which service should ultimately be planned.

Response

The map attached to the comment letter does not show any group A or B systems. It does show the City limits and planning area. The City is aware that are some Group B system within the planning area. Please provide correct map showing any group A or B systems within the City's service area. The City's policy regarding the 1,000 feet is a guideline and each existing group B or other system that desires to connect to the City's water system will be evaluated on an individual basis. The City will make water service available if it is reasonable to do so, based on water rights, hydraulic and financial considerations.

The applicant for an existing system would be treated similarly to a new development for evaluation and connection fees. If there is a health and safety issue (existing well volume or quality), the City would prioritize response to the existing system(s) inquiring.

Comment 4

Clarify the fire flow within the RWSA and outside of the City that appear on Figure 4.6A to be less than 1000 gallons per minute (gpm) and the Plan's statement that, "The system can provide the required residential fire flow (1,000 gpm) at all fire flow nodes within the system."

Response

The statement is acknowledged to not reflect the results of the model. Page 4.20, Section 4.5.4, Fire Flow Analysis, first paragraph will be revised to the following: Model results for the 1,000 gpm residential fire flow indicate some deficiencies within the system, almost exclusively outside of City limits. These deficiencies are addressed in projects included in the CIP that can be found in Chapter 8, Improvement Plan, of the Plan."

Comprehensive Plan modifications noted.

Comment 5

Include consistency statements from the neighboring utilities to affirm the Plan is consistent with their respective planning efforts;

Response

The City's signed Local Consistency Review Checklist is included in Appendix A of the Plan. No other Local Consistency Review Checklists are required. Additionally, no comments were received within the 90-comment period from neighboring utilities.

No Comprehensive modifications proposed as noted.

Comment 6

Include the resolution or ordinance from the City council approving the final water plan.

Response

A resolution adopting the final water plan will be included in Appendix A after all comments have been resolved with the approving agencies.

Comprehensive Plan modifications proposed as noted.

Thank you again for your comments. We believe these responses adequately address your concerns. The City is in the process of finalizing the Plan and will provide a final insert and replace packet along with an electronic version once all approvals have been received. Should you have additional questions, please feel free to contact me at (425) 289-7309 or Laurie Fulton, PE at (425) 289-7344.

Regards,

STANTEC CONSULTING SERVICES INC.

Pamela-Rae Cobley, ENV SP
Project Manager
Phone: (425) 289-7309
Fax: (425) 869-1190
pam.cobley@stantec.com

cc: Amy Arrington, Mary Maddole, Tim Woolett, Bill Ferry – City of Carnation
Laurie S. Fulton, PE – Stantec

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

April 14, 2017

Mr. Phil Messina
City Manager
City of Carnation
4621 Tolt Avenue
PO Box 1238
Carnation, WA 98014-1238

RE. City of Carnation – Draft 2015 Comprehensive Water System Plan, Washington DOH System ID #11200, Review by Washington Department of Ecology

Dear Mr. Messina:

Thank you for the opportunity to review the City of Carnation's (Carnation) draft Water System Plan (WSP). Consistent with the Memorandum of Understanding between the Departments of Health (DOH) and Ecology (Ecology) regarding joint review and approval of water system plans, this letter is being sent to your office with Ecology's comments regarding the Water System Plan.

I have reviewed relevant portions of the plan and offer the following comments. Special attention should be paid to comments in bold.

Water Rights

The WSP notes that Carnation holds two water rights. The older right is a surface water claim, S1-117902CL, for Carnation's springs source and has a priority date of December 1916. The junior right is a groundwater certificate, G1-22827C, with a priority date of April 4, 1977, and authorizing withdrawal from Carnation's well source.

Surface Water Claim S1-117902CL claims an instantaneous rate of 1.4 cubic feet per second, equal to 628 gallons per minute (gpm) and an annual quantity of 1,000 acre-feet per year (afy). No obvious issues are noted with the claim. However, it should be noted that the extent and validity of any claim can only be formally determined in an adjudication in Superior Court. Ecology does not anticipate a general adjudication of water rights in your watershed in the foreseeable future.

Groundwater Certificate G1-22827C authorizes withdrawal at a rate of 800 gpm and an annual quantity of 538 afy. Carnation's interpretation of the nature of this certificate appears erroneous. Language within previous documents, the Report of Examination (reviewing the original application) and the Permit (authorizing withdrawal), clearly

states that the annual quantity of this water right was intended to be **"non-additive" to the senior claim**. The language is as follows, ***"Issued as a supplemental supply to any other rights. The total annual use shall not exceed 538.0 acre-feet per year less any amount utilized under other rights."*** This means that any quantity withdrawn under the claim should be subtracted from the groundwater right.

This language is recognized within the WSP, however Carnation states that it "considers the water rights from both sources as additive."

The basis of Carnation's interpretation is uncertain. Ecology's interpretation is that, although the language is not present in the Certificate, the intent within the Report of Examination and subsequent Permit is clear and does limit Carnation's withdrawal under this right. Based on the above, **Carnation's total authorized quantities including both sources are 1,428 gpm and 1,000 afy.**

Future Growth

The 6-, 10-, and 20-year forecasts suggest that total annual demand in 20 years (468 afy) will be significantly less than the 1,000 afy recognized above. However, for the instantaneous rate, Carnation suggests, in Table 3-10 and in their water rights self-assessment, that they would increase diversion from the springs source to meet demand. For the 10- and 20-year projections, the diversion rate would exceed the claimed rate of 628 gpm by 5 gpm and 98 gpm, respectively. **The claimed instantaneous rate for the springs (628 gpm) is a limiting factor and cannot legally be exceeded.** It is expected that Carnation would activate the approved well source to help meet higher instantaneous demands when needed.

Service Area

RCW 90.03.386(2) requires that water systems be in compliance with the terms of their water system plan AND that any alteration of the place of use not be inconsistent with any comprehensive plans or development regulations. Carnation does not indicate any near-term plans to expand/alter their service area. An evaluation of any such change should be undertaken if/when an expansion plan is forthcoming.

Thank you for the opportunity to review the City of Carnation Water System Plan. Please contact me at (425) 649-7013 if you have any questions regarding this comment letter.

Sincerely,

Michelle Courts

FOR Jay Cook
Water Resources Program

cc: Mr. Richard Rodriguez, Department of Health

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent Washington 98032-2388

March 27, 2017

WILLIAM FERRY
CITY OF CARNATION
PO BOX 1238
CARNATION WA 98014

RE: Carnation, City of, ID# 11200
King County
Water System Plan - 2017
Submittal#17-0105

Dear Mr. Ferry:

Thank you for submitting the Water System Plan (WSP) for the City of Carnation (the City) received in this office on January 17, 2017. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

Description of Water System

1. Please provide determinations of local government consistency from the City's Planning Department.
2. King County provided comments on your WSP on March 17, 2017. Please respond to their issues. Adequate responses to their issues should be included in your final WSP submittal in order to receive a WSP Adoption Ordinance from King County.

Policies, Criteria and Standards

3. Section 2.6.14 indicates source meters "shall be calibrated every 5 years." Please clarify if this is an action the City takes, or if it is a recommendation.

Basic Planning Data

4. Table 3.8 Projected ERUs. Please include the authorized consumption and distribution system leakage.

System Analysis

No issues.

Water Use Efficiency/ Water Rights

No issues.

Wellhead Protection

No issues.

Operations & Maintenance

5. Thank you for the comprehensive Coliform Monitoring Plan (CMP) provided in Appendix L.
    a. The City typically collects four samples per month rather than the minimum two that are required. Consider stating this fact clearly in your CMP. This is excellent water quality surveillance.
    b. The Revised Total Coliform Rule (RTCR) no longer requires increased monitoring in the month following an unsatisfactory sample. It is great if the City wants to continue with such increased monitoring. If the City wants to simply comply with the minimum requirements of the RTCR, pages 6 and 7 of the CMP can be deleted.
    c. Please provide a larger map showing the routine sample site locations.
    d. We appreciate the City working on an *E.coli* response plan. Consider using the checklists for such planning that are on the Department of Health website in order to create a robust plan.
    e. Please provide standard operating procedures for coliform routine and repeat sampling in the appendix with the Coliform Monitoring Plan.
6. Section 7.5 refers to collection of five bacteriological samples per month. However, the CMP in Appendix L indicates the City collects from four routine sample sites per month. Please verify and make appropriate corrections.
7. Section 7.6 incorrectly states that the vulnerability assessment (VA) requirement applies to systems with at least 3,300 connections. The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 requires community water systems serving more than 3,300 people to conduct a VA. Please correct the text.
8. Section 7.7 refers to the cross-connection control program. How many high hazard cross-connections are there? Do these have reduced pressure backflow assemblies that are tested yearly?
9. Please include Construction Completion Reports for all distribution main replacement and extension projects in the City's Recordkeeping and Reporting section.

10. How often does staff check integrity of reservoir seals and screens? The Department recommends a visit to each reservoir to check integrity of the hatch seal, vent, overflow screen and any other penetrations at least once or twice a year.

11. Utilities often find that components of pressure reducing valves (PRVs) deteriorate and need replacement sooner than the 15-year life span. Consider incorporating routine PRV inspection and repair in the Operation and Maintenance Program.

Distribution Facilities Design and Construction Standards

12. Thank you for submitting water distribution standard plans and specifications. We understand the City intends requests the project submittal exception to DOH for distribution main projects under WAC 246-290-125(2).

13. DWG. No. W-7 – 2" temporary blow off assembly for testing. Please eliminate the drain hole from the blow off assembly design standard.

14. Please provide the Standard Specification for the hydrostatic test referred to on page 49 of Appendix E.

Improvement Program

15. What is the cost of source meter calibration and repairs every five years? Where is this cost accounted for?

16. Consider adding the cost of PRV inspection and repair in the capital improvement program.

Financial Planning

17. Consider adding discussion of how the water system plans to incorporate the goals presented in the Governor's Directive 16-06 (see attached). The Governor directed water utilities to locate lead service lines and lead components in the distribution system over the course of the next two years, and replace in the next 15 years. How does this change the capital improvement plan and financial plan?

Miscellaneous

18. The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the WSP, prior to DOH approval of the WSP.

19. Prior to DOH approval, the City's elected governing body must approve and adopt the WSP.

20. Please provide copies of any comments made by adjacent purveyors or other interested parties, along with the City's response to those comments.

21. Is the City a member of WARN?

We hope that you have found these comments to be clear, constructive and helpful in the development of your final draft WSP. We ask that you submit the revised WSP on or before **June 27, 2017**. In order to expedite the review of your revised submittal, please include a cover letter summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.)

Regulations establishing a schedule for fees for review of planning, engineering and construction documents have been adopted (WAC 246-290-990). Please note that we have included an invoice in the amount of **$2280.00** for the review of the Water System Plan. This fee covers our cost for review of the initial submittal, plus the review of one revised document. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: **DOH, Revenue Section, and P.O. Box 1099, Olympia, WA 98507-1099.**

Thank you again for submitting your draft Water System Plan for our review. If you have any comments or questions concerning our review, please contact either of us.

Sincerely,

Richard Rodriguez
Regional Planner
(253) 395-6771

Brietta Carter, PE
Regional Engineer
(253) 395-6770

Enclosure (invoice)

Cc: Ria Berns, DOE, NWRO
Steve Hirschey, King County UTRC
Laurie Fulton, PE, Stantec

King County

Utilities Technical Review Committee
Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 512
Seattle, WA 98104-3855
www.kingcounty.gov

March 17, 2017

Mr. Phil Messina, City Manager
City of Carnation
P O Box 1238
Carnation, WA 98014

Dear Mr. Messina:

Thank you for submitting the City of Carnation (City) draft 2015 Comprehensive Water System Plan for King County approval. The Plan was received on January 17, 2017, from Ms. Cobley, with Stantec. In accordance with the King County Code 13.24 the King County's Utilities Technical Review Committee (UTRC) has reviewed the Plan for consistency with the King County Comprehensive Plan and the King County Code.

In reviewing the Plan, the UTRC found that the Plan is largely consistent with the County's comprehensive plan and code. However, six additions or clarifications are necessary before we can make a recommendation to the King County Council for approval of the City's final Plan. The six items are:

- Clarify the projected growth of service connections outside the City's urban growth area but within the service area. Section 3.6.2 has a projection that, "approximately 210 new service connections could develop outside the UGA in the 20-year planning period". That is roughly 10 new connections per year. However, Table 3.7 provides a twenty-year projection of service connections outside the urban growth area of 2 connections over 20 years.
- Clarify, incorporate, and or make reference to either the County's Growth Management Planning Council's (GMPC) growth target for the City (adding about 330 new housing units in the City and its UGA between now and 2031) or to the Puget Sound Regional Council's Land Use Vision forecast for the City within your forecast of residential connections.
- Clarify the City's service area policies for water service requests outside the city but within the retail water service area and more than 1000 feet from an existing water line. Does the 1000 feet apply to new development or an existing Group B that may desire direct service? Enclosed is a map of the Group A and B public water systems within the City's service area for which service should ultimately be planned.
- Clarify the fire flow within the RWSA and outside of the City that appear on Figure 4.6A to be less than 1000 gallons per minute (gpm) and the Plan's statement that, "the system can provide the required residential fire flow (1,000 gpm) at all fire flow nodes within the system."
- Include consistency statements from the neighboring utilities to affirm the Plan is consistent with their respective planning efforts;

- Include the resolution or ordinance from the City council approving the final water plan.

We note in Section 5.3.1 the City is currently evaluating water reclamation opportunities. Reclaimed water planning should be coordinated with King County Wastewater Treatment Division so the City can understand available volumes and permit conditions. The Carnation Reclaimed Water Permit limits the volume of reclaimed water that can be used for uses such as irrigation due to discharge requirements to the wetland project. To coordinate on reclamation opportunities please contact Ms. Jacque Klug at Jacque.Klug@kingcounty.gov or by telephone at 206-477-4474.

Often times the construction and/or maintenance of utility lines requires work within the road right-of-way for roads in unincorporated King County. When a utility has a proposed project within unincorporated King County, please contact the King County Department of Transportation (KCDOT), Road Services Division, Engineering Services Section for coordination with the County's annual overlay program. Failure to do so may result in the denial of the permit to work within the right-of-way once an overlay of the road section has been completed. Although each utility has a set of construction standards and specifications for their projects, when construction and or maintenance of utilities requires work within the road right-of-way for roads in unincorporated King County, please be aware that the current edition of the King County Road and Construction standards (http://www.kingcounty.gov/transportation/kcdot/Roads/EngineeringServices/RoadStandards2007.aspx) apply to any installation or work in these rights-of-way. Not adhering to these standards could result in the installation of non-specified and approved methods and/or materials that are out of the specifications for King County, and could potentially add additional costs to the purveyor for future repairs or adversely affect acceptance of those repairs/installations.

Related to the water plan is the County franchise granted to the City for water service in unincorporated King County. The Plan states and we agree that franchise number 17850 is held by the City for water distribution. Franchise 17850 was approved in 2014 and expires 2039.

We look forward to seeing the final Plan and working with you to secure the King County Council's approval. The Council's action will represent King County's final action on the Plan. If you have any questions or concerns about any of the information in the letter, please do not hesitate to call me at 206-477-5387.

Sincerely,

Stephen Hirschey
Chair, Utilities Technical Review Committee

cc: Richard Rodriguez, Regional Planner, Washington State Department of Health
Pam Cobley, Stantec Consulting Services Inc.

Enclosure


SNOQUALMIE RIVER
NE 55TH ST
316TH AVE NE
318TH AVE NE
320TH AVE NE
322ND AVE NE
326TH AVE NE
TOLT HIGHLANDS RD NE
NE 52ND ST
NE 52ND WAY
NE 50TH PL
NE 50TH ST
E MORRISON ST
E REITZE ST
E BIRD ST
W ENTWISTLE ST
W COMMERCIAL ST
STEWART AVE
TOLT AVE
MILWAUKEE AVE
CITY OF CARNATION WATER SYSTEM WELL (4)
E ENTWISTLE ST
NE 45TH ST
W EUGENE ST
MCKINLEY AVE
NE 42ND ST
325TH AVE NE
331ST AVE NE
332ND AVE NE
334TH AVE NE
NE 40TH ST
REGAL ST
TOLT RIVER
LAKE
NE TOLT HILL RD
NE 32ND ST
323RD AVE NE
NE 24TH ST
328TH AVE NE
324TH AVE NE
NE 20TH ST
324TH WAY NE
NE 16TH ST
NE 14TH ST

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent Washington 98032-2388

January 17, 2017

WILLIAM FERRY
CARNATION WATER SYSTEM, CITY OF
PO BOX 1238
CARNATION WA 98014

RE: CARNATION WATER SYSTEM, CITY OF ID# 11200
KING COUNTY
DRAFT COMPREHENSIVE WSP
SUBMITTAL #17-0105

Dear William Ferry:

On January 17, 2017, our office received your documents and assigned them the submittal number 17-0105. Please use this number on all correspondence or additional submittals about this project.

When we have completed the review you will receive either an approval letter or a comment letter listing items that need to be addressed prior to an approval. We expect to review the submittal within 90 days.

There is a fee for our review; we will send you an invoice for payment. The base fee includes our initial review and the review of one resubmittal if needed. If additional reviews are needed, you will receive additional invoices. Payment of the fee does not guarantee or imply approval of your submittal. There is a link to our fee schedule on our website www.doh.wa.gov/ehp/dw under rules, WAC 246-290-990

Thank you for giving us the opportunity to serve you. We look forward to working with you to ensure your community has safe and reliable drinking water at the tap. Please call me at (253) 395-6750 if you have any questions.

Sincerely,

Rachel Schlegel
Northwest Drinking Water Operations

cc: PAM COBLEY

Notice: Any purveyor who begins construction on a drinking water project without all required approvals may be subject to penalty of up to $5,000 per service connection (Chapter 70.119A RCW). The Department is under no obligation to accept or approve any component installed or constructed prior to approval. You may be required to expose system components for inspection and rebuild/replace if necessary to meet Department requirements.

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent Washington 98032-2388

January 17, 2017

Ria Berns
Department of Ecology – M/S NB-81
3190 160th Ave SE
Bellevue, WA 98008-5452

Subject: Carnation Water System, City Of Water System, ID #11200
King County
Water System Plan
Submittal #17-0105

Dear Ria Berns:

Here is the water system plan for the Carnation Water System, City Of located in King County. Please review and provide comments as required in the 2007 Memorandum of Understanding. Please focus comments on the elements identified in the *Joint Review Procedures for Planning and Engineering Documents*. Comments on other elements of the document are welcome, but a response from the water system on other elements is not required.

Please provide written comments to the water utility and copy our office within 60 days from the date of this letter. We will forward any changes to the document regarding water rights to you for review.

Please mail comments to:

Richard Rodriguez
20425 72nd Ave South, Suite 310
Kent WA 98032-2388

If I receive no response by the comment deadline, DOH will determine compliance based on information provided by the water system. If you have any questions, please contact me at (253) 395-6771. Thank you for your time and assistance.

Sincerely,

Richard Rodriguez
Regional Planner
NW Drinking Water Operations

Enclosures – Water System Plan & Submittal Form

cc: WILLIAM FERRY
PAM COBLEY

Appendix C

Franchise Agreement

17850

City of Carnation, Washington

WATER SUPPLY FRANCHISE

Franchise 17850

King County, Washington

TABLE OF CONTENTS

FRANCHISE NO. 17850

City of Carnation, Washington
WATER SUPPLY FRANCHISE

In the matter of the application for a Franchise to Construct, Operate, Maintain, repair, relocate, remove and replace its water utility facilities, including water mains, transmission lines, force mains, fire hydrants and other appurtenances in, over, along and under specified County roads and rights-of-way in King County Washington.

APPLICATION AND HEARING

The application of the City of Carnation, WA for a Franchise to Construct, Operate, Maintain, repair, relocate, remove and replace its water utility facilities, including water mains transmission lines, force mains, fire hydrants and other necessary appurtenances in, over, along, and under specified County Roads and Rights-of-Way located within the area described in attached Exhibit A and illustrated in Exhibit B has been heard on this 28th day of July, 2014.
All of the property described in Exhibit A and Exhibit B lies outside the limits of any incorporated town or city.

Legal notice of the Franchise application and of the hearing has been given as is required by law.

GRANT OF FRANCHISE

The King County Council, having considered the interests proposed and advanced, and finding that the granting of this Franchise is in the public interest, ORDERS that a Water Supply Franchise be granted to the City of Carnation, Washington, the Grantee, subject to the condrtions set out herein. This Franchise grants the right, privilege, authority and Franchise to Construct, Operate, Maintain, repair, relocate, remove and replace its water utility facilities, including mains, transmission lines, force mains, fire hydrants and other necessary appurtenances as a part of its water supply system in, over, along, and under County Roads and Rights-of-Way located within the Franchise Area described in Exhibit A and B.

This Franchise is granted subject to all of the terms and conditions contained herein, including in exhibits and attachments to the Franchise, and subject to the terms and conditions within the ordinance approving this franchise, Ordinance No. 17850. The Franchise shall expire twenty-five (25) years from the date of full acceptance, on the date specified in Section 3.

GENERAL TERMS AND CONDITIONS

THIS FRANCHISE is subject to the following terms and conditions:

1. DEFINITIONS.

References to any County official or office also refer to any office that succeeds to any or all of the responsibilities of the named office or official. References to laws or "applicable laws" include federal, state, and local laws and regulations adopted pursuant to those laws; unless otherwise stated, references to laws include laws now in effect, as the same may be amended from time to time during the operation of this Franchise. In addition, the following definitions shall apply for the purposes of this Franchise and all exhibits attached hereto. Defined words shall have their meaning as defined in this section when capitalized in the text. Words not defined, and defined words when not capitalized in the text shall be given their common and ordinary meaning.

Abandon (Abandonment). The term "Abandon or Abandonment" shall mean when Grantee discontinues use of the Facilities, or any portion thereof with no immediate intent to resume such use.

County or Grantor. The terms "County" or "Grantor" refer to King County, a political subdivision of the State of Washington. Where discretionary acts by the County are authorized or required herein, unless otherwise stated they shall be performed by the Director.

County Road Rights-of-Way. The term "County Road Rights-of-Way" includes any maintained or unmaintained road, street, avenue, or alley located within unincorporated King County. It does not include recreational or nature trails except where the trails intersect with or are within roads, streets, avenues or alleys.

Construct or Construction. The term "Construct or Construction" shall mean to construct, reconstruct, install, reinstall, align, realign, locate, relocate, adjust, affix, attach, modify, improve, remove, support, maintain, or repair Franchisee's Facilities and may include, but is not limited to, digging and/or excavating for the above purposes.

Council. The term "Council" refers to the King County Council, acting in its official capacity.

Default. The term "Default" shall mean a failure, omission or neglect to perform, satisfy or discharge any term, condition, representation, warranty or other obligation under the Franchise.

Director. The term "Director" refers to the Director of the King County Department of Transportation or his or her designee.

Effective Date. The term "Effective Date" shall mean the date designated herein, after passage, approval and legal publication of this Ordinance and acceptance by Grantee, upon which the rights, duties and obligations shall come in effect and the date from which the time requirement for any notice, extension and/or renewal will be measured.

Facilities. The term "Facilities" shall mean the Grantee's water mains, transmission lines, force mains, and fire hydrants and other appurtenances within the Franchise Area that are necessary for the purposes of collecting, transporting or treating water within the Franchise Area. The term shall include electrical and fiber optic cables, but only those necessary and used for the Operation and Maintenance of the Grantee's water supply system.

Franchise. The term "Franchise" shall mean this Franchise, once accepted by the Grantee, and including any amendments, exhibits, or appendices to this Franchise.

Franchise Area. The term "Franchise Area" shall mean the County Roads Rights-of-Way wherein the Grantee has or will locate the Grantee's Facilities within the external boundaries of Grantee's approved comprehensive water system plan area as identified and described in Exhibits A and B.

Grantee. The term "Grantee" refers to the Franchisee, the City of Carnation, Washington, and its successors and those assignees approved pursuant to paragraph 29 herein.

Maintenance or Maintain. The term "maintenance or maintain" shall mean examining, testing, inspecting, repairing, maintaining and replacing the Facilities or any part thereof as required and necessary for safe Operations and related activities, as performed by the Grantee, unless otherwise provided herein.

Operate or Operations. The term "Operate or Operations" shall mean the use of Grantee's pipeline(s) and/or Facilities for the, transportation, transmission, treatment and delivery of water within and through the Franchise area.

Other Governing Body. The term "Other Governing Body" refers to any public official or other public board or body as may have the power and jurisdiction to permit or regulate the installation and maintenance of utilities and other Facilities in, under, over, across, and along any of the county property described in Exhibit A or Exhibit B.

Public Properties. The term "Public Properties" shall mean the present and/or future property owned or leased by Grantor.

Utility. The term "Utility" refers either to the Grantee or, depending on the context, to any other person, firm, or corporation, public or private, which may hold a Franchise to maintain and operate facilities in, under, over, across, and along any of the County property described in Exhibit A or Exhibit B, or within the Franchise Area.

2. ACCEPTANCE BY GRANTEE OF TERMS AND CONDITIONS

The full acceptance of this Franchise and all of its terms and conditions shall be filed with the Clerk of the Council within forty-five (45) days from July 28, 2014, by the Grantee, unless Grantee requests additional time in which to accept the Franchise and is granted such additional time in writing by the Director. Full acceptance of this Franchise is a condition precedent to its taking effect, and unless this Franchise is accepted within the time specified, this

grant will be null and void and have no force or effect. Full acceptance shall be accomplished by filing three signed originals of this Franchise, together with the following:

a. The insurance certificates required in Section 12.
b. Payment of the administrative and other costs for issuance of the Franchise according to Section 16.

3. FRANCHISE TERM

The Franchise shall expire in 25 years, on 7/28/2039; provided, however, that certain of Grantee's obligations, including obligations to Maintain, repair, remove, and replace its Facilities shall survive expiration and continue as more fully provided in Section 31.

4. FRANCHISE AREA.

This Franchise shall apply to the Franchise Area within the external boundaries set out in Exhibits A and B. Grantee and the County recognize that Grantee may need to utilize additional County Road Rights-of-Way in order to Construct, Operate and Maintain the Facilities. Grantee agrees to cooperate with the County to timely identify and evaluate any additional County Roads Rights-of-Way necessary to Construct and Operate its water supply system. Exhibit A shall describe the external boundaries of that Franchise area. The legal description and Exhibits A and B may be amended by written agreement of both parties to add additional Franchise Areas or delete portions of or modify existing Franchise Areas, and such amendments shall be incorporated herein to evidence such approval.

5. NON-EXCLUSIVE FRANCHISE

This Franchise is not exclusive. The primary purpose of the County Roads Rights-of-Way is to provide for the efficient transportation of the public. This Franchise does not prohibit King County from granting Franchises for other public or private utilities, in, under, over, across, and along any County Road Rights-of-Way and the Franchise Area, as it may deem fit.

Franchisee shall cooperate in allowing any other additional uses authorized in franchises granted by King County. King County retains full power to use, construct, and alter the County Road Rights-of-Way covered by this Franchise and to make all changes, relocations, repairs, and perform maintenance as it may deem fit.

6. JURISDICTION

This Franchise is intended to convey limited rights and interests only as to those roads and rights-of-way in which King County has an actual interest. It is not a warranty of title or of interest in County Road Rights-of-Way.

Whenever any of the County Road Rights-of-Way as designated in this Franchise, by reason of the subsequent incorporation of any town or city, or extension of the limits of any town or city, shall later fall within the city or town limits, this Franchise shall terminate as to such rights-of-way at such time as the incorporation and/or annexation is complete, after which time the County

will no longer have any responsibility for maintenance of any County roads or rights-of-way within the area of annexation/incorporation.

None of the rights granted to the Grantee shall affect the jurisdiction of King County over County road rights-of-way or the County's power to perform work upon its roadways, rights-of-way or appurtenant drainage facilities including by constructing, altering, renewing, paving, widening, grading, blasting or excavating.

All of the rights herein granted shall be subject to and governed by this Franchise; provided, however, that nothing in this Franchise may be construed in any way as limiting King County's rights to adopt ordinances that which are necessary to protect the health, safety and welfare of the general public.

7. REGULATION OF USE AND CONTROL

This Franchise does not deprive King County of any authority it now has or may later acquire to regulate the use of and to control the County Road Rights-of-Way covered by this Franchise. This Franchise authorizes the use of County Road Rights-of-Way solely for water service, including the transmission, transportation, treatment and delivery of water.

King County shall have complete authority over the location of the Grantee's Facilities within the County Road Rights-of-Way, to both determine the initial location during Construction and to require relocation of the Grantee's Facilities under Section 13 of this Franchise.

Any use of the Grantee's equipment or Facilities in County rights-of-way by others, is prohibited unless separately authorized and approved in writing by King County. The Grantee agrees that prior to authorizing any person to use the Grantee's equipment or Facilities located in County rights-of-way, the Grantee will require the user to provide the Grantee with an affidavit that it has obtained the necessary Franchise or other approval from the County to operate and provide the proposed activity or service in County Roads Rights-of-Way. At least thirty (30) days prior to executing any agreement with a potential user for the use of the Grantee's equipment or Facilities, the Grantee shall provide a copy of the affidavit to the County Road Engineer at: King County Department of Transportation, King Street Center, 201 South Jackson St., MS-KSC-231, Seattle, WA 98104, and to the King County Office of Cable Communication at Chinook Building, 401 5th Avenue, Suite 600, Seattle, WA 98104, Fax: 206-296-0842.

8. EMINENT DOMAIN

This Franchise and the limited rights and interests for the Operation, Maintenance, repair, and Construction of Grantee's Facilities are subject to the exercise of eminent domain. In the event of an exercise of eminent domain by King County, the value to be attributed to all the rights and interests granted under this Franchise shall not exceed the actual amount the Grantee paid to King County in obtaining the Franchise.

9. ENFORCEMENT

Failure of King County, on one or more occasions to exercise a right or to require compliance or performance under this Franchise or any applicable law, shall not be deemed to constitute a waiver of such right or a waiver of compliance or performance, unless such right has been specifically waived in writing. Failure of King County to enforce or exercise its rights under any provision of this Franchise or applicable law does not constitute a waiver of its rights to enforce or exercise a right in any other provision of this Franchise or applicable law.

Failure of Grantee, on one or more occasions to exercise a right or to require compliance or performance under this Franchise or any applicable law, shall not be deemed to constitute a waiver of such right or a waiver of compliance or performance, unless such right has been specifically waived in writing. Failure of Franchisee to enforce or exercise its rights under any provision of this Franchise or applicable law does not constitute a waiver of its rights to enforce or exercise a right in any other provision of this Franchise or applicable law.

10. CONDITION OF FRANCHISE AREA

Grantee has inspected or will inspect each applicable Franchise Area, and enters upon each such Franchise Area with knowledge of its physical condition and the danger inherent in operations conducted in, on or near any Franchise Area. GRANTEE ACCEPTS THE FRANCHISE AREA IN AN "AS-IS WITH ALL FAULTS" BASIS WITH ANY AND ALL PATENT AND LATENT DEFECTS AND IS NOT RELYING ON ANY REPRESENTATION OR WARRANTIES, EXPRESS OR IMPLIED, OF ANY KIND WHATSOEVER FROM THE COUNTY AS TO ANY MATTERS CONCERNING THE FRANCHISE AREA, including, but not limited to the physical condition of the Franchise Area; zoning status; presence and location of existing Utilities; operating history; compliance by the Franchise Area with Environmental Laws or other Laws and other requirements applicable to the Franchise Area; the presence of any Hazardous Substances or wetlands, asbestos, or other environmental conditions in, on, under, or in proximity to the Franchise Area; the condition or existence of any of the above ground or underground structures or improvements, including tanks and transformers in, on or under the Franchise Area; the condition of title to the Franchise Area, and the leases, easements, Franchises, orders, licensees, or other agreements, affecting the Franchise Area (collectively, the "Condition of the Franchise Area").

Grantee represents and warrants to the County that neither the Grantee nor its contractors or subcontractors have relied and will not rely on, and the County is not liable for or bound by, any warranties, guaranties, statements, representations or information pertaining to the Condition of the Franchise Area or relating thereto made or furnished by the County, or any agent representing or purporting to represent the County, to whomever made or given, directly or indirectly, orally or in writing. COUNTY HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY, WHETHER EXPRESS OR IMPLIED, AS TO THE DESIGN OR CONDITION OF THE FRANCHISE AREA, ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, THE QUALITY OF THE MATERIAL OR WORKMANSHIP OF THE PUBLIC RIGHT-OF-WAY, OR THE CONFORMITY OF ANY PART OF THE PUBLIC RIGHT-OF-WAY TO ITS INTENDED USES. COUNTY SHALL NOT BE RESPONSIBLE TO GRANTEE OR ANY OF GRANTEE'S CONTRACTORS FOR ANY DAMAGES RELATING TO THE DESIGN, CONDITION, QUALITY, SAFETY, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY PART

OF THE PUBLIC RIGHT-OF-WAY PRESENT ON OR CONSTITUTING ANY FRANCHISE AREA, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES.

11. INDEMNITY AND HOLD HARMLESS

The indemnification, protection, defense and save harmless obligations contained herein shall survive the expiration, abandonment or termination of this Franchise.

The Grantee agrees to protect, defend, indemnify and hold harmless King County as provided herein to the maximum extent possible under law. Accordingly, the Grantee agrees for itself, its successors, and assigns to defend, indemnify and hold harmless King County, its appointed and elected officials, and employees from and against liability for all claims, demands, suits, and judgments, including costs of defense thereof, for injury to persons, death or property damage, for monetary losses of any kind, including refunds of charges or fees paid by customers, and any other claim of liability of any kind which is caused by, arises out of, or is incidental to Grantee's exercise of rights and privileges granted by this Franchise, or is otherwise related to Grantee's operation and maintenance of its facilities, and including, but not limited to liability from the products contained in, transferred through, released or escaped from Grantee's facilities. The Grantee's obligations under this section shall include:

A. Indemnification for such claims whether or not they arise from the sole negligence of the Grantee, the concurrent negligence of both parties, or the negligence of one or more third parties.
B. The duty to promptly accept tender of defense and provide defense to the County at the Grantee's own expense.
C. Indemnification of claims made by the Grantee's own employees or agents.
D. Waiver of the Grantee's immunity under the industrial insurance provisions of Title 51 RCW, which waiver has been mutually negotiated by the parties.
E. Indemnification for claims submitted by Grantee's contractor or subcontractors arising from Construction of the transmission and delivery pipelines, appurtenances and Facilities.

The Grantee shall have no obligation under this section to indemnify and hold harmless King County for claims arising from the sole negligence or willful misconduct of King County, its appointed and elected officials and employees.

In the event it is necessary for the County to incur attorney's fees, legal expenses, or other costs to enforce the provisions of this section, all such fees, expenses and costs shall be recoverable from the Grantee.

In the event it is determined that RCW 4.24.115 applies to this Franchise agreement, the Grantee agrees to defend, hold harmless and indemnify King County to the maximum extent permitted there under, and specifically for its negligence concurrent with that of King County to the full extent of Grantee's negligence.

King County shall give the Grantee timely written notice of the making of any claim or of the commencement of any such action, suit, or other proceeding covered by the indemnity in this section. In the event any such claim arises, the County or any other indemnified party shall tender the defense thereof to the Grantee and the Grantee shall have the duty to defend, settle, or compromise any claims arising hereunder and the County shall cooperate fully therein. Failure of the County to timely notify Grantee of such a claim or action, however, shall not constitute a defense to the indemnity set out in this section, except to the extent of actual prejudice to the Grantee.

In addition to other indemnifications required by this Franchise, Grantee specifically agrees to defend, indemnify, and save harmless King County, its officers, agents and employees, from and against all suits, claims, actions, losses, costs, penalties, judgments, settlements and damages of whatsoever kind or nature, including third party construction delay and impact claims, arising out of failure to complete all Utility related adjustments, relocations, repairs, relocations, or work in accordance with this Franchise and the work plan and schedule agreed to by King County and Grantee.

Notwithstanding the above, the County shall have no obligation to tender a defense as a condition of the indemnity where there is a material conflict between the interests of the Grantee and King County.

12. INSURANCE REQUIREMENTS

A. Insurance Required

By the date of execution of this Franchise, the Grantee shall procure and maintain for the duration of this Franchise, insurance against claims for injuries to persons or damages to property which may arise from, or in connection with, the performance of work hereunder by the Grantee, its agents, representatives, employees and/or contractors/subcontractors. The Grantee or contractor/subcontractor shall pay the costs of such insurance. The Grantee shall furnish separate certificates of insurance and policy endorsements from each contractor/subcontractors as evidence of compliance with the insurance requirements of this Franchise.

The Grantee is responsible for ensuring compliance with all of the insurance requirements stated herein. Failure by the Grantee, its agents, employees, officers, contractor/subcontractors to comply with the insurance requirements stated herein shall constitute a material breach of this Franchise. Grantor acknowledges that Grantee is a municipal corporation with membership in the municipal risk pool operated by the Association of Washington Cities (AWC). Notwithstanding any other provision herein, Grantee's obligation under this Section 12 shall be deemed fulfilled by furnishing Grantor with evidence of Grantee's ongoing membership in the AWC risk pool or its reasonable equivalent.

Each insurance policy shall be written on an "occurrence" form; except that insurance on a "claims made" form may be acceptable with prior County

approval. If coverage is approved and purchased on a "claims made" basis, the Grantee warrants continuation of coverage, either through policy renewals or the purchase of an extended discovery period, if such extended coverage is available, for not less than three years from the date of Franchise termination, and/or conversion from a "claims made" form to an "occurrence" coverage form.

Nothing contained within these insurance requirements shall be deemed to limit the scope, application and/or limits of the coverage afforded by said policies, which coverage will apply to each insured to the full extent provided by the terms and conditions of the policy(s). Nothing contained in this provision shall affect and/or alter the application of any other provision contained within this Franchise.

B. Risk Assessment by Grantee

By requiring such minimum insurance, the County shall not be deemed or construed to have assessed the risks that may be applicable to the Grantee under this Franchise, nor shall such minimum limits be construed to limit the limits available under any insurance coverage obtained by the Grantee. The Grantee shall assess its own risks and, if it deems appropriate and/or prudent, maintain greater limits and/or broader coverage. Grantee's liability for indemnification and other risks under this Franchise shall not be construed as limited by the requirement of the minimum insurance coverage set out herein.

C. Minimum Scope of Insurance. Coverage shall be at least as broad as the following:

1. General Liability

Insurance Services Office form number (CG 00 01) covering COMMERCIAL GENERAL LIABILITY including XCU coverage.

Explosion and Collapse, Underground Damage (XCU). Coverages shall apply for the same limits as the general liability. Evidence of insurance must specifically state the coverage has not been excluded.

2. Automobile Liability

Insurance Services Office form number (CA 00 01) covering BUSINESS AUTO COVERAGE, symbol 1 "any auto"; or the appropriate coverage provided by symbols 2, 7, 8, or 9.

3. Workers' Compensation

Workers' Compensation coverage, as required by the Industrial Insurance Act of the State of Washington, as well as any similar coverage required for this work by applicable federal or "Other States" state law.

4. Stop Gap/Employers Liability

Coverage shall be at least as broad as the indemnification, protection provided by the Workers' Compensation policy Part 2 (Employers Liability) or, in states with monopolistic state funds, the protection provided by the "Stop Gap" endorsement to the general liability policy.

D. Minimum Limits of Insurance

The Grantee shall maintain limits no less than the following:

1. Commercial General Liability: $5,000,000 combined single limit per occurrence by bodily injury, personal injury, and property damage; and for those policies with aggregate limits, a $5,000,000 aggregate limit.

2. Automobile Liability: $1,000,000 combined single limit per accident for bodily injury and property damage if the use of motor vehicles is contemplated.

3. Workers' Compensation: Statutory requirements of the state of residency.

4. Stop Gap /Employers Liability. $1,000,000.

E. Minimum Limits of Insurance - Construction Period

In addition to the minimum coverages, prior to commencement of Construction and until Construction is complete and approved by the Grantee and the County, the Grantee shall cause the Construction Contractor and related professionals to procure and maintain insurance against claims for injuries to persons or damages to property which may arise from, or in connection with the activities related to this Franchise. The cost of such insurance shall be paid by the Grantee and/or any of the Grantee's contractor/subcontractors. The Grantee shall maintain limits no less than the following:

1. Commercial General Liability: $5,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage and $5,000,000 in the aggregate.

2. Automobile Liability: $1,000,000 combined single limit per accident for bodily injury and property damage.

3. Professional Liability, Errors & Omissions: $1,000,000, Per Claim and in the Aggregate.

4. Workers Compensation: Statutory requirements of the State of residency.

5. Stop Gap or Employers Liability Coverage: $1,000,000.

F. Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to, and approved by, the County. The deductible and/or self-insured retention of the policies shall not apply to the Grantee's liability to the County and shall be the sole responsibility of the Grantee.

G. Other Insurance Provisions

The insurance policies required in this Franchise are to contain, or be endorsed to contain, the following provisions:

1. All Liability Policies except Professional and Workers Compensation.

   a. The County, its officers, officials, employees, and agents are to be covered as additional insureds as respects liability arising out of activities performed by or on behalf of the Grantee/contractor in connection with this Franchise. Grantee and the County shall be named as additional insureds on all liability policies except Workers Compensation and professional Liability. Such coverage shall include Products-Completed Operations.

   b. To the extent of the Grantee's/contractor's negligence, the Grantee's/contractor's insurance coverage shall be primary insurance as respects the County, its officers, officials, employees, and agents. Any insurance and/or self-insurance maintained by the County, its officers, officials, employees, or agents shall not contribute with the Grantee's insurance or benefit the Grantee in any way.

   c. The Grantee's insurance shall apply separately to each insured against whom claim is made and/or lawsuit is brought, except with respect to the limits of the insurer's liability.

2. All Policies

   Coverage shall not be suspended, voided, canceled, reduced in coverage or in limits, except by the reduction of the applicable aggregate limit by claims paid, until after 45 days prior written notice has been given to the County. In the event of said cancellation or intent not to renew, the Grantee shall obtain and furnish to the County evidence of replacement insurance policies meeting the requirements of this Section by the cancellation date. Failure to provide proof of insurance could result in a "stop work order" being issued, as specified in Section 19 of this Franchise or the suspension or termination of the Franchise.

H. Acceptability of Insurers

Unless otherwise approved by the County, insurance is to be placed with insurers with an A.M. Bests' financial strength rating of no less than A: VIII, or, if not rated with Bests, with minimum surpluses the equivalent of Bests' surplus size VIII.

Professional Liability, Errors, and Omissions insurance may be placed with insurers with an A.M. Bests' financial strength rating of B+VII. Any exception must be approved by the County.

If, at any time, the foregoing policies shall fail to meet the above requirements, the Grantee shall, upon notice to that effect from the County, promptly obtain a new policy, and shall submit the same to the County, with appropriate certificates and endorsements, for approval.

I. Verification of Coverage

The Grantee shall furnish the County with certificates of insurance and endorsements required by this Franchise. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates and endorsements for each insurance policy are to be on forms approved by the County prior to the commencement of activities associated with the Franchise. The County reserves the right to require complete, certified copies of all required insurance policies at any time.

J. Subcontractors

The Grantee shall include all subcontractors as insureds under its policies or shall require separate certificates of insurance and policy endorsements from each subcontractor. If the Grantee is relying on the insurance coverages provided by subcontractors as evidence of compliance with the insurance requirements of this Franchise, then such requirements and documentation shall be subject to all of the requirements stated herein.

K. Insurance Review

In consideration of the duration of this Agreement, the parties agree that the Insurance section herein, at the discretion of the County Risk Manager, may be reviewed and adjusted with each amendment and within ninety (90) days of the end of the first five (5) year period of the Agreement and the end of each successive five (5) year period thereafter.

Any adjustments made as determined by the County Risk Manager, shall be in accordance with reasonably prudent risk management practices and insurance industry standards and shall be effective on the first day of each successive five (5) year period.

Adjustment, if any, in insurance premium's shall be the responsibility of the Grantee. Any failure by the County to exercise the right to review and adjust at any of the aforementioned timings shall not constitute a waiver of future review and adjustment timings.

13. CONTRACTORS PERFORMANCE AND PAYMENT BOND

The Grantee shall cause each and every Contractor performing work under the Franchise to execute and deliver to the Grantee a performance and payment bond for 100% of the construction price of the project the Contractor is performing, on a form acceptable to the Grantee with an approved surety company and incompliance with Chapter 39.08 RCW. Contractor shall notify surety of any changes in the work.

14. HAZARDOUS MATERIALS AND ENVIRONMENTAL COMPLIANCE.

A. Definition. "Hazardous Materials" as used herein shall mean:

1. Any toxic substances or waste, sewage, petroleum products, radioactive substances, medical, heavy metals, corrosive, noxious, acidic, bacteriological or disease-producing substances; or

2. Any dangerous waste or hazardous waste as defined in:

a. Washington Hazardous Waste Management Act as now existing or hereafter amended (RCW Ch. 70.105); or

b. Resource Conservation and Recovery Act as now existing or hereafter amended (42 U.S.C. Sec. 6901 et seq.); or

3. Any hazardous substance as defined in:

a. Comprehensive Environmental Response, Compensation and Liability Act of 1980 as now existing or hereafter amended (42 U.S.C. Sec. 9601 et seq.); or

b. Washington Model Toxics Control Act as now existing or hereafter amended (RCW Ch. 70.105D); or

4. Any pollutants, contaminants, or substances posing a danger or threat to public health, safety or welfare, or the environment, which are regulated or controlled as such by any applicable federal, state or local laws, ordinances or regulations as now existing or hereafter amended.

B. Grantee shall not without first obtaining King County's prior written approval, use, generate, release, handle, spill, store, treat, deposit, transport, or dispose of any Hazardous Materials in, on, or about the Franchise Area.

C. Environmental Compliance.

1. Grantee shall, at Grantee's own expense, comply with all federal, state and local laws, ordinances and regulations now or hereafter affecting the Franchise Area, Grantee's business, or any activity or condition on or about the Franchise Area, including, without limitation, all laws, ordinances and regulations related to Hazardous Materials and all other environmental laws, ordinances and regulations, and any other laws relating to the improvements on the Franchise Area, soil and groundwater, storm water discharges, or the air in and around the Franchise Area, as well as such rules as may be formulated by King County, including the conditions required in any permits issued by the County for project and critical areas protection under the Growth Management Act ("the Laws"). Grantee warrants that its business and all activities to be conducted or performed in, on, or about the Franchise Area shall comply with all of the Laws. Grantee agrees to change, reduce, or stop any non-complying activity, or install necessary equipment, safety devices, pollution control systems, or other installations may be necessary at any time during the Franchise to comply with the Laws.

2. Grantee shall not cause or permit to occur any violation of the Laws on, under, or about the Franchise Area, or arising from Grantee's use or occupancy of the Franchise Area, including, but not limited to, soil and ground water conditions.

3. Grantee shall promptly provide all information regarding any activity of Grantee related to Hazardous Materials on or about the Franchise Area that is requested by King County. If Grantee fails to fulfill any duty imposed under this paragraph within a reasonable time, King County may do so; and in such case, Grantee shall cooperate with King County in order to prepare all documents King County deems necessary or appropriate to determine the applicability of the Laws to the Franchise Area and Grantee's use thereof, and for compliance therewith, and Grantee shall execute all documents promptly upon King County's request. No such action by King County and no attempt made by King County to mitigate damages shall constitute a waiver of any of Grantee's obligations under this paragraph.

4. Grantee shall, at Grantee's own expense, make all submissions to, provide all information required by, and comply with all requirements of all governmental authorities ("the Authorities") under the Laws.

5. Should any Authority demand that a cleanup plan be prepared and that a cleanup be undertaken because of any deposit, spill, discharge or other release of Hazardous Materials that occurs during the term of this Franchise at or from the Grantee's Facilities or which arises at any time from Grantee's use or occupancy of the Franchise Area, then Grantee shall, at Grantee's own expense, prepare and submit the required plans and all related bonds and other financial assurances to the County for

approval; and Grantee shall carry out all such cleanup plans. Any such plans and cleanup are subject to King County's prior written approval. Any mitigation associated with the cleanup solely shall be at the Grantee's own expense.

D. Indemnification.

1. Grantee shall be fully and completely liable to King County for any and all cleanup and/or mitigation costs, and any and all other charges, fees, penalties (civil and criminal) imposed by any Authority with respect to Grantee's use, disposal, transportation, generation, release, handling, spillage, storage, treatment, deposit and/or sale of Hazardous Materials in or about the Franchise Area, or common areas. Grantee shall indemnify, defend and save King County harmless from any and all of the costs, fees, penalties, and charges assessed against or imposed upon King County (as well as King County's attorney's fees and costs) by any Authority as a result of Grantee's use, disposal, transportation, generation, release, handling, spillage, storage, treatment, deposit and/or sale of Hazardous Materials, or from Grantee's failure to provide all information, make all submissions, and take all steps required by all Authorities under the Laws.

2. Grantee shall indemnify and hold King County harmless from any and all claims, liabilities, lawsuits, damages, and expenses, including reasonable attorney's fees, for bodily injury or death, property damage, loss, or costs caused by or arising from the use, disposal, transportation, generation, release, handling, spillage, storage, treatment, deposit and/or sale of Hazardous Materials by Grantee or any of its agents, representatives or employees in, on, or about the Franchise Area occurring during the term of the this Franchise.

E. Reporting Requirements. Grantee shall comply with the Laws requiring the submission, reporting, or filing of information concerning Hazardous Materials with the Authorities, and shall provide to King County a full copy of any such filing or report as submitted within 15 days of such submission.

F. Right to Check on Grantee's Environmental Compliance. King County expressly reserves the right, and Grantee shall fully cooperate in allowing, from time to time, such examinations, tests, inspections, and reviews of the Franchise Area as King County, in its sole and absolute discretion, shall determine to be advisable in order to evaluate any potential environmental problems or violations.

G. Remedies. Upon Grantee's Default under this Section 14 HAZARDOUS MATERIALS AND ENVIRONMENTAL COMPLIANCE, King County shall be entitled to the following rights and remedies in addition to any other rights and remedies that may be available to the County:

1. At King County's option, to terminate this Franchise immediately; and/or,

2. At King County's option, to perform such response, remediation and/or cleanup as is required to bring the Franchise Area and any other areas of King County property affected by Grantee's Default into compliance with the Laws and to recover from Grantee all of the County's costs in connection therewith; and/or

3. To recover from Grantee any and all damages associated with the Default, including but not limited to, response, remediation, replacement and cleanup costs and charges, civil and criminal penalties and fees, adverse impacts on marketing the Franchise Area or any other adjacent areas of King County property, loss of business and sales by King County and other King County Grantees, but only to the extent of King County liability to such grantees, diminution of value of the Franchise Area and/or other adjacent areas owned by King County, the loss of or restriction of useful space in the Franchise Area and/or other adjacent areas owned by King County, any and all damages and claims asserted by third parties, and King County's attorney's fees and costs.

H. Remediation on Termination of Franchise. Upon the expiration or earlier termination of this Franchise, Grantee shall remove, remediate or clean up any Hazardous Materials on, or emanating from, the Franchise Area, Grantee shall undertake whatever other action may be necessary to bring the Franchise Area into full compliance with the Laws ("Termination Cleanup"). The process for such Termination Cleanup is subject to King County's prior written approval. If Grantee fails or refuses to commence the Termination Cleanup process, or fails to reasonably proceed toward completion of such process, King County may elect to perform such Termination Cleanup after providing Grantee with written notice of the County's intent to commence Termination Cleanup, and after providing Grantee a reasonable opportunity, which shall be not less than ninety (90) days after such notice (unless King County is given notice by a government agency with jurisdiction over such matter that Termination Cleanup must commence within a shorter time, in which case King County shall give Grantee notice of such shorter time), to commence or resume the Termination Cleanup process. If King County performs such Termination Cleanup after said notice and Grantee's failure to perform same, Grantee shall pay all of King County's costs.

I. Survival. Grantee's obligations and liabilities under this Section 14, HAZARDOUS MATERIALS AND ENVIRONMENTAL COMPLIANCE, shall survive the expiration of this Franchise.

15. LIENS

Grantee shall inform each mechanic, artisan, materialman and other contractor related to this Franchise that the County Roads Right-of-Way and other Public property is not subject to attachment for liens related to the Franchise. In the event that any County property becomes subject to any claims for mechanics', artisans', or materialmen's liens,

or other encumbrances chargeable to or through Grantee which Grantee does not contest in good faith, Grantee shall promptly, and in any event within 30 days, cause such lien claim or encumbrance to be discharged or released of record (by payment, posting of bond, court deposit, or other means), without cost to the County, and shall indemnify the County against all costs and expenses (including attorneys' fees) incurred in discharging and releasing such claim of lien or encumbrance. If any such claim or encumbrance is not so discharged and released, the County may pay or secure the release or discharge thereof at the expense of Grantee after first giving Grantee five business days' advance notice of its intention to do so. The County may charge such expenses against any performance bond, security fund or letter of credit. Nothing herein shall preclude Grantee's or the County's contest of a claim for lien or other encumbrance chargeable to or through Grantee or the County, or of a contract or action upon which the same arose.

16. CONSIDERATION, FRANCHISE FEE AND COSTS

A. Fire Hydrants and water mains.

In consideration of the rights granted to Grantee under this Franchise, Grantee shall provide and maintain, at no cost to the County, fire hydrants, water mains and other suppression water facilities and services as described in SHB 1512, Chapter 127, Session Laws of 2013 and in accordance with Ordinance 5828, as amended, Chapter 17.08, K.C.C.

B. Utility Tax.

King County specifically reserves for itself the right to impose a Utility tax on the Grantee if such taxing authority is granted by State of Washington.

C. Franchise Fees.

The County reserves the right to exercise authority it has or may acquire in the future to charge a reasonable franchise fee and secure and receive fair market compensation for the use of its property, pursuant to an ordinance. If King County elects to exercise such authority, the fair market compensation requirement for Grantee shall be established by ordinance not less than one hundred eighty (180) days after written notice ("Compensation Notice") is delivered to the Grantee, said Compensation Notice identifying with specificity the definition, terms and/or formula to be used in determining such fair market compensation.

In the event Grantee for any reason finds the amount of payment established by the County as a franchise fee or fair market compensation to be unacceptable, Grantee has the option at any time after the establishment of such payment amount to provide the County with three years written notice to terminate the Franchise and to withdraw from the Franchise Area at the conclusion of the notice period.

D. Reimbursement of Actual Costs of Issuance, Renewal, Amendment and Administration.

Grantee shall reimburse the County for the County's actual costs relating to the issuance, renewal, amendment (if requested by or for the benefit of the Grantee) and administration of this Franchise.

E. Reimbursement of Actual Costs of Design Review and Inspection.

County review and inspections, as provided for in this Franchise, are for the sole purpose of protecting the County's rights as the owner or manager of the County Roads Rights-of-Way and are separate and distinct from the approvals and inspections and fees that may be required pursuant to a right-of-way construction permit. Therefore, Grantee shall reimburse to the County, its actual costs of review and inspections, to the extent that such costs are not included in the costs for issuance of and compliance with the right-of-way construction permit. Review and inspection, by way of example and not limitation, include review of design document and inspection for compliance with Standards and 100% Design Documents.

F. Reimbursement of Actual Costs of altering County Roads Rights-of-Way.

Grantee shall reimburse the County of the actual costs incurred by the County in planning, designing, constructing, installing, repairing, relocating or altering any County infrastructure, structure, or facility as the result of the actual or proposed presence in the County Roads Right-of-Way of Grantee's Facilities. Such costs and expenses shall include, but not be limited to, the costs of County personnel and contractors utilized to oversee or engage in any work in the County Roads Rights-of-Way as the result of the presence of Grantee's Facilities in the County Roads Rights-of-Way, and any time spent reviewing construction plans in order to either accomplish the relocation of Grantee's Facilities or the routing or rerouting of any public Utilities or County Roads Rights-of-Way so as not to interfere with Grantee's Facilities. Upon request, as a condition of payment by Grantee, all billing will be itemized so as to specifically identify the costs and expenses for each project for which the County claims reimbursement. A reasonable charge for the actual cost incurred in preparing the billing may also be included in said billing.

G. Grantee Responsibility for Costs.

Except as expressly provided otherwise in this Franchise, any act that Grantee, its contractors or subcontractors are required to perform under this Franchise shall be performed at their sole cost and expense. Grantee shall be fully responsible for the cost of all of the Facilities, equipment, lines, and appurtenances which are used in the construction, operation, maintenance or repair of Grantee's service and which are located in the County Road Rights-of-Way.

H. Grantee Work Performed by the County.

Any work performed by the County that Grantee has failed to perform as required pursuant to this Franchise and which is performed by the County in accordance with the terms of this Franchise, shall be performed at the cost and expense of the Grantee. Grantee shall be obligated to pay to the County the actual costs of performing such work, including overhead costs at the standard rate charged by the County.

17. VACATION

If at any time King County vacates any County road rights-of-way covered by this Franchise, King County will not be held liable for any damages or loss to the Grantee by reason of such vacation. King County may, after giving ninety (90) days written notice to the Grantee, terminate this Franchise with respect to any County road rights-of-way vacated. Upon receiving the notice the Grantee will use its best efforts to secure a continuing easement or remove its Facilities from the proposed vacation area. Alternatively, if the Grantee is unable to secure an easement or remove its Facilities and so notifies King County, the King County Council may in its vacation proceedings reserve an easement for the Grantee.

18. REPAIR, REMOVAL OR RELOCATION

The Grantee hereby covenants, at its own expense, to keep its Facilities covered by this Franchise in good repair and working order so that the presence of such Facilities in the County Road Rights-of-Way shall not cause damage to property, the roadway, county property, the Facilities or appurtenances of other Utilities, or the environment, cause injury to persons, or otherwise impair the public's right to travel on or otherwise use the roadway. All pipeline Construction, Maintenance or Operation undertaken by Grantee, upon Grantee's direction or on Grantee's behalf shall be completed in a workmanlike manner.

Facilities installed by Grantee within County Road Rights-of-Way shall remain the sole responsibility of Grantee until the Facilities are removed and roadway restored to current Road Standards.

The Grantee hereby covenants, as its sole responsibility and at its own expense, to adjust, repair, remove or relocate its Facilities and all equipment, appurtenant facilities and service lines connecting its system to users, within King County Road Rights-of-Way if such repair, removal or relocation is required by King County for any reasonable purpose including but not limited to, the need to allow for an improvement or alteration planned by King County in such road right-of-way. The Grantee shall correct or repair, at its own expense, any defective work or damage to property associated with the repair, removal, or relocation of its facilities for any reason.

The County shall give the Grantee written notice of such requirement as soon as practicable, at the beginning of the pre-design stage for projects that are part of the County's capital improvement program, including such available information as is reasonably necessary for the Grantee to plan for such adjustment, removal or relocation. For projects that are not part of King County's capital improvement program that are deemed as maintenance, emergencies or urgent construction by King County, King County shall give the Grantee as much notice and information as is practical under the circumstances.

For projects that are part of the County's capital improvement program, in addition to any other notice given to the Grantee, the County shall provide a vertical and horizontal profile of the roadway and drainage Facilities within it, both existing and as proposed by the County, and the proposed construction schedule. Notwithstanding any permit conditions that may later be applied to the County project, this initial design information shall be given at least 180 days before construction is scheduled to begin, except in cases of urgent construction or emergencies. The Grantee shall respond to this notice, and to any later notices of revised designs based on permit conditions, within no more than thirty (30) days by providing to the County the best available information as to the location of all of the Grantee's Facilities, including all appurtenant facilities and service lines connecting its system to users and all facilities that it has abandoned, within the area proposed for the public works project.

For joint construction contracts only, the County may offer the Grantee the opportunity to participate in the preparation of bid documents for the selection of a contractor to perform the public works project as well as all required adjustments, removals or relocations of the Grantee's Facilities. Such bid documents shall provide for an appropriate cost allocation between the parties. The County shall have sole authority to choose the contractor to perform such work. The Grantee and the County may negotiate an agreement for the Grantee to pay the County for its allocation of costs, but neither party shall be bound to enter into such an agreement. Under such an agreement, in addition to the Grantee's allocation of contractor's costs, the Grantee shall reimburse the County for costs, such as design, construction and contract management, inspections or soils testing, related to the Grantee's work and reasonably incurred by the County in the administration of such joint construction contracts. Such costs shall be calculated as the direct salary cost of the time of County professional and technical personnel spent productively engaged in such work, plus overhead costs at the standard rate charged by the county on other similar projects, including joint projects with other County agencies.

19. REQUIREMENT OF CONSTRUCTION PERMITS

A. The Grantee, its successors or assigns, has the right, privilege, and authority to enter the County road rights-of-way for the purpose of Constructing, Operating, Maintaining, repairing, relocating, removing or replacing its water supply Facilities on the condition that it obtains permits approved by the Director and King County Real Estate Services and, when applicable, by the Department of Development and Environmental Services. Applications for County Right-of-Way construction permits shall be presented to King County Real Estate Services along with required detailed design and construction plans and documents, studies and reports. The design and construction must address the following items to the satisfaction of the County: compliance with applicable federal, state, and local regulations and guidelines; consistency with current, approved water system plans, traffic impacts, haul routes, structural integrity and appearance of roadways, drainage structures, bridges or other structures; ease of future road maintenance and appearance of roadway; impact upon compatibility with other facilities located within the public rights-of-way or future County improvements or future Utility installations within the rights-of-way. In an emergency, the Grantee may immediately commence the necessary work and shall apply the next

business day for a construction permit. In such event Grantee must take all necessary and prudent steps to protect, support, and keep safe from harm its pipeline(s) and/or Facilities, or any part thereof; Grantor's property; or other persons or property, and to protect the public health and safety.

All construction and other work shall be completed to the satisfaction of the Director. The Director or the Director's designee may condition the issuance of a County Right-of-Way construction permit or any other permit or approval that is required under this Franchise, as follows:

1. The Grantor may impose any condition reasonably necessary for the safe use and management of the public right-of-way or the Grantor's property including, by way of example and not limitation, maintaining proper distance from other utilities, protecting the continuity of non-motorized and vehicular traffic and protecting any rights-of-way improvements, private facilities and public safety. The Grantee will be responsible for any special studies and mitigation that is necessary to support the permit request.

2. The Grantor may require completion of the permitted Construction or other activity within a reasonable time as required in the permit. If the Grantee shall fail to complete Construction or other permitted activity to the satisfaction of the Grantor within the permitted time, the Grantee will be subject to the provisions of Section 36.

3. The Grantor may condition the granting of a County Right-of-Way construction permit or any other permit or approval upon the mitigation of the adverse affects of the Grantee's activities undertaken in connection with the Franchise. These conditions may address adverse impacts upon, without limitation, the environment, pedestrian and vehicular traffic, businesses, and residents.

4. Grantee shall be required to continuously be a member of the State of Washington one number locator service under RCW 19.122, or an approved equivalent, and shall comply with all such applicable rules and regulations. Grantee shall provide reasonable notice to the County prior to commencing any Maintenance or Construction under this Franchise and additionally to those owners or other persons in control of property in the Franchise Area when the Maintenance or Construction will affect access or otherwise impact the property.

B. All Grantee's Facilities and all other equipment, facilities and appurtenances which are used in the operation, maintenance, repair or construction of the Grantee's service and which are located within the County road rights-of-way shall be considered to be part of the Grantee's Operations system and shall be the responsibility of the Grantee. All permits for the construction, operation, maintenance, repair, relocate, removal and replacement of said system shall be

applied for and given in the name of the Grantee, who will be responsible for all work done under the permit. The Grantee remains responsible whether the work is done by the Grantee, its contractors, or by third parties.

The Grantee shall, at no expense to the County, assume the following obligations with respect to Grantee's Facilities and to facilities connected to its system that are within County road rights-of-way and which it does not own, including appurtenant facilities.

1. The Grantee shall apply for a County Right-of-Way construction permit for any repairs or upgrades required for such Facilities, equipment and appurtenances. All work to be performed in the County Right-of-Way shall comply with all conditions of the County permit and all applicable County requirements.

2. In the event that the County or Grantee determines emergency repair of such Facilities are necessary to halt or prevent significant damage to County road rights-of-way or significant threats to the health, safety and welfare of the public, the Grantee shall take prompt remedial action to correct the emergency to the County's approval, which the County shall not unreasonably withhold.

3. Except in the event of an emergency, Grantee shall provide Grantor at least ten (10) calendar days written notice prior to any Construction and/or Maintenance, or other substantial activity, other than routine inspections and Maintenance, by Grantee, its agents, employees or contractors on Facilities within the Franchise Area.

4. When the County or its contractor provides notice to the Grantee, pursuant to RCW 19.122, of its intent to excavate within County road rights-of-way, the Grantee shall provide to the County or the County's contractor the best information available from the Grantee's records or, from the use of locating equipment as to the location of such Facilities, including surface markings where these would reasonably be of use in the excavation. If the Grantee fails to make good faith efforts to provide the above information within the deadlines provided by RCW 19.122, the Grantee shall hold the County harmless for all reasonable costs, and damages to such Facilities if such damage occurs as a result of the failure to provide such information. Nothing in this subsection is intended or shall be construed to create any rights in any third party or to form the basis for any obligation or liability on the part of the County or the Grantee toward any third party, nor is anything in this subsection intended to be construed to alter the rights and responsibilities of the parties under RCW 19.122, as amended.

5. Upon acceptance of this Franchise by Grantee, the Grantee shall file and thereafter maintain at all times with the Grantor a survey depicting the

approximate location of Grantee's Facilities within the Franchise Area along with all other known Utilities, landmarks, and physical features.

6. Grantee shall also provide detailed as-built design drawings showing Grantee's Facilities in the Road Rights-of-Way, other service appurtenances and Facilities within the Franchise area. Within thirty (30) days of completing any Maintenance or Construction, or any other substantial activity within the Franchise area, the Grantee shall provide updated and corrected as-built drawings and a survey showing the location, depth and other characteristics of the Facilities within the Franchise Area.

7. Grantee shall be solely and completely responsible for workplace safety and safe working practices on its job sites within the Franchise Area, including safety of all persons and property during the performance of any work.

8. When Grantee does any work in the rights-of-way that affects, disturbs, alters, or damages any adjacent private property, the Grantee shall, at its own expense, restore such private property to the conditions reasonably existing before such work. .

9. On notice from the County that any work does not comply with this Franchise, approved permits, approved engineering plans and studies, applicable local, state and federal guidelines, standards and regulations, or work is being performed in an unsafe or dangerous manner as reasonably determined by the County, the non-compliant work may immediately be stopped by the County. The "stop work order" shall be, in writing; given to the person performing the work and be posted on the work site; indicate the nature of the alleged violation or unsafe condition; and establish conditions under which work may be resumed. If so ordered, Grantee shall cease and shall cause its contractors and subcontractors to cease such activity until the County is satisfied that the violation has been addressed. The County has the right to inspect, repair, and correct the unsafe condition if the Grantee fails to do so in a timely manner, and to reasonably charge the Grantee therefore.

20. NOTIFICATION OF WORK

The Grantee shall give notice of intent to commence work within the right-of-way in the manner and to the persons as is required for notice under KCC 20.20.060(G)(1), and as set forth in the permit issued for such work and the applicable provisions of Title 14 of the King County Code.

21. PERFORMANCE OF WORK

The Grantee covenants that in consideration for the rights and privileges granted by this Franchise, all work performed by the Grantee on County road rights-of-way shall conform to all

applicable County, state and federal requirements including, but not limited to, the current edition of the County Road Standards, the King County Regulations for Accommodations of Utilities on County Road Rights-of-Way and the Washington State Specifications for Road, Bridge and Municipal Construction in force when the work is performed. All traffic control shall also conform to the current edition of the Manual of Uniform Traffic Control Devices in force when the work is performed.

Grantee shall remain solely and separately liable for the Construction, Operation, function, testing, Maintenance, relocation, removal, replacement and/or repair of the Facilities or other activities permitted under this Franchise.

Nothing in this Franchise shall be deemed to impose any duty or obligation upon Grantor to determine the adequacy or sufficiency of Grantee's plans and designs or to ascertain whether Grantee's proposed or actual construction, testing, maintenance, repairs, relocation, replacement or removal is adequate or sufficient or in conformance with the plans and specifications reviewed by Grantor.

22. RESTORATION OF COUNTY ROAD RIGHTS-OF-WAY

After work on, under or adjacent to County road rights-of-way, the Grantee is responsible for and shall leave all County Road Rights-of-Way and other Public Properties in as good a condition as they were in before any work was done. This includes removal of all debris, paving, patching, grading and any other reasonably necessary preparation, repair or restoration to the County road rights-of-way. The restoration shall be done in accordance with the King County Road Design and Construction Standards.

In the event that the Grantee, its contractors, or third parties working on behalf of the Grantee under permit shall fail to restore County road rights-of-way to the satisfaction of the Director, King County may make such repairs or restorations as are necessary to return the County road rights-of-way to its pre-work condition. Upon presentation of an itemized bill for repairs or restorations, including the costs of labor and equipment, the Grantee shall pay the bill within thirty (30) days. If suit is brought upon the Grantee's failure to pay for repair and restoration, and if judgment in such a suit is entered in favor of King County, then the Grantee shall pay all of the actual costs, including interest from the date the bill was presented, disbursements, and attorney's fees and litigation related costs incurred.

23. OPERATIONS, MAINTENANCE, INSPECTION, TESTING

Grantee shall Operate, Maintain, inspect and test its Facilities and County property in the Franchise Area utilizing best management practices in full compliance with the applicable provisions of all federal, state and local laws, regulations and standards, as now enacted or hereafter amended, and any other future laws or regulations that are applicable to Grantee's pipeline(s) and Facilities, products and business Operations.

24. EMERGENCY ABATEMENT OF DANGEROUS CONDITIONS

In the event that the County Road Engineer determines that Construction or Operation of the Facilities has caused or contributed to a condition that threatens substantial damage to the County Road Right-of-Way, or endangers the health, safety and welfare of the public, any utilities, or other public property, the County may reasonably require the Grantee to take action to abate the condition, including immediate action or action within a prescribed time under Section 18, herein. In the event that the Grantee fails or refuses to promptly take the actions directed by the County, or fails to fully comply with such directions, or if Emergency conditions exist which require immediate action, the County may take prompt remedial actions as are necessary to abate the conditions and correct the emergency. The Grantee shall be responsible for all costs of the County's abatement actions and those costs may be charged against the security established under Section 15.

25. BLASTING REQUIREMENTS

The rights to Operate, Maintain, repair and Construct Grantee's Facilities granted by this Franchise does not preclude King County, its agents or contractors from blasting, grading or doing other road work affecting the Grantee's Facilities. Except in the case of an emergency, the Grantee will be given ten (10) business days written notice of any blasting so that the Grantee may protect its Facilities. If the Grantee notifies the County within twenty (20) business days that the Facilities will have to be relocated to protect them from blasting, the County will defer the blasting for up to one (1) year from the date of the original notice. In no event will the Grantee be given less than two (2) business days written notice of any blasting, unless unforeseen natural disaster that would warrant immediate action. Notification of any excavation shall be provided through the One-Call System as provided by RCW 19.122, as hereinafter amended.

26. SURVEY MARKERS AND MONUMENTS

It shall be the responsibility of the Grantee performing any construction work in the County road rights-of-way to restore any survey marker, reference, hubs, or monuments that were disturbed or destroyed during Grantee's work in the areas covered by this Franchise in accordance with RCW 58.09.130 and WAC 332-120, and as hereinafter amended. Such restoration shall be done in a manner consistent with applicable codes and laws, under the supervision of the Grantor.

27. LEAKS, RUPTURES AND EMERGENCY RESPONSE

Grantee shall have in place, at all times during the term of this Franchise, a system for monitoring safety and service delivery across the Franchise Area. During the term of this Franchise, Grantee shall have a written emergency response plan and procedure which shall be provided to the Grantor.

Grantee's emergency plans and procedures shall designate Grantee's local emergency response officials and a direct 24-hour emergency contact number. Grantee shall, after being notified of an emergency, cooperate with the Grantor and make every effort to respond as soon as possible to protect the public's health, safety and welfare. Grantees emergency plans shall also designate

communication procedures for contacting local emergency response officials from fire, police, school, and health agencies.

Grantee shall be solely responsible for all necessary costs incurred in responding to any leaks or ruptures from Grantee's pipeline(s) and/or Facilities.

If requested by Grantor in writing, Grantee shall provide a written summary concerning any event within thirty (30) days of the event, including, but not limited to, the date, time, amount, location, response, remediation and other agencies Grantee has notified.

The Grantor may demand that any event be investigated by an independent consultant selected by the Grantor, and shall allow such consultants access to all Grantee Facilities for purposes of the investigation upon written request of the County. Grantee shall be solely responsible for paying all of the consultant's costs and expenses incurred in investigating the occurrence and reporting the findings. Grantee shall meet and confer with the independent consultant following the consultant's investigation to address whether any modifications or additions to Grantee's pipeline(s) and/or Facilities may be warranted.

28. REMOVAL, ABANDONMENT IN PLACE

In the event of Grantee's Abandonment of use of its Facilities, or any portion thereof, within the Franchise Area, for a period of 1 year for causes not amounting to force majeure with no immediate intent to resume use, the Grantee shall inform the County in writing. Grantee shall, after notice from the County that the Facilities must be removed, within one hundred and eighty days (180) or such other reasonable period specified by the County, after the cessation of use, remove the Facilities or any portion thereof.

In the event of the removal of all or a portion of the Facilities, Grantee shall restore the Franchise Area to as good or better condition as it was in before the work began.

Removal and restoration work shall be done at Grantee's sole cost and expense and to Grantor's reasonable satisfaction. Grantee shall be responsible for any environmental review required for the removal of any Facility and the payment of any costs of the environmental review.

If Grantee is required to remove its Facilities and fails to do so and/or fails to adequately restore the Franchise Area or other mutually agreed upon action(s), Grantor may, after reasonable notice to Grantee, remove the Facilities, restore the Franchise Area and/or take other action as is reasonably necessary at Grantee's expense. This remedy shall not be deemed to be exclusive and shall not prevent the County from seeking a judicial order directing that the Facilities be removed.

With the express written consent of the Grantor, the Grantee, as directed by Grantor, may abandon its Facilities in place. Grantee shall be responsible for any environmental review required for the abandonment of Facilities and the payment of any costs of such environmental review. Grantor's consent to the abandonment of Facilities in place shall not relieve the Grantee of the obligation and/or costs to remove or to alter such Facilities in the future in the event it is reasonably determined that removal or alterations is necessary or advisable for the health and

safety of the public, in which case the Grantee shall perform such work at no cost to the Grantor. This paragraph shall survive the expiration, revocation or termination of this Franchise.

29. ASSIGNMENT AND WITHDRAWAL

The Grantee shall not have the right to assign this Franchise to third parties without the consent of the King County Council given by Ordinance. No assignment shall be effective unless an acceptance by the assignee of all rights, conditions, terms, provisions, and responsibilities contained within the Franchise, as well as any surety bonds which the Council deems necessary to be posted are received. Council approval of the assignment may be made subject to the assignee's acceptance of new or modified terms of the Franchise.

30. EXPIRATION AND RENEWAL

All rights granted by this Franchise to County road rights-of-way outside incorporated towns and cities apply only to the existing County road rights-of-way described in Exhibit A during the term of this Franchise.

If the Grantee has initiated a renewal of this Franchise two years or more before it expires, the Council may, at its sole discretion, temporarily extend the term of the Franchise on a month to month basis for up to two year(s).

If the Grantee has not applied for a renewal of this Franchise two years or more before it expires, King County has the right to remove, relocate, or decommission its Facilities and appurtenances of the Grantee as is reasonably necessary for the public's health, welfare, safety, or convenience including, but not limited to, the safe operation of County roads, Franchise holders, or for the construction, renewing, altering, or improving of any County road right-of-way, or facilities of other Franchise holders. Grantee shall be liable for the costs incurred in any removal, relocation, or decommissioning of its Facilities and appurtenances under this section. Costs include the expense of labor and equipment.

If the Grantee has not initiated a renewal of this Franchise two years or more before it expires, the County may, at its sole discretion, discontinue issuing permits for the Construction and installation of new Facilities that would provide additional services or capacity.

31. CONTINUATION OF CERTAIN OBLIGATIONS

Upon suspension, revocation, expiration, termination, or abandonment of this Franchise, the Grantee shall continue to be responsible for the operation and maintenance of existing Facilities in the County road rights-of-way as ordered by the County until removed, assigned to another Franchised Utility or abandoned; however, the Grantee shall not have the right to use the Facilities to provide additional services or construct new Facilities. The Grantee shall continue to be responsible for insurance, indemnity and hold harmless, bonding, hazardous materials and environmental compliance, Maintenance, inspection, testing, repair, relocation, removal, performance of work, emergency response and abandonment. King County will issue permits required for the repair and maintenance of the existing Facilities in accordance with K.C.C. 14.44.055 as amended and Section 19 of this Franchise. This section and other pertinent sections

of this Franchise shall continue in force until such time as the lines are removed from County road rights-of-way, assigned to another Franchised Utility, or abandoned in place with the approval of the Director of the Department of Transportation, Road Services Division.

32. AMENDMENT

This Franchise may be modified at any time as proposed by mutual written agreement of the parties, provided that such an amendment shall not become effective unless and until it is approved by County ordinance. King County may also amend the provisions of this Franchise by ordinance pursuant to its police powers as reasonably necessary for public health, safety and welfare, or to implement the authorities reserved in Section 16. The legal description of the Franchise Area may be amended by mutual written agreement of the parties without adoption of a separate ordinance to include any areas of unincorporated King County established as within the Franchisee's service area under Franchisee's water comprehensive plan approved by ordinance.

33. COMPLIANCE WITH LAWS

Grantee shall conform to all applicable federal, state and local laws and regulations including, but not limited to, the State Environmental Policy Act, King County environmental standards and ordinances, and King County water supply and water service requirements in Title 13 and Chapter 6.27 of the King County code.

34. NON-DISCRIMINATION CLAUSE

In connection with its performance of work under this Franchise, Grantee shall, fully comply with all applicable equal employment and non-discrimination provisions and requirements of federal, state, and local laws, Presidential Executive orders and regulations.

No person shall be denied, or subjected to discrimination in contracting to perform a service or provide goods made possible by or resulting from this franchise on the grounds of race, color, age (except minimum age and retirement provisions), gender, marital status, sexual orientation, religion, ancestry, national origin, disability or the use of a service or assistive animal by an individual with a disability, unless based upon a bona fide contractual qualification. During the performance of this franchise, Grantee and any party subcontracting under the authority of this franchise shall not discriminate or engage in unfair contracting practices prohibited by KCC 12.17.

No person shall be denied, or subjected to discrimination in employment or in the receipt of employee benefits of any services or activities made possible by or resulting from this franchise. During the performance of this franchise, Grantee and any party subcontracting under the authority of this franchise shall not discriminate or engage in unfair employment practices prohibited by KCC 12.18.

Any violation of this provision shall be considered a violation of a material provision of this Franchise and shall be grounds for cancellation, termination or suspension in whole or in part, of the Franchise by the County and may result in ineligibility for further County agreements.

35. JUDICIAL REMEDIES

Either party shall be entitled to seek any and all remedies at law, in contract or in equity, against the other party, in the event of Default or breach of the Franchise, including without limitation to: 1) compel specific performance by Grantee of its obligations, restrictions, covenants, representations, or warranties of the Franchise, 2) to restrain by injunction the actual or threatened commission or attempt of a breach or Default of the Franchise, and 3) an award of monetary damages resulting from such violation of the Franchise.

36. FRANCHISE REMEDIES FOR VIOLATION OF CONDITIONS

In addition to the judicial remedies available to the parties, each party shall be entitled to pursue the alternative remedies set out in this section. These remedies are cumulative with the judicial remedies and the exercise of one or more of these Franchise remedies shall not preclude a party from seeking appropriate judicial relief.

If either party fails to observe or perform any of the terms, conditions, obligations, restrictions, covenants, representations or warranties of the Franchise, including Exhibit B and the conditions in the ordinance approving this Franchise, referenced in the "Grant Of Franchise" on page 3, or if the Grantee abandons the Franchise, and if such noncompliance is not cured as provided herein, then such noncompliance shall be considered an event of Default and the following shall apply:

A. Opportunity to cure. Either party shall give the other party written notice of any Default, stating with reasonable specificity the events or circumstances and nature of the Default. The party receiving notice shall have thirty (30) days or such lesser or greater time as reasonably specified in the notice to cure the Default. If the party receiving notice fails to cure the Default or to promptly commence and diligently pursue a cure to the reasonable satisfaction of the party giving notice, then the party giving notice may invoke the alternative Franchise remedies set out in this section.

B. Revocation of Franchise. Grantor may revoke this Franchise in whole or in part, but only upon a majority vote of the County Council. King County shall give reasonable written notice of its intent to revoke this Franchise. A public hearing shall be scheduled in the manner provided for applications for a Franchise under RCW 36.55.040; provided that, if exigent circumstances necessitate expedited revocation, the hearing may be held as soon as possible after the notice. The decision to revoke this Franchise will become effective ninety (90) days following the public hearing if the County, by ordinance, finds either:

1. That the Grantee has not substantially cured the violation or failure to comply which was the basis of the notice; or

2. That the violation or failure to comply which was the basis of the notice is incapable of cure; or

3. That the Grantee has repeatedly violated or failed to comply with any of the material terms, conditions, or responsibilities of the Franchise, even though the individual violations have been cured; and

4. That the revocation of the Franchise is in the public interest.

C. Suspension of Franchise. The Director may temporarily suspend this Franchise without a hearing whenever the continued work or operation by the Grantee would constitute a danger to public health, safety, welfare or public morals, including, but not limited to where there is a failure to maintain the minimum levels and standards of liability insurance or claims reserve or failure to keep in full force and effect any applicable licenses, bonds, permits required by federal, state or local law or regulation. The notice of temporary suspension may be personally delivered to the party named and to the address given in Section 40 of this Franchise. The notice of temporary suspension shall also be given to the person doing work and posted at the work site. The notice shall indicate the nature of the violation or danger to the public. Notwithstanding other notice and opportunity to cure provisions of this Franchise, the temporary suspension is effective upon actual notice at the date and time provided in the notice. The Grantee may invoke the dispute resolution provisions of Section 38 and seek an opportunity to cure under Section 36 A., which shall not be unreasonably denied.

Grantor's failure to exercise a particular remedy at any time shall not waive Grantor's right to terminate, assess penalties, or assert that or any other remedy at law or equity for any future breach or Default of Grantee.

37. RECEIVERSHIP AND FORECLOSURE

Grantee shall immediately notify the Grantor in writing if it: files a voluntary petition in bankruptcy or a voluntary petition to effect a plan or other arrangement with creditors; files an answer admitting the jurisdiction of the Court and the material allegations of an involuntary petition filed pursuant to the Bankruptcy Code, as amended; or is adjudicated bankrupt, makes an assignment for the benefit of creditors, or applies for or consents to the appointment of any receiver or trustee of all or any part of its property including all or any parts of its business Operations or Facilities within or affecting the Franchise Area.

Upon the foreclosure or other judicial sale of all or a substantial part of Grantee's business Operations, pipeline(s) or Facilities within or affecting the Franchise Area, or Facilities within or affecting the Franchise Area, or upon the occasion of additional events which effectively cause termination of Grantee's rights or ability to Operate the Facilities within or affecting the Franchise Area, Grantee shall notify the Grantor of such fact, and such notification or the occurrence of such terminating events shall be treated as a notification that a change in control of the Grantee has taken place, and the provisions of this Franchise Agreement governing the consent of the Grantor to such change in control of the Grantee shall apply.

The Grantor shall have the right to cancel this Franchise one hundred twenty (120) days after the appointment of a receiver or trustee to take over and conduct the business of a Grantee, whether

in receivership, reorganization, bankruptcy, or other action or proceeding, unless such receivership or trusteeship shall have been vacated prior to the expiration of said one hundred twenty (120) days, or unless:

A. Within one hundred twenty (120) days after the election or appointment, such receiver or trustee shall have fully complied with all of the provisions of this Franchise Agreement and remedied any existing violations and/or Defaults; and

B. Within said one hundred twenty (120) days, such receiver or trustee shall have executed an agreement, duly approved by the court having jurisdiction, whereby such receiver or trustee assumes and agrees to be bound by each and every provision of this Franchise Agreement granted to the Grantee except where expressly prohibited by Washington law.

38. DISPUTE RESOLUTION AND RIGHT OF APPEAL

Decisions, requirements, or approvals of the Director are binding on the parties to this document. In the event of a dispute between Grantor and Grantee arising by reason of this Franchise, the dispute shall first be referred to the representatives designated by Grantor and Grantee to have oversight over the administration of this Franchise. The officers or representatives shall meet within a reasonable time not longer than thirty (30) calendar days of either party's request for a meeting, whichever request is first, and the parties shall make a good faith effort to achieve a resolution of the dispute.

If the parties are unable to resolve the dispute under the procedure set forth in this section, the parties hereby agree that the matter shall be referred to mediation. The parties shall mutually agree upon a mediator to assist them in resolving their differences. Any expenses incidental to mediation shall be borne equally by the parties.

If the parties fail to achieve a resolution of the dispute through mediation, either party may then pursue any available judicial remedies, provided that if the party seeking judicial redress does not substantially prevail in the judicial action, it shall pay the other party's reasonable legal fees and costs incurred in the judicial action.

39. NOTICES

Any and all notices and other communications required or permitted to be given under the provisions of this Franchise shall be in writing and shall be deemed to have been duly given when personally delivered of sent by overnight courier or two (2) days after deposit in the United States mail If by first class, certified or registered mail, return receipt requested. All notices shall be addressed to the parties at the addresses set forth below or at such other addresses as any parties may specify by notice to all other parties and given as provided herein:

To Grantee: City of Carnation, Washington
P.O. Box 1238
Carnation, WA 98014-1238

With a copy to: Laurie Fulton, PE
Stantec
11130 NE 33rd Place, Suite 200
Bellevue, WA 98004-1465

To County: King County Real Estate Services
c/o Real Estate Services Manager
K.C. Admin. Bldg. (ADM-ES-0830)
500 4th Avenue
Seattle, WA 98104

In case of an emergency notices may be given by any means of reliable communication to the persons identified above, or their designee, followed by notice in the manner provided above, as soon as possible.

40. SEVERANCE

This Franchise gives effect to purposes and uses which are consistent with economical and efficient services rendered in the public interest. If any provision of this Franchise or its application is determined to be invalid by a court of law, then the remaining provisions of this Franchise shall continue and remain valid unless the dominant purpose of the Franchise would be prevented or the public interest is no longer served. If the dominant purpose would be prevented or the public interest is no longer being served, then the parties shall seek to renegotiate the Franchise in good faith, or either party may invoke the dispute resolution provisions of Section 38.

41. MISCELLANEOUS

Nothing contained in this Franchise shall be construed to create an association, trust, partnership, agency relationship, or joint venture or to impose a trust, partnership, or agency duty, obligation or liability on or with regard to any party. Each party shall be individually and severally liable for its own duties, obligations, and liabilities under this Franchise.

The parties each represent and warrant that they have full authority to enter into and to perform this Franchise, that they are not in Default or violation of any permit, license, or similar requirement necessary to carry out the terms hereof, and that no further approval, permit, license, certification, or action by a governmental authority is required to execute and perform this Franchise, except such as may be routinely required and obtained in the ordinary course of business.

This Franchise Agreement and the attachments hereto represent the entire understanding and agreement between the parties with respect to the subject matter and it supersedes any oral negotiations between the parties.

Dated this 4 day of August, 2014

KING COUNTY, WASHINGTON

BY Dow Constantine

TITLE King County Executive

Acceptance of Franchise

The undersigned, Ken Carter, certify that I am the City Manager of the City of Carnation and am duly certified to accept this Franchise on behalf of the Franchisee. I accept all the rights, privileges, and duties of this Franchise subject to all terms, conditions, stipulations, and obligations contained herein, and within Ordinance 17850 unconditionally and without reservation.

CITY OF CARNATION, WASHINGTON
GRANTEE

BY Ken Carter

TITLE City Manager, City of Carnation, Washington

On behalf of the City Council of Carnation, Washington

Dated this 20th **day of** August, 2014

STATE OF WASHINGTON |
ss.
CITY OF CARNATION |

I certify that I know or have satisfactory evidence that KEN CARTER is the person who appeared before me, and said person acknowledged that said person signed this instrument, on oath stated that said person was authorized to execute the instrument and acknowledged it as the CITY MANAGER of Franchisee, a MUNICIPAL CORPORATION to be the free and voluntary act of such association for the uses and purposes mentioned in the instrument.

Dated this 20th day of AUGUST, 2014

REBECCA L. BUELNA
NOTARY PUBLIC
4-29-15
STATE OF WASHINGTON

(Signature of Notary)
REBECCA L. BUELNA
Print Name
Notary public in and for the state of WA, residing at DUVALL, WA
My appointment expires 5-29-2015

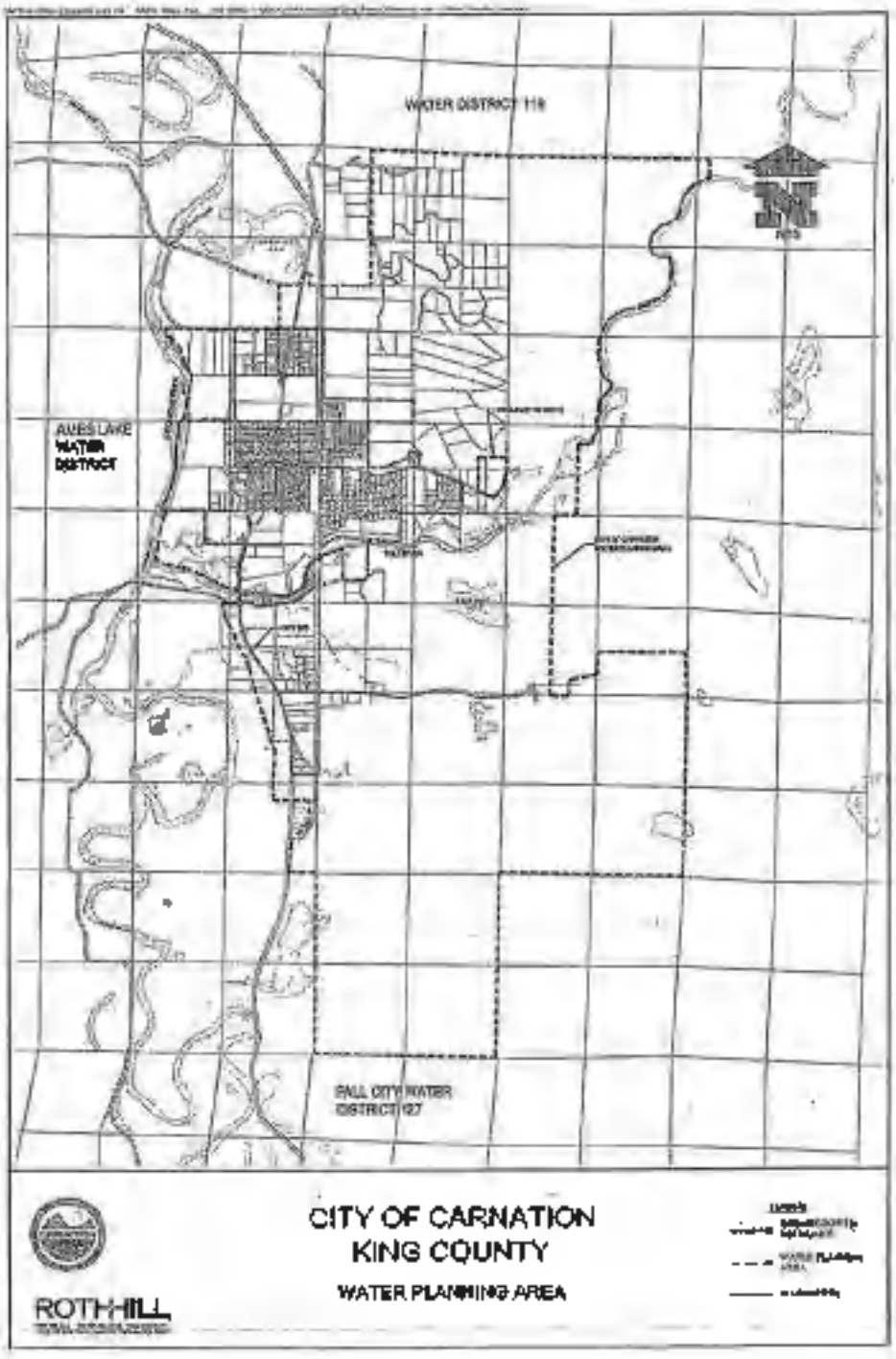
EXHIBIT A

City of Carnation
Water Planning Area – Franchise External Boundary – Legal Description

BEGINNING at the Northwest corner of Section 12, Township 25 North, Range 7 East, W.M., in King County, Washington;
Thence easterly along the North line of said Section 12 a distance of 505 feet, more or less, to the East line of the West 505 feet of the Northwest quarter of said Section 12;
Thence southerly along said East line a distance of 512 feet, more or less, to the northwesterly bank of the Tolt River;
Thence southwesterly along said northwesterly bank to the West line of said Section 12, said West line also being the East line of Section 11, Township 25 North, Range 7 East, W.M.;
Thence continuing southwesterly along said northwesterly bank to the South line of said Section 11, said South line also being the North line of Section 14, Township 25 North, Range 7 East, W.M.;
Thence continuing southwesterly along said northwesterly bank to its intersection with the northerly prolongation of the East line of the West half of Government Lot 10 in the Southwest quarter of said Section 14;
Thence southerly, departing said northwesterly bank, along said northerly prolongation and the East line of the West half of said Government Lot 10 to the South line of said Section 14, said South line also being the North Line of Section 23, Township 25 North, Range 7 East, W.M.;
Thence westerly along said North line of Section 23 to the Northwest corner of the East half of the Northwest quarter of said Section 23;
Thence southerly along the West line of said East half of the Northwest quarter and the West line of the East half of the Southwest quarter of said Section 23 to the South line of said Section 23;
Thence easterly along said South line of Section 23 to a point 840 feet West of the South quarter corner of said Section 23, said point being the Southwest corner of a tract of land conveyed to the Town of Carnation by Cherry Valley Logging Company in deed dated December 8, 1925, under Auditor's File Number 2110230, records of King County, Washington;
Thence northerly along the West line of said tract 410 feet;
Thence North 33° East along the Northwest line of said tract a distance of 100 feet;
Thence North 78° 04' East along the North line of said tract to the West line of the Southeast quarter of said Section 23;
Thence northerly along said West line to the Northwest corner of the Southwest quarter of said Southeast quarter of Section 23;
Thence easterly along the North line of the South half of said Southeast quarter of Section 23 to the East line of said Section 23;
Thence southerly along said East line of Section 23 to the Southeast corner thereof, also being the Northeast corner of Section 26, Township 25 North, Range 7 East, W.M.;
Thence southerly along the East line of said Section 26 to the Southeast corner thereof;
Thence westerly along the South line of said Section 26 to the Southwest corner thereof, also being the Northeast corner of Section 34, Township 25 North, Range 7 East, W.M.;
Thence southerly along the East line of said Section 34 to the Southeast corner thereof;
Thence westerly along the South line of said Section 34 to the Southwest corner thereof;
Thence northerly along the West line of said Section 34 to the Northwest corner thereof, also being the Southeast corner of Section 28, Township 25 North, Range 7 East, W.M.;
Thence westerly along the South line of said Section 28 to its intersection with the southerly prolongation of the Easterly right of way margin of State Route 203 (Fall City – Carnation Road N.E.);
Thence northerly along said southerly prolongation and Easterly right of way margin to the Northerly right of way margin of N.E. 11th Street;
Thence easterly along said Northerly right of way margin to the Westerly right of way margin of 324th Way N.E.;
Thence northeasterly along said Westerly right of way margin to the Westerly margin of the abandoned location of the Chicago, Milwaukee and Puget Sound Railway Company;
Thence northeasterly, departing said Westerly right of way margin of 324th Way N.E., along said Westerly margin of the abandoned location of the Chicago, Milwaukee and Puget Sound Railway Company, to the South line of the North 15 Acres of the East half of the Southeast quarter of said Section 28;
Thence westerly, departing said Westerly right of way margin, along said South line of the North 15 Acres, to the West line of the Northeast quarter of the Southeast quarter of said Section 28;

Thence northerly along said West line to the North line of said Southeast quarter of Section 28;
Thence northerly along the West line of the of the South half of the Southeast quarter of the Northeast quarter of said Section 28 to the North Line of said South half;
Thence northwesterly to the Northeast corner of the South half of the Southwest quarter of the Southwest quarter of the Southeast quarter of Section 21, Township 25 North, Range 7 East W.M.;
Thence continuing northwesterly to the Northwest corner of the East 252 feet of the Northeast quarter of the Southwest quarter of said Section 21,
Thence easterly along the East-West centerline of said Section 21 to the centerline of State Route 203 (Fall City - Carnation Road N.E.);
Thence northerly along said centerline to the North Bank of the Tolt River;
Thence northwesterly along said North Bank to the East Bank of the Snoqualmie River;
Thence northeasterly along said East Bank to the North Line of said Section 21, said North line also being the South line of Section 16, Township 25 North, Range 7 East;
Thence westerly along said South line to the centerline of the Snoqualmie River;
Thence northeasterly along said centerline to the South line of the Northwest quarter of said Section 16;
Thence easterly along said South line to the Easterly Bank of the Snoqualmie River,
Thence northerly and northwesterly along said Easterly Bank to the North line of said Section 16, said North line also being the South line of Section 9, Township 25 North, Range 7 East, W.M.
Thence easterly along said South line to the Southwest corner of the Southeast quarter of the Southeast quarter of said Section 9;
Thence northerly along the West line of said Southeast quarter of the Southeast quarter to the Northwest corner thereof;
Thence easterly along the North line of said Southeast quarter of the Southeast quarter to the Westerly right of way margin of State Route 203 (Carnation – Duvall Road N.E.);
Thence northerly along said Westerly margin a distance of 500 feet;
Thence easterly, parallel with said North line of the Southeast quarter of the Southeast quarter, a distance of 200 feet;
Thence southerly, perpendicular to said North Line, to said North line of the Southeast quarter of the Southeast quarter;
Thence easterly along said North line to the Southwest corner of the Northwest quarter of the Southwest quarter of Section 10, Township 25 North, Range 7 East, W.M.;
Thence continuing easterly along the South line of said Northwest quarter of the Southwest quarter to the Southeast corner thereof;
Thence northerly along the West line of the East half of said Southwest quarter and the West line of the East half of the Northeast quarter to the North line of said Section 10;
Thence easterly along said North line of Section 10 to the Northeast corner thereof, said corner also being the Northwest corner of Section 11, Township 25, North Range 7, East W.M.
Thence continuing easterly along the North line of said Section 11 to the Northeast corner thereof, and the Point of Beginning;
EXCEPT those portions thereof lying within the Corporate Limits of the City of Carnation;
ALSO EXCEPT Lots A and B of King County Boundary Line Adjustment Number L93L0107 dated July 15, 1993, recorded May 17, 2001, recording number 20010517001402 , Records of King County, Washington.
All situate in King County, Washington.

EXHIBIT B


WATER DISTRICT 119
AWS LAKE
WATER
DISTRICT
FALL CITY WATER
DISTRICT 127
CITY OF CARNATION
KING COUNTY
WATER PLANNING AREA
ROTHHILL

Appendix D

Water Facilities Inventory Form/
Water Rights Certificates

Washington State Department of Health

Table 1

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – EXISTING STATUS

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		EXISTING CONSUMPTION		CURRENT WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. S1-117902CL	Town of Carnation	Dec. 1916	Spring	No	628 gpm	1,000 acre-feet	404 gpm	260 acre-feet	224 gpm	740 acre-feet
2. G1-22827C	City of Carnation	April 4, 1977	Well	No*	800 gpm	538 acre-feet	0 gpm	0 acre-feet	800 gpm	538 acre-feet
3.										
4.										
Claims 1.										
2.										
3.										
4.										
TOTAL	**********	*********	*********	**********	1,428 gpm	1,000 acre-feet*	404 gpm	260 acre-feet	1024 gpm	740 acre-feet*

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		EXISTING CONSUMPTION THROUGH INTERTIE		CURRENT INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1.					
2.					
3.					
4.					

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

DOH Form 331-371 (Updated 08/10)

* For water planning purposes the City will plan and forecast based on the authorized 1,428 gpm and an annual limitation of 1000 afy (in response to Ecology's comment letter dated April 14, 2017). Nothing in the Plan is intended to accept Ecology's interpretation, or waive any rights or arguments as to Ecology's interpretation of the City's water rights.

Please return completed form to the Office of Drinking Water regional office checked below.

☐ Northwest Drinking Water
Department of Health
20425 72nd Ave S, Suite 310
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

Washington State Department of Health

Table 2

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 6 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (6-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. S1-117902CL	Town of Carnation	Dec. 1916	Spring	No	628 gpm	1,000 acre-feet	553 gpm	357 acre-feet	75 gpm	643 acre-feet
2. G1-22827C	City of Carnation	April 4, 1977	Well	No*	800 gpm	538 acre-feet	0 gpm	0 acre-feet	800 gpm	538 acre-feet
3.										
4.										
Claims 1.										
2.										
3.										
4.										
TOTAL	**********	********	********	**********	1,428 gpm	1,000 acre-feet*	553 gpm	357 acre-feet	875 gpm	643 acre-feet*

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1.					
2.					
3.					
4.					

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

DOH Form 331-372 (Updated 08/10)

* For water planning purposes the City will plan and forecast based on the authorized 1,428 gpm and an annual limitation of 1000 afy (in response to Ecology's comment letter dated April 14, 2017). Nothing in the Plan is intended to accept Ecology's interpretation, or waive any rights or arguments as to Ecology's interpretation of the City's water rights.

Please return completed form to the Office of Drinking Water regional office checked below.

☒ Northwest Drinking Water
Department of Health
20425 72nd Ave S, Suite 310
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

Washington State Department of Health

Table 3

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 10 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (10-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. S1-117902CL	Town of Carnation	Dec. 1916	Spring	No	628 gpm	1,000 acre-feet	633 gpm	409 acre-feet	(5) gpm	591 acre-feet
2. G1-22827C	City of Carnation	April 4, 1977	Well	No*	800 gpm	538 acre-feet	0 gpm	0 acre-feet	800 gpm	538 acre-feet
3.										
4.										
Claims 1.										
2.										
3.										
4.										
TOTAL	**********	********	********	**********	1,428 gpm	1,000 acre-feet*	633 gpm	409 acre-feet	795 gpm	591 acre-feet*

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1.					
2.					
3.					
4.					

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

DOH Form 331-373 (Updated 08/10)

* For water planning purposes the City will plan and forecast based on the authorized 1,428 gpm and an annual limitation of 1000 afy (in response to Ecology's comment letter dated April 14, 2017). Nothing in the Plan is intended to accept Ecology's interpretation, or waive any rights or arguments as to Ecology's interpretation of the City's water rights.

Please return completed form to the Office of Drinking Water regional office checked below.

☐ Northwest Drinking Water
Department of Health
20425 72nd Ave S, Suite 310
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

Washington State Department of Health

Table 4

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 20 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (20-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. S1-117902CL	Town of Carnation	Dec. 1916	Spring	No	628 gpm	1,000 acre-feet	726 gpm	468 acre-feet	(98) gpm	532 acre-feet
2. G1-22827C	City of Carnation	April 4, 1977	Well	No*	800 gpm	538 acre-feet	0 gpm	0 acre-feet	800 gpm	538 acre-feet
3.										
4.										
Claims 1.										
2.										
3.										
4.										
TOTAL	**********	********	********	**********	1,428 gpm	1,000 acre-feet*	726 gpm	468 acre-feet	702 gpm	532 acre-feet*

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1.					
2.					
3.					
4.					

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

DOH Form 331-373 (Updated 08/10)

* For water planning purposes the City will plan and forecast based on the authorized 1,428 gpm and an annual limitation of 1000 afy (in response to Ecology's comment letter dated April 14, 2017). Nothing in the Plan is intended to accept Ecology's interpretation, or waive any rights or arguments as to Ecology's interpretation of the City's water rights.

Please return completed form to the Office of Drinking Water regional office checked below.

☐ Northwest Drinking Water
Department of Health
20425 72nd Ave S, Suite 310
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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 03/03/2016
Printed: 4/22/2016
WFI Printed For: On-Demand
Submission Reason: Pop/Connect Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
11200 B	CARNATION WATER SYSTEM, CITY OF	KING	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

WILLIAM T. FERRY [PW SUPERINT.]
PO BOX 1238
CARNATION, WA 98014

7. OWNER NAME & MAILING ADDRESS

CARNATION WATER SYSTEM, CITY OF
PHIL MUSSINA
PO BOX 1238
CARNATION, WA 98014

8. OWNER NUMBER: 000894

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS 4621 TOLT AVE
CITY CARNATION STATE WA ZIP 98014

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS 4621 TOLT AVE
CITY CARNATION STATE WA ZIP 98014

9. 24 HOUR PRIMARY CONTACT INFORMATION

Primary Contact Daytime Phone: (425) 691-8353
Primary Contact Mobile/Cell Phone:
Primary Contact Evening Phone: (425) 319-5220
Fax: (425) 333-4336 E-mail: xxxxxxxxxxxxxxxxxxx

10. OWNER CONTACT INFORMATION

Owner Daytime Phone: (425) 691-8353
Owner Mobile/Cell Phone: (425) 691-8353
Owner Evening Phone: (xxx)-xxx-xxxx
Fax: (425) 333-4336 E-mail: xxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [x] Agricultural
- [x] Commercial / Business
- [x] Day Care
- [x] Food Service/Food Permit
- [x] 1,000 or more person event for 2 or more days per year
- [x] Hospital/Clinic
- [x] Industrial
- [ ] Licensed Residential Facility
- [ ] Lodging
- [x] Recreational / RV Park
- [x] Residential
- [x] School
- [ ] Temporary Farm Worker
- [x] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] County
- [ ] Investor
- [ ] Special District
- [x] City / Town
- [ ] Federal
- [ ] Private
- [ ] State

14. STORAGE CAPACITY (gallons)

700,000

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	SOURCE NAME LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	CARNATION SPRING SOU					X							X			Y		X						380	SW SE	23	25N	07E
S02	WELL # 1 AFJ090		X											X		Y	X						96	700	SE SE	16	25N	07E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
11200 B	CARNATION WATER SYSTEM, CITY OF	KING	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		821	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	704		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	20		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	117		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	99	99	
28. TOTAL SERVICE CONNECTIONS		920	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 2200

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?												
B. How many days per month is water accessible to the public?												

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	2	2	2	2	2	2	2	2	2	2	2	2

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

DEPARTMENT OF ECOLOGY
Jun 4 1974 123720
BASIN STATE

1. NAME Town of Carnation, Washington

ADDRESS P.O. Box 267

Carnation, Washington ZIP CODE 98014

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 Springs

3. QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 1.4 c.f.s.
(CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED 1000 PRESENTLY USED 500
(ACRE FEET PER YEAR)

IF FOR IRRIGATION, ACRES CLAIMED PRESENTLY IRRIGATED

C. PERIOD EACH YEAR WHEN WATER IS USED: continously

4. DATE OF FIRST PUTTING WATER TO USE: MONTH (estimate) December YEAR 1915

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 2400 FEET east AND 400 FEET north FROM THE south-west CORNER OF SECTION 23

South ½ of South ½ OF SECTION 23 T. 25 N., R. 7E (E.OR W.) W.M.

IF WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT " BLOCK " OF
(NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED:

South ½ of South ½ of East ½ and the South-east ¼ of the South-west ¼ of Section 23, Township 25 North, Range 7 EWM

COUNTY King

7. PURPOSE FOR WHICH WATER IS USED: Municipal

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: Riparian

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

X Nick Louteis

DATE June 4, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

Nick Louteis, Mayor
Town of Carnation, Wa.

P.O. Box 267
Carnation, Washington 98014

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE

RETURN ALL THREE COPIES WITH CARBONS INTACT, ALONG WITH $ FEE TO DEPARTMENT OF ECOLOGY

Exhibit 4.7
SPRINGS WATER RIGHT CLAIM

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

CERTIFICATE OF WATER RIGHT

RECEIVED
JAN 24 2000

☐ Surface Water Issued in accordance with the provisions of Chapter 372, 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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 4, 1977	G1-22827	G1-22827P	G1-22827C

NAME
CITY OF CARNATION

ADDRESS (STREET)	CITY	STATE	ZIP CODE
P. O. Box 207	Carnation	Washington	98014

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
Well

TRIBUTARY OF (IF SURFACE WATER)

MAXIMUM RATE: FEET PER SECOND	MAXIMUM RATE: GALLONS PER MINUTE	MAXIMUM QUANTITY: ACRE-FEET PER YEAR
	800	536

QUANTITY, TYPE OF USE, PERIOD OF USE
Community Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
240 feet west and 140 feet south of the E¼ corner of the SE¼ of Sec. 10

LOCATED WITHIN SMALLEST LEGAL SUBDIVISION	SECTION	TOWNSHIP N.	RANGE E. OR W.	W.M.	COUNTY
NE¼SE¼SE¼	16	25	7 E	7	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Carnation.

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

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 Redmond *Washington, this* 15th *day of* August *19* 83

Department of Ecology

ENGINEERING DATA

OK.

by Robert K. McCormick

ROBERT K. McCORMICK, Regional Manager

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ 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.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 4, 1977	G1-22827		

NAME
TOWN OF CARNATION

ADDRESS (STREET)	(CITY)	(STATE)	ZIP CODE
P. O. Box 267	Carnation	Washington	98014

Examination Date: August 15, 1977

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	906.0	538.0

QUANTITY, TYPE OF USE, PERIOD OF USE
Community Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
240 feet West and 140 feet South of the East ¼ corner of the Southeast ¼ Sec. 16

LOCATED WITHIN SMALLEST LEGAL SUBDIVISION	SECTION	TOWNSHIP N.	RANGE E. OR W.	W.M.	COUNTY
NE¼SE¼SE¼	16	25	7 E.	W	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Carnation

DESCRIPTION OF PROPOSED WORKS

Present Pop. = 640, May eventually tie into Lake W. D.
500,000 - 1,000,000 gal. reservoir on east hill (Sec. 15) proposed.
8" mains, 6" laterals. Town now supplied by springs in SW¼, Sec. 23, under "grandfather" use. This well will tie into that system, with overflow from springs pumped to proposed reservoir. Well initially to serve as backup.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	5 yrs from permit issuance	*0 yrs from permit issuance

* Based on Capability of as-built system.

PROVISIONS

The Town presently has Permit No. 15503 for 1.0 cubic feet per second from springs near the Tolt River in Sec. 14. That source is undeveloped, however, and the Town has stated it will drop that Permit upon successful completion of this well.

The Town is now supplied by springs in Sec. 23 under "grandfather" use. No claim was filed, however, so the validity of that use may be in question in an adjudication. If the Town desires a more secure right to that source, it is advised to apply for a Permit and Certificate.

This application is approved, and the Permit will issue for 900.0 gallons per minute, 538.0 acre-feet per year based on per capita use of 120.0 gallons per day for 4,000 population. The Permit and Certificate will issue with the following provision: "Issued as a supplemental supply to any other rights. The total annual use shall not exceed 538.0 acre-feet per year less any amount utilized under other rights."

The Town is reminded of its proximity to the 100-foot deep Hall well, which has a superior right. The Town should construct its well (depth and/or pumping rate) so that existing right is not adversely affected.

The amount granted is a maximum, and the final Certificate can only issue for the amount used, based on the functional system. The Town's main system may not be capable at present for a population of 4,000. Therefore, an expanded development schedule (5 year) is given to expand the main system, if needed. Extensions of that schedule can be granted if diligent progress is being made and the system will be completed within reasonable time. If no more extensions can be granted, the Certificate will issue for the system capability at that time. Larger use would then require a new application with a new priority date.

Applicant is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Assistant Secretary, Division of Health prior to any new construction or alterations of a public water supply. The applicant is advised to contact the Washington State Division of Health, Public Health Building No. 4, Thurston Airdustrial Center, Olympia, with regard to the need for compliance.

"The installation of an access port as described in attached Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port."

Additionally, the permit when issued shall carry the following provision: "Nothing in this permit shall be construed as excusing the permittee 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."

Signed at Redmond, Washington,

this 27 day of September, 1977

TERRY B. TANNER
Resource Management
Department of Ecology

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ 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.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 4, 1977	G1-22827	G1-22827P	

NAME
TOWN OF CARNATION

ADDRESS (STREET)	CITY	STATE	ZIP CODE
P. O. Box 267	Carnation	Washington	98014

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATER)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	900.0 gpm	538.0

QUANTITY, RATE OF USE, PERIOD OF USE
Community Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
240 feet West and 140 feet South of the East ¼ corner of the Southeast ¼ Sec. 16

LOCATED WITHIN SMALLEST LEGAL SUBDIVISION	SECTION	TOWNSHIP N.	RANGE E. OF W.M.	W.R.I.A.	COUNTY
NE¼SE¼SE¼	16	25	7 E.	7	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OFFICIAL NAME OF PLAT OR ADDITION

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Carnation.

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	November 15, 1982	* November 15, 1983

* Based on Capability of as-built system

PROVISIONS

Issued as a supplemental supply to any other rights. The total annual use shall not exceed 538.0 acre-feet per year less any amount utilized under other rights.

The installation of an access port as described in Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port.

Nothing in this permit shall be construed as excusing the permittee 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.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Redmond *Washington, this* 15th *day of* November *19* 72

Department of Ecology

ENGINEERING DATA
ON

by
ROBERT K. McCORMICK, Regional Manager

Purchaser

ARE THERE ANY EXISTING WATER RIGHTS RECORDED ON THE LAND ON WHICH THE WATER IS TO BE USED INCLUDING WELLS, SPRINGS, DITCHES OR DITCH EASEMENTS? None Recorded 5-18-77 JS. ☐ YES ☒ NO

IF YES, FROM WHAT SOURCE OR SOURCES OR GROUND WATER AND UNDER WHAT AUTHORITY IS

(X) see page 1.

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(GIVE EXPECTED SIZE OF PUMP, CAPACITY OF PUMP, TYPE OF WELL CASING, DEPTH AND DIAMETER OF WELL, OR DIMENSIONS OF DITCH, ETC.)

10 to 60 HP depending on the results of pump testing after well is drilled.

REMARKS

7. King County, c[illegible]rrent owner of said property has agreed to sell the above described property to the Town of Carnation.

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS FROM THE DEPARTMENT OF ECOLOGY

SIGNATURES

x Jack Fowler (APPLICANT'S SIGNATURE) Mayor Town of Carnation.

x Chris J. Rantis (APPLICANT'S SIGNATURE) Property Manager For King County

King Co. Court House, Seattle Wa. 98104 (LEGAL LANDOWNER'S ADDRESS)

FOR OFFICE USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY } ss

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows:

.....

.....

.....

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before ..... 19.....

RECEIVED
JUN 6 1977
DEPARTMENT OF ECOLOGY

WITNESS my hand this ..... day of ..... 19.....

.....
Director of Ecology

State of Washington
Department of Ecology

APPLICATION FOR PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

$6000 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO. G1-24327 | TOWNSHIP 25 | COUNTY King | PRIORITY DATE 4/4/77 | TIME 3:29 | ACCEPTED 4/4/77 | BH

APPLICANT'S NAME: Town of Carnation, Washington — BUSINESS TEL. NO. 333 4192

ADDRESS (STREET): P.O. Box 267 — CITY: Carnation — STATE: Washington — ZIP CODE: 98014

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION:

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC., IF UNNAMED GIVE DISTANCE AND DIRECTION TO NEAREST NAMED STREAM)	SOURCE (WELL, TUNNEL, INFILTRATION GALLERY, ETC.): Well
TRIBUTARY:	DEPTH AND DIAMETER OF WELL: 8" - 12"dia., 100' - 600' deep

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.): ~~Town domestic supply~~ COMMUNITY SUPPLY.

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF	CUBIC FEET PER SECOND	OR	GALLONS PER MINUTE	ACRE FEET PER YEAR
	2 cfs		900 gpm	~~1440~~ 375

TYPES DURING YEAR WATER WILL BE REQUIRED: ~~Water may ultimately be required all year.~~ CONTINUOUSLY.

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS OF FIVE OR LESS HOUSEHOLD DWELLING SITES	IF MUNICIPAL USE, ESTIMATED POPULATION TO BE SERVED FROM PROJECT	IF OTHER USE, NATURE OF USE
	415 services	4000+	

DATE PROJECT WAS OR WILL BE STARTED: Estimated date 7-18-77

DATE PROJECT WAS OR WILL BE COMPLETED: ~~Anticipate 7-15-77~~

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	TRACT NAME OR PLAT OF ADDITION	SECTION	TOWN	RANGE

ALSO PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION

3B. IF NOT IN PLATTED PROPERTY

IN ACCORDANCE WITH SECTION MARK ACCURATELY AND IDENTIFY EACH POINT OF DIVERSION SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER

ALSO ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL

240 feet West & 140 feet South of the East ¼ corner of SE ¼ Sec. 16-25-7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N	RANGE E OR W W.M.	COUNTY
N.E. ¼ of S.E. ¼ of S.E. ¼	16	25	7 E.W.M.	King

4. DO YOU OWN THE LAND ON WHICH THE SOURCE IS LOCATED? IF NOT, PLEASE GIVE NAME & ADDRESS OF OWNER

King County

5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY ON WHICH THE WATER WILL BE USED TAKEN FROM A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY OR COMPLETE IN THE SPACE BELOW

Beginning at a point on the centerline of Entwistle Street, said point being 200 feet west of the westerly boundry of the Chicago, Milwaukee, St. Paul and Pacific Railroad right of way; thence South 30 feet to the southerly boundry of the Entwistle Street right of way, this point being NW co of the Chicago, etc. property, and being the true point of beginning; thence south 396 feet along the westerly boundry of the Chicago, etc. property; thence east 220 feet (extending 20 feet into the actual Chicago, etc. right of way); thence north 396 feet; thence west 220 feet along the n northerly boundry of the Chicago, etc. property to the true point of beginning; encompassing an area of approximately 2.0 acres.

The above described property is located in the Town of Carnation, County of King, State of Washington, in the SE ¼ of Section 16, Twp. 25 N., Range 7 East, W.M.

(X) Cancel SWP 15903 when Permit issues

APPLICATION

King County
Always at your service

Recorders Office

Search

Official Public Records

Document Detail

Menu · New Search · Search Results · Help

Document Detail

Instrument Number: 199309161202
Sequence #: 0
Date Received: 09/16/1993 12:00:00 AM
Document Type: MISCELLANEOUS
Book:
Page:
Image: Not scanned or not available online

Grantors
WASHINGTON STATE GOVT

Grantees
CARNATION CITY OF

Legal Records

#	Plat	Lot/Unit	Block/Building	Section	Township	Range	Q1	Q2	Tax Parcel	Freeform
1	IN SEC 16 25 07									IN SEC 16 25 07

Related Documents
None found

Recorder's Office Home Page

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

CERTIFICATE OF WATER RIGHT

☐ 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.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 4, 1977	G1-22827	G1-22827P	G1-22827C

NAME
CITY OF CARNATION

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P. O. Box 267	Carnation	Washington	98014

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
Well

(TRIBUTARY OF (IF SURFACE WATERS))

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	800 —	538

QUANTITY, TYPE OF USE, PERIOD OF USE
Community Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
140 feet west and 140 feet south of the E¼ corner of the SE¼ of Sec. 16

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W. W.M.	W.R.I.A.	COUNTY
E½SE¼SE¼	16	25	7 E	7	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Carnation.

Exhibit 4.6

WELL CERTIFICATE OF WATER RIGHT

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
NORTHWEST

CERTIFICATE OF WATER RIGHT

RECEIVED
JAN 24 2000

☐ Surface Water Issued in accordance with the provisions of Chapter 263, 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.

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 4, 1977	G1-22827	G1-22827P	G1-22827C

NAME
CITY OF CARNATION

ADDRESS (STREET)	CITY	STATE	ZIP CODE
P. O. Box 209	Carnation	Washington	98014

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
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	WITHDRAWAL GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	800	535

QUANTITY, TYPE OF USE, PERIOD OF USE
Community Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
240 feet west and 140 feet south of the ¼ corner of the SE¼ of Sec. 16

LOCATED WITHIN (SMALLEST REGULAR SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE E. OR W.M.	W.R.I.A.	COUNTY
NE¼SE¼SE¼	16	25	7 E.	7	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Carnation.

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

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 Redmond *Washington, this* 15th *day of* August *19* 93

Department of Ecology

ENGINEERING DATA

OK .....

by .....

ROBERT K. McCORMICK, Regional Manager

FOR COUNTY USE ONLY

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ 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.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 4, 1977	G1-22827	G1-22827P	

NAME
TOWN OF CARNATION

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P. O. Box 267	Carnation	Washington	98014

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	900.0	538.0

QUANTITY, TYPE OF USE, PERIOD OF USE
Community Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
240 feet West and 140 feet South of the East ¼ corner of the Southeast ¼ Sec. 16

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼SE¼SE¼	16	25	7 E.	7	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Carnation.

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE		
BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	November 15, 1982	* November 15, 1983

* Based on Capability of as-built system

PROVISIONS

Issued as a supplemental supply to any other rights. The total annual use shall not exceed 538.0 acre-feet per year less any amount otilized under other rights.

The installation of an access port as described in Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port.

Nothing in this permit shall be construed as excusing the permittee 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.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Redmond *Washington, this* 15th *day of* November *19* 77

Department of Ecology

ENGINEERING DATA

DK.....

by Robert K. McCormick

ROBERT K. McCORMICK, Regional Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ 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)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 4, 1977	G1-22827		

NAME
TOWN OF CARNATION

ADDRESS (STREET)	CITY	STATE	ZIP CODE
P. O. Box 267	Carnation	Washington	98014

Examination Date: August 15, 1977

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	900.0	538.0

QUANTITY, TYPE OF USE, PERIOD OF USE
Community Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
240 feet West and 140 feet South of the East ¼ corner of the Southeast ¼ Sec. 16

LOCATED WITHIN SMALLEST LEGAL SUBDIVISION	SECTION	TOWNSHIP N.	RANGE E. OF W.M.	W.R.I.A.	COUNTY
NE¼SE¼SE¼	16	25	7 E.	7	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Carnation

DESCRIPTION OF PROPOSED WORKS

Present Dep. = well. Now eventually tie into dam like W. E.
300,000 - 1,000,000 gal. reservoir on west hill (Sec. 15, proposed.
8" mains, 6" laterals. Town now supplied by springs in S½S½, Sec. 23, under "grandfather" use. This well will tie into that system, with overflow from springs pumped to proposed reservoir. Well initially to serve as backup.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	5 yrs from permit issuance	*6 yrs from permit issuance

* Based on Capability of as-built system.

PROVISIONS

The Town presently has Permit No. 13003 for 1.0 cubic feet per second from springs near the Volt River in Sec. 14. That source is undeveloped, however, and the Town has stated it will drop that Permit upon successful completion of this well.

The Town is now supplied by springs in Sec. 23 under "grandfather" use. No claim was filed, however, so the validity of that use may be in question in an adjudication. If the Town desires a more secure right to that source, it is advised to apply for a Permit and Certificate.

This application is approved, and the Permit will issue for 900.0 gallons per minute, 538.0 acre-feet per year based on per capita use of 120.0 gallons per day for 4,000 population. The Permit and Certificate will issue with the following provision: "Issued as a supplemental supply to any other rights. The total annual use shall not exceed 538.0 acre-feet per year less any amount utilized under other rights."

The Town is reminded of its proximity to the 100-foot deep Hull well, which has a superior right. The Town should construct its well (depth and/or pumping rate) so that existing right is not adversely affected.

The amount granted is a maximum, and the final Certificate can only issue for the amount used, based on the functional system. The Town's main system may not be capable at present for a population of 4,000. Therefore, an expanded development schedule (5 year) is given to expand the main system, if needed. Extensions of that schedule can be granted if diligent progress is being made and the system will be completed within reasonable time. If no more extensions can be granted, the Certificate will issue for the system capability at that time. Larger use would then require a new application with a new priority date.

Applicant is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Assistant Secretary, Division of Health prior to any new construction or alterations of a public water supply. The applicant is advised to contact the Washington State Division of Health, Public Health Building No. 4, Thurston Airdustrial Center, Olympia, with regard to the need for compliance.

"The installation of an access port as described in attached Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port."

Additionally, the permit when issued shall carry the following provision: "Nothing in this permit shall be construed as excusing the permittee 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."

Signed at Redmond, Washington,

this 27 day of September, 1977

TERRY B. [illegible]
Resource Management
Department of Ecology

State of Washington
Department of Ecology

APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

$100.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED — SEE INSTRUCTION SHEET

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO. G1-27307 | MAP NO. 7 | COUNTY King | PRIORITY DATE 4/4/77 | RECEIVED 4/4/77 | ACCEPTED 4/18/77 TBH

APPLICANT'S NAME: Town of Carnation, Washington | BUSINESS PH. NO. 333 4192 | HOME PH. NO.

ADDRESS (STREET): P.O. Box 267 | CITY: Carnation | STATE: Washington | ZIP CODE: 98014

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION

SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE NAME OF STREAM, LAKE, SPRING (IF UNNAMED, SO STATE)	SOURCE (WELL, DRIVEN WELL, INFILTRATION TRENCH, ETC.) Well
TRIBUTARY	SIZE AND DEPTH 8" - 12" dia., 100' - 500' deep

USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, POWER, MANUFACTURING, ETC.)

~~Town domestic supply~~ COMMUNITY SUPPLY.

ENTER QUANTITY OF WATER REQUESTED UNDER UNITS OF	CUBIC FEET PER SECOND 2 cfs	OR	GALLONS PER MINUTE 900 GPM	ACRE FEET PER YEAR ~~1448~~ 375

TIMES DURING YEAR WATER WILL BE ADDED

~~Water may be diverted during the entire year.~~

CONTINUOUSLY.

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS (SEE LIST BELOW) AND TYPE (I.E. HOUSE, APARTMENT, MOBILE HOME, CAMPSITE, ETC.) 415 services	IF MUNICIPAL USE, ESTIMATED POPULATION (IF MORE THAN 100) 4000+
DATE PROJECT WAS OR WILL BE STARTED Estimated date 7-18-77	DATE PROJECT WAS OR WILL BE COMPLETED ~~Estimated 7-18-77~~	

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	NAME OF PLAT OR ADDITION	SECTION	TOWN	RANGE

ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION

3B. IF NOT IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAP, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER

ALSO GIVE THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL

240 feet West & 140 feet South of the East ¼ corner of SE ¼ Sec. 16-25-7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N	RANGE E OR W	COUNTY
N.E. ¼ of S.E. ¼ of S.E. ¼	16	25	7 E.W.M.	King

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED? IF NOT, WHAT IS THE NAME & ADDRESS OF OWNER?

King County

5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY ON WHICH THE WATER WILL BE USED (FROM A DEED, A REAL ESTATE CONTRACT, A MORTGAGE, DEED OF TRUST, OR TITLE INSURANCE POLICY) OR COPY CAREFULLY IN THE SPACE BELOW

Beginning at a point on the centerline of Entwistle Street, said point being 200 feet west of the westerly boundry of the Chicago, Milwaukee, St. Paul and Pacific Railroad right of way; thence South 30 feet to the southerly boundry of the Entwistle Street right of way, this point being NW cor. of the Chicago, etc. property, and being the true point of beginning; thence south 396 feet along the westerly boundry of the Chicago, etc. property; thence east 220 feet (extending 20 feet into the actual Chicago, etc. right of way); thence north 396 feet; thence west 220 feet along the northerly bounday of the Chicago, etc. property to the true point of beginning; encompaseling an area of approximately 2.0 acres.

The above described property is located in the Town of Carnation, County of King, State of Washington, in the SE ¼ of Section 16, Twp. 25 N., Range 7 East, W.M.

(K) Cancel SWP 15903 when Permit issues

FEE: $100.00

APPLICATION

Purchaser

NONE Recorded 5-12-77 JS. ☐ YES ☒ NO

(8) see page 1.

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

10 to 50 HP depending on the results of pump testing after well is drilled.

7. King County, present owner of said property has agreed to sell the above described property to the Town of Carnation.

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS FORM. THESE FORMS CAN BE SECURED TOGETHER WITH INSTRUCTIONS FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

×Dick Fenton APPLICANT'S SIGNATURE Mayor Town of Carnation.

×Chris J. Pontes Property Manager
For King County LEGAL LANDOWNER'S SIGNATURE

King Co. Court House, Seattle Wa. 98104
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY } ss

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows:

RECEIVED MAY 16 1977

In order to retain its priority date, this application must be returned to the Department of Ecology with corrections, on or before ..... 19.....

Witness my hand this ..... day of ..... 19.....

.....
Director

State of Washington
Department of Ecology

APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

$100.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO.	WRIA	COUNTY	PRIORITY DATE	TIME	ACCEPTED

APPLICANT'S NAME: Town of Carnation, Washington — BUSINESS TEL: 333-4192 — HOME TEL:

ADDRESS (STREET): P.O. Box 267 — (CITY): Carnation — (STATE): Washington — (ZIP CODE): 98014

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION:

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE)	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.): Well
TRIBUTARY	SIZE AND DEPTH: 8" - 12" dia., 100' - 600' deep

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.): Town domestic supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF	CUBIC FEET PER SECOND (C.F.S.)	OR	GALLONS PER MINUTE (G.P.M.)	ACRE FEET PER YEAR
			900 G.P.M.	1448

TIMES DURING YEAR WATER WILL BE REQUIRED: Water may ultimately be required all year.

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS OR TYPE (E.G. 1-HOME, 2-MOBILE HOME, 3-CAMPSITES), ETC.	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY
-	415 services	4000+

DATE PROJECT WAS OR WILL BE STARTED	DATE PROJECT WAS OR WILL BE COMPLETED
estimated date 7-18-77	estimate = 7-18-77

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)	SECTION	TOWN	RANGE	ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION

3B. IF NOT IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAPS ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION SHOW NORTH/SOUTH AND EAST/WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER.

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL

243 feet West & 140 feet South of the East ¼ corner of SE ¼ Sec. 16-25-7.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N	RANGE (E OR W) W.M.	COUNTY
N.E. ¼ of S.E. ¼ of S.E. ¼	16	25	7 E.W.M.	King

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED? IF NOT, INSERT NAME & ADDRESS OF OWNER:

King County

5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY ON WHICH THE WATER WILL BE USED TAKEN FROM A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY, OR, COPY CAREFULLY IN THE SPACE BELOW.

Beginning at a point on the centerline of Entwistle Street, said point being 200 feet west of the westerly boundry of the Chicago, Milwaukee, St. Paul and Pacific Railroad right of way; thence South 50 feet to the southerly boundry of the Entwistle Street right of way, this point being NW cor of the Chicago, etc. property, and being the true point of beginning; thence south 396 feet along the westerly boundry of the Chicago, etc. property; thence east 220 feet (extending 20 feet into the actual Chicago, etc. right of way); thence north 396 feet; thence west 220 feet along the s northerly boundry of the Chicago, etc. property to the true point of beginning; encompassing an area of approximately 2.0 acres.

The above described property is located in the Town of Carnation, County of King, State of Washington, in the SE ¼ of Section 16, Twp. 25 N. Range 7 East, W.M.

APPLICATION

ECY 040-7(A)

5. YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)

Purchaser

ARE THERE ANY LOCAL WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES.) ☐ YES ☒ NO

IF YES, FROM WHAT SOURCE (i.e. SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE, SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.)

10 to 60 HP depending on the results of pump testing after well is drilled.

REMARKS

7. King County, current owner of said property has agreed to sell the above described property to the Town of Carnation.

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

x Town of Carnation Mayor
APPLICANT'S SIGNATURE

x Chris J. Romano Property Manager
For King Co. Executive
LEGAL LANDOWNER'S SIGNATURE

King Co. Court House, Seattle Wa. 98104
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON } ss.
DEPARTMENT OF ECOLOGY }

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows: .....

.....

.....

In order to retain its priority date this application must be returned to the Department of Ecology, with corrections, on or before ..... 19.....

Witness my hand this .....*day of* ..... 19.....

.....
Department of Ecology

ECY 040-1-(18)
Rev. 7-15

file

March 28, 1977

Department of Ecology
Northeast Regional Office
4350 150th. Ave. N.E.
Redmond, Washington 98052

Re: Permit Application

Submitted herein for your consideration is an Application for Permit for the Town of Carnation to appropriate public ground waters within the Town Limits of Carnation.

We have received approval for a 50 percent Block Grant (HUD), and have applied for a 40 percent grant under Referendum No. 27.

In order that construction starting time may fall within the required time frame of agencies concerned and that required approvals are received before the contractor is authorized to proceed, we request consideration of this application at your earliest convenience.

Sincerely,

TOWN OF CARNATION, WASHINGTON

Nick Loubsis, Mayor

NL/sf
Encl: Permit application

Appendix E

City of Carnation Combined Water and Sewer Utility Technical Standards

CITY OF CARNATION

COMBINED WATER AND SANITARY SEWER UTILITY TECHNICAL STANDARDS

September 2017

Adopted by Resolution No. 416

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

BURIED UTILITIES IN AREA
CALL BEFORE YOU DIG
1-800-424-5555 or 811

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

TABLE OF CONTENTS

CITY OF CARNATION
COMBINED WATER AND SANITARY SEWER
UTILITY TECHNICAL STANDARDS

WATER STANDARD DETAILS: W-1 through W-33

W-29 Air Gap For Makeup Tank
W-30 Fire Department Access Standards
W-30A Fire Department Fire Lane Standards
W-31 Double Check Detector Valve
W-32 Typical Trench Detail
W-33 Final Connection to the Existing Water Main

SEWER STANDARD DETAILS: S-1 through S-20

S-1 Typical Building Connection
S-2 Vacuum Service Lateral to Minor Branch Connection
S-3 Vacuum Branch to Main Connection
S-4 Valve Pit: Single Connection
S-5 Valve Pit: Two Connection
S-6 Valve Pit Prior to Home Hook-up
S-7 Valve Pit and Lateral Installation
S-8 Division Valve & Guage Tap
S-9 Valve Pit & Side Sewer Stub Service Construction Detail
S-9A Airvac Flexible Connector
S-10 Standard Plan Side Sewer Stub
S-11 Air Intake Otions
S-12 Backwater Valve Detail Alternative No. 1
S-13 Backwater Valve Detail Alternative No. 2
S-13A Backwater Valve Instructions Alternative No. 2
S-14 Air Vent Detail
S-15 Surface Cleanout Detail
S-16 Side Sewer Standards Connection Schematic-Supplement
S-17 Dual Valve Buffer Tank
S-17A Buffer Tank External Breather Assy.
S-18 Typical Building Connection for Grinder Pump Service
S-19 Grinder Pump Installation Materials for Connection to Gravity Stub
S-20 Typical Vaccum Sewer Main Trench Detail

10. City of Carnation: Cross Connection Control Program .....

APPENDICES

Appendix A – Cross Connection Control Plan
Appendix B – Pre Approved BAT
Appendix C – Cross-Connection Hazard Survey
Appendix D – Water-Use Survey Report
Appendix E – Backflow Incident Report
Appendix F – Annual Summary Report Forms
Appendix G – Customer Information Packet
Appendix H – Sample Letters

CITY OF CARNATION

COMBINED WATER AND SANITARY SEWER UTILITY TECHNICAL STANDARDS

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

1. DEFINITIONS

A. “Council or City Council” is the City Council of the City of Carnation.

B. “City” is the City of Carnation in King County, State of Washington.

C. “Contractor” is the Contractor(s) under contract with the City and include the Contractor’s agents, employees and subcontractors.

D. “City Engineer” or “Engineer” shall be a licensed civil engineer and as designated by the City or his duly authorized assistants, which includes, Consultant Engineer and/or Inspectors.

E. "Cross Connection" means any connection between any part of the water system used or intended to supply water for drinking purposes and any source or system containing water for drinking purposes and any source or system containing water or substances that is not or cannot be approved as safe, wholesome, and potable for human consumption.

F. “Customer” or “Owner” is the property owner constructing the water or sewer system and its Contractor, and any representatives thereof, including builders or engineers acting on behalf of the Owner, who either will be or are currently connected to the City’s water or sewer system.

G. “Developer” is any individual, company, partnership, joint venture, corporatin, association, society or group that has made, or intends to make, application to the City for permission to construct a water system connection, or extension, the the City’s water system.

H. “Fire Marshal” is the agent designated by the City Manager. The Fire Marshal for the City is the authorized representative of Eastside Fire and Rescue.

I. “Fire Protection Service” is any part of the water system that connects to the customer’s fire sprinkler system. This line is owned and maintained by the customer except where located within public right-of-way or easement to the City. The City also owns and maintains the meter in the fire service line. The customer shall provide unrestricted access for the City to the fire service line meter.

J. “Inspector” is the City authorized representative assigned to make inspections for compliance with the City specifications and standards.

K. “Licensed Side Sewer Contractor” is a contractor licensed by the State of Washington.

K. “Manager” is the City Manager or their designee, of the City of Carnation.

L. “Owner” or “Customer” is the property owner constructing the water or sewer system and its Contractor, and any representatives thereof, including builders or engineers acting on behalf of the Owner, who either will be or are currently connected to the City’s water or sewer system.

M. “Owner’s Contractor” is any Contractor or agent of the Owner authorized to act on behalf of the Owner.

N. “Premises” means a private home, building, apartment house, condominium, trailer court, mobile home park, farm, each residential or commercial unit, a group of adjacent buildings or properties utilized under one ownership and under a single control with respect to use of water and responsibility for payment therefore.

O. “Property” is the parcel of land associated with any development or property being improved to these standards.

P. “Residential Customer Equivalent” (RCE) means a single-family residence is equal to one RCE. Users other than single-family residential are based on an inventory of plumbing components (i.e., faucets, toilets) that are assigned a number of “fixture units” on estimated flows. These flows are then converted to RCEs using a conversion factor.

Q. “Residential service” means a water or sewer service connection to a dwelling unit.

R. “Retail Service Area” is the area designated by the municipal water supplier and ultimately approved by WSDOH as the area within which water is or will be sold directly to the ultimate consumers.

S. “Service line” is any part of the water system that connects to the water main service line and the customer’s building. The City owns, maintains and operates all service lines within the public right-of-way, including and through the water meter. The customer owns, maintains and operates all service lines on private property that are located downstream of the City’s water meter.

T. “Sewer or Sanitary Sewer System” is any lateral, trunk, or other sewer owned or constructed by and/or a part of the public sewerage facilities of the City.

U. “Sewer Service Area” is that area consisting of the corporate limits of the City and those areas that have been or may be designated for sewer service by the City Council.

V. “Side Sewer” is the line which connects at the property or easement line to the City’s side sewer stub service and extends on private property to the connection at the building, and is

owned and constructed by private parties and maintained by the property owner.

W. “Side Sewer Stub” is the portion of the City owned system that extends from the valve pit to the property or easement line.

X. “Water Meter” is the part of the water system that meters the water consumption of the customer. The water meter is owned, maintained and operated by the City.

Y. “Water Service installation, service connection, or connection” means all piping and fittings from the main to the property owner’s side of the water meter assembly.

Z. “Water Service Area” is that area consisting of the corporate limits of the City and those areas that have been or may be designated for water service by the City Council. “Water System” is any water main, service, or appurtenance owned or constructed by and/or a part of the public water system facilities of the City.

2. GENERAL POLICIES

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

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

A. Authorized employees of the city, properly identified, shall have access, upon the permission of the owner or his/her authorized agent, at reasonable hours of the day, to all parts of a premises or buildings to which water or sewer service is provided by the City for the purpose of assuring conformity to these standards.

B. Whenever the owner of any premises supplied by the City restrains authorized city employees from making such necessary inspections, water or sewer service may be discontinued.

C. Any person causing damage to any property belonging to the City shall be liable to the City for any and all damages resulting either directly or indirectly therefrom.

D. It is unlawful for any person to store, maintain or keep any goods, merchandise, vegetation materials or rubbish within a distance of five feet of, or to interfere with the access or operation of any water meter, gate valve, fire hydrant, valve pit or other appurtenance in use on any water service, sewer service, connection, water main, or fire protection service.

(1) Authorization for Use of Hydrants Required It is unlawful for any person, other than authorized employees of the Eastside Fire and Rescue or of the City, to operate fire hydrants and hose outlets unless approved in writing by both the City Engineer and City Public Works Superintent.

E. Emergency Interruption of Service

(1) In case of emergency, or whenever public health, safety, or the equitable distribution of water so demands, the City or his/her designee may authorize the City to change, reduce or limit the time for, or temporarily discontinue the use of water. Water service may be temporarily interrupted for purposes of making repairs, extension or doing other necessary work.

(2) Before so changing, reducing, limiting or interrupting the use of water, the City shall notify, insofar as practicable, all water consumers affected.

(3) The City shall not be responsible for any damage resulting from interruption, change or failure of the water supply system.

F. Permits Required

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

G. Cross Connections Prohibited

(1) The installation or maintenance of a cross connection is prohibited.

(2) Any such cross connection now existing or hereafter installed is declared a nuisance and shall be abated immediately. The control or elimination of cross connections shall be in accordance with the State of Washington Administrative Code (WAC 284-54-820) as now enacted or hereafter amended, together with any future manuals of standard practice pertaining to cross connection control approved by the Director of the State of Washington Department of Health and the City's Cross Connection Control Plan attached as Appendix A to this document.

(3) Water service will be discontinued to any premises for failure to comply with the provisions of this section.

I. Furnishing of water services shall be contingent upon the customer's providing cross connection control approved by the appropriate health authority and the Public Works Director or designee for protecting the city supply from backflow.

J. Nonliability of City for Damages

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

K. Discontinuance of Service

(1) The City may discontinue service by reason of a failure to pay a bill for service or the failure to comply with the terms of this chapter, in accordance with the procedures established by state law, this chapter, and other city ordinances or procedures.

(2) Service to any premises upon which a private water supply system or private sewage disposal system is used or operated contrary to the provisions of this chapter may be discontinued or refused.

L. Unauthorized Turn On Prohibited

(1) It is unlawful for any person, except duly authorized employees of the City, to turn on the water supply to the premises after a turn off is made at the meter by the City.

(2) A water service to any premises turned on by an unauthorized person, after such water supply had been turned off by the City, may upon discovery, be disconnected by the City from the water main in the street, and shall not be connected again until all fees due as a result of the disconnecting and reconnecting of such service are paid.

M. Nonliability of City

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

N. Service Disconnection for Condemned Buildings

Whenever a premises supplied with water has been found by the proper authorities to be dangerous to human life and unfit for human habitation, and notice of such finding has been received by the City from such authorities, the City shall cause the water service to such premises to be turned off or disconnected. Water service to such premises shall not be restored until the owner and/or his agent has secured a release or clearance from the City and Fire Marshal.

O. Administrative Authority

(1) The City Manager or his/her designee may make such administrative determinations for the proper operation of this chapter as are not inconsistent with its provisions.

(2) The City Manager or his/her designee shall promulgate and enforce such customer service policies and related additional rules as may be deemed necessary from time to time to encourage and facilitate the use of water, pursuant to city council resolution approving the same.

P. Violation Penalty

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

Q. Service Connections, Charges and Application for Service

(1) An application shall be made for all service connections, for the use of fire hydrants, and for water or sewer service work to be performed by the City. Such application shall be on forms provided by the City.

(2) An application shall be accompanied by all fees or deposits required by the City's fee

schedule.

(3) The application shall provide all information required by this chapter, as well as all other information determined by the City to be necessary for consideration and action upon the application.

(4) The application, when approved by the City, shall constitute an agreement whereby the applicant agrees to conform to the provisions of this section, as now enacted or hereafter amended.

(5) A change of use of the served premises will require that a new application for service be made.

R. Conditions Applicable To All Water Service Connections

(1) All service connections shall be metered.

(2) All meters installed by the City shall be and remain, the property of the city and shall be removed only by the City.

(3) The owner, engineer, or architect shall provide the size of the meter for non- residential services. The City may require a change to the meter size if the City determines it not sufficient.

(4) Whenever the owner of any premises desires to change the size of a meter, an application shall be made to the City, and, upon approval, the exchange will be made at the expense of the owner, less credit for the usable value of the meter removed including all related charges. Credit for the difference in fees and charges between the old and new sizes shall be made for all applicable fees and charges, including GFC, meter installation, etc.

(5) Whenever demand periodically exceeds the rated capacity of a meter to the extent that the meter may be damaged, the City shall notify the owner of this fact. After evaluating the owner's requirements, the City shall advise what size meter is necessary to give proper service without damage to the meter. The estimate of cost covering such change shall be furnished by the City, upon request by the owner, without charge. If the owner does not make the required deposit for the installation of the larger meter within thirty days after the date of the notice, then the City shall install the proper size meter, charging the total cost to the owner, or the City may discontinue service.

(6) Each served premises must have a separate connection to a main, unless otherwise approved by the City when impossible or impractical. Permitted accessory dwelling units, either attached or detached, and the primary residence shall be considered a single residential premises and may share one connection to the water main.

(7) Water will not be provided to more than one new customer or dwelling through a single service connection, and separate service applications are required for each dwelling unless otherwise allowed in this section. When two customers or buildings are being

served by a single service connection on the effective date of this chapter, the City may require the installation of a new service, when necessary, for efficient operation of the system, at the cost of the customer. Attached dwelling units may be served through a single water service and meter. Detached buildings will each have their own meters.

(8) When the premises for which service is sought does not abut a main with sufficient pressure and capacity to provide the required flow at the property line, the application for service shall be rejected.

(9) No application for water service shall be accepted or approved for locations outside of the City's water service area.

(10) The furnishing of water by a customer to premises other than that served by the customer's service, is prohibited, except as may be approved by the City, and except during emergencies, provided that emergency service cannot continue for more than thirty days and an application for emergency service shall be made to the City within forty-eight hours of the onset of the emergency.

(11) A request for a change in the size of service connection shall be treated as a request for a new service installation.

(12) A change of use of the served premises will require a new service connection, unless the existing service is adequate for the changed use, as determined by the City. Also, additional connection (GFC) charges may apply.

(13) All water service connections to existing mains shall be made by the City or the City's contractor unless the development is more than one connection – in which case the developer's contractor shall install the services subject to City inspection

(14) The cost of such connections shall be paid by the customer at the time of application.

(15) The fees established by this chapter are for the water service connection only. Where special conditions exist, such as inability to bury service lines, the actual cost on installation shall be charged to the customer.

(16) When buildings are replaced by new buildings, the existing water service connection shall not be used when the City determines that such connection is not acceptable. In such an instance, the customer shall be required to install a new water service connection, in accordance with the terms of this chapter.

S. Fee for New 1" Water Service Connection

(1) The fee for new residential 1" water service connections, including the meter, shall be as set forth in the City's current fee schedule, except as noted below - refer to the standard detail.

(2) The water meter installation fee shall cover the cost of tapping the City's water main for the necessary size of service, installing service line necessary to reach to within two feet

of the property line, to a maximum distance of sixty feet, and provide and install a meter, and meter box.

T. Conditions Applicable To All Sewer Service Connections

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

(2) Whenever the owner of any premises desires to change the size of a sewer service, an application shall be made to the City, and, upon approval, the a permit will be issued for the new service

(3) Each served premises must have a separate connection to a valve pit, unless otherwise approved by the City when impossible or impractical.

(4) When the premises for which service is sought does not abut a main with capacity to provide the required flow at the property line, the application for service shall be rejected unless a main extension can provide the service.

(5) No application for sewer service shall be accepted or approved for locations outside of the City limits.

(6) A change of use of the served premises will require an evaluation of whether the sewer service is adequate for the changed use, as determined by the City. Also, additional connection (GFC) charges may apply.

(7) All side sewer connections to existing mains shall be made by the City or the City's contractor unless the development has more than one connection – in which case the developer's contractor shall install and connect the side sewers at the City's discretion, subject to City inspection

(8) The cost of such side sewer connections shall be paid by the customer at the time of application.

(9) The fees for side sewer installation are listed in the City's current fee schedule.

(10) When buildings are replaced by new buildings, the existing sewer service connection will be used unless the City determines that such connection is not acceptable based on capacity, materials or age. In such an instance, the customer shall be required to install a new side sewer in accordance with the terms of this document.

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

U. Additional Fees

(1) For any additional length of water service pipe beyond sixty feet, the customer shall be billed for the additional cost plus administrative overhead.

(2) Water services for the sizes indicated in the Utility Service Fee Schedule irrespective of meter size, shall be based on the City's actual costs and administrative overhead which may include contractor fees.

(3) For all commercial and/or industrial services, and for all residential services larger than two-inch diameter irrespective of meter size, the owner or applicant shall retain a qualified contractor to install the service and pay the contractor directly. The City will charge a meter drop fee in accordance with its Utility Service Fee Schedule.

(4) In no event shall the installation charge be less than the charge for a one-inch diameter residential service with a five - eighths-inch meter.

(5) Crossings of SR203, King County Roads or City streets that require trenchless methods will be paid for by the owner based on the City's or Contractor's costs.

V. Easements

(1) All water and sewer mains not in the public right-of-way shall be in easements granted to the City of Carnation only by the form of easement provided by the City. Easements to the City may be shared with other utilities subject to approval by the City. General multiple utility easement references on Plan documents are not sufficient.

(2) In general, all easements for water and sewer mains shall be a minimum of 15 feet wide. In special circumstances, the easement width may be reduced to 10 feet with the approval of the City. Additional facilities may require other easement limits.

(3) No permanent structures are allowed to be constructed in the easement area. No additional building setback line from the edge of easements is required. Access to easements for maintenance and/or repair of the utility by the City shall not be restricted or prohibited by fences, rockeries, plantings and other improvements.

(4) Easements within single lots are preferred rather than being split by a lot line. Easements may be located on two adjacent lots with the approval of the City.

(5) The locations of water mains within easements shall be accurately surveyed and staked to guide the construction. All sewer mains or facilities shall be accurately staked by a licensed surveyor prior to installation. Any deviation from these requirements must be approved by the City.

W. Extension Policies

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

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

(2) There is a geographic impediment for future main extension. If, in the City's sole judgment, a property proposed for a single family residence abuts a geographic feature where future extension is highly unlikely, the city may allow an extended water or sewer service line in lieu of requiring a main to be extended, subject to engineering review. Examples of these geographic features may be major water features, steep slopes, etc. The City may authorize a water or sewer service for these instances without a main extension.

(3) If the single family structure to be served is more than 150 feet from a water main or 200 feet from a sewer main but construction of a main would not benefit the City, nor is necessary to provide service to the applicant. The City may authorize a water or sewer service for these instances without a main extension.

(4) Temporary emergency service:

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

X. Additions, Betterments, Extensions – Reimbursements Contracts

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

Y. Additions, Betterments, Extensions – Over-sizing

Water and sewer mains to be installed by developers shall be oversized at the request of the

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

Z. Connection to City Water Main

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

AA. Disconnection of Water or Sewer Service

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

AA. Unauthorized Connections to the Water or Sanitary Sewer System

(1) Unauthorized Connections Prohibited

Connection to the water and sewer systems without City approval is prohibited. Infiltration and inflow are serious problems negatively impacting the efficient and economical operation of the City's system of sewers, and prohibited by the City's sewage treatment contract with the King County. Connection of cesspools, septic tanks, privy vaults or cisterns, gutter drains, sump pumps, storm water collection systems, or any other such facilities to the public sanitary sewer or a side sewer, or allowing surface or storm water inflow into a grinder pump chamber, is strictly prohibited.

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

prohibited.

(2) Notice and Removal of Unauthorized Connections

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

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

(3) Investigation, Testing and Inspection Charge

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

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

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

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

(4) Contractor, Owner, Builder Suspension

In addition to the foregoing provisions, and supplemental thereto, if investigation by the City determines that an owner, contractor or builder has willfully made an unauthorized connection, or has directed that an unauthorized connection be made, all right under this

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

(5) Reduction or Waiver of Charges

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

BB. Compliance

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

A notice shall be sent to the owner of any side sewer that has been connected to the City's sewer system, but which does not strictly comply with the provisions and standards of this Policy. If such side sewer is not brought into compliance within 30 days of such notice, the City or authorized representative may enter the owner's property and make such corrections as are necessary to bring the side sewer into compliance. The cost of such corrections shall be charged against the property owner, and shall become a lien upon the property.

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

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

3. GENERAL CONSIDERATIONS

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

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

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

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

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

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

A. Call Before You Dig

The Owner and Contractor are advised that underground utilities such as but not limited to electrical power, natural gas, telephone, cable TV, sewer system mainlines, side sewers, water system main lines, water system service lines and storm sewer lines are buried within the City's Right-of-Way and on private property. The presence or location of these utilities are not readily identifiable and can only be located by trained personnel.
Underground utilities may be shown graphically in these standards or other documents provided by the City. Any representation of underground utilities is for general informational purposes only. The owner or their agents may not rely upon any representatives of the location or absence of underground utilities in these standards or other documents provided by the City.

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

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

B. Cultural Resources

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

C. Standard Specifications

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

D. Other Specifications

In addition to the current version of the City of Carnation's Combined Water and Sanitary Sewer Utility Technical Standards, additions, betterments, and extensions to the City's water or sewer systems shall be made in accordance with the:

(1) Carnation Municipal Code.

(2) Applicable Washington Administrative Code Sections.

(3) Washington State Department of Health (DOH) Water System Design Manual, current edition.

(4) Washington State Department of Ecology (DOE) "Criteria for Sewage Works Design", current edition.

(5) King County Department of Natural Resources Wastewater Division's Industrial Waste program.

(6) Standards and Manuals of the American Water Works Association (AWWA), current editions.

(7) East King County Coordinated Water System Plan, current edition.

(8) Standards of the American Society for Testing and Materials (ASTM), current editions

(9) City of Carnation Comprehensive Water System Plan, current edition.

(10) City of Carnation Comprehensive Sewer System Plan, current edition.

(11) Standards of the American National Standards Institute (ANSI), current editions

(12) Manual of Uniform Traffic Control Devices (MUTCD) by the US Department of Transportation as amended and approved by the Washington State Department of

(13) Transportation, current editions

(14) International Plumbing Code, latest edition

(15) King County Road Standards, current edition.

(16) City of Carnation Road and Street Standards, current edition.

(17) International Building Code, latest edition

E. Legal Relations and Responsibilities

(1) Laws to be Observed

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

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

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

(2) Protection and Restoration of Property

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

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

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

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

(3) Utilities and Similar Facilities

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

(4) Traffic Control

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

(5) Detours and Road Closures

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

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

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

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

F. Developer Extension Agreement

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

4. Main Extensions or New Facilities Required

A. When Required.

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

B. Application.

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

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

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

C. Preparation of Plans and Specifications.

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

D. Inspection.

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

E. Construction of Main Extensions.

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

F. City Participation in Main Construction.

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

G. Acceptance of Main Extensions.

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

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

H. Construction Record Drawings.

Upon Completion of Construction, the electronic file shall be edited to reflect actual construction conditions and as-built records by the design engineer. The electronic file shall then be submitted to the City and shall become the property of the City. The electronic file shall contain all data, including topography, lot line, other utilities and text. Title blocks may be removed. The electronic files shall be in both PDF and AutoCAD format. The AutoCAD files in a .dwg format in the AutoCAD version requested by the City. In addition, a reproducible Mylar drawing that accurately indicates the main extension and appurtenances as actually installed in plan and profile if necessary to convey the details of the extension is required. The as built drawing shall be plotted on a 22"x34" Mylar and wet stamped and signed by the design engineer.

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

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

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

5. Drafting Standards

Construction drawing shall be stamped and signed by professional civil engineer currently licensed in the State of Washington. Drawings shall be 22 x 34 inches full size, 11 x 17 inches half size.

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

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

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

(1) Erosion Control & Grading plan

(2) Street Improvements

(3) Storm Drain or Drainage Plan (Drainage & Street Plans may be combined together)

(4) Sanitary Sewer Plan, if applicable

(5) Water System Plan, if applicable

(6) Landscaping Plan, if applicable

6. General Construction Standards for Water and Sanitary Sewer System

(1) Trench Excavation

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

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

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

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

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

Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe

laying without approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.

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

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

(2) Trenching Transverse to Existing Roadway

Open-cut transverse crossings of roadways after final paving are not to be permitted unless it can be shown that alternatives such as jacking, auguring or tunneling are not feasible or unless the utility can be installed just prior to reconstruction or an overlay of the road. Should an open cut be approved, all transverse trenches shall be backfilled with controlled density fill or crushed surfacing. Pavement restoration of transverse crossing of existing roadways shall be a minimum of 30-feet in width. Transverse crossings in roadway under construction with ATB applied may be backfilled with crushed rock.

(3) Trench Shoring and Dewatering

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

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

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

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

(4) Trench Backfill

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

(a) Capable of attaining the degree of compaction specified within reasonable tolerance of optimum moisture content as recommended by the project's geotechnical engineer.

(b) Reasonably free of organic material, clay, frozen lumps, rocks greater than 2 inches, or other deleterious matter.

If unsuitable materials are encountered, the unsuitable materials shall be hauled to an approved disposal site or used in non-critical areas outside the roadway prism. The City shall be provided with the location of all disposal sites to be used and also copies of the permits and approvals for such disposal sites.

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

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

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

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

(5) Controlled Density Fill

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

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

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

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

If CDF is used for trench backfill on ductile iron, steel, or copper utility mains or services, the mains and services shall be encased in polyethylene wrap and covered with a six-inch thick sand layer.

(6) Compaction of Backfill

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

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

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

The Contractor or Developer shall contract with a geotechnical or material testing firm to provide a proctor and compaction testing, copies of all results shall be emailed by the compaction testing firm to the City.

(7) Capping

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

(8) Trenchless Construction Required

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

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

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

The existing asphalt surface shall be cut on a neat line by saw cutting, jack- hammering or other approved method prior to excavation to provide a continuous line. Following proper backfill and compaction of the trench, the edges of the surfacing shall be retrimmed (saw cut) 12 inches wider than the excavation with straight vertical edges free from irregularities. A 1 ¼-inch minus crushed surfacing base course shall be placed to a compacted thickness of 3 ½-inches, followed by 5/8-inch minus crushed surfacing top course placed to a compacted thickness of 4 inches. The HMA surface shall match existing thickness plus 1-inch or be 3-inches minimum compacted depth. Pavement restoration of transverse crossing of existing roadways shall be a minimum of 30-feet in width. Half street pavement restoration is required for longitutitlal trenching within an existing asphalt surface.

(10) Temporary Street Patching

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

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

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

(11) Trench Pavement Restoration

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

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

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

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

Asphalt concrete Class CL ½ In. PG 64-22 shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the applicable requirements of the Standard Specifications, except that longitudinal joints between successive layers of asphalt concrete shall be displaced laterally a minimum of 12 inches unless otherwise approved by the City. Fine and coarse aggregate shall be in accordance with the Standard Specifications. Asphalt concrete over 2 inches thick shall be placed in equal lifts not to exceed 2 inches each.

All street surfaces, walks or driveways within the street trenching areas affected by the trenching shall be feathered and leveled to an extent that provides a smooth-riding connection and expedites drainage flow for the newly paved surface. Leveling and feathering as required by the City shall be accomplished by raking out the oversized aggregates from the Class ½ In PG 64-22 mix as appropriate.

Surface smoothness shall be per the Standard Specifications.

(a) All joints shall be sealed using paving asphalt AR4000W.

(b) When trenching within the roadway shoulder(s), the shoulder shall be restored to its original or better condition.

(c) The final patch shall be completed as soon as possible and shall be completed within 30 days after first opening the trench. This time frame may be adjusted if delays are due to inclement paving weather, or other adverse conditions that may exist. However, delaying of final patch or overlay work is allowable only subject to the City's approval.

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

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

When it is necessary to tunnel or jack a stub service under any private right-of- way or private

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

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

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

7. DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS – WATER SYSTEM

A. General

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

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

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

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

B. Main Line

Water mains shall be sized to provide adequate domestic and fire flow demands at the required residual pressure per WSDOH regulations and fire flow requirements. Fire flow requirements will be determined by the Fire Marshal; however, the quantity of water required will in no case be less than 1000 gpm at 20 psi residual pressure for single family residential areas and provide a Peak Hour Demand while maintaining a minimum pressure of 50 psi where the distribution system consists of eight-inch mains and fire flow is provided.

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

C. Dead End Lines

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

D. Ductile Iron Pipe

Ductile iron pipe shall conform to ANSI Specification A21.51, 1976, AWWA C151-76, or the

latest revision thereof and shall be of the pressure Class 350 for pipe unless otherwise specified by the City. The pipe shall be furnished with rubber gasketed push-on type joints except where flanged or mechanical joints are specifically required by the City. Joint details shall be as specified in ANSI A21.11. Pipe with push-on fitting joints shall be suitable for use with mechanical joint fittings. The pipes shall be coated as specified in ANSI A21.51 and be furnished with cement mortar lining as specified in ANSI A21.4.

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

E. Fittings

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

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

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

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

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

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

F. Polyethylene Encasement

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

G. Minimum Cover

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

H. Couplings

Flexible couplings and transition coupling cast components shall be ductile iron. Center rings

and end rings shall be ductile iron in accordance with ASTM 536-80, Grade 65-45-12.

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

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

I. Adapters

Adapters shall be Romac flange coupling adapters.

J. Bolts In Piping

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

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

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

K. Hydrants

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

The lead from the service main to the fire hydrant shall be ductile iron cement mortar lined Class 350 no less than 6 inches in diameter, with a maximum length of 50 feet. Where leads require more than one length of pipe, Restraint Joint type gaskets are required.

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

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

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

Hydrant shall be M & H 129, Clow Medallion, or Mueller Centurian 250 or approved equal. All hydrants shall be bagged until system is approved.

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

Hydrant valves installed in unpaved areas shall have a 4-inch thick, 3-foot square concrete cement pad placed around them.

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

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

(1) At least one hydrant shall be installed at all intersections.

(2) All hydrants newly installed in a single family residential area shall be supplied by not less than eight (8) inch circulating mains. Dead end mains supplying fire hydrants must be at least eight (8) inches in diameter, except hydrant leads up to fifty (50) feet long may be six (6) inches in diameter.

(3) Hydrant spacing of 600 feet maximum or as required by the Fire Marshal shall be required for single family residential areas.

(4) Fire hydrants shall be installed at the ends of dead end lines which are more than three hundred (300) feet in length. Said hydrants may later be moved to conform to standard spacing requirements when the main is again extended, under supervision of the City.

(5) No one shall plant any vegetation, erect any structure, or perform any action which results in obstructing the view of a fire hydrant for a distance of 50 feet. The Owner and/or occupant of any area in which a hydrant is located shall be responsible for removing weed and tree growth from around the hydrant for a distance of not less than 5 feet. The purpose of this part is to maintain a clear visual area around the hydrant.

(6) All fire hydrants installed as required by these standards shall be maintained by the City unless conditions warrant a waiver of this provision.

(7) Fire hydrants shall be set as shown in the Standard Detail.

(8) The City and Eastside Fire and Rescue may require hydrants to be protected by two or more guard posts. If guard posts are required, they shall be made of either reinforced concrete or steel pipe filled with concrete, 8 inches in diameter, 6 feet long and buried to a minimum depth of 3 feet. Guard posts shall be set with their tops at the same elevation as the bonnet flange of the hydrant. The exposed portion of the guard posts shall be painted with 2 coats of caterpillar yellow paint.

(9) Fire hydrants must be installed, tested, and accepted prior to final plat acceptance or

the issuance of an occupancy permit.

(10) Fire hydrants shall be installed with a tee and an auxiliary gate valve between the service main and the hydrant sufficient to permit repair and replacement of the hydrant without disruption of water service. The location of all valves and fire hydrants installed shall be properly and accurately marked on identifiable plans or drawings.

(11) Hydrants shall stand plumb, be set to the finished grade per the standard detail with the lowest outlet of the hydrant no less than 18 inches above grade and no less than 36 inches of clear area about the hydrant for clearance of a hydrant wrench on all outlets and on the control valve. The pumper port shall face the street. Where the street cannot be clearly defined or recognized, the port shall face the most likely route of approach and location of the fire truck while pumping as determined by the City.

(12) When any portion of a proposed commercial or residential building is in excess of 200 feet from a public street right-of-way, on-site hydrants or a building sprinkler system shall be required. Such hydrants shall be located per Eastside Fire and Rescue and easements for such hydrants, leads, and water mains, shall be granted to the City.

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

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

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

Fire hydrants shall be set as shown in Standard Detail.

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

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

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

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

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

L. Valves

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

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

(1) Gate valves shall be used on all 4-inch to 12-inch lines. The design, materials, and workmanship of all gate valves shall conform to either AWWA C509-01 (or latest revision) or AWWA C515-01 (or latest revision). Gate valves shall be resilient wedge non-rising stem (NRS) with two internal O-ring stem seals.

(2) Butterfly valves shall conform to ANSI/AWWA C504, Class 150, with cast iron short body and “O” ring stem seal. Valves in chambers shall have a manual crank operation. Buried valves shall have a stem extension with AWWA 2-inch operating nut and suitable valve box.

(3) Butterfly valves shall be used on all lines 14 inches and larger unless designated by the City.

(4) Valve Box. All valves shall have a standard APWA cast iron water valve box set to grade with two-piece, extension type cast iron riser from valve. Valve box shall have a lug type cover, 18” or 8” top and 24” bottom per the standard detail. Valve box lids shall have the word “WATER” cast in the upper surface and the valve box ears shall be set in direction of flow.

(5) If valves are not set in paved area, a 2-foot by 2-foot by 4-inch asphalt concrete pad shall be set around each valve box at finished grade. In areas where valve box falls in road shoulder, the ditch and shoulder shall be graded before placing asphalt or concrete pad. The valve and valve box shall be set plumb with the valve box centered on the operator nut. Valve boxes shall be set flush in pavement or road shoulder. See Standard Details.

(6) Operating Valve Nut Extension. A valve stem extension shall be installed whenever the valve operating nut is more than 3 feet below finished grade. Extensions are to be a minimum of 1 foot with only one extension per valve. The operator nut extension shall extend into the top section of the valve box and shall clear the bottom of the lid by a minimum of 10 inches. See Standard Details.

(7) Valve Marker Post. Marker posts shall be of reinforced concrete, 42 inches in length, and tapered in cross-section from 6-inches by 6-inches to 4-inches by 4- inches. The posts shall be painted with 2 coats of caterpillar yellow paint. The horizontal distance from the valve to the post, to the nearest one-tenth foot, shall be stenciled in 2" black numerals on the face of the post per the Standard Detail.

(8) Check Valve. Check valves for permanent installations other than cross connection control shall be rated for 150 psi working pressure, unless otherwise specified, and shall have adjustable tension lever and spring to provide non-slamming action under all conditions unless otherwise specified.

(9) Air and Vacuum Release Valve. Air and vacuum release valves (ARV) shall be APCO 145C combination air release valve. Installation shall be as shown on standard drawings. The installation shall be set at the high point of the line when required. Where possible pipes are to be graded to limit the number of ARV's needed.

M. Pressure Reducing Stations and Pressure Reducing Valves

(1) Pressure Reducing Valve Stations

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

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

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

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

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

(2) Individual Pressure Reducing Valve (Residential).

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

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

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

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

N. City's Service Connections

(1) All service connections relating to new development shall be installed by the developer at the time of mainline construction. After the lines have been constructed, tested, approved, and a letter of acceptance has been issued, the Owner may apply for a water meter. The City will install a water meter after the application has been made and all applicable fees have been paid. Water meters will be set only after the system is inspected and approved.

(2) When water is desired to a parcel fronting an existing main but not served by an existing meter, an application must be made to the City. Upon approval of the application and payment of all applicable fees, the City will allow tapping of the main, and installation of the meter, box, and setter.

(3) Corporation stop shall be all bronze alloy and shall be Ford, Mueller, or approved equal in accordance with AWWA Standard C800 with iron pipe thread (IP) thread inlet by compression fitting outlet for hi-mol plastic, cl 200 (IPS).

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

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

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

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

(5) Service lines shall be 1″ polyethylene meeting the requirements of AWWA C901, with high molecular mass with at least 200 psi rating, and have a 16gauge copper tracer wire wrapped along its entire length (one wrap per foot).

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

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

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

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

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

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

O. Turn On – New Installation For Owner

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

P. Owner's Service Pipe Specifications

(1) All water service line piping leading from the meter to the premises, shall be laid not less than 18 inches below the surface of the ground.

(2) Water service line pipes or any underground water pipes shall not be laid in the same trench with building sewer or drainage piping.

(3) Water service line pipes, parallel to building sewers or drainage piping, shall normally be above and separated by a distance of at least ten feet horizontally, unless otherwise approved by the City.

(4) Shutoff valves of approved full-flow pattern with key or hand wheel shall be installed in the water service pipe leading from the City meter to the building, within the premises served, in accordance with the applicable plumbing code. Shutoff valves where buried shall be properly enclosed in a minimum six-inch diameter pipe, or box, of concrete, plastic, or iron with an approved cover, protected from freezing and readily accessible. Valves internal to the structure are recommended.

(5) Customer-owned valves or equipment are not permitted to be installed within the City's meter box.

(6) Service connections and extension pipes laid underground shall be sized in conformance with the applicable provisions of the IBC as adopted by the City.

Q. Owner's Plumbing Specifications

(1) All persons installing fixtures or appliances to be supplied with water from the City system shall be subject to the requirements of the applicable plumbing code of the City. Persons installing plumbing in new buildings shall leave the valve at the meter in the off position upon completion of their work.

(2) The City Public Works Director shall have the right to refuse water service or discontinue water service in any situation where it is discovered that applicable City standards and codes have not been complied with in making the installation.

R. Irrigation System Specifications

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

S. Fire Protection Service

(1) A water service connection to be used solely for fire protection purposes may be installed, servicing any premises, subject to the provisions of this section.

(2) A plan of the proposed required fire protection system showing the general installation detail shall be required and shall be approved by the City and the Chief of Eastside Fire and Rescue, prior to construction.

(3) Service of more than one premise by a fire service shall not be permitted.

(4) Fire protection systems shall be installed and maintained by the customer in a manner approved by Fire and Rescue and the system shall contain an approved, tested backflow prevention device.

(5) Fire protection systems shall be installed with a double check detector assembly (DCDA) of a size and type approved by the City, for un-metered service.

(6) Indication of unauthorized use of water through a DCDA meter more than once per calendar year shall be cause for installation of a fire line meter at the expense of the customer.

(7) Delinquency in payment of expense for fire protection service or failure of the customer to make changes in meter installation as provided in this chapter, after reasonable notice from the City, shall be sufficient cause for filing a lien on the property and/or discontinuance of the service.

T. Steel Casing

(1) Steel casing shall be black steel pipe conforming to ASTM A53.

(2) Casing wall minimum thickness shall be 0.250 inch for casings 24 inches or less in diameter and 0.375 inch for casings over 24 inches in diameter.

(3) Carrier pipe for water shall be Ductile Iron, Class 350.

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

U. Galvanized Iron Pipe

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

V. Blowoff Assembly

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

W. Concrete Bedding and Blocking

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

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

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

X. Joint Restraint

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

Y. Backflow Prevention

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

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

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

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

(1) Reduced Pressure Backflow Assembly with Detector

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

All other appurtenances shall be as shown in Standard Details.

(2) Double Check Valve Assembly

All Double Check Valve Assemblies shall be the one listed on the most current copy of "Accepted Cross-Connection Control Assemblies" published by Washington DOH. The assembly shall include a tightly closing resilient seated shut-off valve on each end of the body and each assembly shall be fitted with four properly located resilient seated test cocks.

(3) Double Check Valve Assembly with Detector

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

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

(4) Backflow Device Resilient Seated Shut-off Valves

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

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

Z. Existing Utilities

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

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

It is anticipated that the contractor will encounter private water services during work operations. Records of these utilities often are not maintained by the City and will not be field located by the City. It shall be the contractor's responsibility to ascertain the location of and protect these private utilities from damage.

AA. Water Main/Sanitary Sewer Crossings

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

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

BB. Staking

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

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

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

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

and mark cut or fill to hydrant flange finished grade.

CC. Installation

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

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

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

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

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

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

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

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

DD. Laying Pipe on Curves

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

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

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

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

Maximum Permissible Deflection in Laying Mechanical-Joint Pipe

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

Maximum Permissible Deflection in Laying Push-In Joint Pipe

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

EE. Hydrostatic Pressure Tests

Hydrostatic testing consistent with WSDOT Standard Specification 7-09.3(23) is required for new water main lines.

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

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

No air will be allowed in the lines. The mains shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. Test pressure shall be maintained while the entire installation being tested is inspected. The Contractor shall provide all necessary equipment and shall perform all work connected with the test. Tests shall be made before all valved

connections have been made. At unvalved connection points, a temporary plug (or 2" blow-off assembly on lines without hydrants) shall be installed at the end of the new main. This shall include concrete blocking and/or restrained joints necessary to withstand pressures encountered during the hydrostatic test.

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

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

FF. Sterilization and Flushing of Water Mains

Sterilization of water mains shall be accomplished by the Contractor in accordance with the requirements of the State Health Department and in a manner satisfactory to the City. The section to be sterilized shall be thoroughly flushed at maximum flow established by the City prior to chlorination, no less than 2.5 ft/s. Flushing period must be approved by the City. Sections will ordinarily be sterilized between adjacent valves unless, in the opinion of the City, a longer section may be satisfactorily handled. Chlorine shall be applied by solution feed at one end of the section with a valve or hydrant at the opposite end open sufficiently to permit a flow through during chlorine application. The chlorine solution shall be fed into the pipeline already mixed by an automatically proportioning applicator so as to provide a steady application rate of not less than 50 ppm chlorine. Hydrants along the chlorinated section shall be open during application until the presence of chlorine has definitely been detected in each hydrant run. When a chlorine concentration of not less than 50 ppm has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours minimum contact time.

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

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

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

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

GG. Chlorine Dosage

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

The amounts of chlorine (Cl2) required to provide 50 mg/l for 100-foot lengths of various diameter of pipe are:

AMOUNTS OF CHLORINE REQUIRED FOR 50MG/L DOSAGE

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

8. DESIGN AND CONSTRUCTION STANDARDS AND SPECIFCATIONS – SANITARY SEWER SYSTEM

A. General

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

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

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

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

B. Materials

(1) Sewer main pipes shall be 6-inch minimum or as directed by the City. Material cut-sheets of vacuum pipes, pits, valving and accessories shall be submitted to the City a minimum of 10 working days before installation of vacuum sewer facilities.

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

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

Gravity sewers and services shall be constructed of ASTM 2241 SDR 21 PVC, ASTM 3034 SDR 35 PVC, or Class 350 ductile iron pipe conforming to Section 9-05.12 of the Standard Specifications unless shown otherwise on drawings. PVC gravity sewer service pipe shall be considered flexible conduit. PVC compound shall meet the requirements of ASTM D 1784 for Class 12454-B PVC. Vent pipes shall be PVC SDR 21 or Schedule 40 PVC with solvent weld joints as shown on the standard detail. Installation of tracer tape or wire over the side sewer is recommended.

Ductile iron pipe (Class 350) may be used in lieu of PVC pipe provided the ductile iron pipe is lined with epoxy, polyurethane, or SewperCoat as

manufactured by Lafarge Calcium Aluminates or approved equal. All linings shall be applied per the manufacturer's recommendations.

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

(2) Wyes, Tees and Cleanouts

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

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

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

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

(3) Pipe Bedding

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

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

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

bedding shall be completed before inspection or testing of the side sewer.

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

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

(4) Grade and Alignment (minimum and maximum)

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

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

(5) HDPE Pipe and Fittings

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

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

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

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

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

Flange fittings shall be Flange Type VR 955.

Pipe marking shall conform to the requirements of AWWA C906.

C. Shoring

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

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

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

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

D. Trenching Transverse to Existing Roadway

Open-cut transverse crossings of roadways after final paving are not to be permitted unless it can be shown that alternatives such as jacking, auguring or tunneling are not feasible or unless the utility can be installed just prior to reconstruction or an overlay of the road. Should an open cut be approved, all transverse trenches shall be backfilled with controlled density fill or crushed surfacing. Pavement restoration of transverse crossing of existing roadways shall be a minimum of 30-feet in width. Transverse crossings in roadway under construction with ATB applied may be backfilled with crushed rock.

E. Trench Excavation, Bedding and Backfill

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

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

pipe for a minimum of 6 inches above the crown of the pipe.

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

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

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

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

If Side Sewer is constructed outside of the Right-of-Way, trench backfill may be compacted to 90% max density.
Backfill shall begin immediately after inspection and approval of the installation by the City. Backfill compaction on private property is the owner's responsibility.

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

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

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

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

The owner may elect to extend the side sewer stub by one length of side sewer pipe. Any such extension shall not exceed 12 feet in length from a Tee installed at the

property line. The Tee, with a push-in plug, shall be laid in such a fashion that the branch is vertical. Such length of side sewer shall terminate with a cap, and shall be tested along with the stub service.

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

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

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

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

H. Testing Specifications

Vacuum Sewer Mains and Fittings

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

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

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

Two (2) Hour Vacuum Line Test Modification Provision:

If the Contractor succeeds in meeting the daily 2-hour test for seven (7) consecutive working days or two thousand feet of pipe, he may alter the procedure to allow the trench to be covered as work progresses rather than the trench being kept open all day as is the norm with the daily 2-hour test. Should a

line fail the vacuum test while utilizing this test modification, the Contractor shall take whatever action necessary at his cost to pass the test including the re-excavation of the trench, leak detection and line repair, and additional cleanup as required by the Engineer. After the failure, the contractor must "re-qualify" as specified above. Note that this test modification is optional, and as such, the Contractor assumes all liability in its use.

Vacuum Pipe Flushing

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

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

Place system under vacuum.

(1) Add water and air in controlled amounts to valve pits at extreme ends of system.

(2) Utilize system vacuum to transport water and debris to collection point.

(3) Continue procedure until water entering at collection point is free of contamination or debris. If vacuum collection tank is used as collection point, monitor volume of liquid in tank and pump out as necessary. Use system sewage pumps only after verifying that no debris is present in collection tank. If debris is present, use other methods to empty collection tank. At completion of flushing, clean collection tank of all collected debris.

(4) Seal system and make ready to place into operation.

Alternate flushing procedures are subject to ENGINEER’s review.

<u>Side Sewer Testing</u>
Prior to being connected to the premises all side sewers shall be tested by one of the two following methods:

(1) Exfiltration

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

(2) Air test

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

Air testing shall meet the following requirements:

PIPE SIZE	SECONDS PER LINEAL FOOT OF PIPE
4"	1.0
6"	1.5

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

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

I. Inspections

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

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

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

J. Side Sewer Connections

No more than one building may be connected with the side sewer unless the City issues an exemption for multiple connections. An exemption will be issued only upon the condition that the permittee has no other feasible option based on utility conflicts or space considerations or other technical issue that prevents installation of separate

side sewers. Permitted accessory dwelling units, either attached or detached, and the primary residence shall be considered a single residential premises and may share a side sewer connection to the sewer main consistent with the city's standards for side sewers.
The permittee shall hold the City harmless from any damages by reason of such installation and subject to the following regulations:

Common Side Sewers

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

(1) At the end of the common portion of the joint side sewer a cleanout shall be installed per detail for joint side sewer cleanout.

(2) A backwater valve shall be installed on both houses.

(3) An easement on a form acceptable to the City shall be provided for the installation and maintenance of the common side sewer by all properties connected to the common side sewer. It is the property owners' responsibility to record the easement with King County.

(4) The exemption will be prepared by the City in a form of an agreement of their choice and will include a hold harmless and indemnification provision satisfactory to the City. All participants of the joint side sewer shall execute the agreement and reimburse the City for all cost of reviewing the request and preparing agreements and necessary documentation.

Backwater Valves

Backwater valves shall be installed on all structures except when waived by the City. Backflow valves may be used as the cleanout between the house plumbing and side sewer as otherwise required by these standards.

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

Required Size

(1) For single family residences a four inch minimum side sewer is required. For single family residences utilizing a joint side sewer, each residence may use a four inch side sewer from the residence to the wye connection; a six inch side sewer stub service shall be required from the wye to the connection to the valve pit.

(2) For projects with more than 2 units, the City shall determine the required side sewer size and any buffer tanks or appurtenances to connect to the

system.

Maximum Length – Four and 6-Inch Side Sewers

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

K. Commercial Buildings

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

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

L. Swimming Pools

It is unlawful to drain large volumes of water directly into the sewer and thereby cause surcharging of sewer lines. Swimming pools, public or private, shall not be connected to the sewer. Discharge of swimming pools into the sewer shall be allowed; provided, that the City is authorized to enter into agreement with owners of private and public swimming pools to provide for off-hour discharge of pool waters into City lines, where this is done under the supervision of the Public Works Director and at such hours as he may direct. Any such connection shall include a keyed valve to be opened only by the Public Works Director or his authorized representative.

M. Industrial Waste Program

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

It will be the sole responsibility of the owner to operate within the guidelines of all regulations, discharge limits, and pretreatment limits set forth by King County

Department of Natural Resources Wastewater Treatment Division, King County Industrial Waste Program, and the Federal Government for the disposal of materials including but not limited to Metals and cyanide, Fats, oils, and grease (FOG), Corrosive substances (pH), Flammable or explosive materials, Organic compounds, Hydrogen sulfide, High temperature, Solids and food waste.

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

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

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

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

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

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

(1) A written policy articulating management and corporate support for the plan and a commitment to implement planned activities and achieve established goals.

(2) A description of the facility type and a summary of the products made and/or service provided.

(3) Quantities of FOG brought into the facility as raw product, amounts contained in products, and quantities discharged to the sewer.

(4) Schematics of process areas illustrating drains and discharge points connected to the sewer.

(5) A description of current reduction, recycling, and treatment activities.

(6) Identification of a full range of potentially feasible reduction opportunities.

(7) A description of the reduction or control opportunities selected for implementation, process(es) affected, and estimated reductions to be achieved.

(8) Specific performance goals and implementation schedule.

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

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

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

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

Hazardous waste is a federal and state designation for waste material that is toxic, flammable, corrosive, or reactive; this kind of waste requires special handling and treatment at a licensed treatment, storage, disposal facility (TSDF). Hazardous waste can be discharged to the sewer system only with verbal or written authorization from the Industrial Waste Program. More information can be obtained at King County Department of Natural Resources Wastewater Treatment Division at http://dnr.metrokc.gov/wlr/indwaste/index.htm or contact King County Industrial Waste Program at 130 Nickerson Street #200, Seattle WA 98109. Phone: (206) 263-3000.

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

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

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

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

N. Alternative Installations

(1) Where Permitted

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

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

In the case where a property owner has an existing gravity side sewer service and plans to add new plumbing facilities that cannot be served by gravity, the property owner shall contact the City for requirements. If a gravity system is proposed instead of a vacuum system for mainline construction, this will have to be approved by the City, and requirements will be provided to developer.

(2) Type

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

(3) Permit

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

(a) The plot plan required for a Side Sewer Permit Application shall include the data required for a Standard Installation, plus the location of the electrical panel in the building to be served, the plumbing outlet

location, and the proposed location of the grinder pump station and force main.

(b) The applicant shall execute the City's Grinder Pump Agreement, which the City will record with the King County Recorder's Office. The City's Power Outage Policy is incorporated into the Agreement.

(c) The City or its agent must be present during the initial activation of the system.

O. Installation

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

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

9. APPROVED MATERIALS LIST – WATER SYSTEMS

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

A. Ductile Iron Pipe

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

B. Ductile Iron Fittings

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

C. Galvanized Iron Pipe

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

D. Joint Restraint Systems

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

E. Couplings

Romac, Dresser

F. Stainless Steel Repair Bands

Romac, Ford

G. Casing Insulators

Pipeline Seal and Insulator Co.
8-inch band Model C8G 12-inch band Model C12G

Cascade Waterworks Mfg. Co.

Stainless Steel Casing Spacers (catalog number depends on size)

H. Casing End Seals

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

I. Gate Valves (3 inches to 12 inches)

Manufacturers that meet the performance requirements specified in the Standards.

J. PRV Station

(1) Pressure Reducing Valves

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

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

(2) Strainers

Mueller 758 6-inch Mueller

11M 2-inch
(With brass or stainless steel perforated screen, 1/16" diameter, 144 holes per square inch)

(3) Pressure Relief Valves

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

K. Individual Pressure Reducing Valves (Residential)

Wilkins 600 with built-in bypass.

L. Individual Pressure Reducing Valves (Commercial)

(1) Pressure Reducing Valves

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

(2) Pressure Relief Valves CLA-VAL 55F

M. Service Saddles

Per the Standards and Standard Details.

N. Corporation Stops

Per the Standards and Standard Details.

O. Angle Meter Valves

Per the Standards and Standard Details.

P. Valve Boxes

Seattle style #940B with deep skirt lid

Q. Butterfly Valves

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

R. Check Valves

Rennselaer List 340

S. Air and Vacuum Release Valves

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

T. Fire Hydrants

M&H 129, Mueller Centurion, and Clow Medallion

U. Meter Setters

Per the Standards and Standard Details.

V. Meter Boxes

Per the Standards and Standard Details.

W. Reduced Pressure Backflow Assemblies

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

X. Double Check Valve Assemblies

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

Y. Resilient Seated Shut-Off Valves

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

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

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

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

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

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

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

CC. HDPE Pipe and Fittings (Force Mains)

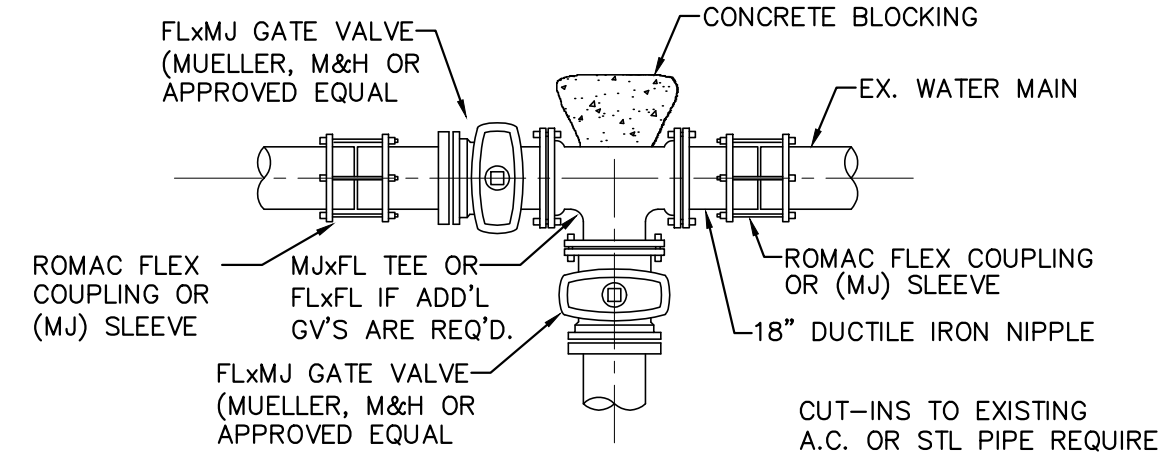
HDPE piping components shall be manufactured from materials that meet or exceed the requirements of the Plastic Piping Institute designation PE3408 and that conform to the requirements of ASTM D3350 for a cell classification of PE 345434C.

DD. Controlled Density (Flowable) Fill

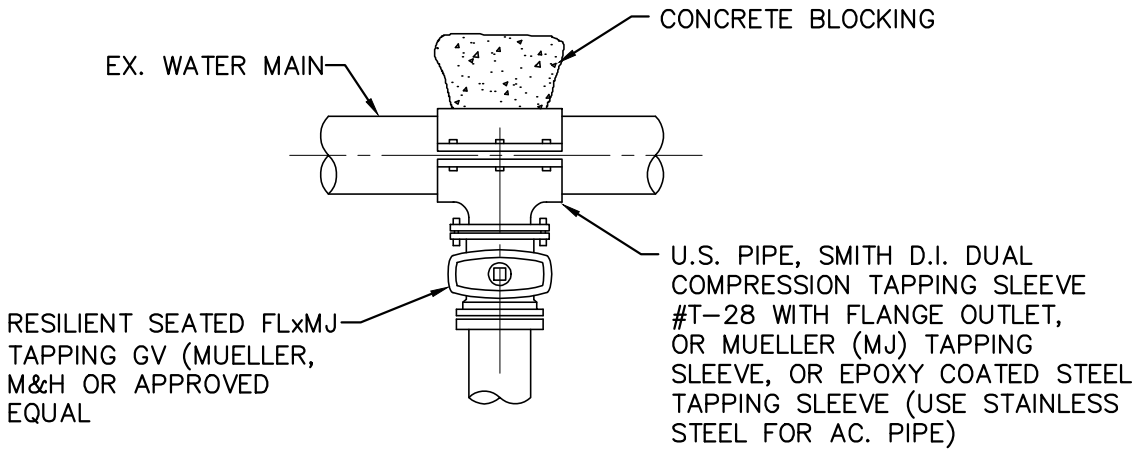
Approved Sources are:
Stoneway, CADMAN, Earth to Earth if available

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

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



CUT-IN TO EXISTING WATER MAINS (TYP)



WET TAP EXISTING WATER MAINS (TYP)

NOTE:

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

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

STEEL PIPES SHALL BE RECOATED WHERE WRAPPING HAS BEEN DISTURBED.

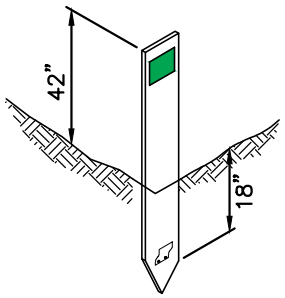
TAP SHALL BE AT LEAST 2" SMALLER DIAMETER THAN THE EXISTING MAIN

LOCHNER
(425)-454-3160

CUT IN & LIVE TAPS

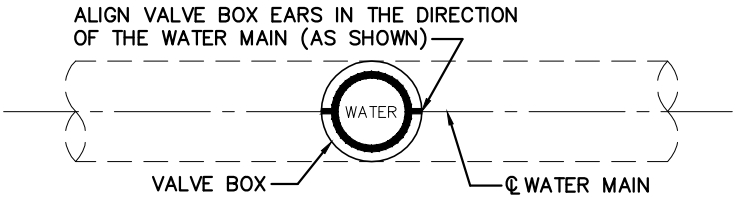
08/2017

DWG. NO. W-1

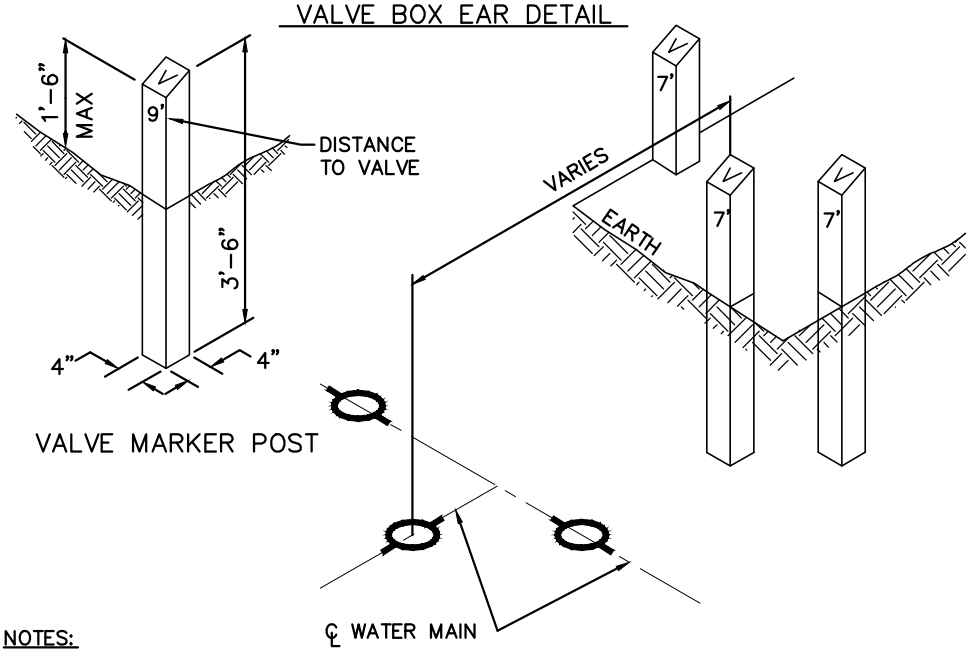


PROVIDE A VALVE MARKER POST FOR EACH VALVE OUTSIDE OF THE PAVEMENT. THE FIBERGLASS VALVE MARKER POST SHALL BE YELLOW IN COLOR, 3 ¾" WIDE (FLAT), 60" LONG, & FURNISHED WITH A 2"x 2", HIGH DENSITY WHITE REFLECTOR (250 CANDLE POWER) & A FLEXIBLE ANCHOR BARB. VALVE MARKER SHALL BE CARSONITE UTILITY MARKER CUM 375 OR APPROVED EQUAL.

OPTIONAL VALVE MARKER
POST WHERE REQUIRED



VALVE BOX EAR DETAIL



NOTES:

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

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

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

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

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

VALVE MARKERS NOT REQUIRED FOR VALVES LOCATED IN PAVED AREAS.

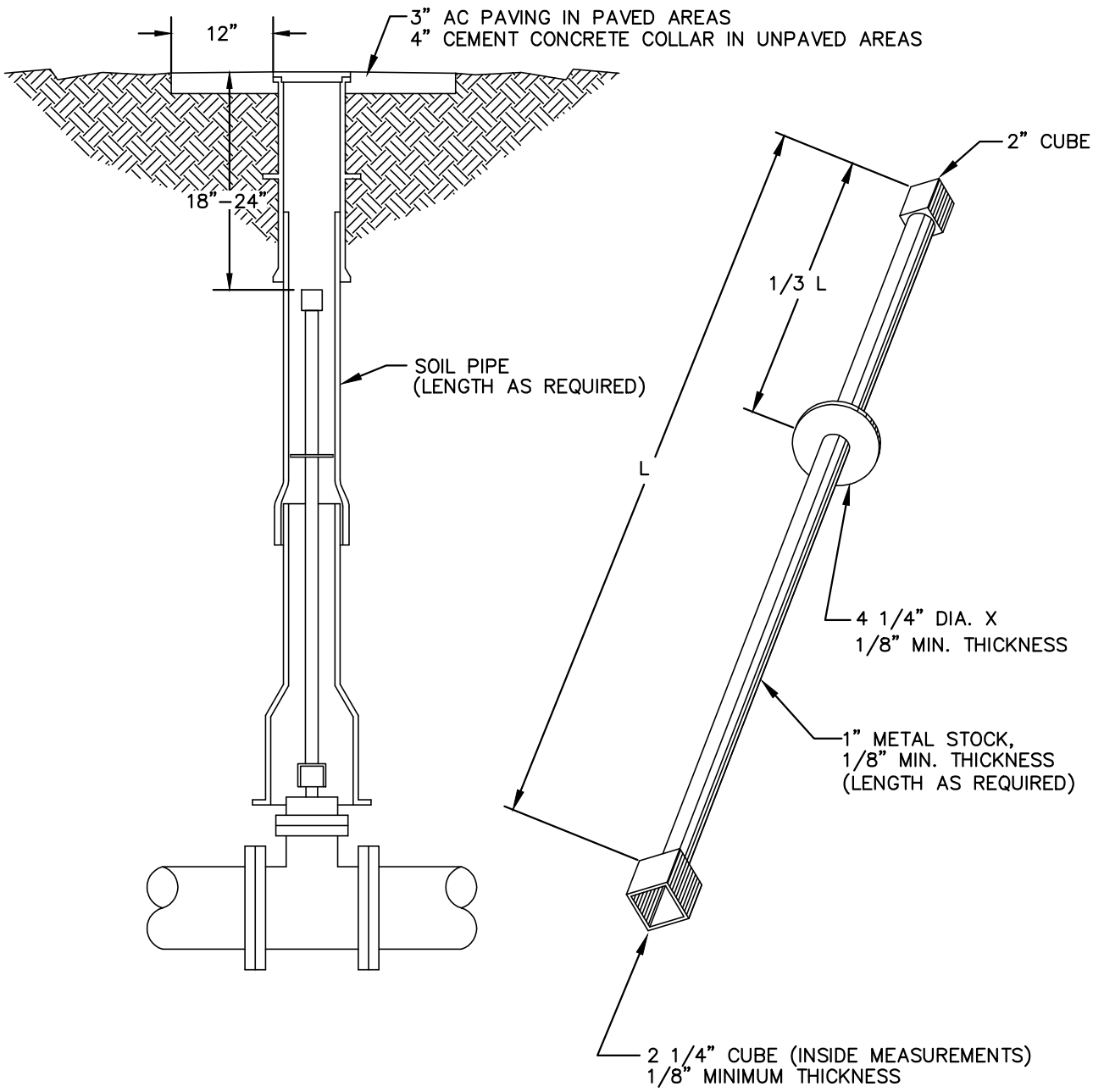
LOCHNER
(425)-454-3160

VALVE MARKER POST DETAIL

Carnation

08/2017

DWG. NO. W-2



NOTES:

LENGTH AS REQUIRED TO PUT OPERATING NUT BETWEEN 18 AND 24 INCHES FROM SURFACE. EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE 30 INCHES BELOW FINISHED GRADE. ONE EXTENSION IS TO BE USED PER VALVE.

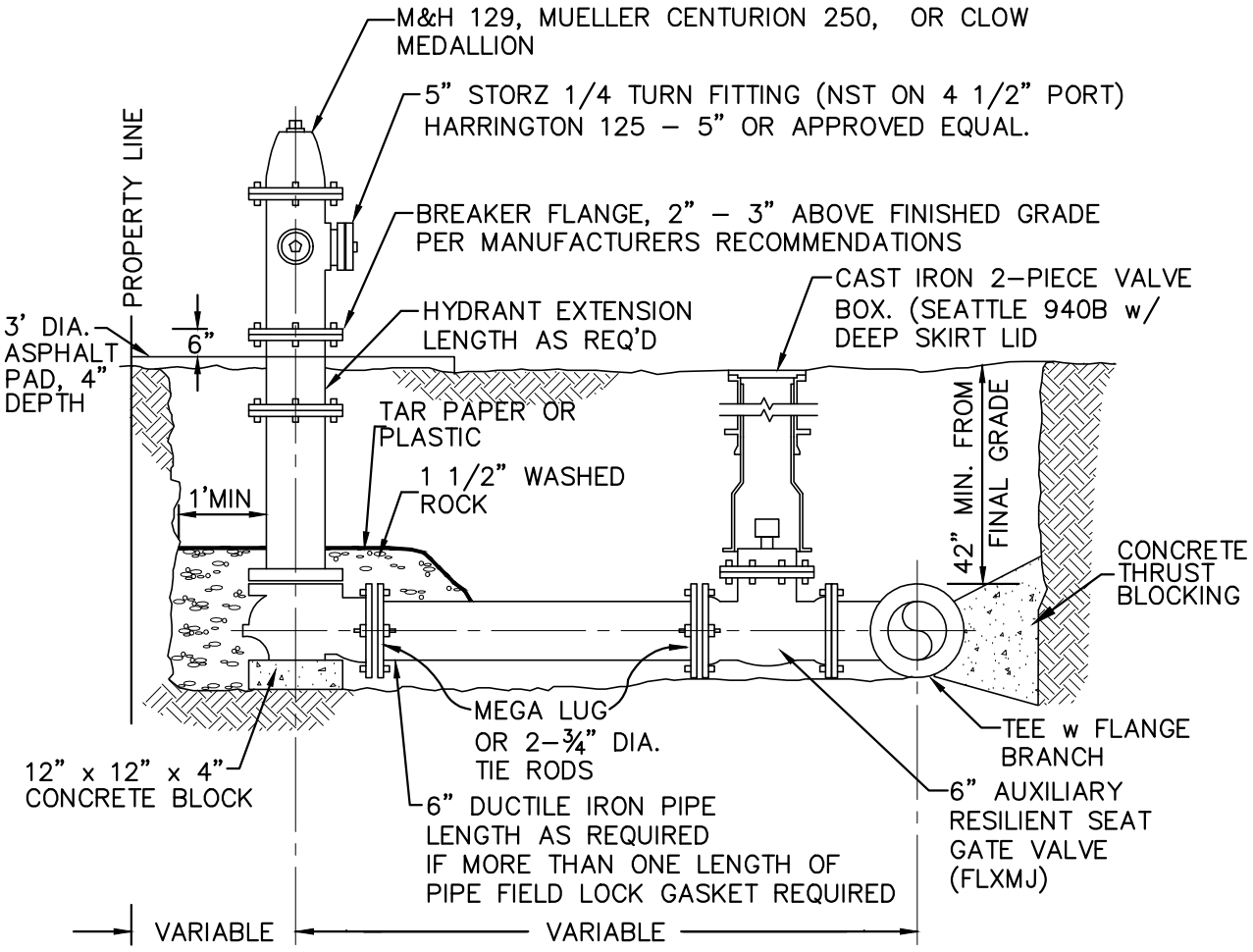
ALL EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND HOT DIPPED GALVANIZED.

LOCHNER
(425)-454-3160

VALVE OPERATING NUT EXTENSTION DETAIL

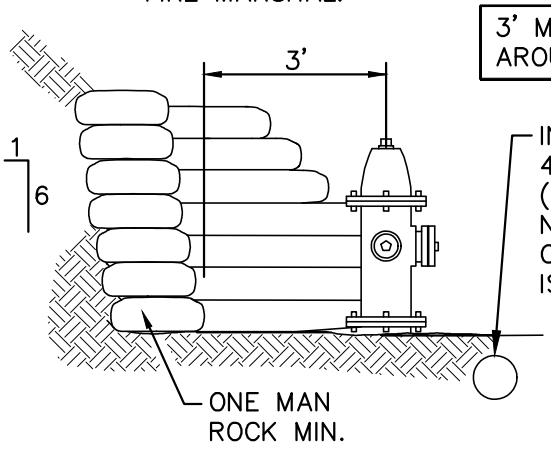
08/2017

DWG. NO. W-3

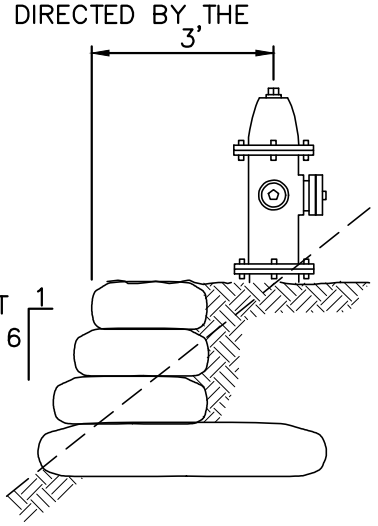


NOTES:
1) PAINT HYDRANT WITH CATERPILLAR YELLOW. BAG HYDRANT UNTIL SYSTEM IS APPROVED.
2) INSTALL BLUE RAISED PAVEMENT MARKER (RPM) TYPE 2 ON PAVEMENT SURFACE ADJACENT TO FIRE HYDRANT. THE RPM SHALL BE LOCATED 18–IN FROM CENTERLINE ON THE FIRE HYDRANT SIDE OR AS DIRECTED BY THE FIRE MARSHAL.

3' MINIMUM CLEARANCE AROUND FIRE HYDRANT



CUT



FILL

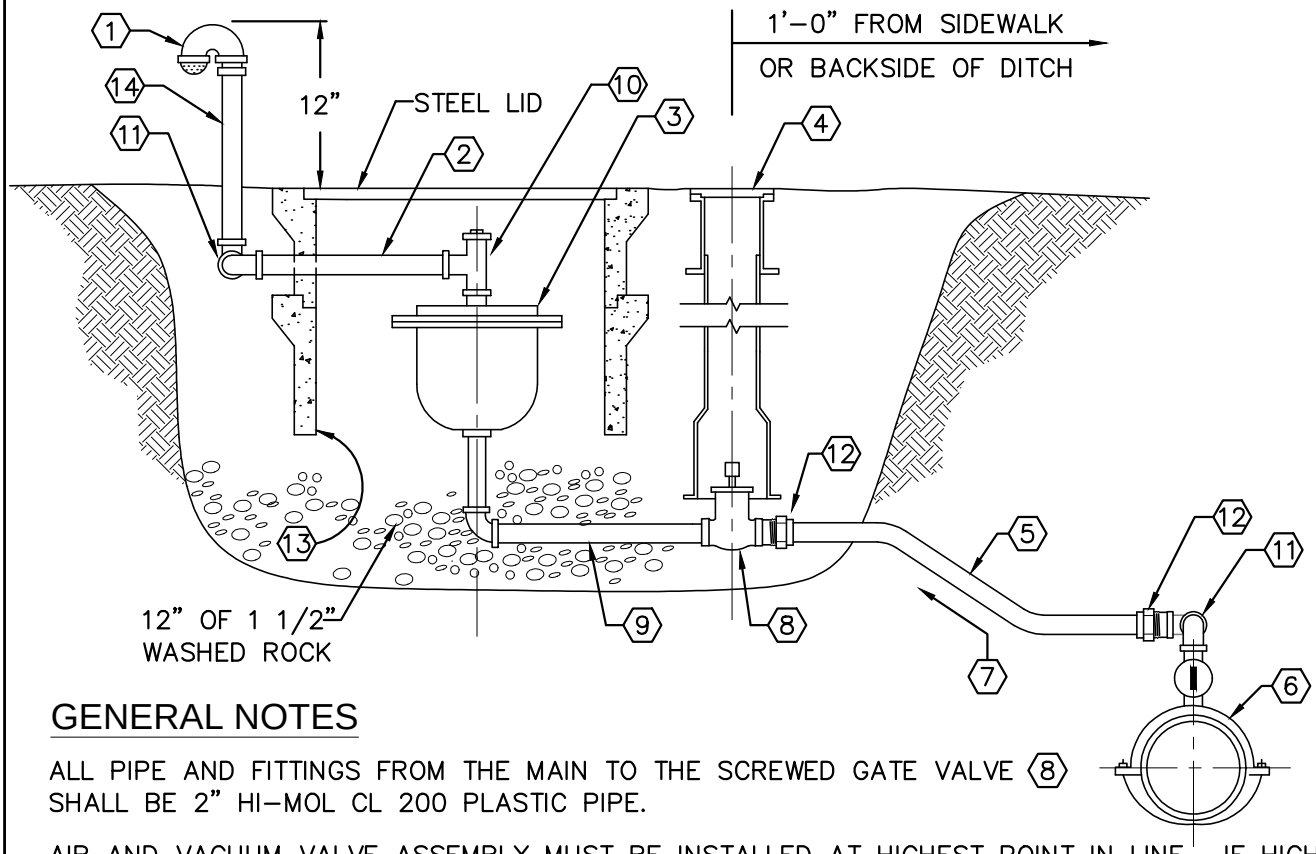
LOCHNER
(425)-454-3160

FIRE HYDRANT ASSEMBLY INSTALLATION

Carnation

08/2017

DWG. NO. W-4



GENERAL NOTES

ALL PIPE AND FITTINGS FROM THE MAIN TO THE SCREWED GATE VALVE ⟨8⟩ SHALL BE 2" HI–MOL CL 200 PLASTIC PIPE.

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

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

KEYED NOTES

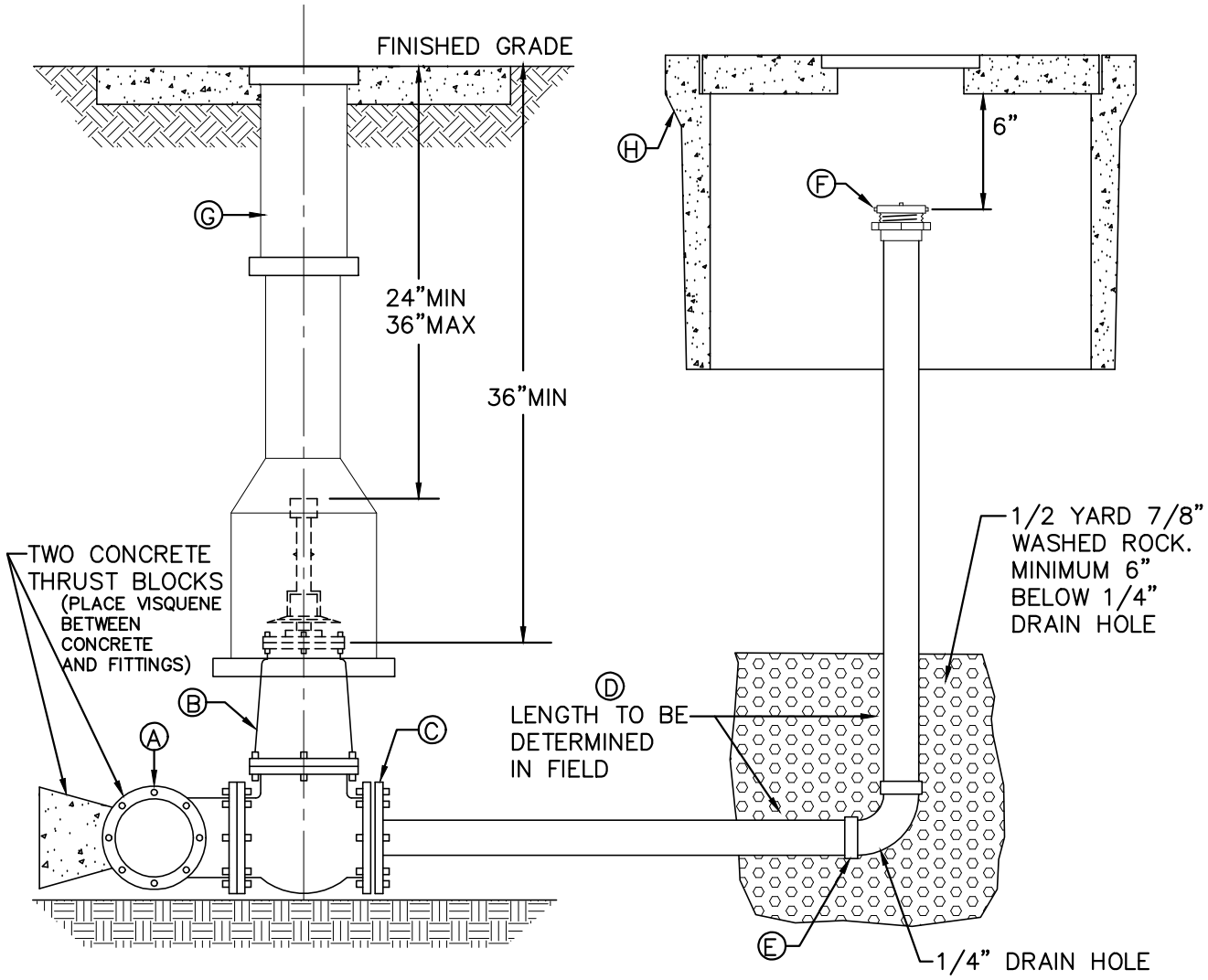
⟨1⟩ 2" BRONZE BEEHIVE STRAINER, 2" RETURN BEND, PAINTED CATERPILLAR YELLOW
⟨2⟩ EXTEND 2" GALV. PIPE HORIZONTALLY THROUGH NOTCHED OPENING IN BACK OF BOX
⟨3⟩ 2" AIR RELEASE OR COMBINATION AIR/VACUUM VALVE, APCO 145C OR EQUAL.
⟨4⟩ CAST IRON 2 PIECE VALVE BOX w/ LID, SEATTLE STYLE 940A
⟨5⟩ 2" HI–MOL CL 200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

LOCHNER
(425)-454-3160

2" AIR RELEASE OR COMBINATION AIR/VACUUM VALVE

08/2017

DWG. NO. W-5



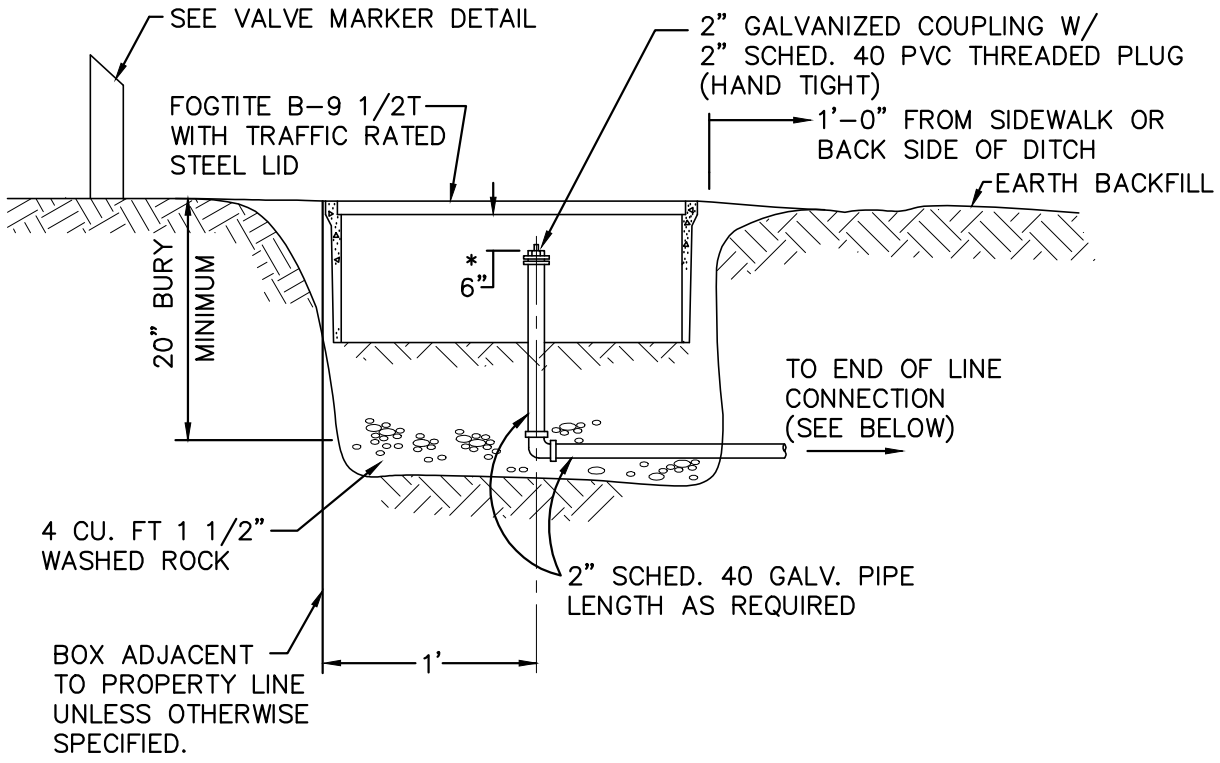
A. DUCTILE IRON TEE (MJxFL) WITH 4" BRANCH & MJ SOLID PLUG.
B. 4" GATE VALVE, (FLxMJ) TO BE LOCATED IN ASPHALT.
C. 4" PLUG (MJ) w/ 2" IP TAP.
D. 2" SCHED 40 GALVANIZED PIPE
E. 2" 90 DEG BEND, GALV.
F. 2" FIPx 2 ½" NST HOSE ADAPTER & CAP w/ CHAIN.
G. SEATTLE #940B (18"x 24") VALVE BOX ASS'Y. w/ DEEP SKIRT LID.
H. FOGTITE B–9 1/2T BOX WITH STEEL LID LOCATED BEHIND SIDEWALK.

LOCHNER
(425)-454-3160

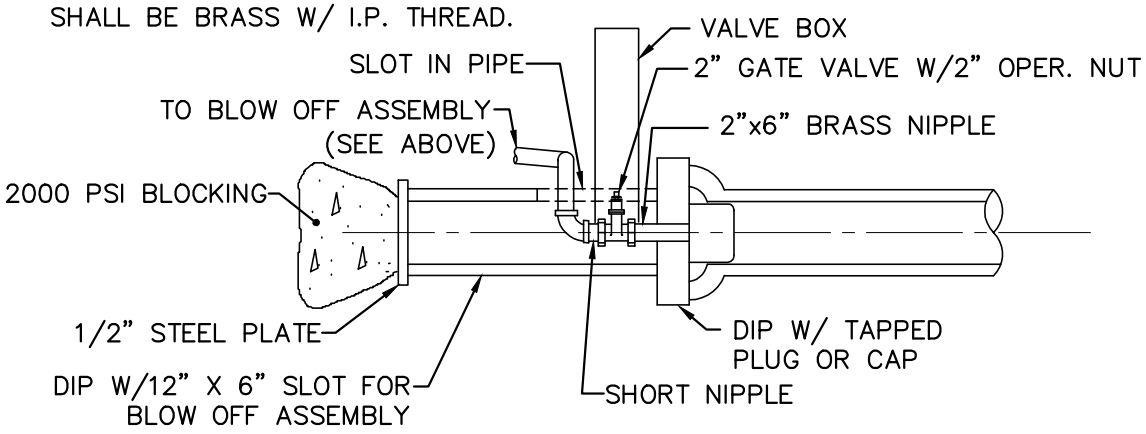
2" PERMANENT BLOW OFF ASSEMBLY: 6" & SMALLER MAINS

08/2017

DWG. NO. W-6



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



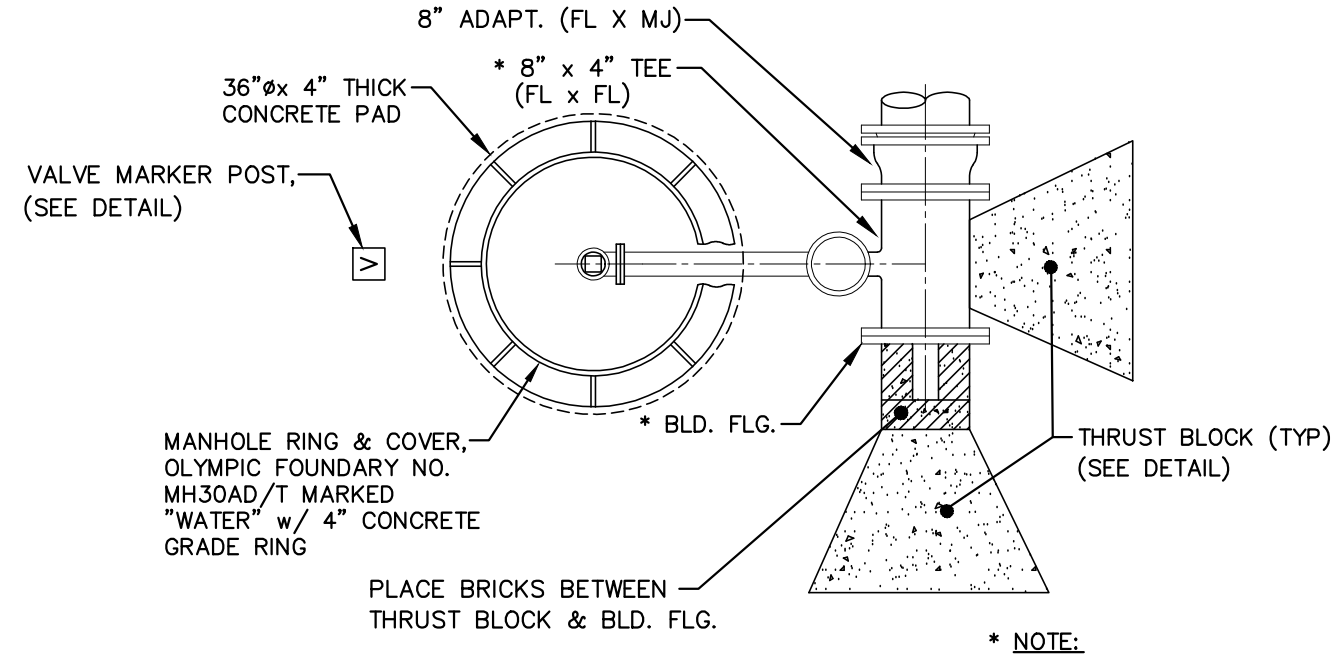
END OF LINE CONNECTION

LOCHNER
(425)-454-3160

2" TEMPORARY BLOW OFF ASSEMBLY FOR TESTING

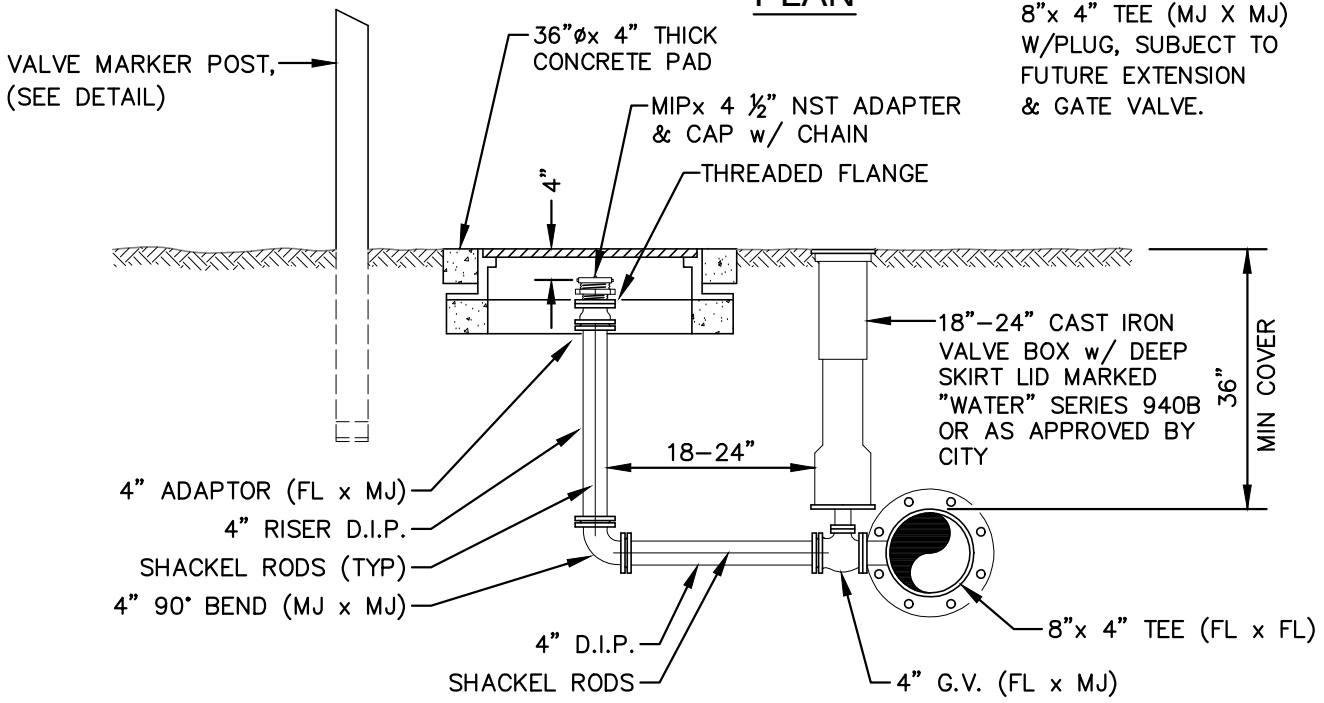
08/2017

DWG. NO. W-7



PLAN

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



ELEVATION

NOTES:

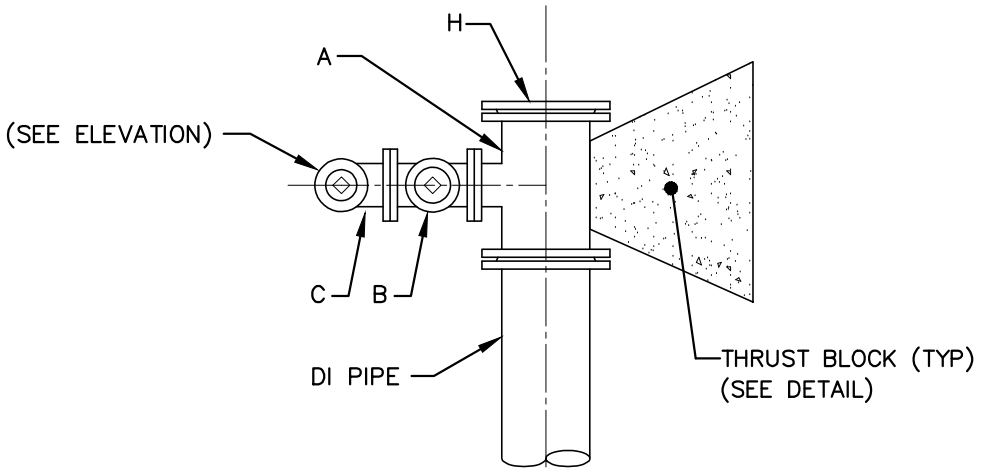
1. LOCATE BLOW–OFF AS CLOSE AS POSSIBLE TO MAIN, OR AS DIRECTED BY CITY.
2. THE GROUND WITHIN 3' RADIUS OF BLOWOFF SHALL BE GRADED UNIFORMLY.
3. SHACKEL RODS TWO EA. 3/4" GALV. STEEL TIE RODS WITH ONE HEAVY COAT OF COAL TAR PRESERVATIVE ON TIE RODS, NUTS AND BOLTS AFTER INSTALLATION.

LOCHNER
(425)-454-3160

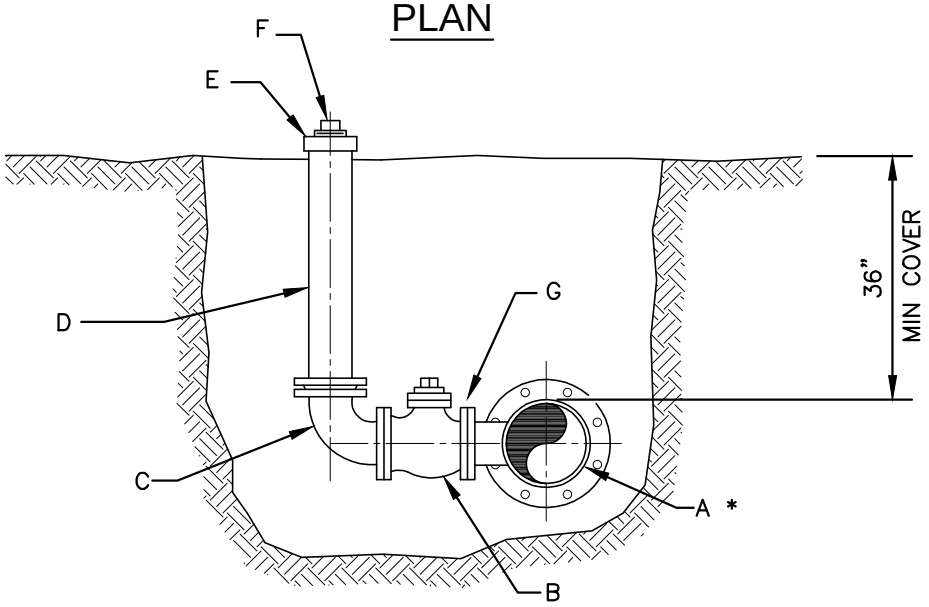
OFF PAVING 4" BLOWOFF ASSY. FOR 8" & LARGER MAINS

08/2017

DWG. NO. W-8



PLAN



ELEVATION

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

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

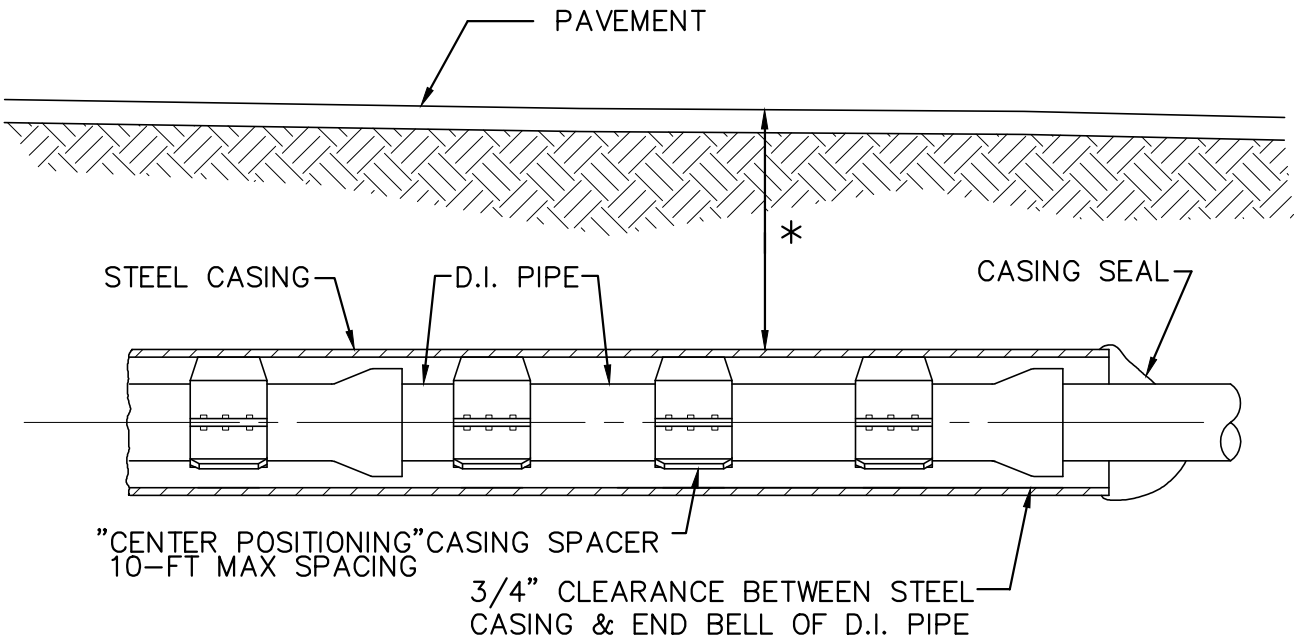
LOCHNER
(425)-454-3160

4", 6" OR 8" TEMP. BLOW OFF ASSEMBLY FOR TESTING

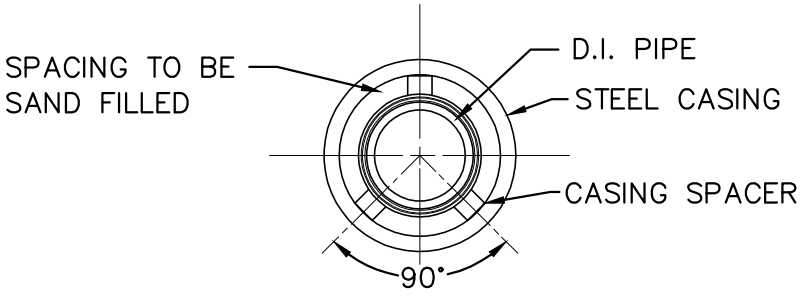
Carnation

08/2017

DWG. NO. W-9



* DEPTH PER APPLICABLE COUNTY/STATE REQUIREMENTS



NOTES:

CASING

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

CASING SEAL

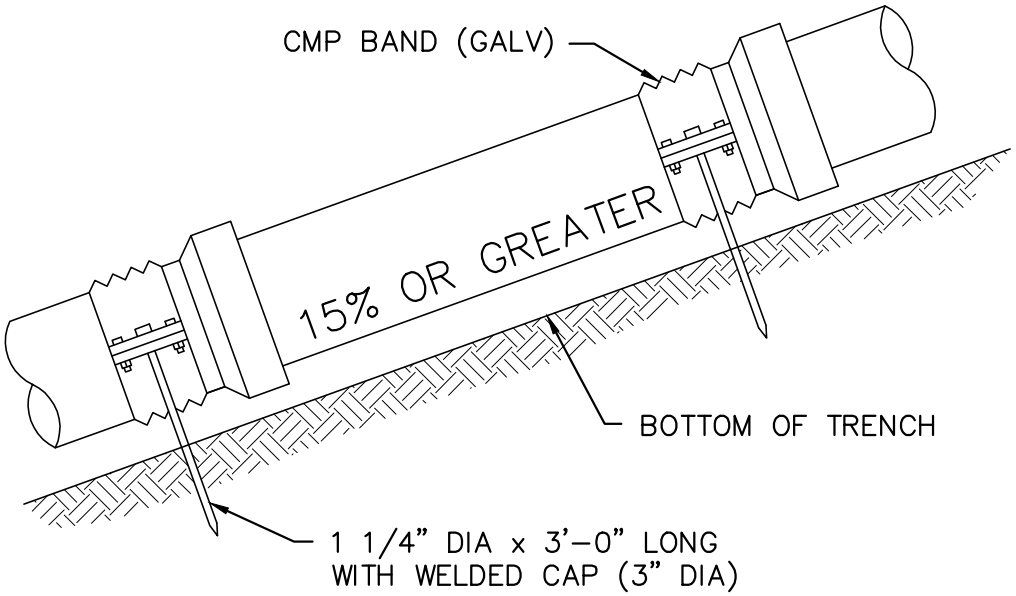
MINIMUM 3/16" THICK, SHEET TYPE SYNTHETIC RUBBER WITH STAINLESS STEEL BANDS. ONE BAND ON CARRIER PIPE AND ONE BAND ON CASING PIPE.

LOCHNER
(425)-454-3160

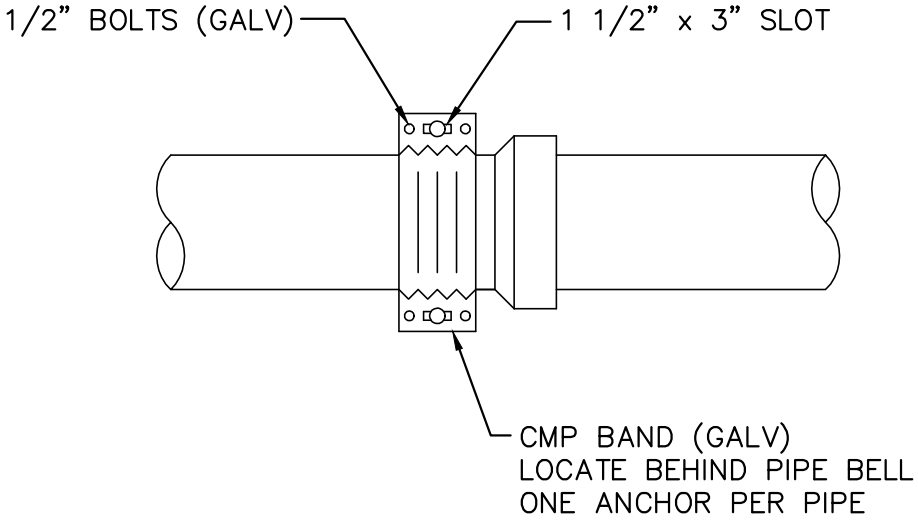
PIPE CASING

08/2017

DWG. NO. W-10



PROFILE/ELEVATION



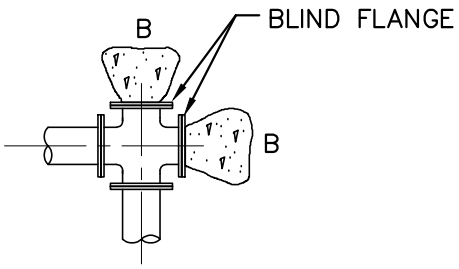
PLAN VIEW

LOCHNER
(425)-454-3160

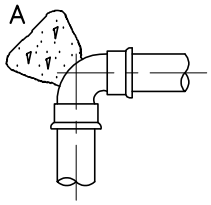
PIPE ANCHOR DETIAL FOR SLOPES

08/2017

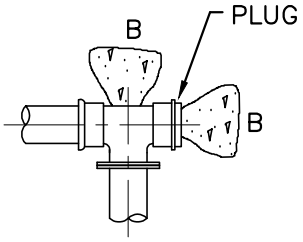
DWG. NO. W-11



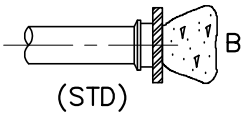
CAPPED CROSS



90° BEND

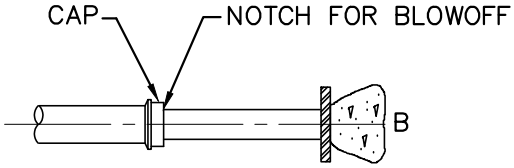


TEE

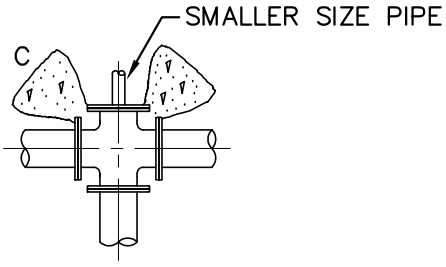


(STD)

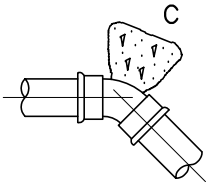
OR



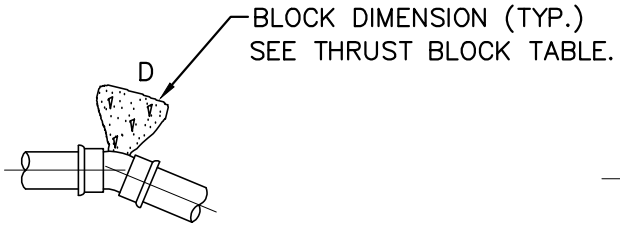
ONE PIPE SIZE SMALLER
THAN DEAD ENDING PIPE



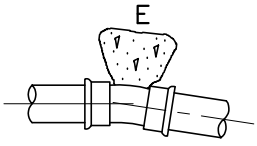
CROSS



45° BEND



22 1/2° BEND



11 1/4° BEND

NOTES:

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

LOCHNER
(425)-454-3160

CONCRETE BLOCKING DETAIL

08/2017

DWG. NO. W-12

THRUST BLOCK – TABLE

MIN. BEARING AREA AGAINST UNDISTURBED SOIL

SQUARE FEET

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

NOTES:

1. BEARING AREA OF CONC. THRUST BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2,000 POUNDS PER SQUARE FOOT.

2. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.

3. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM BEARING SURFACE OF 6" X 6" SQUARE AGAINST THE FITTING.

4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.

5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATION PRESSURE UNDER ALL CONDITIONS OF SERVICE.

6. ALL BOLTS AND NUTS SHALL BE POLYWRAPPED PRIOR TO POURING CONCRETE.

LOCHNER
(425)-454-3160

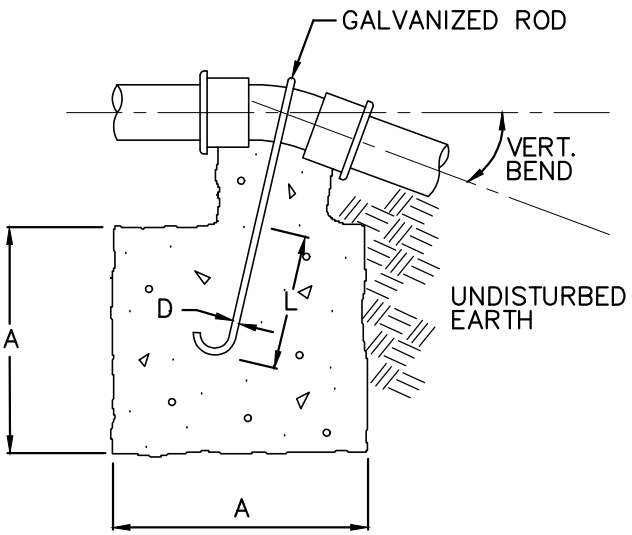
THRUST BLOCK TABLE

08/2017

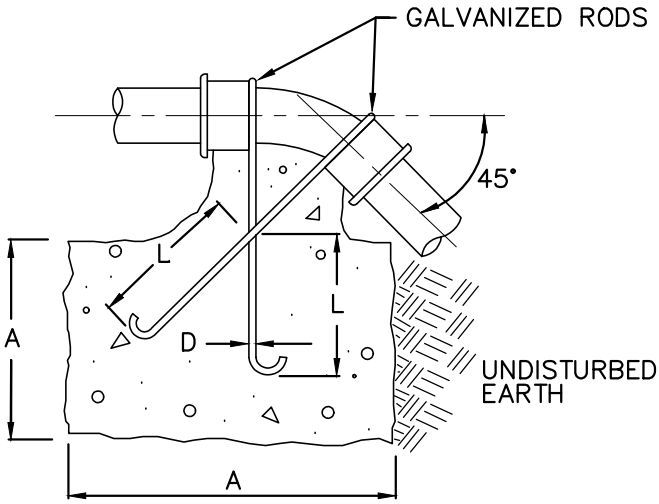
DWG. NO. W-13

VERTICAL BLOCKING FOR 11 1/4° & 22 1/2° BENDS					
PIPE SIZE	V B	CU FT	A	D	L
4"	11 1/4° 22 1/2°	8 11	2.0' 2.2'	3/4"	1.5' 2.0'
6"	11 1/4° 22 1/2°	11 25	2.2' 2.9'	3/4"	2.0'
8"	11 1/4° 22 1/2°	16 47	2.5' 3.6'	3/4"	2.0'
12"	11 1/4° 22 1/2°	32 88	3.2' 4.5'	3/4" 7/8"	2.0' 3.0'
16"	11 1/4° 22 1/2°	70 184	4.1' 5.7'	7/8" 11/8"	3.0' 4.0'
20"	11 1/4° 22 1/2°	91 225	4.5' 6.1'	7/8" 11/4"	3.0' 4.0'
24"	11 1/4° 22 1/2°	128 320	5.0' 6.8'	1" 13/8"	3.5' 4.5'
VERTICAL BLOCKING FOR 45° BENDS					
4"	45°	30	3.1'	3/4"	2.0'
6"		68	4.1'		
8"		123	5.0'		
12"		232	6.1'	3/4"	2.5'
16"		478	7.8'	11/8"	4.0'
20"		560	8.2'	11/4"	
24"		820	9.4'	13/8"	4.5'

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



VERTICAL BLOCKING FOR 11 1/4°, 22 1/2° & 30° BENDS



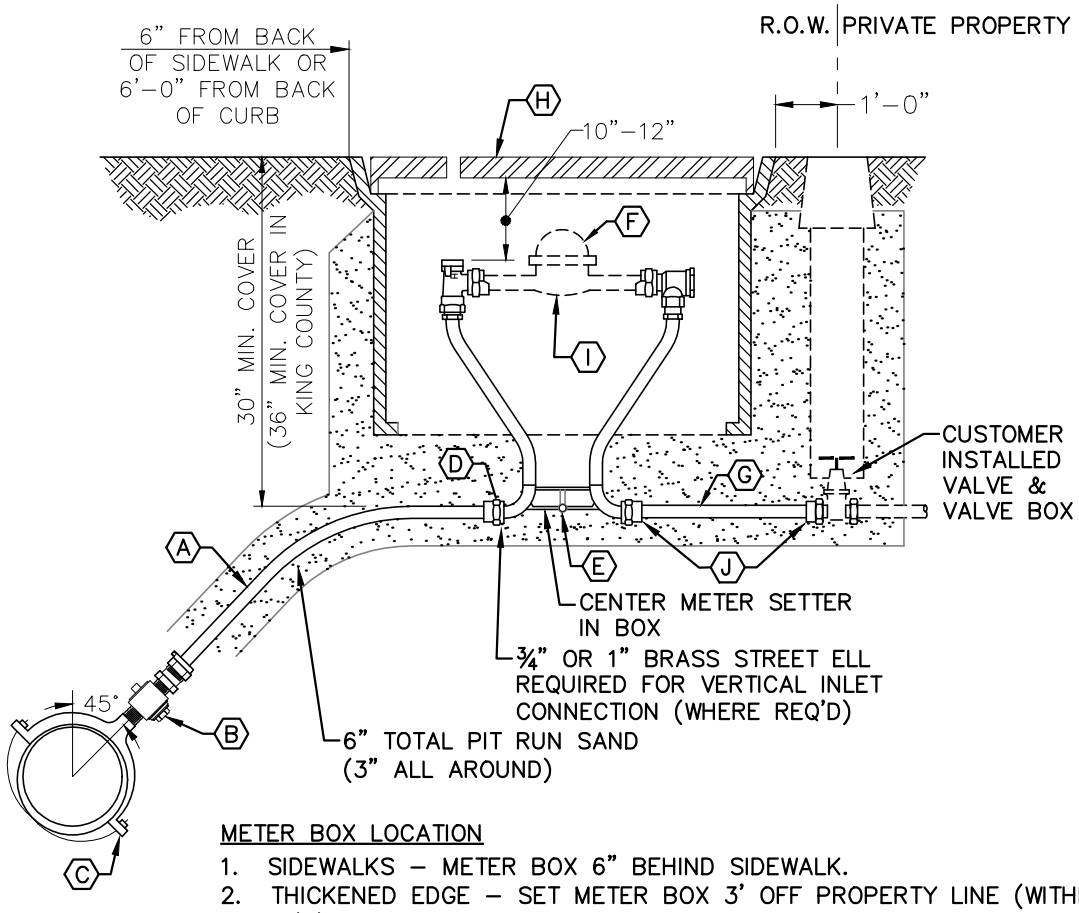
VERTICAL BLOCKING FOR 45° BENDS

LOCHNER
(425)-454-3160

VERTICAL THRUST BLOCKING DETAIL

08/2017

DWG. NO. W-14



METER BOX LOCATION

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

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

KEYED NOTES

A 1" HI–MOL PLASTIC PIPE CL200 (IPS) w/ 16 GAUGE TRACER WIRE & STAINLESS STEEL INSERTS TO REINFORCE PLASTIC PIPE ENDS.
B 1" BALL CORP. STOP (IPxCOMP)
C 1" SERVICE SADDLE WITH DOUBLE STAINLESS STEEL STRAPS EQUAL TO ROMAC.
D 1"x ⅝" REDUCER (COMPxMIP) REQ'D. FOR ⅝" METER SETTERS OR 1" (COMPxMIP) ADAPTOR FOR 1" METER SETTERS.
E ⅝" OR 1"x 12" FORD METER SETTER EQUIPED w/ LOCK WING ANGLE STOP, ANGLE BALL CHECK & MULTI PURPOSE FITTINGS.
F METER TO BE INSTALLED BY CONTRACTOR.
G ⅝" OR 1" DIA. (LENGTH AS REQ'D) HI–MOL PLASTIC PIPE, CL 200 w/ TEMPORARY PLUG.
H MID–STATES HDPE METER BOX #BCF132412B, DI METER LID w/ TOUCH READ BCF1118AMR/TR OR BCF1324AMR/TR.
I TEMPORARY PVC SPACER OF CORRECT LENGTH FOR SETTER.
J ⅝" OR 1" ADAPTOR (MIPxCOMP)

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

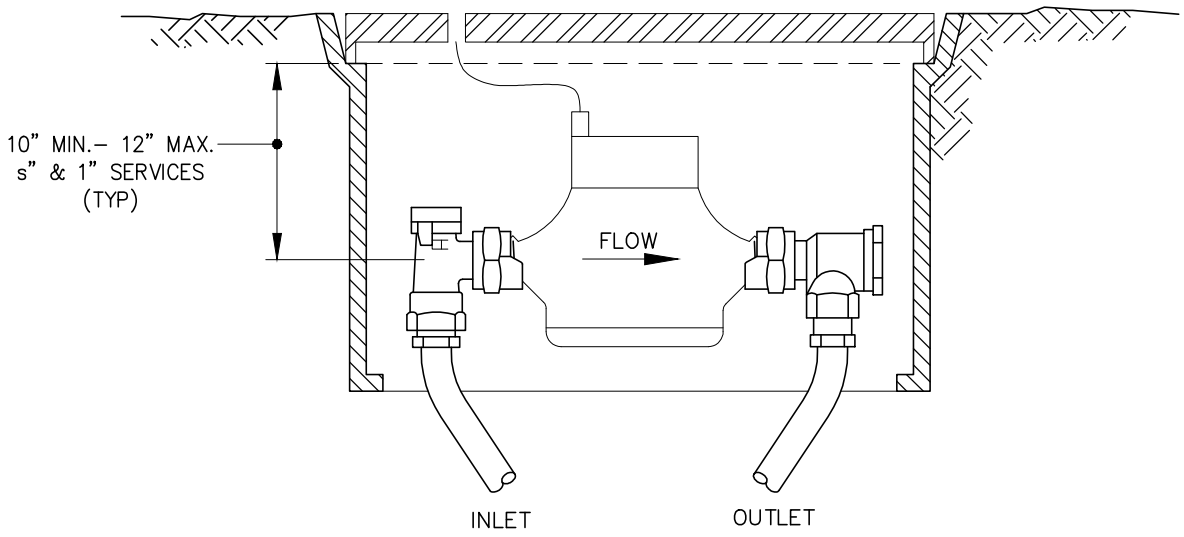
LOCHNER
(425)-454-3160

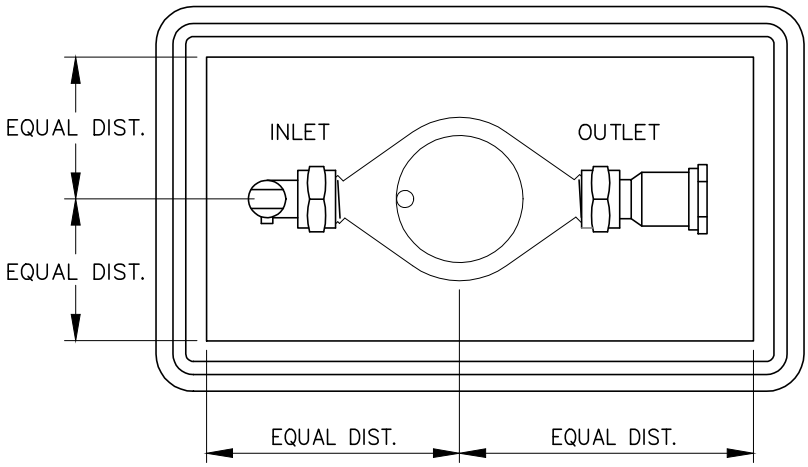
5/8" OR 1" SINGLE METER SERVICE

Carnation

08/2017

DWG. NO. W-15





NOTES:

1. THE METERSETTER MUST BE CENTERED IN THE METER BOX. THE OUTLET OF THE ANGLESTOP MUST BE BETWEEN 10"– 12" BELOW THE BOTTOM OF THE METER BOX LID.

2. THE METER BOX MUST REMAIN FREE OF FOREIGN MATERIAL SUCH AS CONCRETE & ITS BY–PRODUCTS.

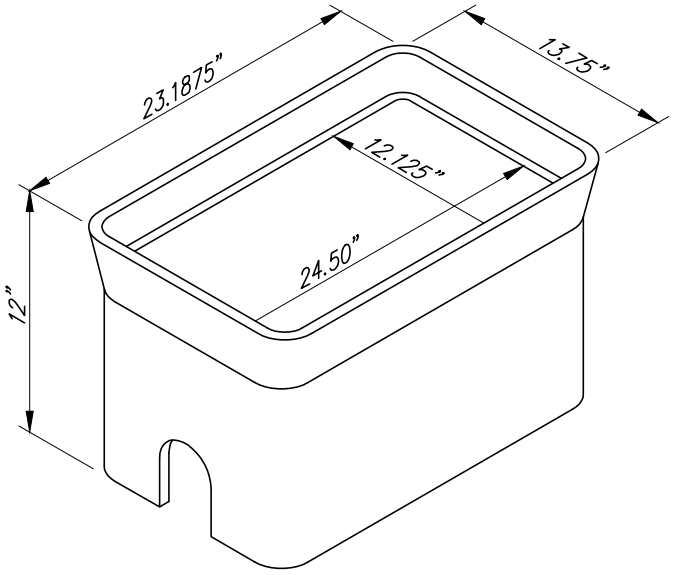
3. METER BOX SUPPLIED BY CONTRACTOR. METER BOX SHALL BE MID–STATES PLASTIC HDPE METER BOX NO. BCF111812BXL WITH D.I. TOUCHREAD LID FOR 5/8"x 3/4" METERS OR MID–STATES PLASTIC HDPE METER BOX NO. BCF132412B WITH D.I. TOUCHREAD LID FOR 1" METERS OR AS APPROVED BY DISTRICT.

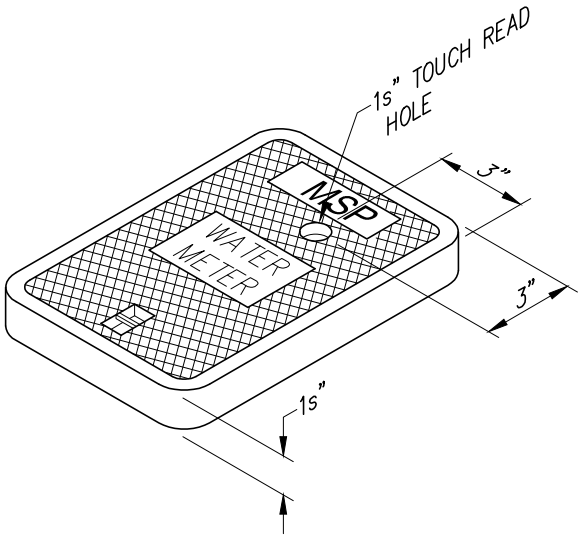
LOCHNER
(425)-454-3160

5/8" & 1" METER INSTALLATION

08/2017

DWG. NO. W-16





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

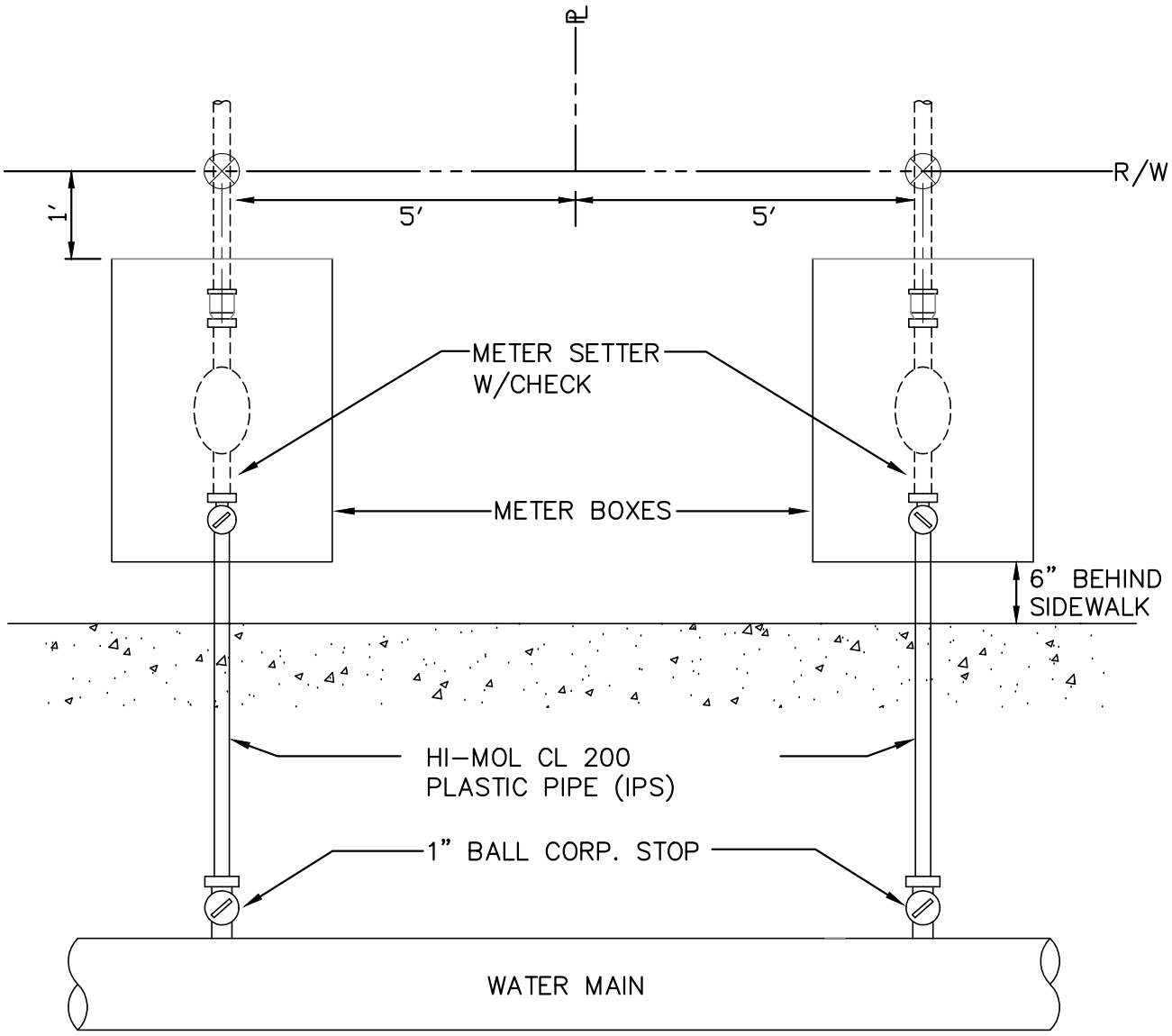
LOCHNER
(425)-454-3160

HDPE METER BOX NO. BCF132412B FOR 5/8" & 1" METER

Carnation

08/2017

DWG. NO. W-17



NOTES:
1. WATER SERVICES SHALL BE LOCATED AT LEAST 5' FROM POWER VAULTS, HAND HOLES AND/OR LIGHT STANDARDS.
2. CUSTOMER SIDE OF METER BOX APPROXIMATELY 2" INSIDE EACH BOX

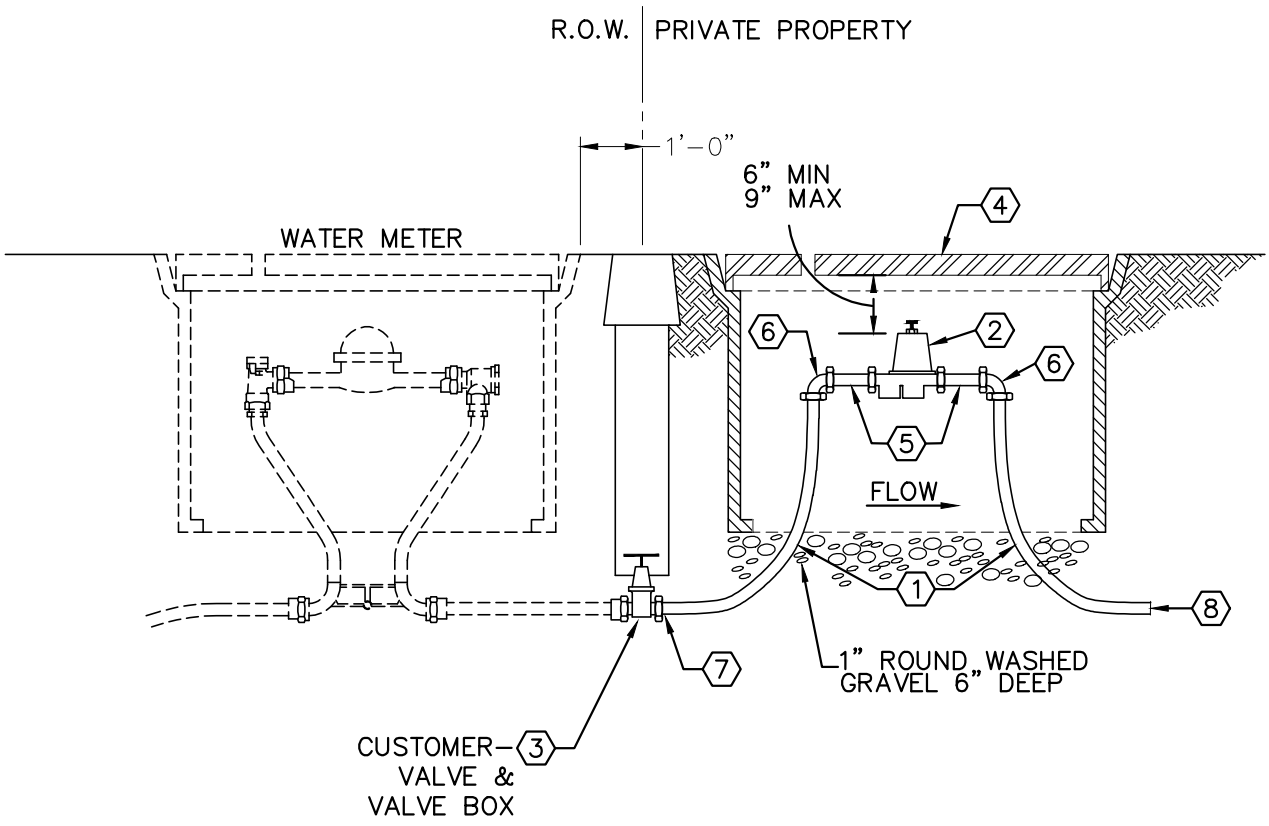
LOCHNER
(425)-454-3160

PAIRED WATER SERVICE LOCATION DIAGRAM

Carnation

08/2017

DWG. NO. W-18



KEYED NOTES FOR PRV

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

INSTALLATION

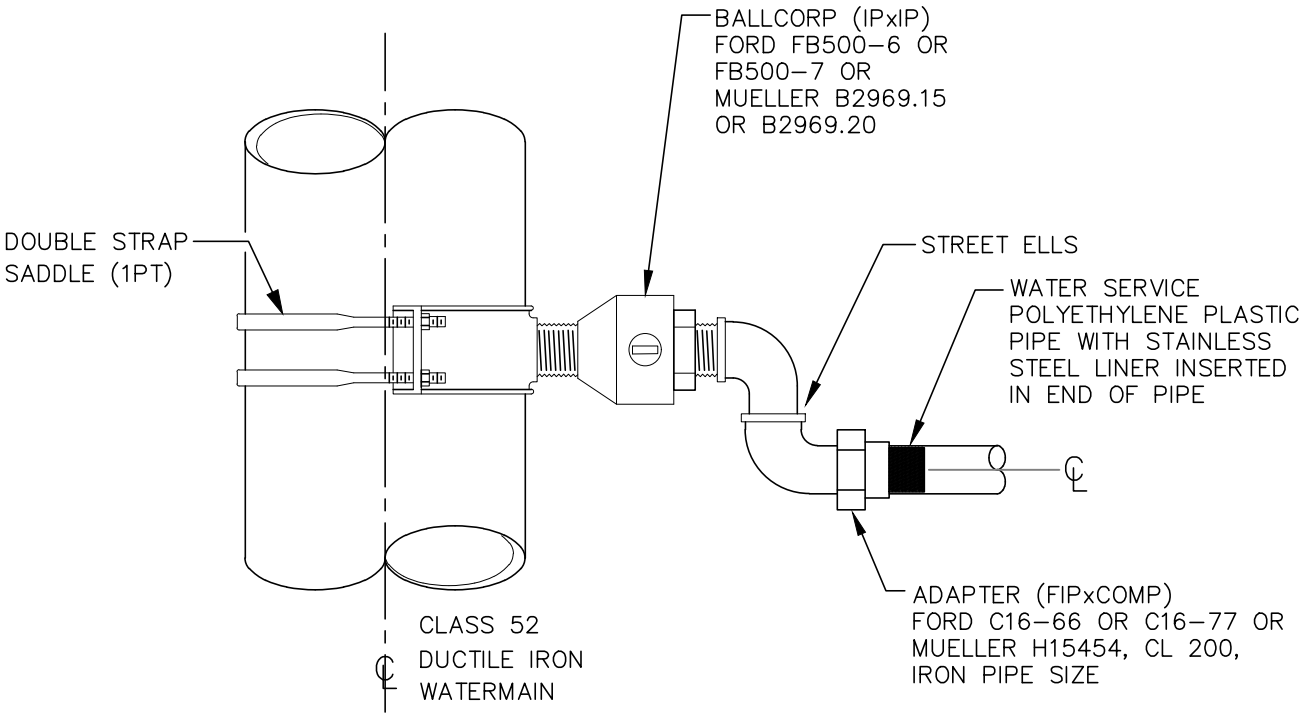
THE PRESSURE REDUCING VALVE SHALL BE LOCATED "DOWNSTREAM" OF THE METER. RESPONSIBILITY FOR PROPER INSTALLATION, AND OPERATION OF THE VALVE SHALL BE THAT OF THE CONTRACTOR.

LOCHNER
(425)-454-3160

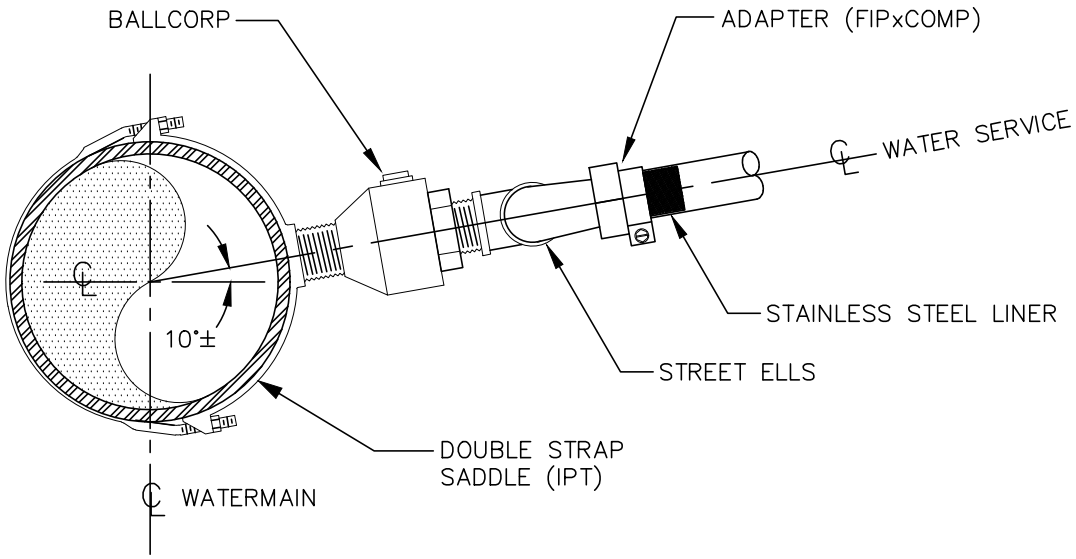
PRESSURE REDUCING VALVE

08/2017

DWG. NO. W-19



PLAN



ELEVATION

NOTES:

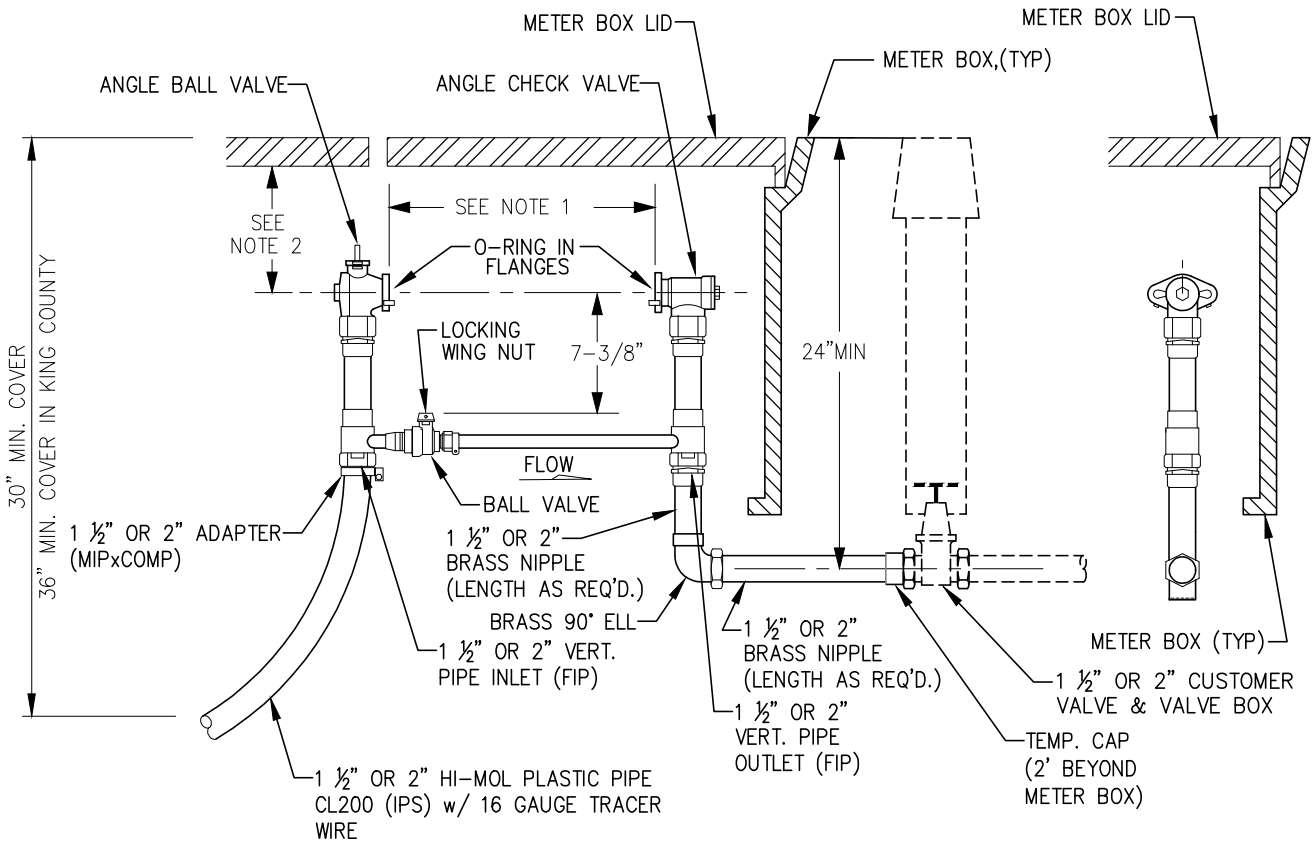
1. SERVICE LINE FITTINGS: ALL FITTINGS SHALL BE CAST FROM WATER WORKS BRASS CONFORMING TO C800-89.
2. MUNICIPAL SERVICE PIPE: IRON PIPE SIZE ID ASTM D-2239 -SIDR 7(PE 3408) (HI-MOL PLASTIC) TRACER WIRE 16 GAUGE.
3. BALLCORP VALVE INSTALLED PARALLEL TO WATERMAIN.

LOCHNER
(425)-454-3160

WATER SERVICE CONNECTION 1-1/2" AND 2"

08/2017

DWG. NO. W-20A



ELEVATION

END VIEW

NOTE 1:

TEMPORARY PVC SPACER FOR
1-1/2" DISC. METER = 13-1/4"
2" DISC. METER = 17-1/4"

NOTE 2:

CLEARANCE FROM BOTTOM OF METER BOX LID TO CENTER OF ANGLE BALL VALVE.
1-1/2" DISC. METER = 8"-10"
2" DISC. METER = 8"-10"

NOTE 3:

BRASS FITTINGS SHALL BE FORD, MUELLER OR APPROVED EQUAL.

GENERAL NOTES:

1. FORD 80 SERIES COPPERSETTER 1 ½"x 12" #VBH86-12B-11-66 2"x 12" #VBH87-12B-11-77.
2. METERS TO BE SUPPLIED AND SET BY THE DISTRICT.
4. METER SETTER TO BE APPROVED BY THE DISTRICT PRIOR TO BACKFILL.
5. METER BOX: MID-STATES PLASTIC, INC. HDPE METER BOX NO. BCF173012B D.I. METER LID w/READER NO. BCF1730RL
6. IF IN PAVING, DRIVEWAY, SHOULDER OR SIDEWALK A TRAFFIC BOX IS REQUIRED NO. 2 FOGTITE CONCRETE METER BOX w/ STEEL LID & HINGED READER WINDOW.
7. WATER SERVICE PIPING SHALL BE BURIED IN 6" OF COURSE SAND (3" ALL AROUND).

LOCHNER
(425)-454-3160

1-1/2" & 2" METER SETTERS

Carnation

08/2017

DWG. NO. W-20

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

GENERAL NOTES:

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

MATERIAL LIST

(1) HATCH — ALUMINUM DOUBLE DOORS w/ GUTTER DRAIN H–20 VEHICLE RATING & LOCKING HASP (LW PRODUCTS OR APPROVED EQUAL).

(2) LADDER RUNGS — CAST IN PLACE 3/4" GALV. BAR AT 12" O.C. OR FABRICATED ALUMINUM LADDER SECURED AT TOP AND BOTTOM w/ "BILCO LADDERUP" SAFETY POST ON LADDER.

(3) CONCRETE VAULT — SUBMIT DETAILS FOR APPROVAL. (SEE TABLE ABOVE)

(4) METER — COMPOUND WATER METER FLG. x FLG. SUPPLIED BY DISTRICT.

(5) MAIN VALVE — TWO EACH, AWWA, FL x MJ W/RESTRAINTS GATE VALVES WITH HANDWHEEL. MUST BE LOCATED INSIDE OF VAULT.

(6) ADAPTER — ONE EACH, ROMAC FLANGE COUPLING ADAPTER.

(7) SPOOL — SPOOL PLANE–END x FLANGED D.I.P. (CL52)

(8) 1–1/2" VALVE — TWO EA. BRASS GATE VALVES FOR BY–PASS.

(9) BEND — TWO EA. 1–1/2 INCH 90° BRASS BENDS.

(10) UNION — ONE EA. 1–1/2 INCH TWO–PART UNION BRASS.

(11) BY–PASS PIPE — 1–1/2 INCH BRASS PIPE AS NEEDED.

(12) SADDLE — TWO EA. 1–1/2 INCH SMITH BLAIR TYPE 313 OR EQUAL.

(13) TEE — 1–1/2"x 1–1/2" BRASS TEE.

(14) BUSHING — 1 1/2"x 3/4" BUSHING WITH 3/4" PLUG.

(15) WATER MAIN — CLASS 52 DUCTILE IRON PIPE WITH MEGALUG RESTRAINED JOINTS.

(16) WALL FLANGE — TWO EACH

(17) D.I. SLEEVE — TWO EACH (MJ) w/ RESTRAINED JOINTS.

* SEE DWG W–21 FOR ADDITIONAL DETAILS

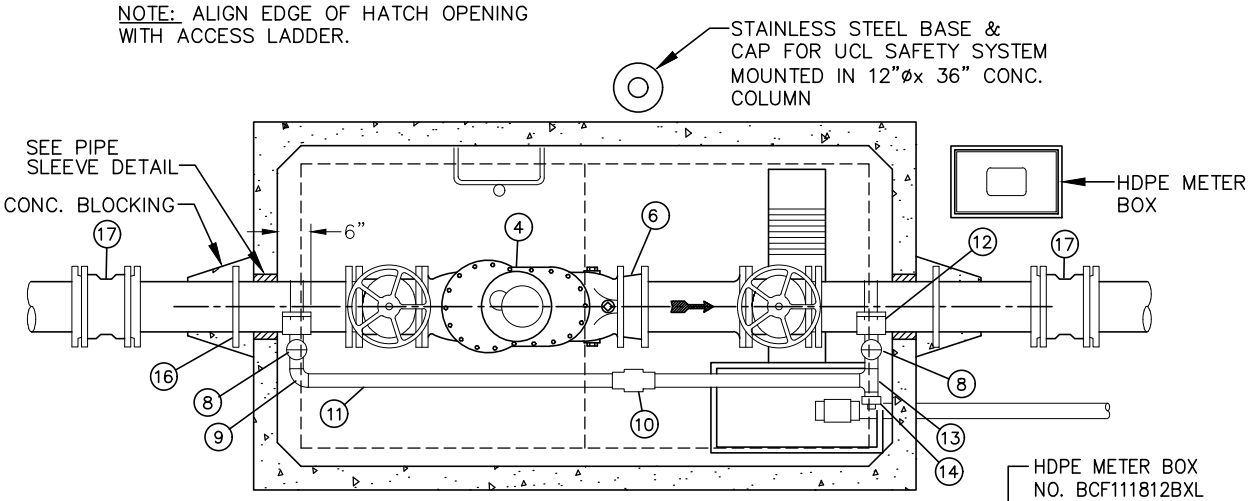
LOCHNER
(425)-454-3160

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

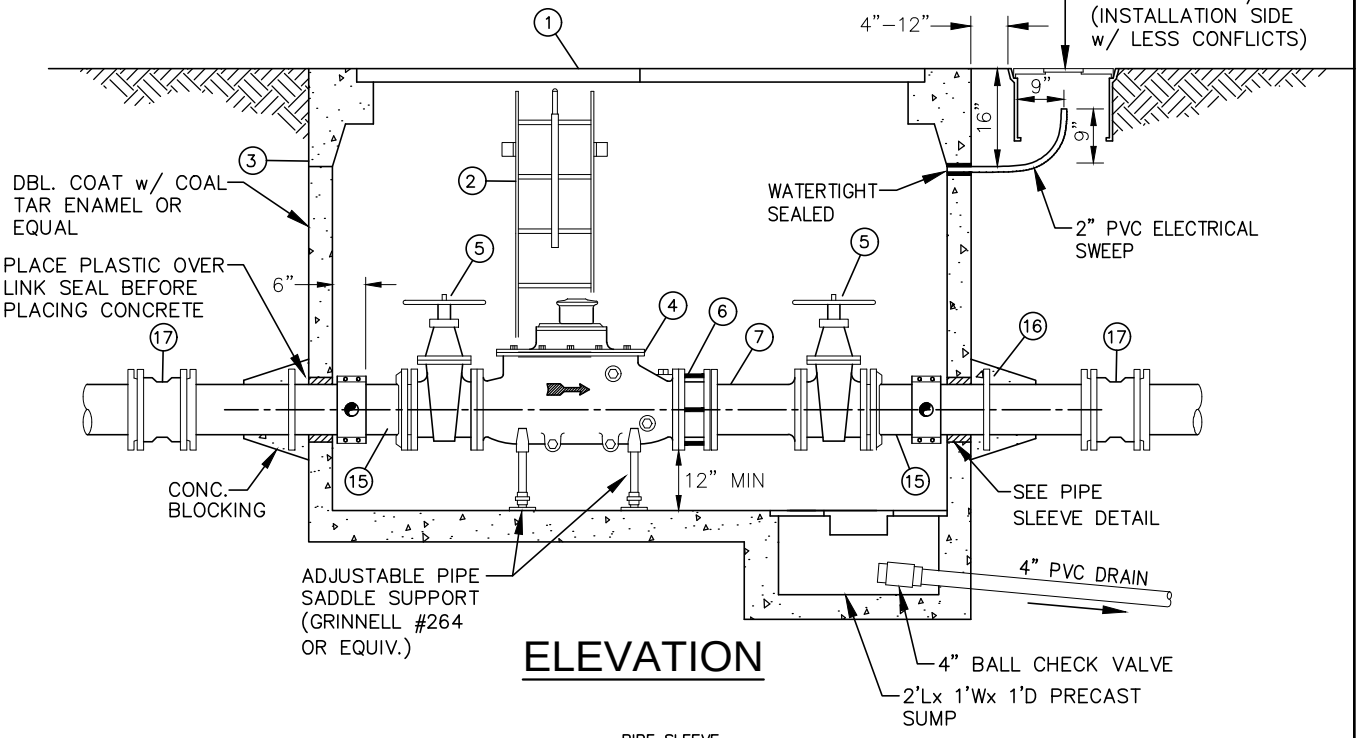
08/2017

DWG. NO. W-21A

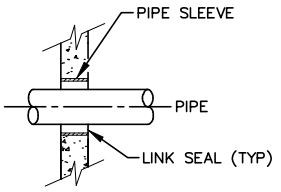
NOTE: ALIGN EDGE OF HATCH OPENING WITH ACCESS LADDER.



PLAN



ELEVATION



PIPE SLEEVE DETAIL

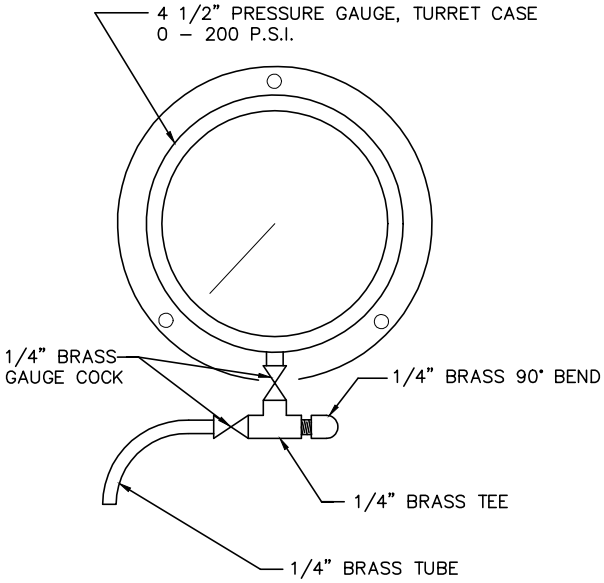
* SEE DWG W-21A FOR ADDITIONAL NOTES & MATERIALS

LOCHNER
(425)-454-3160

3", 4" & 6" METERS

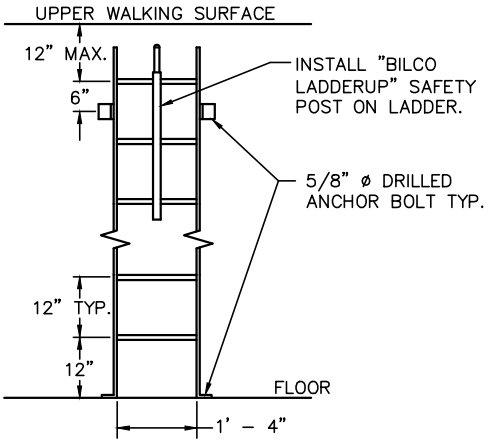
08/2017

DWG. NO. W-21



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

GAUGE ASSEMBLY
N.T.S.



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

LADDER DETAIL
N.T.S.

MATERIALS LIST

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

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

PRV DESCRIPTIONS

1. PRESSURE REDUCING VALVE
A) ____ GLOBE
B) FLANGED
C) CLASS 125
D) APPROXAMATE DOWNSTREAM PRESSURE SETTING – __ P.S.I.
E) WYE STRAINER ON PILOT LINE
F) FLOW CLOSING SPEED CONTROL
G) VALVE POSITION INDICATOR
H) STAINLESS STEEL TRIM ON MAIN AND PILOT VALVE

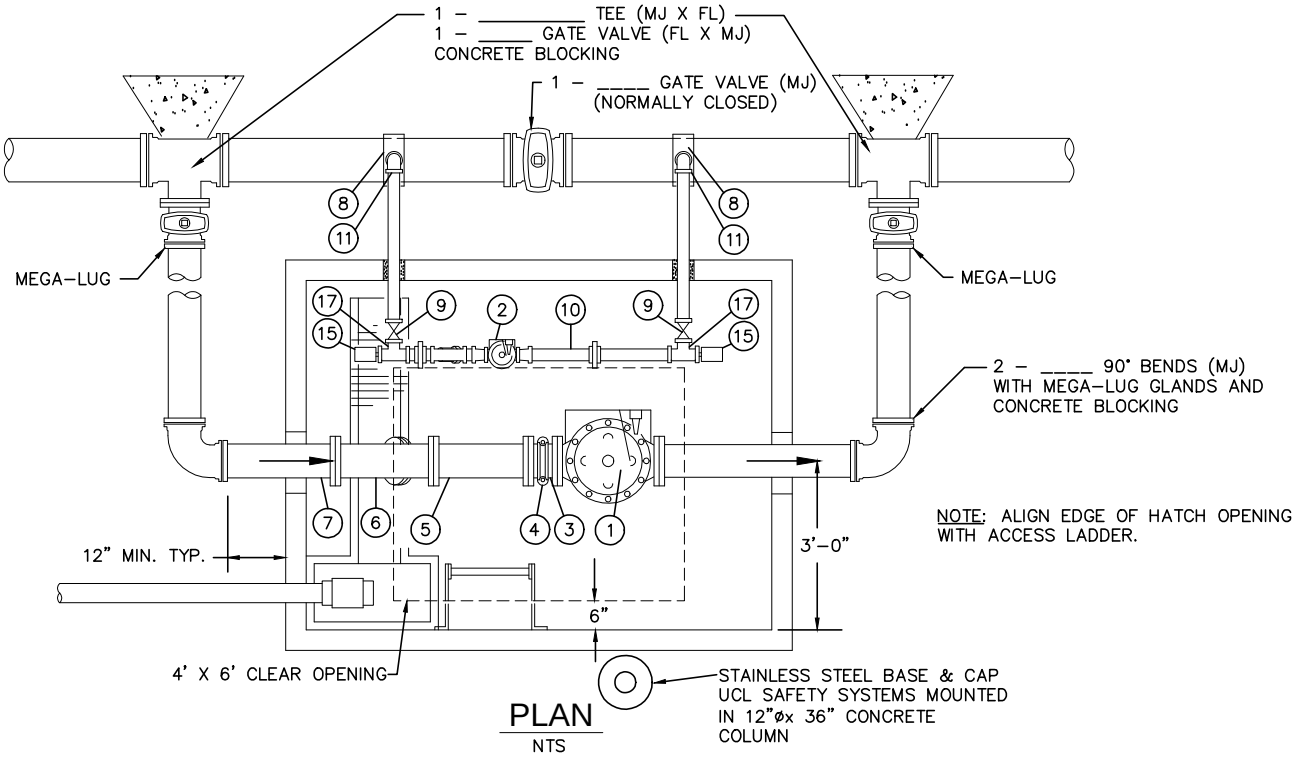
2. PRESSURE REDUCING VALVE
A) _____ GLOBE
B) THREADED
C) CLASS 125
D) APPROXIMATE DOWNSTREAM PRESSURE SETTING – __ P.S.I.
E) WYE STRAINER ON PILOT LINE
F) FLOW OPENING SPEED CONTROL
G) VALVE POSITION INDICATOR
H) STAINLESS STEEL TRIM ON MAIN AND PILOT VALVE

LOCHNER
(425)-454-3160

PRESSURE REDUCING STATION NOTES

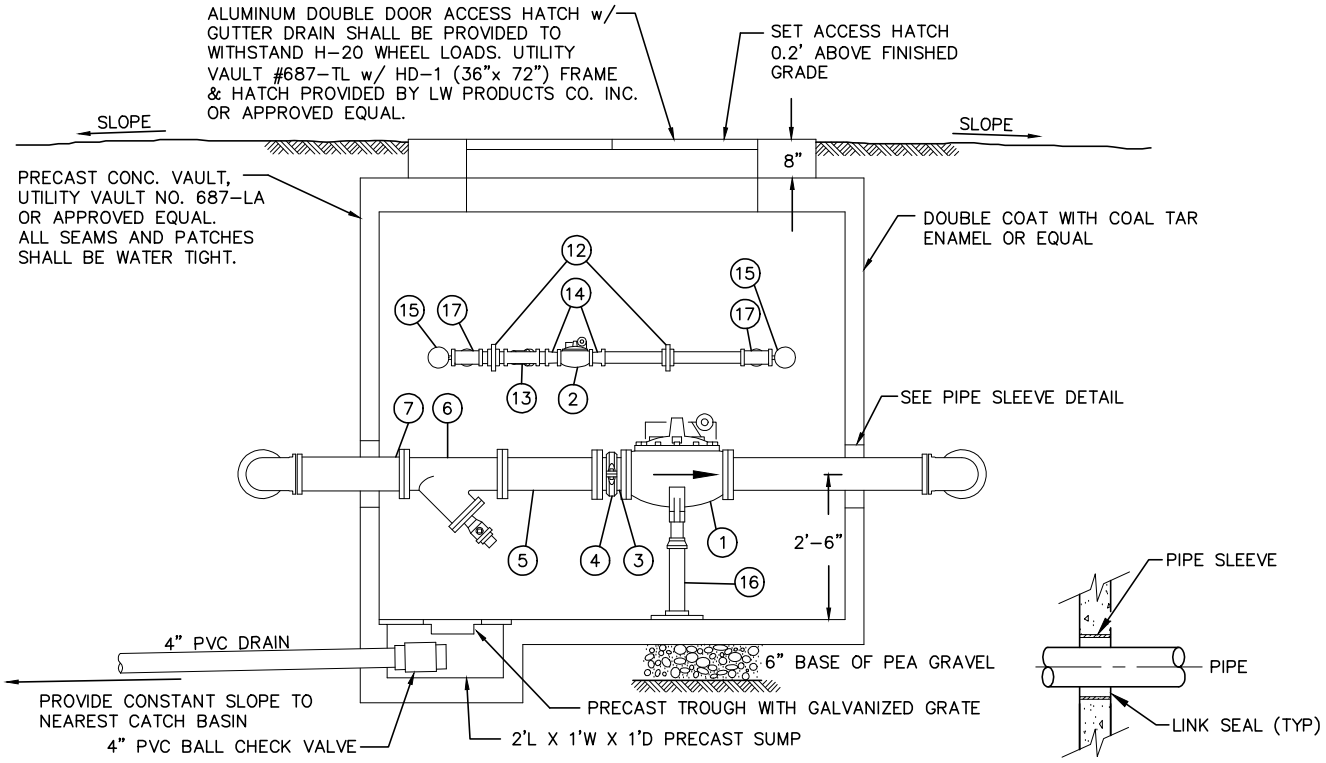
08/2017

DWG. NO. W-22A



PLAN

NTS



ELEVATION

NTS

PIPE SLEEVE DETAIL

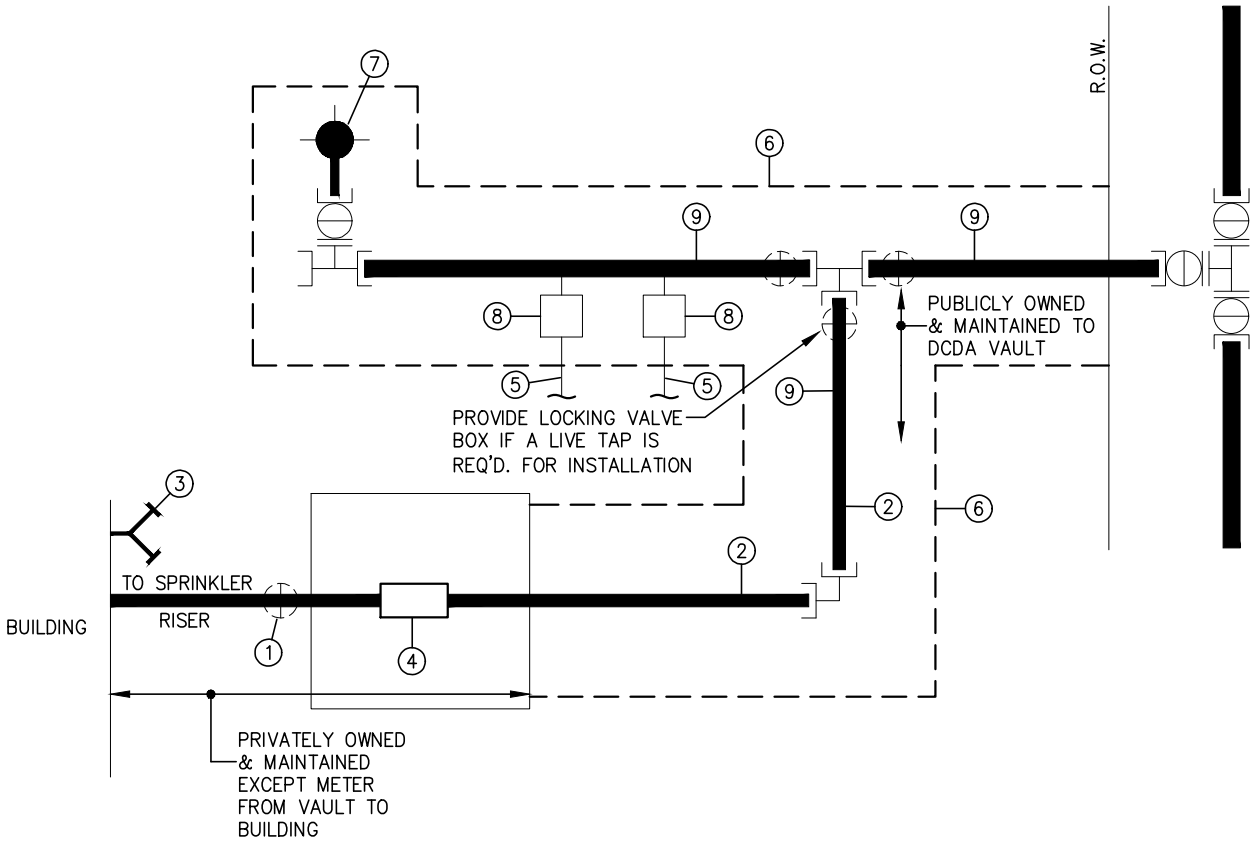
NTS

LOCHNER
(425)-454-3160

PRESSURE REDUCING STATION

08/2017

DWG. NO. W-22



MATERIAL LIST

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

LOCHNER
(425)-454-3160

FIRE DEPARTMENT SPRINKLER UNDERGROUND DETAIL 4" & LARGER

8/2017

DWG. NO. W-23

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

GENERAL NOTES:

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

MATERIAL LIST

(1) HATCH — ALUMINUM DOUBLE DOORS w/ GUTTER DRAIN H–20 VEHICLE RATING & LOCKING HASP (LW PRODUCTS CO. INC. OR APPROVED EQUAL) SEE #3 ABOVE.

(2) LADDER RUNGS — CAST IN PLACE 3/4" GALV. BAR AT 12" O.C. OR FABRICATED ALUMINUM LADDER SECURED AT TOP AND BOTTOM w/ "BILCO LADDERUP" SAFETY POST ON LADDER.

(3) CONCRETE VAULT — SUBMIT DETAILS FOR APPROVAL. (SEE TABLE ABOVE)

(4) DETECTOR — DOUBLE DETECTOR CHECK VALVE ASSEMBLY MUST BE APPROVED FOR INSTALLATION IN WASHINGTON STATE. TYPE SHALL BE APPROVED BY THE DISTRICT.

(5) VALVE — TWO EACH, AWWA, FLANGED OS & Y GATE VALVES WITH HANDWHEEL. MUST BE LOCATED INSIDE OF VAULT.

(6) ADAPTER — DUCTILE IRON (MJxFL)ADAPTER WITH MEGALUG RESTRAINT.

(7) ADAPTER — ROMAC FLANGE COUPLING ADAPTER.

(8) WATER METER — 5/8" x 3/4" TO BE INSTALLED BY THE DISTRICT.

(9) PIPE STAND — 2" SCHEDULE 40 GALVANIZED PIPE STAND & BASE BOLTED TO FLOOR.

(10) TEE — 3/4" BRASS WITH 3/4" PLUG.

(11) GATE VALVE — 3/4" BRONZE BYPASS GATE VALVES (ASTM B62).

(12) WATER MAIN — CLASS 52 D.I. PIPE WITH RESTRAINED JOINTS.

(13) WALL FLANGE — TWO EACH

(14) D.I. SLEEVE — TWO EACH (MJ) w/ RESTRAINED JOINTS.

* SEE SHEET 1 FOR ADDITIONAL DETAILS

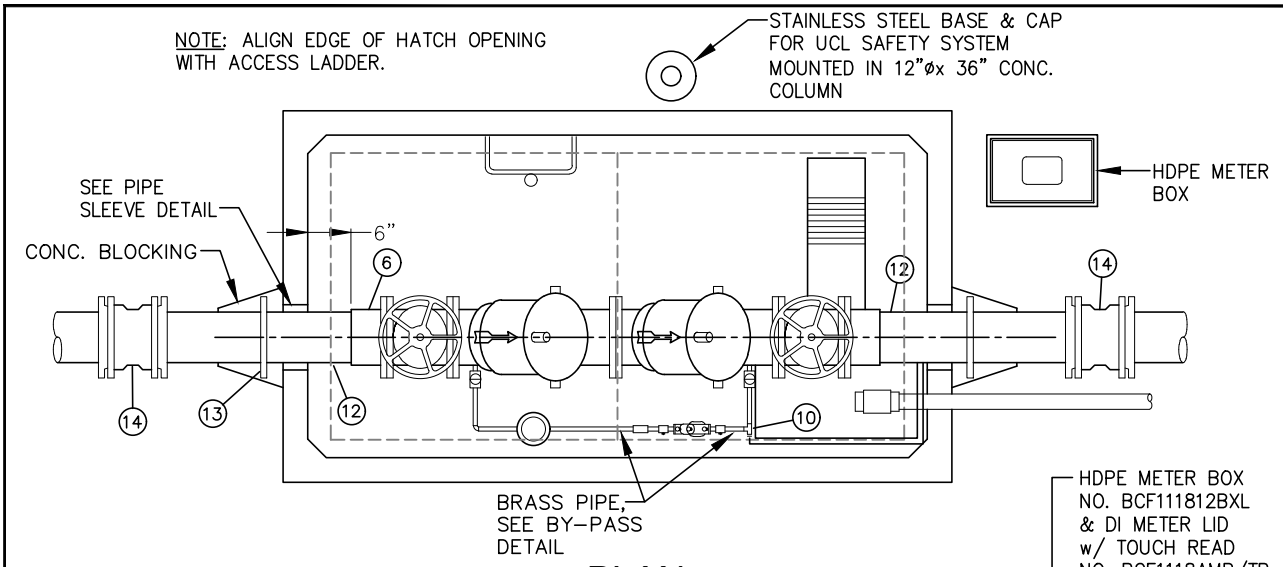
LOCHNER
(425)-454-3160

DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSY.

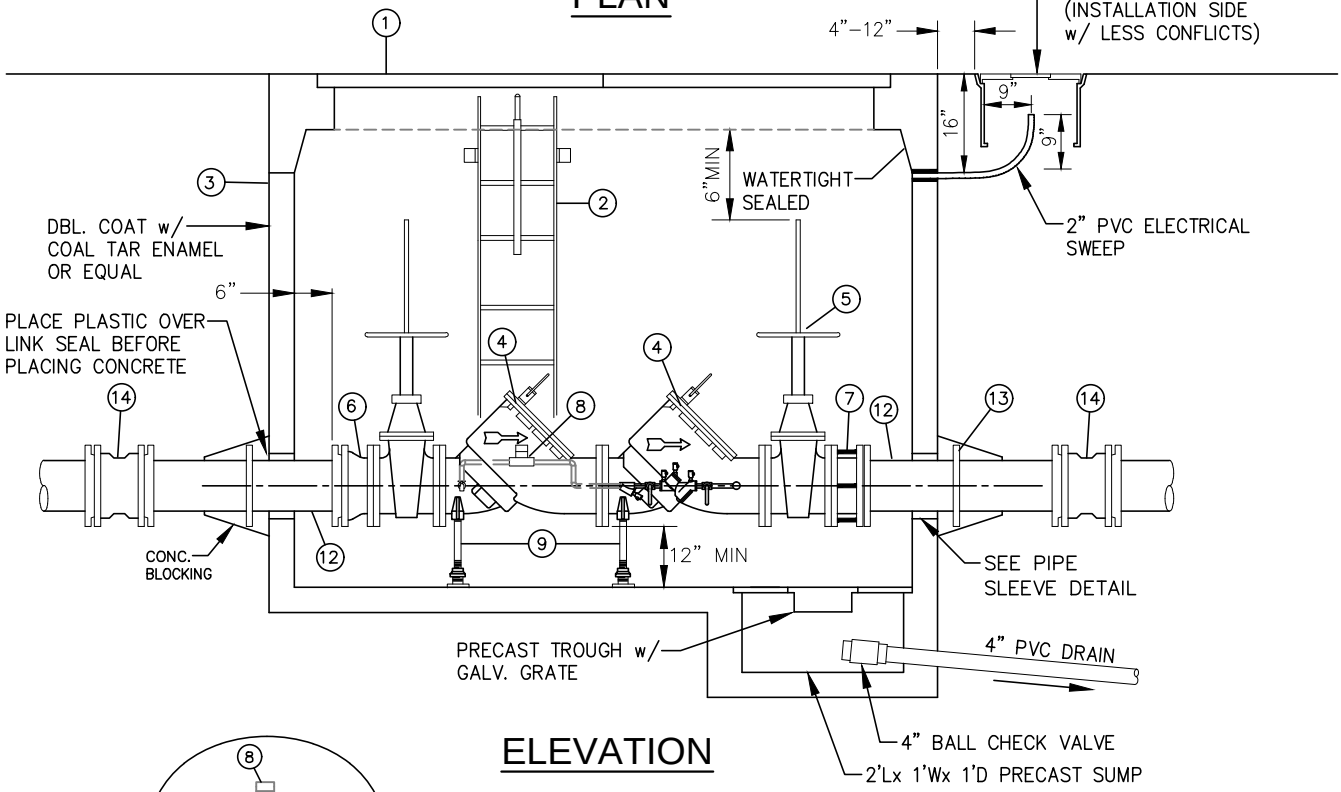
08/2017

DWG. NO. W-24A

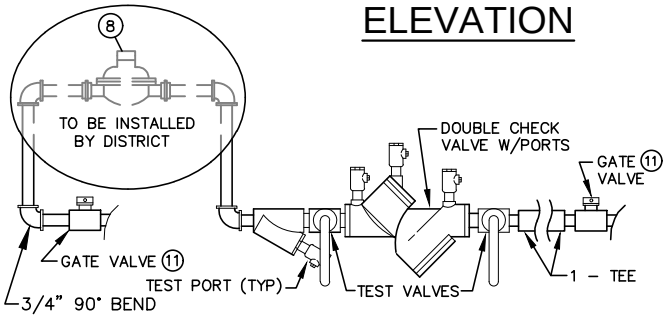
NOTE: ALIGN EDGE OF HATCH OPENING WITH ACCESS LADDER.



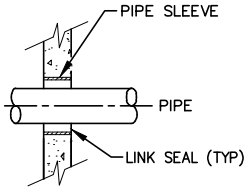
PLAN



ELEVATION



BY-PASS DETAIL (BRASS PIPE)



PIPE SLEEVE DETAIL

* SEE SHEET 2 FOR ADDITIONAL NOTES & MATERIALS

LOCHNER
(425)-454-3160

DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSY.

08/2017

DWG. NO. W-24

LEGEND

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

NOTES

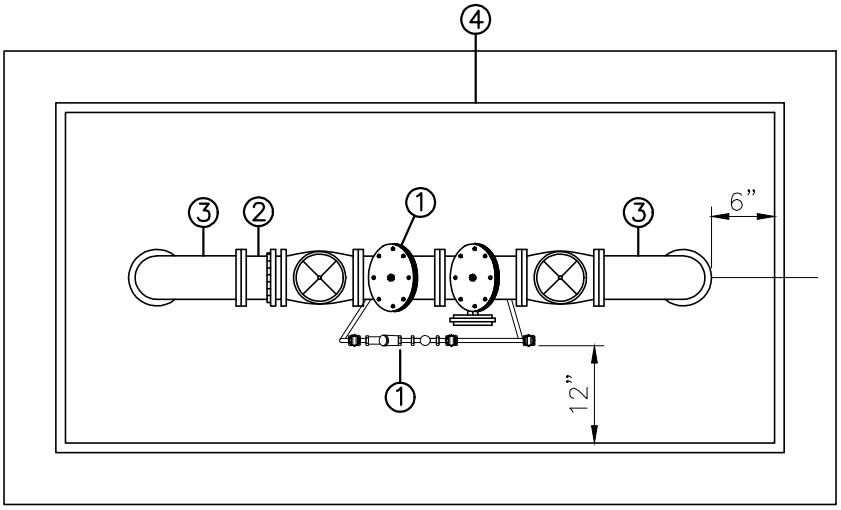
1. TEE AND GATE VALVE REQUIRED ON MAIN.
2. ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.
3. ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION & ANNUAL RECERTIFICATION.

LOCHNER
(425)-454-3160

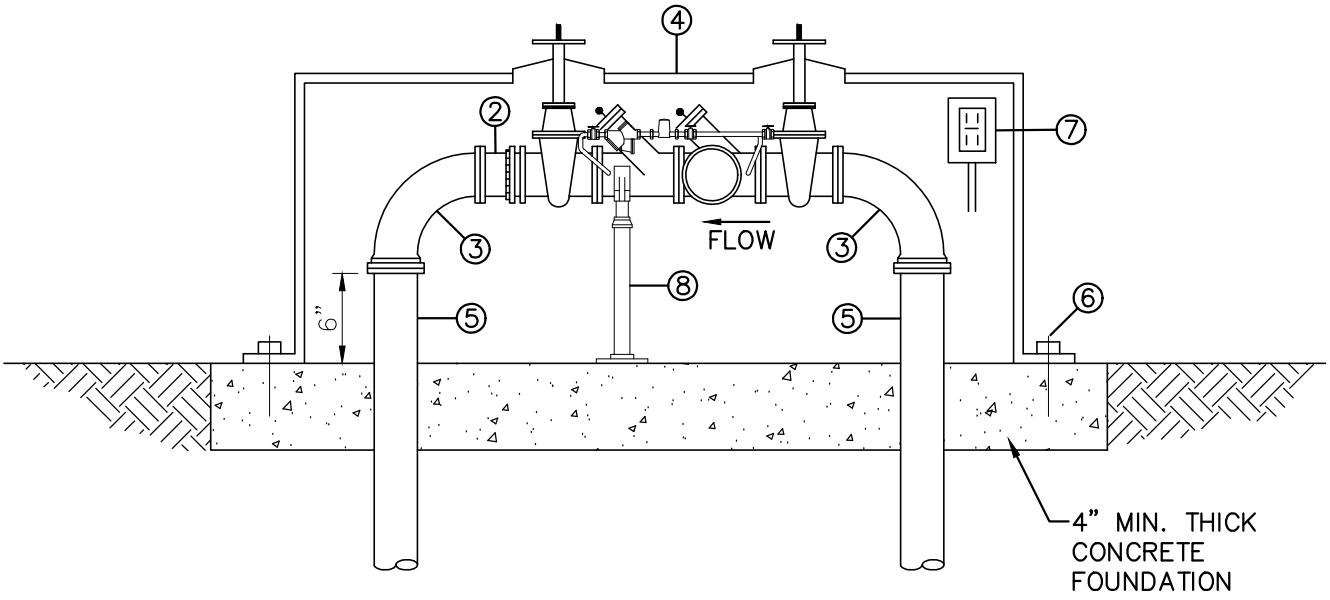
REDUCED PRESSURE DETECTOR ASSY.

08/2017

DWG. NO. W-25A



PLAN



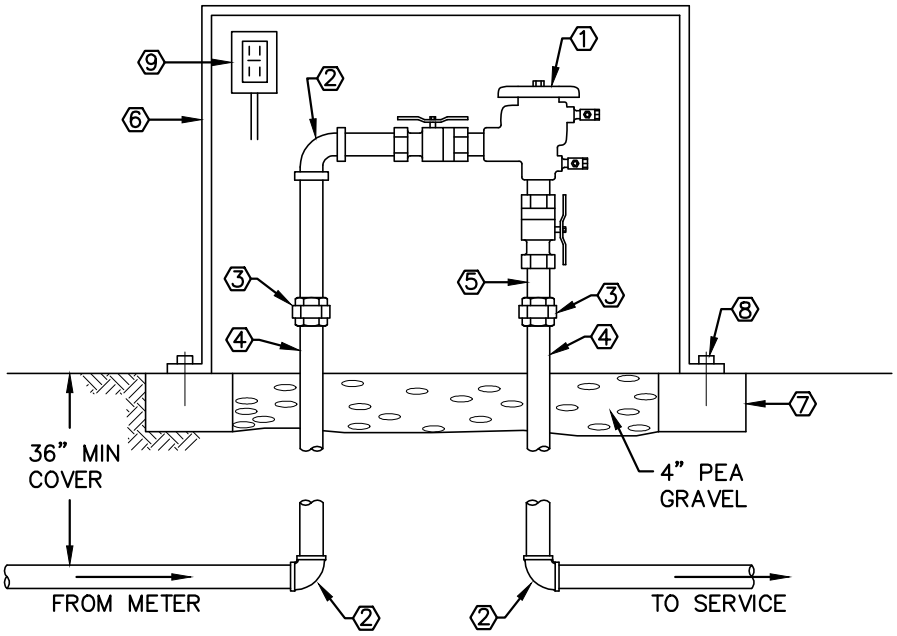
ELEVATION

LOCHNER
(425)-454-3160

REDUCED PRESSURE PRINCIPLE DETECTOR ASSY.

08/2017

DWG. NO. W-25



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

LEGEND

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

IF INSTALLED OUTDOORS:

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

NOTES:

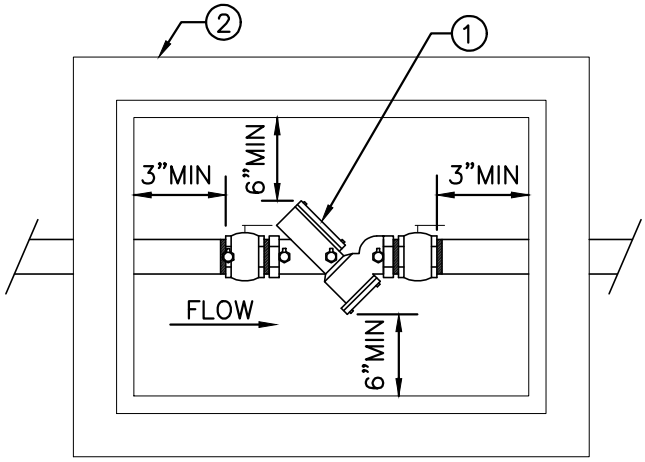
1. ALL PIPE AND FITTINGS SHALL BE SAME SIZE AS THE PRESSURE VACUUM BREAKER.
2. PVB ASSEMBLY SHALL BE INSTALLED WITH TEST COCKS TOWARDS FRONT OF ENCLOSURE (FOR OUTDOOR INSTALLATIONS).
3. PVB ASSEMBLY MAY BE INSTALLED INDOORS FOR FREEZE PROTECTION. INDOOR INSTALLATIONS SHALL MEET CITY OF CARNATION PLUMBING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

LOCHNER
(425)-454-3160

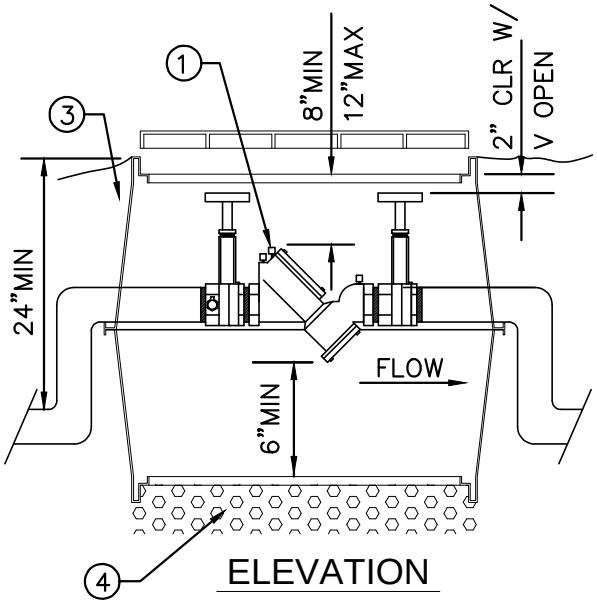
1", 1-1/2", & 2" PRESSURE VACUUM BREAKER ASSY.

08/2017

DWG. NO. W-26



PLAN



ELEVATION

LEGEND

① UL–FM LISTED REDUCED DOUBLE CHECK VALVE ASSEMBLY WITH ISOLATION VALVES AND TEST COCKS. VALVE MUST BE ON LIST OF APPROVED DOUBLE CHECK VALVE ASSEMBLIES PREPARED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH DRINKING WATER PROGRAM.

② MID–STATES HDPE METER BOX #BCF111812BXL w/ FULL STEEL LID FOR 1" DCVA & BCF173012B FOR 1 1/2" & 2" DCVA (2 EACH).

③ IF A DAYLIGHT DRAIN CANNOT BE PROVIDED, THERE MUST BE A 4" MINIMUM LAYER OF FREE DRAINING GRAVEL AT THE BOTTOM OF THE BOX.

④ PROVIDE 4" OF PEA GRAVEL.

NOTES

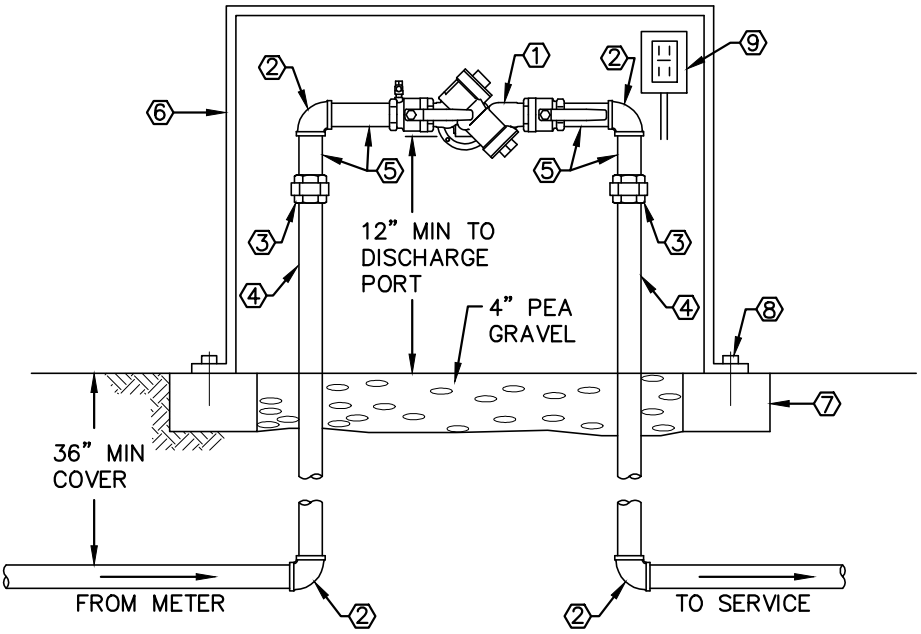
1 ALL TEST COCKS MUST HAVE BRASS PLUGS.
2 TEST COCKS MUST FACE UP OR SIDEWAYS, WHICH EVER IS MORE ACCESSIBLE
3 ASSEMBLY REQUIRES CERTIFICATION UPON INSTALLATION AND RECERTIFICATION ANNUALLY.
4 ALL DIMENSIONS ARE MINIMUM CLEARANCE REQUIREMENTS.

LOCHNER
(425)-454-3160

1",1-1/2", & 2" DOUBLE CHECK VALVE ASSY.

08/2017

DWG. NO. W-27



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

LEGEND

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

IF INSTALLED OUTDOORS:

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

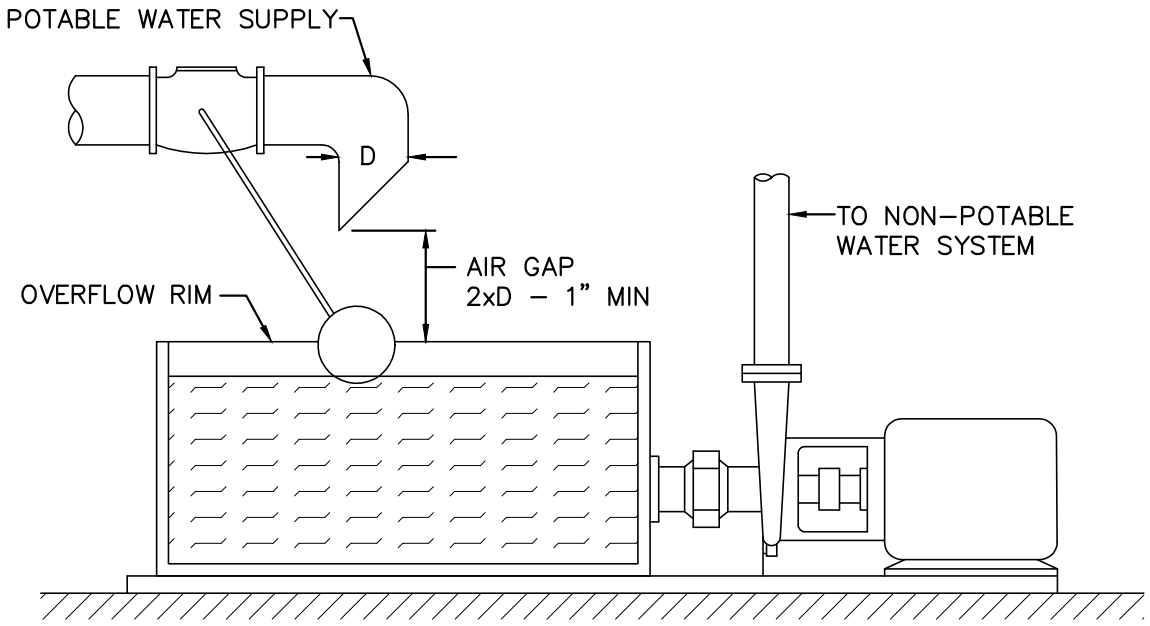
NOTES:

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

LOCHNER (425)-454-3160	1",1-1/2", & 2" REDUCED PRESSURE BACKFLOW PREVENTER ASSY.	Carnation
	08/2017	DWG. NO. W-28

APPROVED AIR GAP SEPARATION

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



LOCHNER
(425)-454-3160

AIR GAP FOR MAKEUP TANK

08/2017

DWG. NO. W-29

(1) ALL DESIGNATED FIRE LANES SHALL BE CLEARLY MARKED BY THE PROPERTY OWNER IN THE FOLLOWING MANNER: VERTICAL CURBS SHALL BE SIX–INCHES (6") IN HEIGHT AND SHALL BE PAINTED RED ON THE TOP AND SIDE, EXTENDING THE LENGTH OF THE DESIGNATED FIRE LANE WITH FOUR–INCH (4") WHITE BLOCK LETTERING STENCILED ON THE FACE "NO PARKING–FIRE LANE". THE STENCILING SHALL BE SPACED EVERY FIFTY FEET (50'). ROLLED CURBS OR SURFACES WITHOUT CURBS SHALL HAVE A RED SIX–INCH (6") WIDE STRIPE PAINTED EXTENDING THE LENGTH OF THE DESIGNATED FIRE LANE WITH FOUR–INCH (4") WHITE BLOCK LETTERING STENCILED ON THE STRIPE "NO PARKING–FIRE LANE". THE STENCILING SHALL BE SPACED EVERY FIFTY FEET (50').

(2) AN EASEMENT OVER ALL FIRE LANES AND TURN–AROUNDS SHALL BE GRANTED TO THE CITY OF CARNATION. LEGAL DESCRIPTION OF THE FIRE LANES AND TURN–AROUNDS SHALL BE PREPARED BY THE OWNER'S SURVEYOR. THE CITY SHALL PREPARE THE EASEMENT.

(3) SIGNS MAY BE SUBSTITUTED FOR CURB PAINTING WHEN APPROVED IN WRITING BY THE FIRE MARSHAL.

(4) SIGNS SHALL NOT BE LESS THAN EIGHTEEN INCHES (18") IN HEIGHT BY TWELVE INCHES (12") IN WIDTH, WITH BLOCK LETTERING OF NOT LESS THAN THREE INCHES (3") HIGH BRUSH STROKE, READING: "NO PARKING–FIRE LANE". SUCH SIGNS SHALL BE REFLECTIVE IN NATURE, WITH RED LETTERING ON A WHITE BACKGROUND, AND SPACED AT INTERVALS OF NOT MORE THAN FIFTY FEET (50') APART. THE TOP OF SUCH SIGNS SHALL NOT BE LESS THAN FOUR FEET (4') OR MORE THAN SIX FEET (6') FROM THE GROUND. SIGNS MAY BE PLACED ON BUILDINGS WHEN APPROVED IN WRITING BY THE FIRE MARSHAL. WHEN POSTS ARE REQUIRED, THEY SHALL BE CONSTRUCTED OF EITHER TWO–INCH (2") OR GREATER GALVANIZED STEEL, OR FOUR–INCH BY FOUR–INCH (4"X4") OR GREATER PRESSURE TREATED WOOD.

(5) THE FIRE MARSHAL MAY APPROVE DEVIATIONS FROM ANY OF THE SPECIFICATIONS WHEN APPROVED IN WRITING BY THE FIRE MARSHAL.

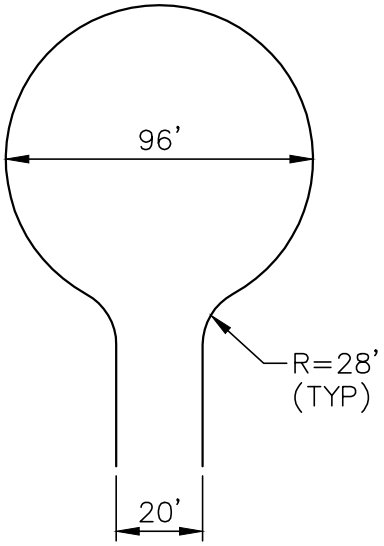
(6) CONTACT EASTSIDE FIRE MARSHAL'S OFFICE @ (425) 837–3123 OR 837–3121 WITH QUESTIONS ABOUT THE SPECIFICATIONS.

LOCHNER
(425)-454-3160

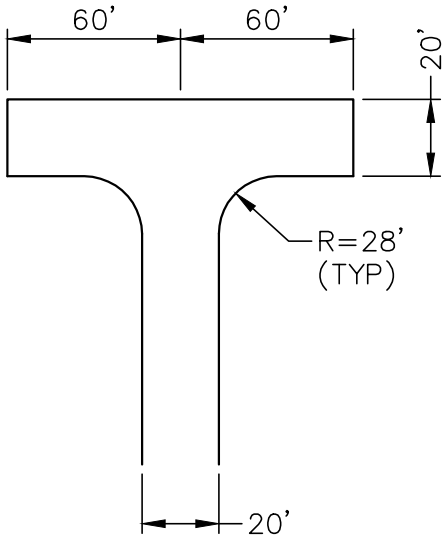
FIRE DEPARTMENT
FIRE LANE STANDARDS

08/2017

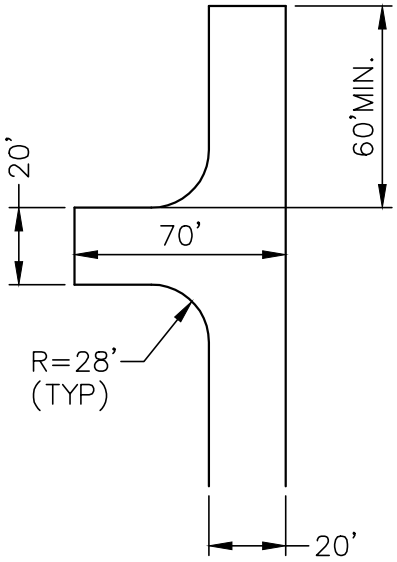
DWG. NO. W-30A



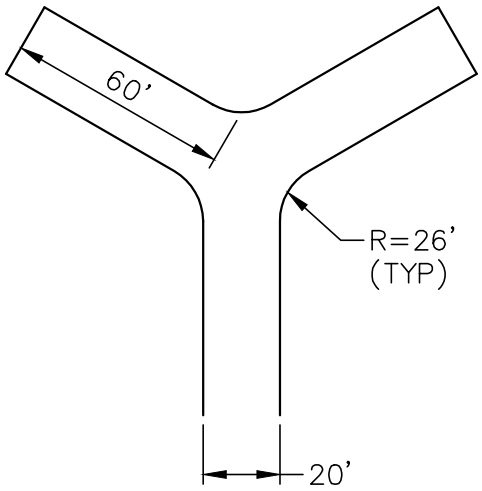
96' DIAMETER CUL-DE-SAC



120' HAMMERHEAD



ACCEPTABLE ALT. TO 120' HAMMERHEAD



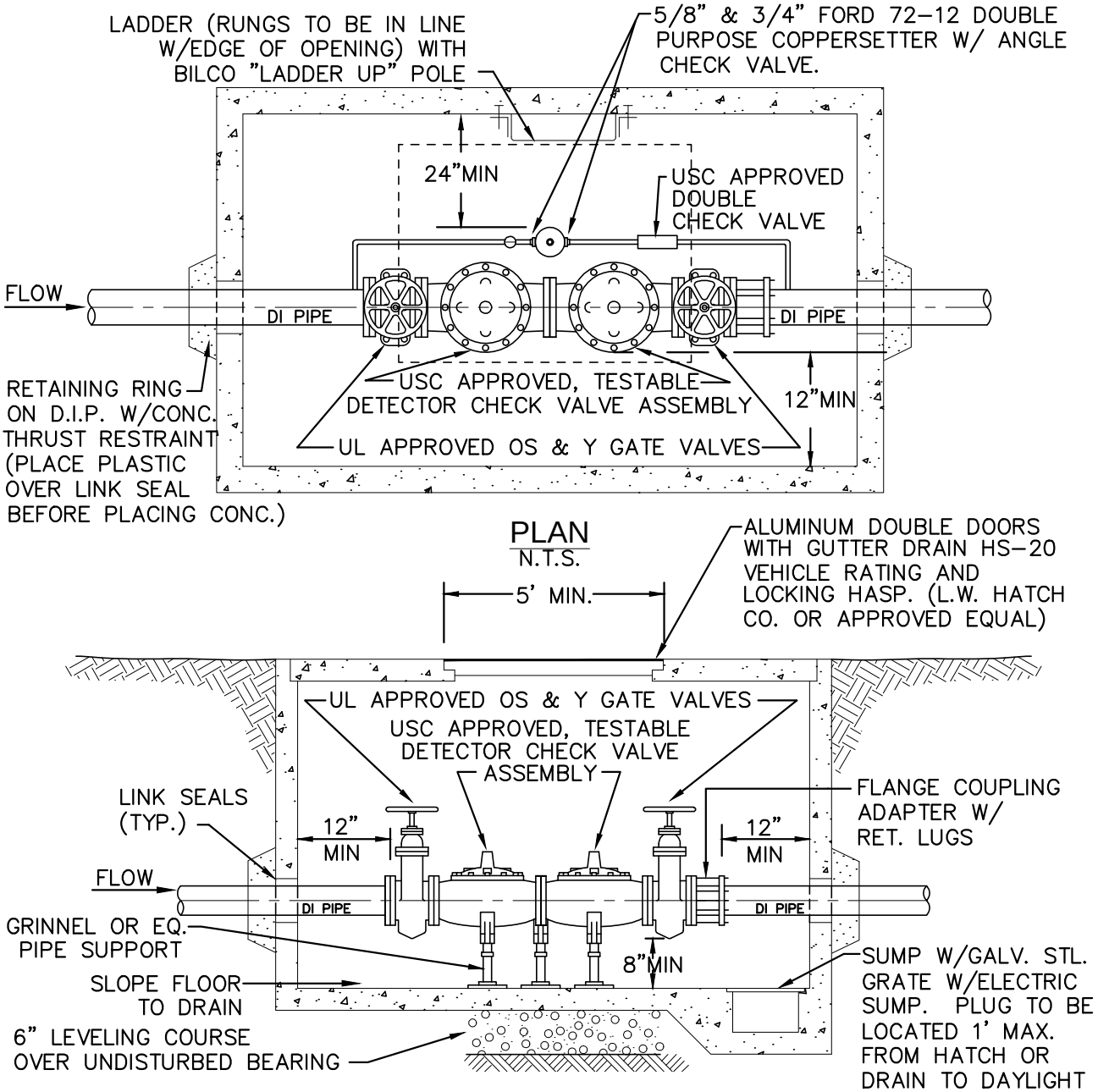
ACCEPTABLE ALT. TO 120' HAMMERHEAD

LOCHNER
(425)-454-3160

FIRE DEPARTMENT ACCESS STANDARDS

08/2017

DWG. NO. W-30



NOTES

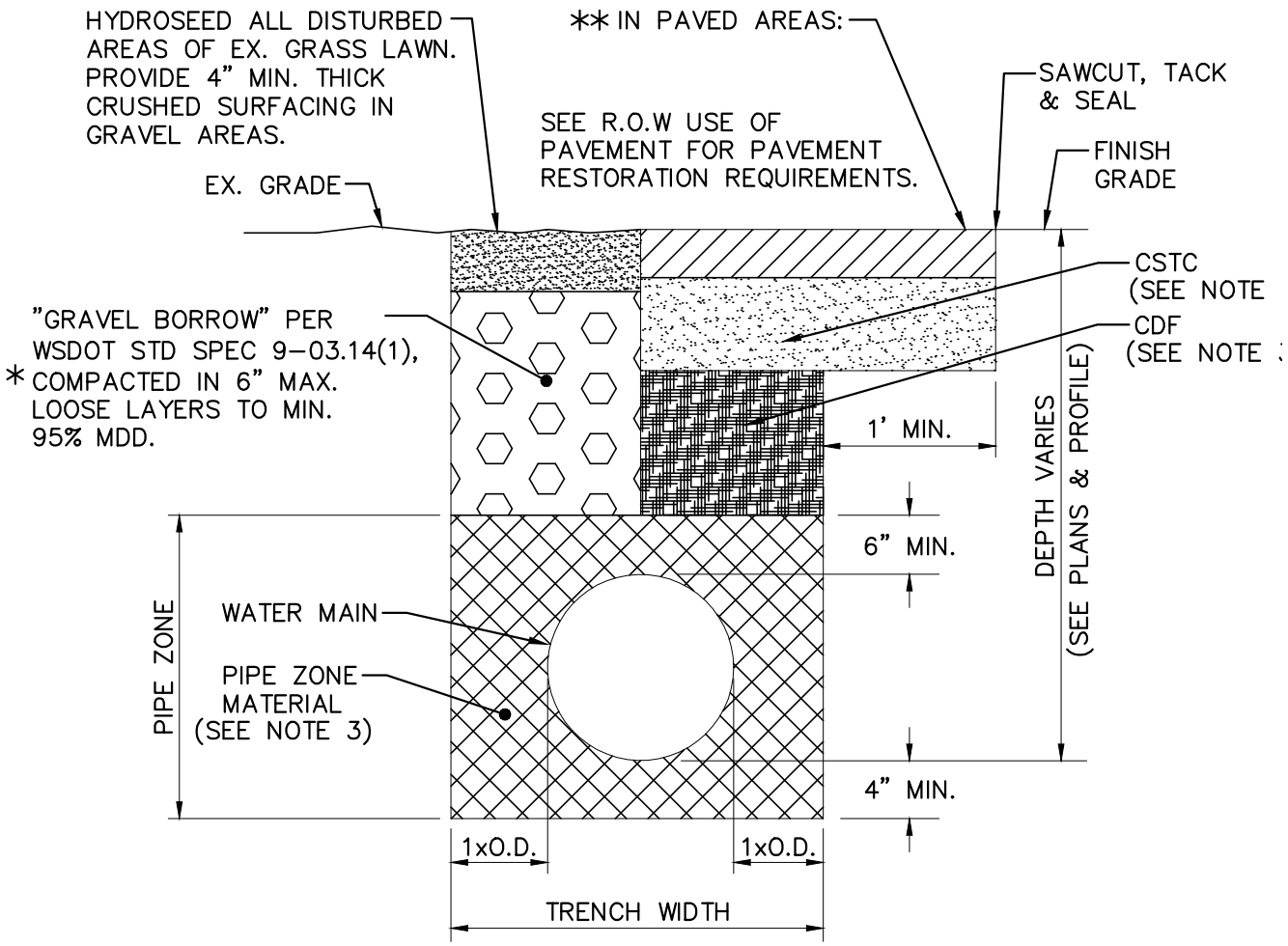
1. 5/8" METER TO BE SUPPLIED BY CITY.
2. COVER SHALL EXTEND 6" ABOVE GRADE WHEN VAULT IS NOT IN TRAFFIC AREA AND SHALL BE FLUSH IN TRAFFIC AREA.
3. SLOPE PAVEMENT AWAY FROM COVER WHEN VAULT IS IN TRAFFIC AREA.
4. ALL BYPASSES TO BE SADDLED AND NOT DIRECT-TAPPED.
5. ALTERNATE LOCATION FOR FIRE SYSTEM; INSIDE BUILDING W/EXTERIOR DOOR FOR IMMEDIATE ACCESS.
6. ALL VALVES TO INCLUDE TAMPER SWITCH FOR FIRE SYSTEMS.

LOCHNER
(425)-454-3160

DOUBLE CHECK DETECTOR VALVE

08/2017

DWG. NO. W-31



NOTE:

1. PERPENDICULAR, OPEN CUT TRENCH CROSSINGS WITHIN THE RIGHT-OF-WAY SHALL BE BACKFILLED WITH 100% CRUSHED SURFACING TOP COURSE (CSTC) PER WSDOT 9-03.9 (3).

2. MINIMUM COVER FOR 8" DIAMETER WATER MAINS SHALL BE 3' MINIMUM COVER & FOR LARGER THAN 8" DIAMETER WATER MAINS SHALL BE 4'.

3. PIPE ZONE MATERIAL PER WSDOT 9-03.12(3).

4. COMPACTION SHALL BE,AT LEAST 95% OF MAXIMUM DENSITY,PER WSDOT STANDARD SPECIFICATION SECTION 2-03.3(14)D.

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

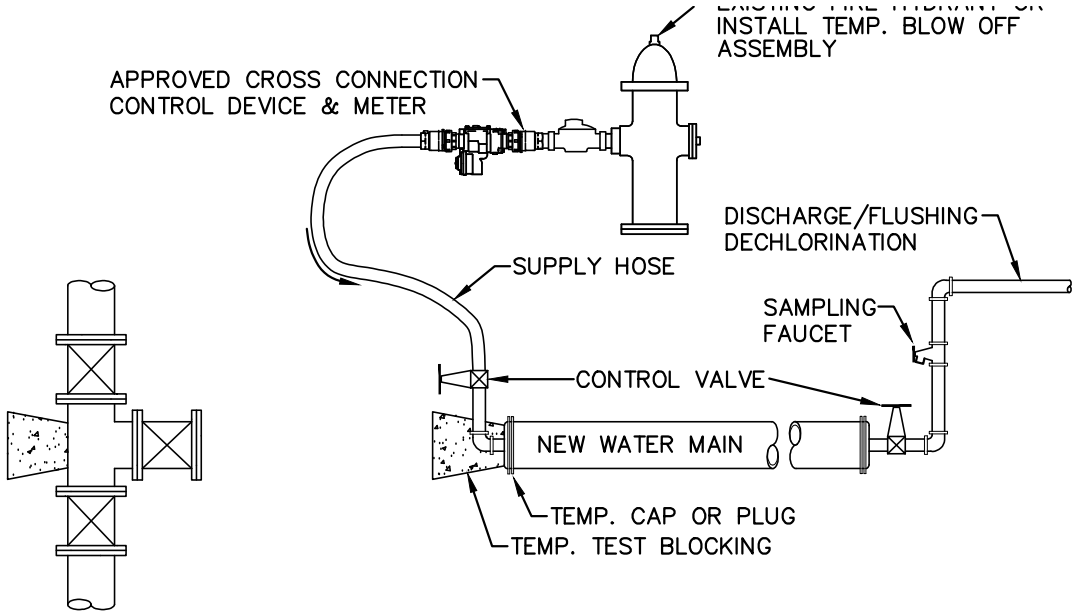
** IN R.O.W MATCH EXISTING PAVEMENT SECTION PLUS 1", BUT NOT LESS THAN 4" ACP CLASS ½" PG.64-22 OVER 6" CSTC (COMPACTED THICKNESS). TACK & SEAL NEAT LINES.

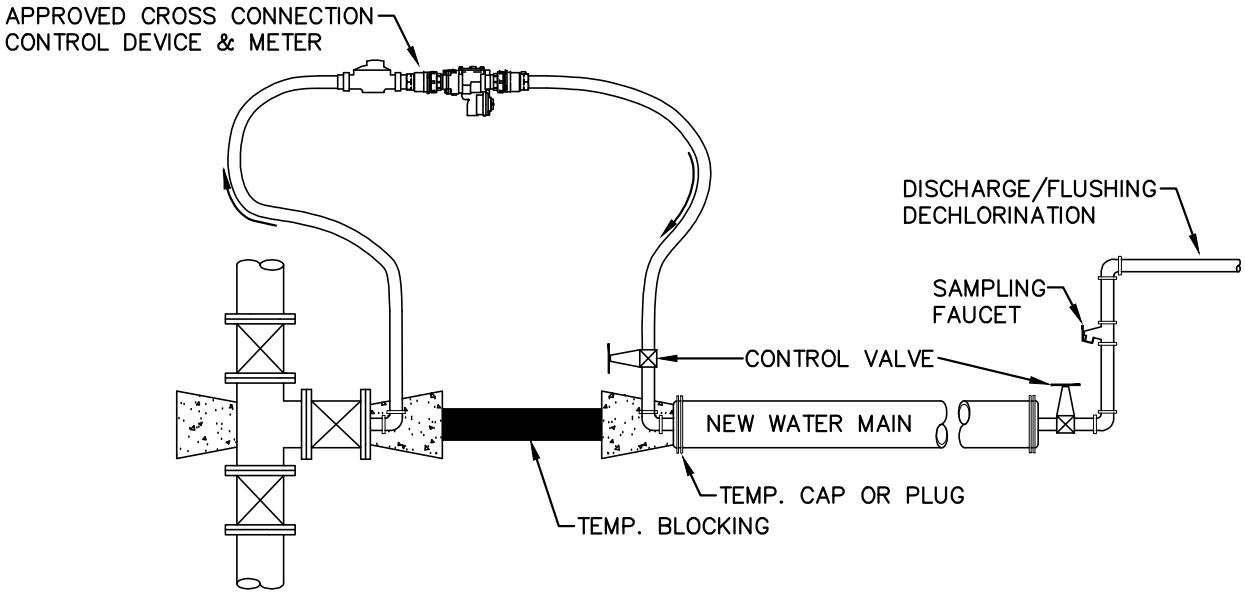
LOCHNER
(425)-454-3160

TYPICAL TRENCH DETAIL

08/2017

DWG. NO. W-32





NOTES:

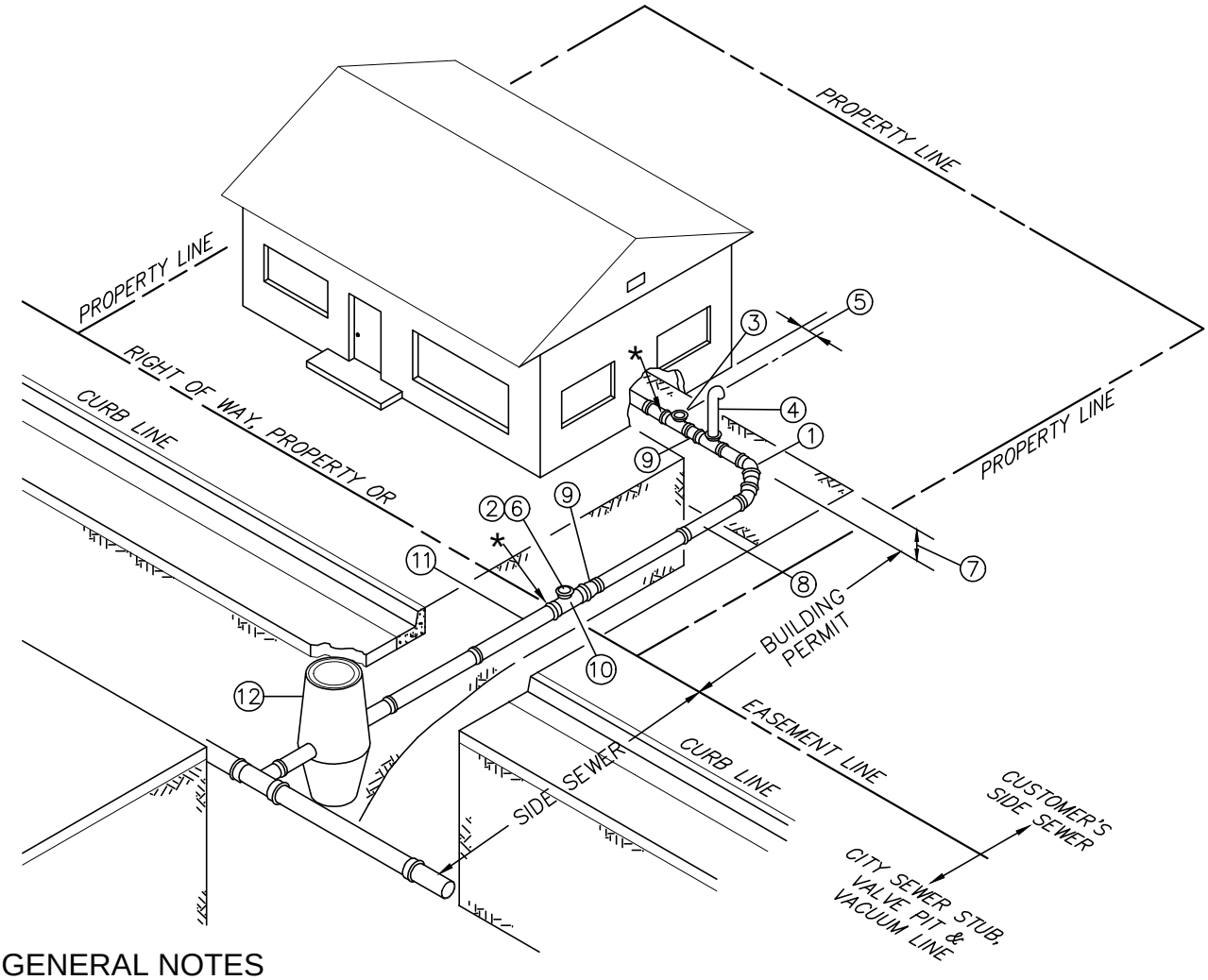
1. WHEN PURITY SAMPLE RESULTS ARE SATISFACTORY & RECEIVED IN WRITING FROM THE STATE–CERTIFIED LABORATORY, & ALL OTHER CITY OF CARNATION WATER SYSTEM STANDARDS HAVE BEEN MET, THE CONTRACTOR SHALL BE ALLOWED TO CONNECT THE NEW MAINS TO THE EXISTING DISTRIBUTION SYSTEM FOLLOWING CITY OF CARNATION & AWWA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

LOCHNER
(425)-454-3160

FINAL CONNECTION TO THE EXISITNG WATER MAIN

08/2017

DWG. NO. W-33



GENERAL NOTES

1. 45° BENDS WITH 24" MIN. SEPARATION BETWEEN BENDS.
2. CONNECT BUILDING SEWER TO SIDE SEWER PER DETAIL S–16.
3. BACKWATER VALVE PER STANDARD DETAIL.
4. SURFACE AIR VENT PER STANDARD DETAIL. THE SURFACE AIR VENT MAY ALSO DOUBLE AS A SECONDARY CLEAN OUT AT OWNER'S OPTION. THE SURFACE AIR VENT MAY BE INSTALLED LATERAL TO THE SIDE SEWER LINE (MAX. 4'). LOCATION OF SURFACE AIR VENT IS AT OWNER'S DISCRETION BUT SHALL BE MIN. 10' UPSTREAM OF THE CITY SIDE SEWER CONNECTION UNLESS OTHERWISE APPROVED.
5. 18" TO 36" RECOMMENDED DISTANCE.
6. PLUG OR CLEANOUT AT OWNER'S OPTION.
7. 18" MIN. COVER.
8. 4" OR 6" SDR 21 PVC SIDE SEWER. SDR 35 PVC & CLASS 50 DUCTILE IRON PIPE ARE ALSO ACCEPTABLE.
9. 4"x 6" REDUCER FITTING AS REQUIRED.
10. 6" TEST TEE WITH PLUG. TEST TEE MAY DOUBLE AS A CLEAN OUT AT OWNER'S OPTION.
11. 6" SIDE SEWER STUB w/ CAP.
12. VALVE PIT

* DURING TESTING, CAP INSTALLED SIDE SEWER AT THESE LOCATIONS. AFTER SUCCESSFUL TEST, REMOVE CITY–SIDE CAP & CONNECT TO CITY SEWER STUB. TESTING METHODS ARE DESCRIBED IN THE CITY SIDE SEWER STANDARDS.

LOCHNER
(425)-454-3160

TYPICAL BUILDING CONNECTION

08/2017

Carnation

DWG. NO. S-1

CITY OF CARNATION

CROSS-CONNECTION CONTROL PROGRAM

PURPOSE

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

GENERAL POLICY

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

RESPONSIBILITY

City

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

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

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

- Premise isolation, as defined in WAC 246-290-010, is the City's preferred method of cross-connection control to isolate the consumer's water system from the City distribution system, whereby an approved air gap or approved backflow prevention assembly is installed at the service connection.

- When the in-premises isolation method is to be used for backflow protection for residential irrigation systems, residential swimming pools, spas, decorative ponds and boilers, the backflow prevention must provide a level of protection commensurate with

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

Water Customer

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

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

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

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

Local Administrative Authority

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

PERSONNEL

Program Administrator

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

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

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

HAZARD EVALUATION

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

Schedule For Initial Hazard Assessments

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

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

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

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

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

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

New Service Connections

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

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

Existing Services

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

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

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

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

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

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

Inspection of High Hazard Sites

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

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

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

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

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

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

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

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

REGULATIONS AND REFERENCES

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

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

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

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

BACKFLOW PREVENTION REQUIREMENTS

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

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

BACKFLOW ASSEMBLY INSTALLATION

General Requirements

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

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

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

Thermal Expansion

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

Schedule for Installation of Backflow Assemblies

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

BACKFLOW ASSEMBLY TESTING

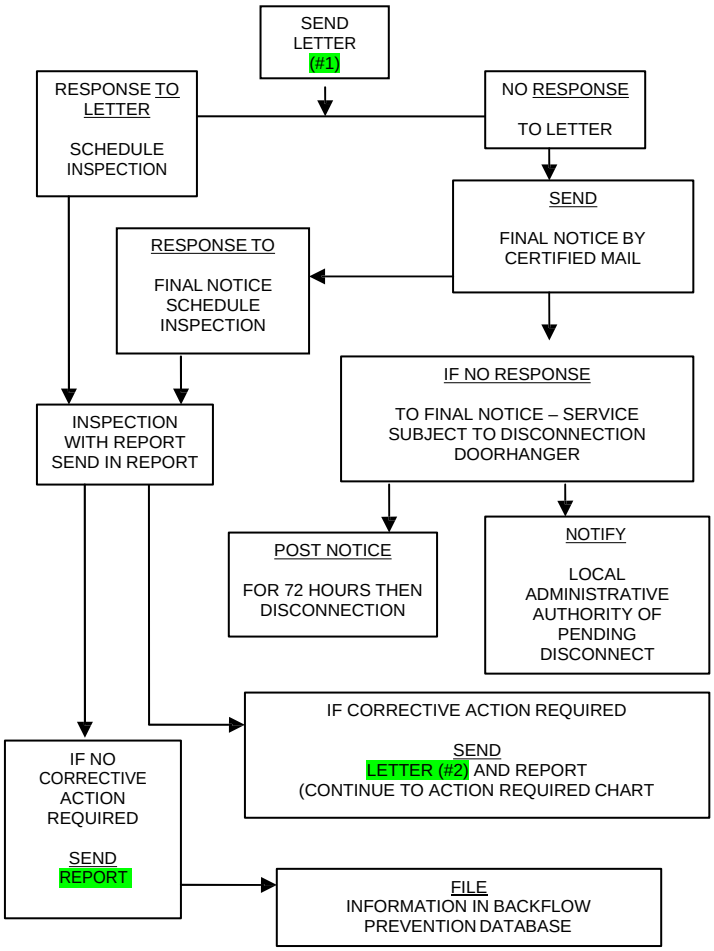
All Backflow preventers that the City relies on for protection of the water system shall be inspected and if applicable tested, including backflow preventers for in-premise protection. Inspection and testing will be conducted by a Washington State Department of Health (DOH) certified BAT for proper application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

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

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

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

BACKFLOW PREVENTION INSPECTION PROCEDURE



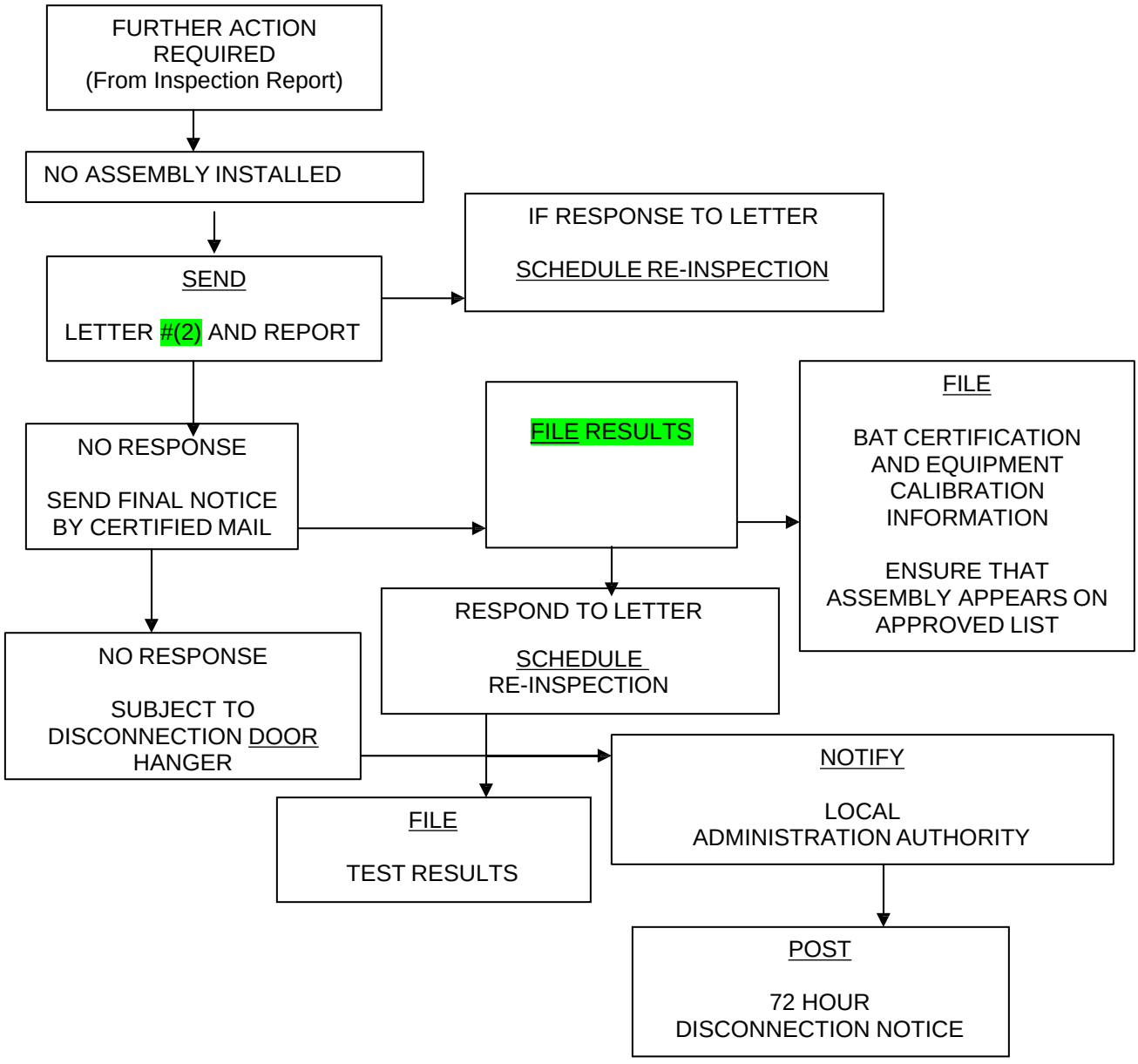
Inspection and Testing of New Installations

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

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

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

BACKFLOW PREVENTION INSPECTION
(CUSTOMERS WITH NO BACKFLOW ASSEMBLY INSTALLED)



Previously Installed Assemblies

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

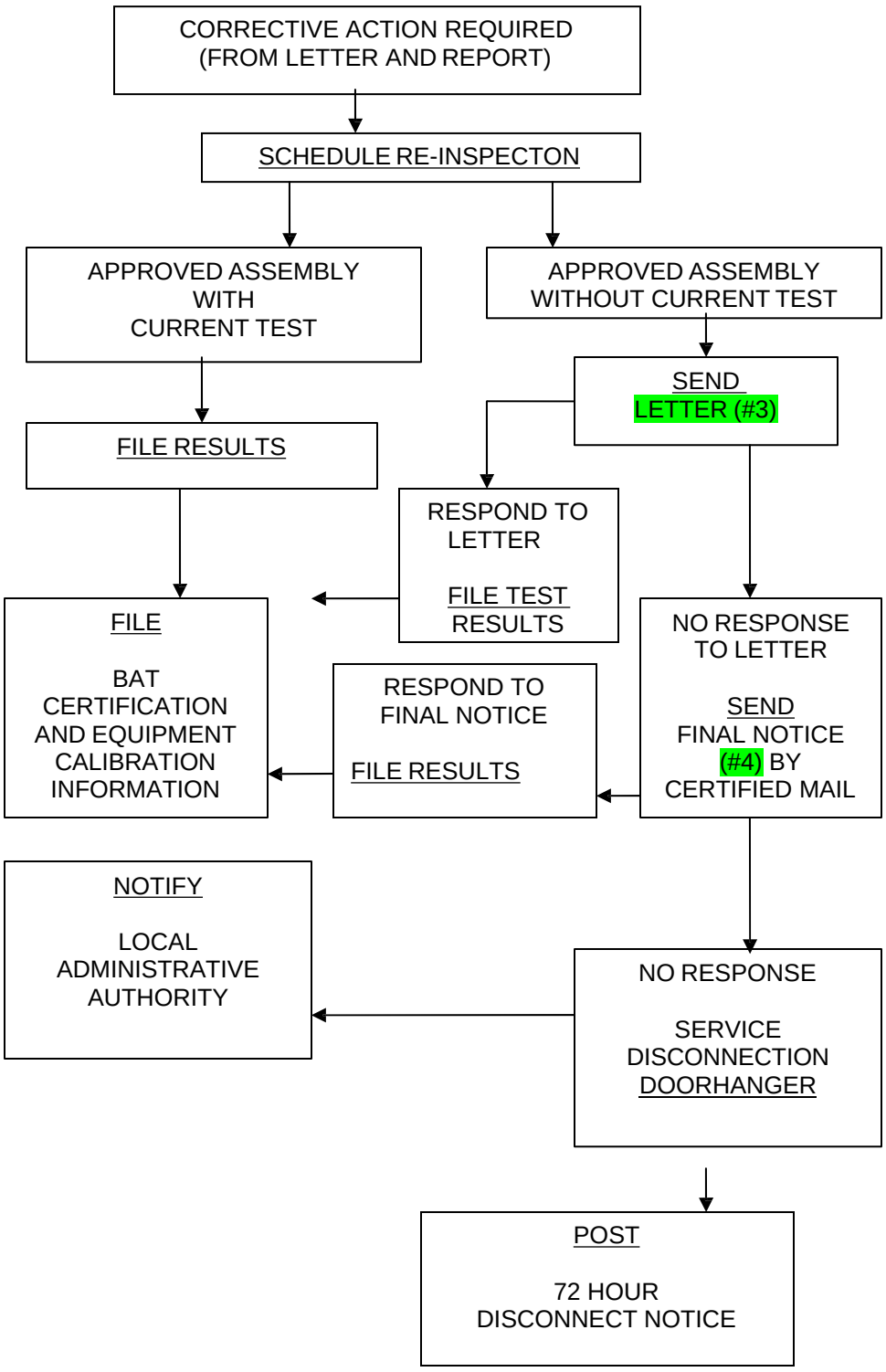
The City shall notify customers with backflow assembly devices of the requirement for testing not less than 30 days prior to the required test date. The completed satisfactory test results shall be forwarded to the City not more than 30 days after the test date.

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

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

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

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



Inspection and Testing of Repaired or Replaced Installations

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

ENFORCEMENT

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

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

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

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

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

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

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

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

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

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

City Authorized To Hire Approved Contractor

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

RECORDS AND REPORTS

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

For approved air gaps:

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

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

For approved backflow prevention assemblies:

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

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

For approved Atmospheric Vacuum Breakers:

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

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

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

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

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

CONSUMER EDUCATION

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

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

Customer Information Packet

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

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

BACKFLOW INCIDENT RESPONSE PROCEDURES

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

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

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

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

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

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

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

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

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

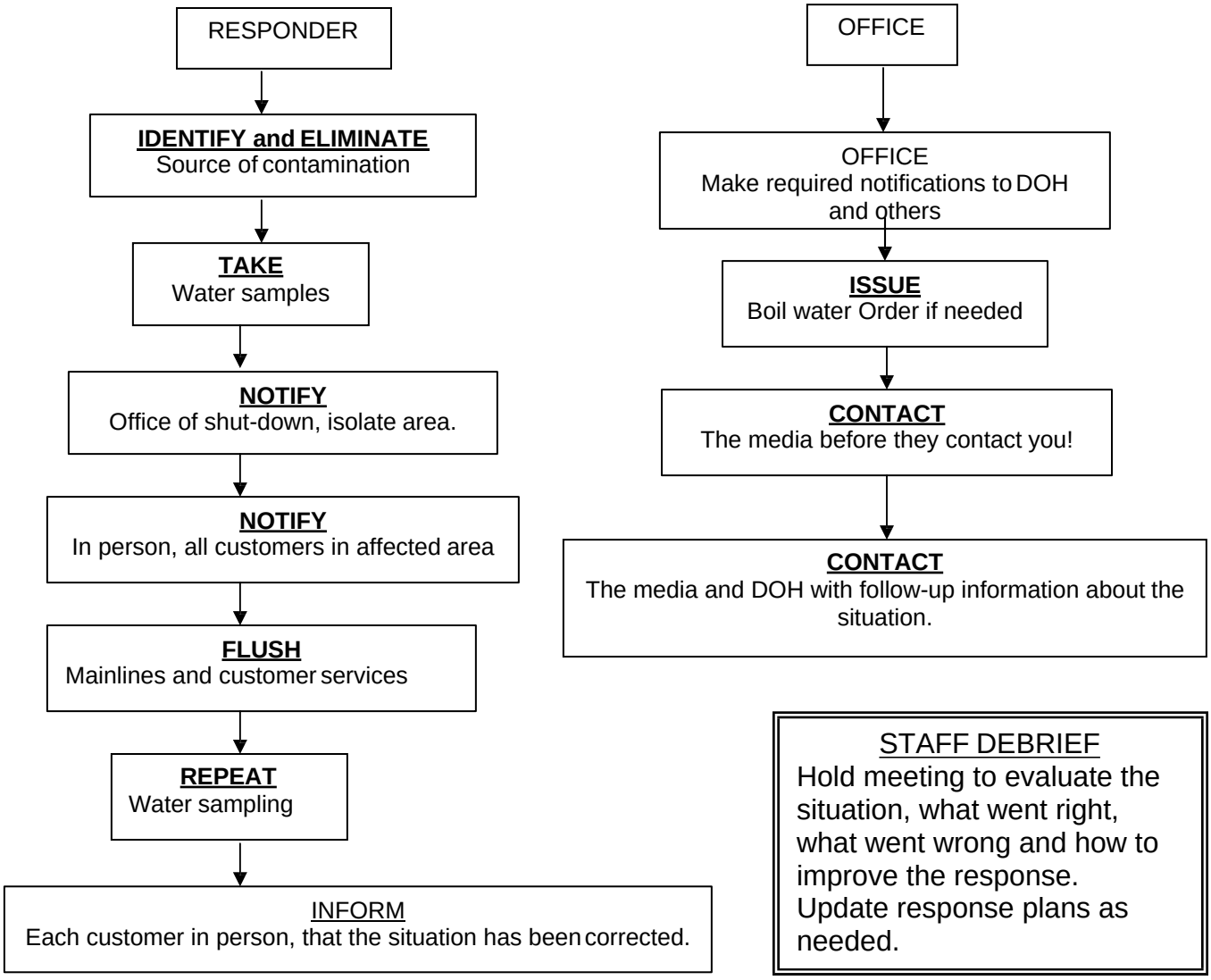
begin public notification. Contact DOH (1-877-481-4901) and follow any directions they may give. When the cross-connection responsible for the system contamination is located, discontinue water service to that customer, until the customer completes the corrective action ordered.

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

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

PROCEDURE FLOW CHART CONFIRMED BACKFLOW INCIDENT

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



PROTECTION OF STAFF

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

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

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

EMERGENCY CONTACTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CITY – The City of Carnation

Combined Fire Protection System –a fire sprinkler system that:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Flow Through Fire System – means a sprinkler system that:

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

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

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

International Plumbing Code –This code establishes Citywide minimum plumbing standards applicable within the property lines of the customer's premises.

Local Administrative Authority – the local official, board, department or agency authorized to administer and enforce the provisions of the International Plumbing Code. Low Health Hazard – a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

Maximum Contaminant Level (MCL) – the maximum amount of a contaminant allowed in a sample of water according to federal and state regulations.

Non-Potable Fluid – any water, other liquid, gas, or other substance which is not safe for human consumption, or is not part of the public potable water supply as described by the health authority.

Primary Disinfection – means a treatment process for achieving inactivation of Giarda lambliaq cysts, viruses, or other pathogenic organisms of public health concern to comply with the treatment technique requirements of Part 6 of this chapter.

Potable Water – water that is safe for human consumption and free from harmful or objectionable materials, as described by the health authority.

Premises – a piece of land to which water is provided, including all structures and improvements located on it.

Reclaimed Water – means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would otherwise occur, and it is no longer considered wastewater.

Reduced Pressure Backflow Assembly (RPBA) – a device incorporating two or more check valves and an automatically opening differential relief valve located between the two checks, two shut off valves, and equipped with the necessary appurtenances for testing.

Reduced Pressure Detector Assembly (RPDA) – an approved assembly consisting of two approved reduced pressure backflow assemblies, set in parallel, equipped with a meter on a bypass line to detect small amounts of water leakage or use.

Safe Drinking Water Act – Legislation enacted by the US Congress in1974 to ensure that the public is provided with safe drinking water.

Service Connection – the piping connection by means of which water is conveyed from the City's distribution main to a customer's property line, or to the end of the water connection.

Thermal Expansion –the pressure increase due to a rise in water temperature. The problem becomes acute in heated water piping systems when such a system becomes "closed" due to a malfunctioning backflow prevention assembly, which disallows expansion beyond that point.

Un-Approved Auxiliary Water Supply – means a supply (other than the purveyor's water supply) available to the customers premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

Used Water – means water which has left the control of the purveyor.

USC FCCCHR – The abbreviation for the UNIVERSITY OF Southern California Foundation for Cross-Connection Control and Hydraulic Research. It is the agency which tests and approves backflow prevention assemblies by approved standards.

Abbreviations and Acronyms

AG – Air Gap
AVB – Atmospheric Vacuum Breaker
BAT – Backflow Assembly Tester
CCS – Cross-Connection Control Specialist
DCDA – Double Check Detector Assembly
DCVA – Double Check Valve Assembly
IAPMO – International Association of Plumbing and Mechanical Officials
PVBA – Pressure Vacuum Breaker Assembly
RPBA – Reduced Pressure Backflow Assembly
RPDA – Reduced Pressure Detector Assembly
SVBA – Spill Resistant Vacuum Breaker Assembly
UBC – Uniform Building Code
UL – Underwriters laboratory
UPC – Uniform Plumbing Code

APPENDICES

Appendix A Application For Water Service
Appendix B Pre Approved BAT
Appendix C Cross-connection Hazard Survey
Appendix D Water-Use Survey Report
Appendix E Backflow Incident Report
Appendix F Annual Summary Report Forms
Appendix G Customer Information Packet
Appendix H Letters

APPENDIX A

Application for Water Service

CITY OF CARNATION
Application for Water Service (Service Agreement)

Owner's Name:_____**Phone:** _____

Mailing Address: _____

Location Address: _____

Legal Description: _____

The undersigned applicant hereby applies for a water connection to the above-described property.

1. The applicant is the owner of the described property or the authorized agent of the owner.

2. As a condition of City of Carnation, hereinafter referred to as the Purveyor, providing and continuing service to the above described property, the property owner, by signing this application, agrees to comply with:

   a. All provisions of the City's current Ordinance and/or Cross Connection program, Resolution of the Purveyor, or latest revision thereof; and

   b. Other such current and future rules and regulations that govern the Purveyor's water system.

3. The property owner specifically agrees:

   a. To install and maintain at all times his plumbing system in compliance with the most current edition of the **International** Plumbing Code as it pertains to the prevention of potable water system contamination and prevention of pressure surges and thermal expansion in his water piping (for thermal expansion, it shall be assumed that a check valve is installed by the Purveyor on the water service pipe);

   b. Within 30 days of the Purveyor's request (or alternate schedule acceptable to the Purveyor):

      i) To install, maintain, test and repair in accordance with the Purveyor's cross-connection control standards all premises isolation backflow prevention assemblies required by the Purveyor to be installed to protect the public water system from contamination; and
      ii) To report to the Purveyor the results of all assembly tests and/or repairs to the premises isolation backflow prevention assemblies.

   c. As a condition of the Purveyor waiving the requirement for premises isolation by a reduced pressure backflow assembly on the property owner's service pipe:

      i) To authorize the Purveyor to make periodic water use surveys of the premises;
      ii) Within 30 days of the Purveyor's request, to install, test, maintain, and repair in accordance with the Purveyor's cross-connection control standards (copy received with

this application) all in-premises backflow prevention assemblies that provide equivalent protection for the Purveyor's distribution system;

iii) To report to the Purveyor within 30 days of obtaining the results of all tests and repairs to the aforementioned backflow prevention assemblies; and

iv) To report to the Purveyor any change to the plumbing system.

d. Not to make a claim against the Purveyor or its agents or employees for damages and/or loss of production, sales or service, in case of water pressure variations, or the disruption of the water supply for water system repair, routine maintenance, power outages, and other conditions normally expected in the operation of a water system.

e. To pay his water bill within 30 days from the date of billing.

30 days after the Purveyor mails a written notice to the property owner of his breach of this agreement, the Purveyor may terminate water service.

In the event legal action is required and commenced between the parties to this agreement to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.

Applicant's Signature_____Date _____

Attachments received (have customer initial):

Water Rates/Charges _____
Service Connection Information _____ Water Service Policy ___

For Purveyor Use Only

_____/_____/____ Date connection fee received

_____/_____/____ Date Water Use Survey questionnaire received

_____/_____/____ Date risk assessment completed; by _____
Name of CCS

_____/_____/____ Date customer notified of requirement for BPA

_____/_____/____ Date BPA installation approved

_____/_____/____ Date BPA test report accepted

_____/_____/____ Date BPA information entered into database

APPENDIX B

Pre Approved BAT

Backflow Assembly Testers Pre-Approved for Submitting Test Reports to the City of Carnation

BAT testers must document that they appear on the approved BAT list of another nearby water system that has a testing QA/QC program acceptable to our system and on State certified BAT list.

WAC 246-290-490 requires a DOH-certified BAT to test all assemblies (RPBA, RPDA, DCVA, DCDA etc.) that protect the distribution system. Assemblies that protect the public water system must be tested in accordance with DOH-approved field test procedures:

- Upon installation, and annually thereafter;
- After repair, reinstallation, or relocation; and
- After a backflow incident.

Note: the DOH BAT certification is a special certification separate from other waterworks operator certification categories, plumbing licenses, contractor registration, etc. Other licenses, certifications and/or registrations may be required to install backflow prevention assemblies and/or perform maintenance work on assemblies within buildings. **However, only a currently DOH-certified BAT may test the assemblies that protect the public water system from contamination. A list of DOH approved BAT's is available upon request.**

APPENDIX C

Cross-Connection Hazard Survey

Preliminary Cross-Connection Control Hazard Assessment Form
Non-Residential Customers

Name of Customer or Business:

_____

Address:

_____

Phone Number: _____

Description of Business:

_____

Is your business or premises of a type included in the table below (check all that apply)?

Agricultural (farm or dairy)		Metal plating industry	
Beverage bottling plant		Mortuary	
Car wash		Petroleum processing or storage plant	
Chemical plant		Pier or dock	
Commercial laundry or dry-cleaners		Radioactive material processing plant or nuclear reactor	
Having both reclaimed water and potable water provided		Survey access denied or restricted	
Film processing facility		Wastewater lift station	
Food processing plant		Wastewater treatment plant	
Hospital, medical center, nursing home, veterinary, medical, or dental clinic, or blood plasma center		Having an unapproved auxiliary water supply interconnected with the potable water supply	
Having separate irrigation system using purveyor's water and adding chemicals*		*Beauty salon, Tattoo business*	
Laboratory		Other (describe) *[See above]*	

*e.g., parks, playgrounds, golf courses, cemeteries, estates, etc.

Other potential cross-connection concerns:

☐ Irrigation system

☐ Fire sprinkler system, using ☐ not using ☐ chemicals or anti-freeze

☐ Swimming pool

☐Other (describe): _____

Note to Customer: *This form is used for preliminary assessment only. The water purveyor may require a more thorough assessment at a later date.*

This form was completed by (print name):_____Date:_____

Please return completed form by {insert date} and send to: {insert name/address}.

Cross-Connection Control Hazard Survey Report

Non-Residential Customers

Survey date: _____

Customer Information

Premises name:_____Telephone: _____

Address:_____ZIP: _____

Contact person:_____Title: _____

Description of premises: _____

Description of water use: _____

Water Service and Backflow Prevention Assembly (BPA) Size/Type

Service Type	Service Size	Meter Size	BPA Size	BPA Type
Domestic				
Fire				
Irrigation				
Other				

Cross-Connection Control Specialist (CCS) Information

Name:_____ Telephone: _____

Company name: _____

Address:_____ZIP: _____

DOH CCS Certification #:_____ Year certified: _____

Survey Results

Note: The CCS's survey shall include an inspection of the premises isolation assembly to verify that it is installed correctly and is a currently listed DOH-approved assembly.

Item	Location & Description of Cross-connection	Backflow Prevention Provided/Required

Attach additional sheets if needed.

Surveyor's Comments

Surveyor's Recommendations

I certify that this cross-connection hazard survey accurately reflects the overall risk posed by the customer's plumbing system to the Purveyor's distribution system. Based on the above survey, I certify that:

1. I found the following type(s) of premises isolation backflow preventer(s):

   Air Gap ____ RPBA/RPDA ____ DCVA/DCDA _____ None ____

2. The existing backflow preventer(s) is/are properly installed.

   Yes____No_____N/A _____

3. The existing backflow preventer(s) is/are commensurate with the degree of hazard:.

   Yes____No_____N/A _____

4. Since no backflow preventer was installed for premises isolation, the premises owner should install a premises isolation backflow preventer of the following type:

   Air Gap ____ RPBA/RPDA ____ DCVA/DCDA ____ N/A ____

5. The premises owner should replace the existing premises isolation backflow preventer(s) with the following:

   Air Gap ____ RPBA/RPDA ____ DCVA/DCDA ____ N/A ____

The completed survey report shall be first signed by the CCS conducting the survey, and then counter-signed by the owner of the premises or the owner's authorized agent.

CCS Signature:_____Date: _____

As the Owner of the Premises (or Owner's authorized agent), I certify that I have received a copy of this completed Cross-Connection Control Hazard Survey Report.

Signature:_____**Date**: _____

Note: Customers and regulatory agencies should be aware that the Purveyor's requirement for this cross-connection hazard survey and/or for the installation of a specific backflow prevention assembly on a service pipe ***do not*** constitute an approval of the customer's plumbing system, compliance of the customer's plumbing system with the International Plumbing Code or an assurance of the absence of cross-connections in the customer's plumbing system.

APPENDIX D

Water-Use Survey Report

SAMPLE 1

Water Use Questionnaire

Residential Customers

Customer Account Number (optional)
Customer Name
Address Line 1
Address Line 2

Please indicate whether the special plumbing or activities listed below apply to your premises:

Yes	No	Plumbing or Activity Present on Customer's Premises*
		Underground sprinkler system
		Water treatment system (e.g., water softener)
		Solar heating system
		Residential fire sprinkler system
		Other water supply (whether or not connected to plumbing system)
		Sewage pumping facilities or grey water system
		Boat moorage with water supply
		Hobby farm
		Animal watering troughs
		Swimming pool or spa
		Greenhouse
		Decorative pond
		Photo lab or dark room
		Home-based business. If Yes, list type/describe (e.g., beauty salon, machine shop, etc.): _____ _____ _____

* Based on their knowledge of residential connections served, public water systems may "customize" this list by adding or deleting plumbing categories or activities

Completed by (print name):_____ Date: _____

Resident's Signature: _____

APPENDIX E

Backflow Incident Report

Backflow Incident Report Form

Reporting Agency:_____Report Date: _____

Reported By:_____Title: _____

Mail Address:_____City: _____

State:_____Zip Code:_____Telephone: _____

Date of Incident:_____Time of Occurrence: _____

General Location (Street, etc.): _____

Backflow Originated From:

Name of Premises: _____

Street Address:_____City: _____

Contact Person:_____Telephone: _____

Type of Business: _____

Description of Contaminants:
(Attach Chemical Analysis or MSDS if available)

_____

_____

Distribution of Contaminants:

Contained within customer's premises: Yes:_____ No: _____

Number of persons affected: _____

Effect of Contamination:

Illness Reported: _____

Physical irritation reported: _____

Cross-Connection Source of Contaminant (boiler, chemical pump, irrigation system, etc.):

_____

_____

Cause of Backflow (main break, fire flow, etc.):

_____

_____

Corrective Action Taken to Restore Water Quality (main flushing, disinfection, etc.):

_____

_____

Corrective Action Ordered to Eliminate or Protect from Cross Connection (type of backflow preventer, location, etc.)

_____

_____

Previous Cross-Connection Survey of Premises:

Date: _____
By_____

Types of Backflow Preventer Isolating Premises:

RPBA: _____ RPDA: _____ DCVA: _____ DCDA: _____ PVBA: _____ SVBA: _____

AVB: _____ Air Gap: _____ None: _____ Other Type: _____

Date of Latest Test of Assembly: _____

Notification of Washington State Health Department:

Date: _____ Time: _____ Person Notified: _____

Attach sheets with additional information, sketches, and/or media information, and mail to:

PNWS-AWWA CCC Committee
c/o George Bratton
1252 S. Farragut Drive
Coupeville, WA 98239

APPENDIX F

Annual Summary Report Forms

Annual Summary Report Forms

Appendix E contains sample cross-connection control (CCC) Annual Summary Report forms. Per WAC 246-290-490, purveyors are required to complete these forms to report information on the status of a public water system's CCC program and implementation activities. When the Department of Health sends out hard copies or electronic copies of the forms, they are color-coded. Purveyors often refer to the forms by color instead of name. The respective color of each form is noted below.

The three forms are:

1. **Cross-Connection Control Activities Annual Summary Report**

   Purveyors use this form to report (for a calendar year) their CCC implementation activities, such as status of high-hazard premises protection, backflow preventer inventory/testing information, and hazard evaluations. This is the "blue form."

2. **Cross-Connection Control Program Summary Report**

   This form is use to report the type, policies, and provisions of a public water system's CCC written program. This is the "cream form."

3. **Exceptions to High Health Hazard Premises Isolation Requirements**

   Purveyors use this form to document and report exceptions to mandatory premises isolation requirements allowed under WAC 246-290-490(4) (b) (iii). Only purveyors granting exceptions need to complete and submit this form. This is the "green form."

The forms provided are those used for the reporting year indicated on the forms. For copies of forms for later years, or for versions suitable for completion on screen using MS Word, contact the DOH Office of Drinking Water (see Appendix F)

Public Water System Cross-Connection Control Activities
Annual Summary Report for Year 2009

Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information

PWS ID:	PWS Name:	County:
Provide name and Certification Number of CCS who develops and implements your CCC program.		
CCS Name (Last, First & MI): ,		CCS Phone: (___)____-____
CCS Cert. No.:	BAT Cert. No. (if applicable):	
CCS is (check one): PWS owner or employee ☐ On contract to PWS ☐ Volunteer or other ☐		

Part 2: Status of Cross-Connection Control (CCC) Program

PWS has: A written CCC program 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.)

Please provide information regarding PWS's specific CCC Program Elements. Check one box in each column.

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is Currently:	
		Included in Written Program	Being Implemented or is Completed
1	Legal Authority Established	Y ☐ 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 2009

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). **Estimate if necessary**.

Type of Service Connection	Number
Residential (as defined by PWS)	
All Other (include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers and docks)	
Total Number of Connections	

PWS

If PWS does not serve any high-hazard premises or systems, check here ☐ and go to Part 4.

- Complete all cells. Count only premises PWS serves water to. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 2009			
	Being Served Water by PWS[1]	With Premises Isolation by AG/RP[2]	With Premises Isolation AG/RP Inspected or Tested[3]	Granted Exception from Mandatory Premises Isolation
Agricultural (farms and dairies)				
Beverage bottling plants (including breweries)				
Car washes				
Chemical plants				
Commercial laundries and dry cleaners				
Both reclaimed water and potable water provided				
Film processing facilities				
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies				
Food processing plants (including canneries, slaughter houses, rendering plants)				
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers				
Separate irrigation systems using purveyor's water supply and chemical addition[4]				
Laboratories				
Metal plating industries				
Mortuaries				
Petroleum processing or storage plants				
Piers and docks				
Radioactive material processing plants or nuclear reactors				
Survey access denied or restricted				
Wastewater lift stations and pumping stations				
Wastewater treatment plants				
Unapproved auxiliary water supply interconnected with potable water supply				
Other high-hazard premises (list)[5]				
Totals				

Count only those connections with AG or RP installed for premises isolation. Do not include connections with only in-premises protection, or those with DCVA/DCDAs installed for premises isolation.

[3] Count only those connections ***whose premises isolation preventers*** were tested or inspected during year 2009

[4] For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RP), such as:

aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, e.g.: other manufacturing, or other commercial. ***If needed, attach additional sheet giving same information as requested by table.***

Part 4A: Backflow Preventer Inventory and Testing Data During Year 2009

- Complete all cells. Enter zero (0) if there are no backflow preventers in the category.
- **Count only the backflow preventers that the PWS relies upon for protection of the distribution system*. If your records do not distinguish between premises isolation and in-premises protection preventers, enter all data in Premises Isolation section and check the box*.**
- Count AVBs on irrigation systems only. **If you do not track AVBs, check box above the "AVB" column.**
- Count multiple tests or failures for any particular backflow preventers as one test or failure for that backflow preventer.
- Multiple Service or Parallel Connections**:** count each assembly separately.
- Assemblies on Dedicated Fire or Irrigation Lines: count as Premises Isolation Assemblies.

If PWS does not track AVBs check here ☐

Backflow Preventer Category and Testing/ Inspection Information		Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. ***If In-Premises Protection preventers are also included,***									
Rows 1 – 3 pertain ONLY to Premises Isolation preventers in service at beginning of 2009									
1Number	In service at beginning								
2Number	Inspected and/or								
3	Failed Inspection or								
Rows 4 – 6 pertain ONLY to NEW Premises Isolation preventers installed during 20099									
4Number of	New preventers								
5	Inspected and/or								
6	Failed inspection or								
Premises Isolation Total at end of									
Installed for In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.									
Rows 7 – 9 pertain ONLY to In-Premises Protection preventers in service at beginning of 2009									
7Number	In service at beginning								
8Number	Inspected and/or								
9Number	Failed Inspection or								
Rows 10 – 12 pertain ONLY to NEW In-Premises Protection preventers installed during 2009									
10Number	New preventers								
11Number	Inspected and/or								
12Number	Failed inspection or								
In-Premises Protection Total at end of									
Grand Total at end of 2009									

[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).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced preventers those in service at beginning of 2009. Replacement preventers may be of a different type than the original.

[3] Total installed at end of 2009 can't be more than preventers in service at beginning of 2008 plus those installed during 2009. May be less due to changes in preventer type and preventers taken out of service during 2008.

Part 4B: Other Implementation Activities in 2009

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New services connections evaluated for cross-connection hazards to PWS in 2009.	
New services connections requiring backflow protection to protect PWS.[1]	
Existing services connections evaluated for cross-connection hazards to PWS in 2009.	
Existing services connections requiring backflow protection to protect PWS.[1,2]	
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b) in 2009.[3]	
CCC Corrective enforcement actions taken by PWS during 2009.[4]	

[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 Exception 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, Risk Factors and Indicators during 2009

	Backflow Incidents, Risk Factors and Indicators during 2009	***Number*** (Enter 0 if none)	Check if Data Not Available
Backflow Incidents during 2009			
1	Backflow incidents that contaminated the PWS.[5]		☐
2	Backflow incidents that contaminated the customer's drinking water system ***only***.[5]		☐
Risk Factors for Backflow during 2009			
3	Distribution main breaks per 100 miles of pipe.		☐
4	Low pressure events (<20 psi in PWS distribution system).		☐
5	Water outage events.		☐
Indicators of Possible Backflow during 2009			
6	Total health-related complaints received by PWS.[6]		☐
7	Received during BWA or PN events.[7]		☐
8	Received during low pressure or water outage events.		☐
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).		☐
10	Received during BWA or PN events.[7]		☐
11	Received during low pressure or water outage events.		☐

[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 "wordwrap" from one line to the next. Press <Enter> to continue on new line. Maximum length of each comment is 255 characters, including spaces.

Part No.	Comment

Part 7: Report Completion Information

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Administrator Name (Print):		Title:
Signature:		Date:
Phone: (___)____-____	E-mail:_____@_____	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
General Manager Name (Print):		Title:
Signature:	Op. Cert. No.:	Date:

Cross-Connection Control Program Summary
For 2009

Part 1: Public Water System (PWS) Identification

PWS ID:	PWS Name:	County:

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 Local Administrative Authority (LAA) on Cross-Connection Issues

Indicate the status of coordination with LAAs in your service area. The LAA is the entity that enforces the International Plumbing Code. ***Check one box in each of last 3 columns for each LAA in your service area***.

LAA No.	**Name of LAA[1]** (e.g., the City or County Building Department)	**PWS currently:**		**If not coordinating, did LAA Decline to Coordinate?**
		Coordinates with LAA	**Has Written Agreement with LAA**	
1		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
2		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 LAAs, attach separate sheet giving the above information.

C. Corrective or Enforcement Actions Available to the Purveyor

Type of Corrective Action	Indicate Whether Available	Most Often Used (Check one)
Denial or discontinuance of water service.	Y ☐ 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 below):	Y ☐ N ☐	☐

D. CCC Program Typical Responsibilities

Typical responsibilities *do not* include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS.	☐	☐
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 ***LAA*** on CCC issues for fire protection systems (FPS).		Y ☐ N ☐ NA ☐	
PWS coordinates with ***local Fire Marshal*** on CCC issues for FPS.		Y ☐ N ☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

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.	Date (mm/dd/yyyy):	N/A ☐
Current number of service connections returning used water to distribution system.		

H. Backflow Protection for Unapproved 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 only one 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 ☐

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. site 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 the District has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow protection required (whether or not that type of customer currently exists).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Protection Required
Commercial	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Industrial	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Institutional	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Other (specify): _____	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Other (specify): _____	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐

K. Backflow Protection for Wholesale Customers

Indicate whether the District requires backflow protection at interties with wholesale customers (other PWSs).

Type of Intertie	District has (plans to have) Customers of this Type	Backflow Protection Required (If protection is required, indicate minimum level)
Existing	Y ☐ 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 ☐

Part 3: CCC Program Record-Keeping and Inventory

Indicate the type or name of computer software used by the District to track CCC records.

BMI ☐ BPMS ☐ 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 customized commercial CCC software. Indicate these on line above.

Part 4: Comments and Clarifications

Enter comments or clarifications to any of the information included in this report.

Part No.	Comment

Part 5: CCC Program Summary Completion Information

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Program Summary is complete and accurate to the best of my knowledge.		
CCC Program Administrator Name (Print):		Title:
Signature:		Date:
Phone: (___)____-____	E-mail:_____@_____	
I certify that the information provided in this report accurately represents the status and description of this water system's CCC Program.		
General Manager Name (Print):		Title:
Signature:	Op. Cert No:	Date:

Exceptions to High Health Hazard Premises Isolation Requirements
For 2009 Annual Summary Report

Exceptions forms must be completed and submitted to the Department of Health (DOH) with the Annual Summary Report per WAC 246-290-490(4)(b)(iii).

Complete one form for **each** exception that was granted:

- During 2009; or
- Prior to 2009, **if** you didn't submit an Exceptions form to DOH previously (i.e., don't duplicate previously submitted Exception forms).

If your system didn't grant any exceptions in 2009, and you have already submitted forms for exceptions granted prior to 2009, don't complete any Exception forms for 2009.

Part 1: Public Water System (PWS) Information

PWS ID:	PWS Name:	County:

Part 2: Premises Information

Name of Premises	
Service Address	
Premises Type or Category – Refer to Table 9 of WAC 246-290-490(4)(b)	
Additional Information or Description of Premises to help explain why exception is appropriate:	

Part 3: Information Regarding Exception to Premises Isolation

Enter dates in MM/DD/YYYY format.

Date of Hazard Evaluation	
Date Exception Granted	
Expiration Date of Exception (if any)	
Date of Next Hazard Evaluation	

Part 4: Justification for not Requiring Premises Isolation Using AG, RPBA or RPDA

- The reasons for not requiring mandatory premises isolation shown in the table are typical examples. *purveyors are not required to follow or apply any of these reasons.*
- purveyors may provide other reasons consistent with WAC 246-290-490(4)(b)(ii), i.e., no hazard exists for this particular service.

Reason that the Premises *Do Not* Pose a High Health Hazard to PWS	**Check if Applicable**
Medical/Health Services Facility not having laboratory or similar facilities, e.g., Psychiatric or Counseling Office.	☐
Dental Office having independent water supplies for dental work (no interconnection with purveyor's water system).	☐
"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.	☐
Other (please describe):_____	☐
	☐
	☐
	☐

Part 5: Form Completion Information

Enter dates in MM/DD/YYYY format.

I am the Cross-Connection Control Specialist (CCS) who granted this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name (Print)**:**		CCS Cert. No:
Signature:		Date:
Phone: (___)____-____	E-mail:_____@_____	
I am the Manager* of the PWS and I concur with the granting of this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name (Print)**:**		Title:
Signature :	Op. Cert. No:	Date:

* The person that the CCS reports to or other manager having direct responsibility for and/or oversight of the CCC program. It is not required that this person be in charge of the entire water system.

APPENDIX G

Customer Information Packet

CUSTOMER INFORMATION PACKET

DEAR CUSTOMER:

Under Washington State Law, the City of Carnation has the responsibility to protect the public water supply from possible contamination due to cross-connections. A cross-connection is the connection point of two otherwise separate water systems, one of which is public containing safe drinking water and the other which is private containing water of questionable safe drinking quality, such as steam, gas or chemicals.

Cross-connection control is necessary because of physics. Water always flows towards the path of least resistance or to the point of lowest pressure. It is logical to assume that because water is under pressure, it can only flow in one direction, but this assumption is wrong. Under certain circumstances, such as loss or reduced pressure, water can and will flow backwards.

Imagine what could potentially happen if a water main broke just as your neighbor began to use a water hose to spray insecticide or flush a car radiator. Or the fire district turned on several hydrants to fight a fire just as someone was dispensing carbonated water from a soft drink machine. These contaminants could be siphoned into the public water system.

The City of Carnation cross-connection program consists of inspections to identify actual or potential cross-connections, requiring the installation of needed assemblies to mitigate the hazard, and the testing of installed backflow prevention assembles on an annual basis.

Generally the risk to the public water supply can be assessed as either High Health Hazard or as a Low Health Hazard.

A High Health Hazard is one in which a substance could impair the quality of the potable water supply and create an actual public health hazard through the poisoning or spread of disease by sewage, industrial liquids or waste.

A Low Health Hazard is one in which a substance could cause an impairment of the quality of the potable water supply to the degree that it does not create a hazard to public health, but does adversely and unreasonably affect the aesthetic qualities for domestic use.

The City has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations and for the prevention of contamination of his plumbing system from sources within his/her premises. Any action taken by the City to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation, installation of a DCVA or RPBA on the service line, is solely for the purpose of reducing the risk of contamination of the City's public water system.

Any action taken by the City shall not be construed as guidance on the safety or reliability of the customer's plumbing system. Installation of backflow prevention

assemblies shall be in accordance with the most recently published edition of the Pacific Northwest Section, American Water Works Association Cross-connection Control Manual.

The City will notify each customer at least 30 days before the due date for each required inspection and or testing of any backflow devices by a certified Department of Health Cross-Connection Control Specialist (CCS) and/or a Backflow Assembly Tester (BAT). The City has on hand a list of certified testers.

The inspection or test reports conducted by the CCS and/or BAT are to be received by the City within 15 days following the due date. After this time enforcement actions may be taken.

TYPE OF FACILITY/REQUIRED DEVICE
AUXILIARY WATER SUPPLY
Any water supply on or available to a premise in addition to the City's approved potable water supply. Backflow protection requires an Air Gap or the installation of an approved Reduced Pressure Backflow Assembly downstream of the meter on the customer's property.

WATER RE-USE SYSTEMS
Reclaimed water can be systems that use treated sewage effluent, Stormwater reuse, and Graywater systems from untreated household wastewater that has not come in contact with toilet or food processing waste. All classes of reclaimed water are considered as a high health hazard and NO Direct connections to the City system will be allowed.

FIRE PROTECTION SYSTEMS
High-Hazard
This includes all fomite systems, systems with an auxiliary water supply connected to the fire system and systems with chemical additives. Backflow protection will be by a Reduced Pressure Backflow Assembly located at the service connection.

LOW-HAZARD
Are all other fire systems and require a Double Check Valve Assembly at the service connection.

SEWAGE LIFT/PUMPING STATIONS
All sewer lift and grinder pump stations pose a sever health hazard due to the potential presence of human pathogens. Backflow protection will be with an approve Reduce Pressure Backflow Assembly located at the service connection.

ACCESS RESTRICTED OR DENIED
The City must consider the health hazard to be severe unless it has the knowledge to make an assessment otherwise. Without the health hazard evaluation, backflow prevention is with an approved air gap of a reduced pressure backflow assembly.

CAR WASHES
Most automatic car washes use re-circulating water with chemical additives in heated water. The system is considered high hazard because of these chemicals and

bacteriological contaminants in the water. Backflow protection will be with a reduced pressure backflow assembly.

HOSPITALS, MEDICAL CENTERS, VETERINARY CLINICS, DENTAL CLINICS, MEDICAL CLINICS AND NURSING HOMES
The primary health hazard is the presence of waterborne disease transmitted in the feces, urine, and blood of humans and animals. The secondary health hazard is from the numerous chemicals used in these facilities. Backflow protection will be with an approved reduced pressure backflow assembly.

LABORATORIES
Laboratories are facilities using and handling chemicals and bacteriological materials such as medical, biological, chemical, environmental, and material testing laboratories including government agencies and schools.

All laboratories should be considered a high health hazard due to storage, use and/or processing of chemicals and soils, liquid's or products containing bacteria. An approved reduced pressure backflow assembly will be utilized for backflow prevention.

LAWN IRRIGATION SYSTEMS
Irrigation systems can be either assessed as either a low or high health hazard. High health hazard systems contain pumps or injectors for addition of chemicals. An approve air gap or reduced pressure backflow assembly is needed on these systems.

A low health hazard is assessed to all other irrigation systems. An approved double check valve assembly will provide backflow protection.

RETAIL CENTERS
Due to the high probability of changes in water use by tenants, retail centers are considered a high health hazard. An approved reduced pressure backflow assembly shall be installed to protect against backflow.

RECREATIONAL VEHICLE PARKS
Recreational vehicle parks usually contain a transient population that significantly increases the probability of cross-connections due to plumbing that has not been approved. As such a high health hazard is assessed and protection will be with a reduced pressure backflow assembly.

HEAT EXCHANGERS/SOLAR HOT WATER SYSTEMS
Heat exchangers physically separate one medium from another and either heat or cool a medium by transferring energy between the two mediums across an enlarged surface. Backflow conditions exist when a leak develops in the piping or tank walls separating potable from non-potable water. Backflow protection will utilize an approved reduce pressure backflow assembly.

BUILDINGS OVER 30" IN HEIGHT
Whenever the hydraulic gradient (water pressure) falls below the elevation of a plumbing fixture, backsiphonage conditions occur. This increased probability of backflow conditions elevates the risk for structures over thirty feet in height. Backflow protection will be with an approved reduced pressure backflow assembly.

TANKER TRUCKS

Tanker trucks are assessed a high health hazard, the same as an unapproved auxiliary source. Chemical and bacteriological contaminants could be present in any tank. Backflow protection will be with an approved air gap or an approved reduced pressure backflow assembly. Additionally tankers may only connect to the District water supply after obtaining a permit and only at specific locations.

SEWER FLUSHING

When sewer or storm lines are flushed, an approved air gap separation will be maintained to protect the potable water supply. If at all possible tanker trucks should be utilized to flush lines.

OTHER

In cases where there has been a history of repeating the same or similar cross-connections or backflows, even though these conditions have been removed or disconnected, a high health hazard is assessed. Backflow prevention will be with an approved reduced pressure backflow assembly.

In cases where intricate plumbing makes it impractical to ascertain whether or not a cross-connection exists, or where any fixture is subject to being submerged, a high health hazard is assessed and protection will be with a reduced pressure backflow assembly.

INSTALLATION STANDARDS

All backflow preventers relied upon by the City to protect the public water system shall meet the definition of “approved backflow preventer” as contained in WAC 246-290-010. The City will maintain a current list of assemblies approved for installation in Washington State.

Installation standards contained in the most recently published edition of the Pacific Northwest Section, American Water Works Association Cross-Connection Manual or the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research Manual shall be followed unless the manufacturer’s requirements are more stringent.

Special considerations to note for each type of assembly are:

Air Gap (AG)

- Separations are measured vertically and must be at least twice the inside diameter of the inlet pipe, but never less than one-inch.
- An obstruction around or near an AG may restrict flow of air into the outlet pipe and nullify the effectiveness in preventing backsiphonage. When affected by sidewalls the vertical separation must be at least three (3) times that of the inside pipe diameter.

Reduced Pressure Backflow Assembly (RPBA)

- The RPBA must be installed above ground or maximum flood level whichever is greater.

- Because of the inherent design of a RPBA, fluctuating water supply pressure may cause nuisance dripping and potential fouling on the assembly. If located inside a building drainage should be provided for these discharges.

Double Check Valve Assembly (DCVA)

- Unless evaluated and approved otherwise a DCVA is only to be installed in the horizontal position.
- If installed in a pipe or meter box, adequate room must be provided for testing.
- Plugs must be installed in the test cocks to reduce the risk of ground water being siphoned through a leaking test cock.
- Sufficient drainage must be provided to prevent the assembly from becoming submerged.
- The DCVA must be protected from freezing, other severe weather and physical damage.

APPENDIX H

Sample Letters

Letter (#1) Requesting Customer to Complete Water Use Questionnaire

Date

Customer Account Number
Customer
Customer Address Line 1
Customer Address Line 2

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs help protect public health by preventing contamination of the drinking water as it is delivered to water system customers. The attached brochure explains what a cross-connection is, describes typical household cross-connections and what you can do to help protect your drinking water.

As part of our efforts to keep your drinking water safe, we are conducting a cross-connection control hazard survey of residential customers served by our system. The purpose of the survey is to help us determine if any of our residential customers have special plumbing or activities on their premises that could increase the risk of contamination to our water system.

For most residential customers, the cross-connection control hazard posed to the public water system is minimal. This is because your household plumbing was installed in compliance with the Uniform Plumbing Code. The Uniform Plumbing Code generally provides adequate protection of your potable water piping and our public water distribution system from cross-connections. However, a few customers with special plumbing or activities on their premises may pose an increased health risk to other customers served by our system. These customers may need to have a backflow preventer installed on their service lines or provide alternate protection to prevent contamination of the public water system.

Please complete the attached questionnaire by checking the applicable boxes on the table; and return the completed, signed questionnaire by {insert date} to the address shown on the letterhead.

Thanks in advance for filling out the questionnaire. We appreciate your cooperation in helping us to protect the drinking water we deliver to our customers. If you have any questions about the survey or how to fill out the questionnaire, please contact me at {**insert phone number**}. We will review your questionnaire and determine whether we need to contact your for further information.

Sincerely,

Name
CCC Program Manager

Enclosures: CCC Brochure
Water Use Questionnaire

Request to Install Backflow Prevention Assembly (Letter#2)

Date

Customer Account Number
Customer Name
Customer Address Line 1
Customer Address Line 2

Dear_____Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs protect public health by preventing contamination of the drinking water as it is delivered to people served by the water system. **The purpose of this letter is to inform you of a requirement to install a backflow assembly.**

Our water system's policy considers each of our customer's plumbing systems, starting from the termination of the service pipe downstream of the water meter, to pose a potential cross-connection hazard to the public water system. Our policy requires a backflow prevention assembly commensurate with the degree of hazard to be installed on the service line. The purpose of this backflow prevention assembly is to isolate your plumbing system from the water distribution system. We've attached a copy of Resolution {**insert number**} describing our cross-connection control policy.

We have received the cross-connection control survey report submitted by your Cross-Connection Control Specialist (CCS). The survey assessed the overall public health hazard posed by your plumbing system (and water use) to the public water system. We agree with the assessment made by the CCS. **Based on the assessment, a Department of Health-approved {insert type of assembly} is required to be installed on your service line (at a location downstream of the water meter).**

Please make arrangements for the assembly to be installed by {**insert date**} or when your plumbing system is modified, whichever comes sooner. We realize that this expense was not anticipated, so if you are unable to comply with this deadline, please contact us to discuss an alternative date. We've enclosed a copy of our standard installation drawings for this type of assembly. Your CCS should oversee the installation of the assembly to ensure compliance with these standards.

We appreciate your cooperation in this matter. If you have any questions, please contact me at {**insert phone number**}.

Sincerely,

Name
CCC Program Manager

cc: {City/County Plumbing Inspector}

Enclosures: Standard Installation Drawings

Request To Submit Test of Backflow Prevention Assembly (Letter #3)

Date

Customer Account Number
Customer Name
Customer Address Line 1
Customer Address Line 2

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies have been installed on your water service(s) and/or within your plumbing system to protect our water distribution system. Annual testing is required to ensure that the backflow prevention assemblies properly function.

The purpose of this letter is to request that you now arrange for the annual testing of the reduced pressure principle (RPBA), double check valve (DCVA), and/or pressure vacuum breaker (PVBA or SVBA) assembly/assemblies described on the attached list. A Washington State Department of Health certified backflow assembly tester (BAT) must conduct the testing. **Testing results should be sent to the address above and submitted by {insert date}.**

For your convenience, we are enclosing a list of backflow assembly testers pre-approved to test assemblies that protect our water system. Test report forms are also enclosed. The test report forms need to be properly completed by the BAT, signed by the customer/assembly owner, and returned to us.

Note: the Uniform Plumbing Code in effect in Washington also requires annual assembly testing. In addition to the testing required for the assemblies that protect the public water system (i.e., identified on the attached list), you may wish to have all of the remaining assemblies within your premises tested at this time.

If you have any questions, please feel free to contact me at {**insert phone number**}.

Sincerely,

Name
CCC Program Manager

Enclosures: Assembly List
Pre-Approved BAT List
Assembly Test Report Forms

Second Notice to Test Backflow Prevention Assembly (Letter#4)

Date

Customer Account Number
Customer Name
Customer Address Line 1
Customer Address Line 2

Subject: Testing of Backflow Prevention Assembly - Second Notice
First Notice Date:_____ Second Notice Date: _____

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies were installed on your service or within your premises to protect our water distribution system from contamination. The WAC requires these assemblies to be tested annually to verify that they are in good working condition.

The assembly/assemblies identified in our letter of {**insert date**} (copy attached) must be tested by a Department of Health certified Backflow Assembly Tester (BAT) upon installation and annually thereafter. This requirement is a condition of our system continuing to supply potable water to your premises. **According to our records, as of today's date, you have not submitted the requested Assembly Test Report(s).** If you believe this is in error, please contact me as soon as possible at the number below.

If you have not submitted the Assembly Test Reports as requested, please:

- Immediately employ a DOH-certified BAT to test the listed assembly/assemblies; and
- Submit a signed copy of the completed Assembly Test Report(s) to me at the address above **within 15 days of the date of this letter**.

Your cooperation in this matter is essential for protecting your drinking water supply and the public water supply from contamination. Failure to comply with the annual assembly testing requirement will trigger an enforcement action by our system. Enforcement could include a shut-off of your water service.

If you have any questions, please contact me at {**insert phone number**}.

Sincerely,

Name
CCC Program Manager

Enclosure: First Test Notice Letter

Appendix F

Emergency Response Plan

CHAPTER 1
BACKGROUND

INTRODUCTION

The City of Carnation is committed to providing safe, high-quality water and infrastructure to its customers. This commitment extends beyond normal working conditions to include preparation for, and response to, emergency situations.

In line with this commitment, State regulations require all Group A water systems to develop an Emergency Response Plan, to include, at a minimum:

Water System Personnel Emergency Call-up List

- Notification Procedures
- Vulnerability Analysis
- Contingency Operational Plan

HOW TO USE THE PLAN

This plan is intended to provide the Public Works department staff charged with responding to water system emergencies with an outline of procedures and protocols to effectively respond and recover from a major emergency event. The information provided is specifically designed as a flexible guide for emergency responses because every major emergency event will pose unique challenges and responses that require flexibility and creativity to effectively respond.

Major emergency events, as referenced in the plan, are defined as:

- Major disasters or emergencies such as earthquakes, major storms and floods, contamination, or explosions (regardless of cause)
- Catastrophic incidents that cause extraordinary levels of mass casualties, damage, and disruption severely affecting the population, infrastructure, environment, economy, and government functions.

The plan is divided into the following chapters:

Chapter 1: Introduction

Provides the basic framework and history behind the Emergency Response Plan, outlines basic strategies for using the plan, identifies and defines key terms and describes the City's jurisdiction, management structure and key water facilities.

Chapter 2: Communications

Identifies the City's chain of command and management structure during a major emergency response.

Identifies and defines internal and external communications procedures during an emergency, provides relevant contact information, outlines public notification procedures, and provides media relations protocols.

Chapter 3: Vulnerability Analysis

Outlines major event specific responses to specific types of events such as earthquakes, floods, terrorist attacks, and contamination.

Provides a set of action plans to assist in the recovery to normal operations for each of the major events.

Chapter 4: Contingency Plan

Establishes a plan to be followed when normal operational procedures are not available. It lists neighboring utilities that could provide assistance and identifies key citizens that have unique abilities to assist in emergencies.

Appendix

Provides a collection of relevant supporting materials that were utilized in the creation of this plan and may be useful in responding to a major emergency event.

All department staff should become familiar with the layout and information presented in the plan as familiarity with the plan will help ensure staff understand the City and department's basic emergency response strategies.

Additionally, the plan should be reviewed and updated annually or after a major emergency event to include up-to-date and new information and additional response elements.

Copies of this plan should be kept primarily at City Hall but in case personnel can't get there, the plan should be placed in City owned vehicles, staff homes, and the maintenance facility.

DESCRIPTION OF CITY OF CARNATION

The City of Carnation is a rural Western Washington community of approximately 1,900 residents that is approximately 1.2 square miles in size. The City lies 30 miles east of Seattle and 14 miles east of Redmond. The City is located along SR-203 in the Snoqualmie Valley and the confluence of the Snoqualmie and Tolt Rivers. A vicinity map is provided in **Figure 1.1**. The City is governed by a Council-Manager form of government. The City's organizational chart is included as **Figure 1.2**.

Figure 1.1
Carnation Vicinity Map

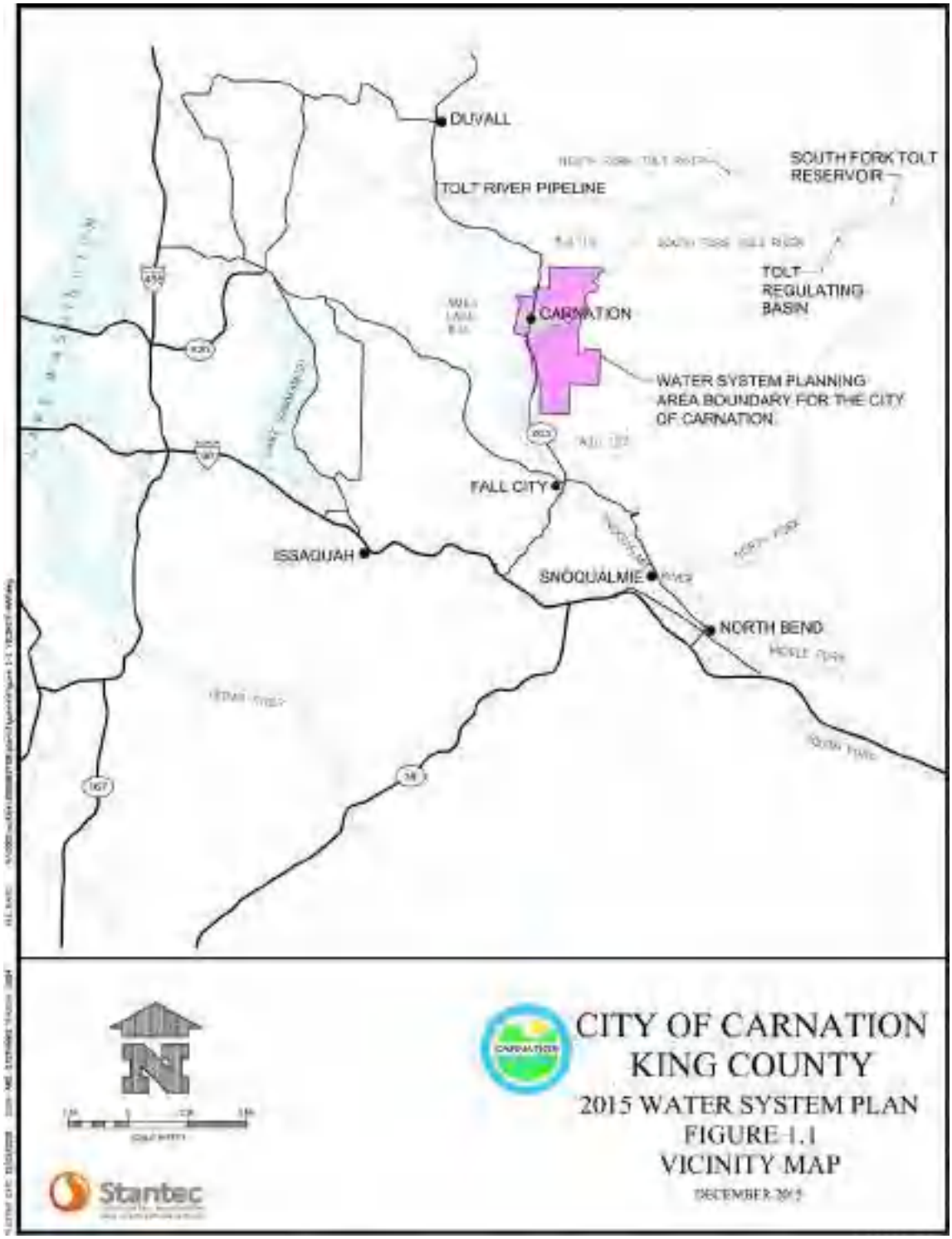
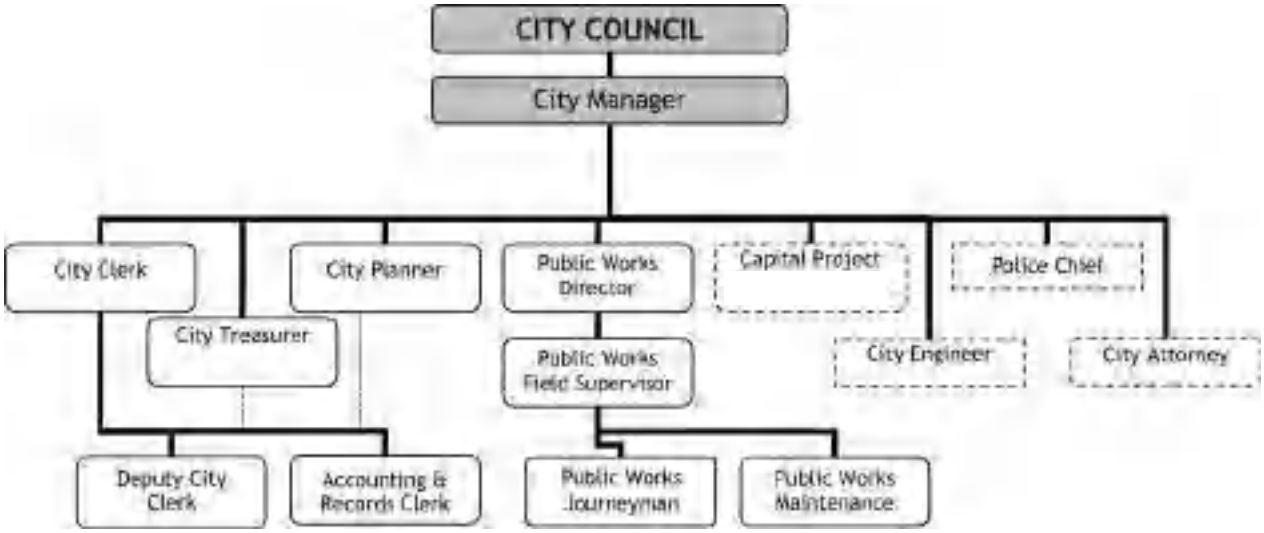


Figure 1.2
Organization Structure Chart



SUMMARY OF THE CITY OF CARNATION'S WATER SYSTEM

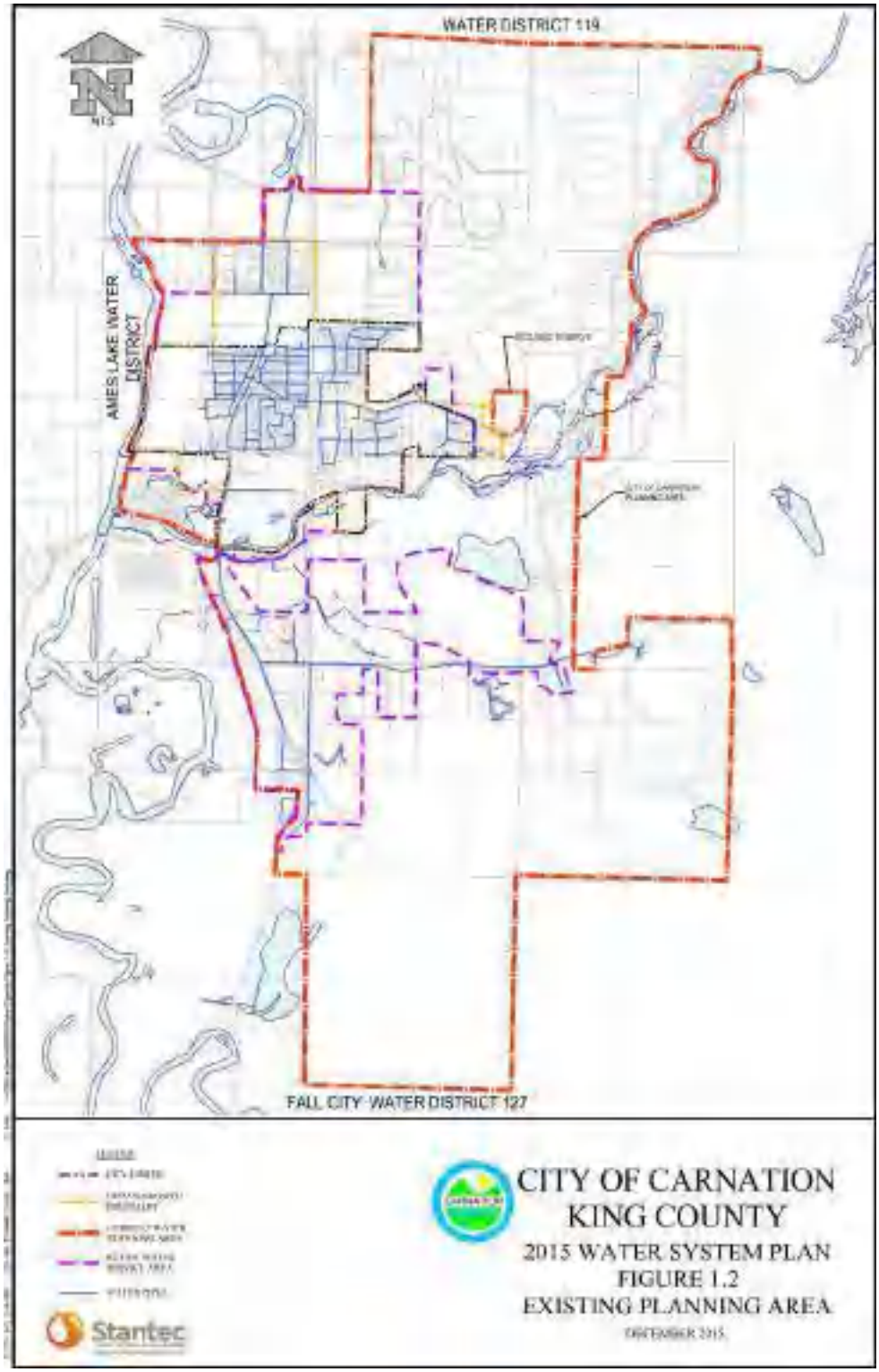
The City of Carnation owns and operates a Class A municipal water system, which serves the majority of the area within the Carnation City limits and also serves outside of its city limits within its water service area. The Washington State Department of Health (DOH) water system identification number is 11200B.

The well, reservoir, springs, pressure reducing/sustaining valve at the Tolt River, and associated transmission mains comprise the main components of the City's water system. The following is a description of these components:

- Well: Current Supplemental Water Right Certificate for 800 gpm and current capacity of 700 gpm
- Springs: Current Water Right Claim of 628 gpm and current capacity of 380 gpm
- Springs Horizontal Wells: Two wells installed under the existing spring intake system connected via 6-inch HDPE pipe which connects to the transmission line with a tee and gate valve.
- Reservoir: Total volume 238,200 gallons
- Pressure Reducing/Pressure Sustaining Valve: The pressure reducing valve (PRV) at Tolt River, pressure set at 77 psi
- Pipe Transmission/Distribution Network: 11.8 miles of mains varying in size from 2 inches to 12 inches in diameter

The City of Carnation Water Service Area is approximately 2.8 square miles, The service area is shown in **Figure 1.3**. Key facilities are highlighted on this map.

Figure 1.3
Existing Water System



City Equipment and Supplies

The City owns the following vehicles and equipment that can be used in the event of a major emergency event:

- Backhoe – CAT, Ford
- Dump Truck – International, Chevrolet
- Pickup Truck – Chevrolet
- Pickup Truck – Dodge
- Pickup Truck – Ford
- 3 - 800 MHz radios

Additionally, the City maintains parts and supplies for the system located primarily at the City shop which is adjacent to the reservoirs shown on **Figure 1.3**. The maintenance facility has inventory to replace any one segment of pipe or component of the water system. If a large section of pipe needs replacement, then outside pipe suppliers will need to be contacted for additional resources.

ROLE OF COUNTY, STATE AND FEDERAL AGENCIES DURING A MAJOR EMERGENCY EVENT

King County

King County is responsible for disaster mitigation, preparedness, response, and recovery for unincorporated King County, and regional coordination of response and recovery operations including warning, public information, damage assessment, resource coordination, and recovery guidance for individuals and special purpose districts. As such, any emergency event that extends beyond the City's abilities, or includes parts of unincorporated King County, will involve coordination with King County. Because the City provides water service outside of the city limits, a major emergency affecting the water system has the potential to trigger County involvement.

Governmental entities within the county (i.e., the city) are responsible for ensuring effective operations and using all available resources to manage emergencies within their respective jurisdictions, prior to requesting assistance from King County.

Washington State

The Washington Military Department, Emergency Management Division, manages the state's Emergency Operations Center (EOC) located on Camp Murray, near Tacoma.

The state EOC serves as the focal point for all state responses to emergencies and disasters that are the result of natural, technological, or human-caused hazards. The numerous primary and back-up communications systems at the EOC allow the state to warn local and state agencies, and the public of an emergency and to communicate among all emergency response agencies during an event. During an emergency, representatives from other state agencies with emergency roles come to the EOC to help coordinate the state response.

During an emergency or disaster, the EOC is designated as the central location for information gathering, hazard analysis, and response coordination. Information gathered within the EOC is used by executives to decide on emergency actions and to identify and prioritize the use of state resources needed to respond to the emergency. The EOC may issue emergency warnings or disseminate critical information and instructions to government personnel and the public who may need to take emergency protective actions. The state EOC can be reached at (800) 532-6108 or (800) 258-5990 (24-hour emergency).

In addition, it is likely that during a major emergency event, the City will need to contact and coordinate with the Washington State Department of Health.

Federal Government

The Department of Homeland Security is the lead federal agency in preventing terrorist attacks within the United States, reducing America's vulnerability to terrorism, and minimizing the damage from potential attacks and natural disasters. The department is divided into four major directorates: Border and Transportation Security, Emergency Preparedness and Response, Science and Technology, and Information Analysis and Infrastructure Protection.

The Emergency Preparedness and Response directorate oversees domestic disaster preparedness training and coordinating with government disaster responses. The directorate brings together into one unit the following entities:

- Federal Emergency Management Agency (FEMA)
- Strategic National Stockpile and the National Disaster Medical System (HHS)
- Nuclear Incident Response Team (Energy)
- Domestic Emergency Support Teams (Justice)

- National Domestic Preparedness Office (FBI)

Under this umbrella, FEMA (Region X (10)) administers the federal emergency preparedness, damage prevention, and response and recovery programs for Washington, Alaska, Idaho, and Oregon. FEMA provides pre-disaster and post-disaster assistance to minimize loss of life and reduce damage and economic loss from natural and technological hazards. In both pre-disaster and post-disaster efforts, FEMA works closely with state emergency management agencies, specifically the Washington Military Department, Emergency Management Division.

FEMA is responsible for the coordination of appropriate emergency plans and programs to ensure proper functioning of the various governments, the most effective utilization of available resources for emergency relief and rehabilitation, and the most expeditious recovery of the nation.

In addition, federal responses to disasters and emergencies may involve federal law enforcement agencies such as the Federal Bureau of Investigation (FBI) and public health agencies such as the Centers for Disease Control and Prevention (CDC) and the Environmental Protection Agency (EPA).

CHAPTER 2
COMMUNICATIONS

INTRODUCTION

This chapter outlines basic communications protocols and strategies for communicating during an emergency. The latter half of the chapter also includes contact lists for all appropriate entities that the department may want to contact in the event of a major emergency.

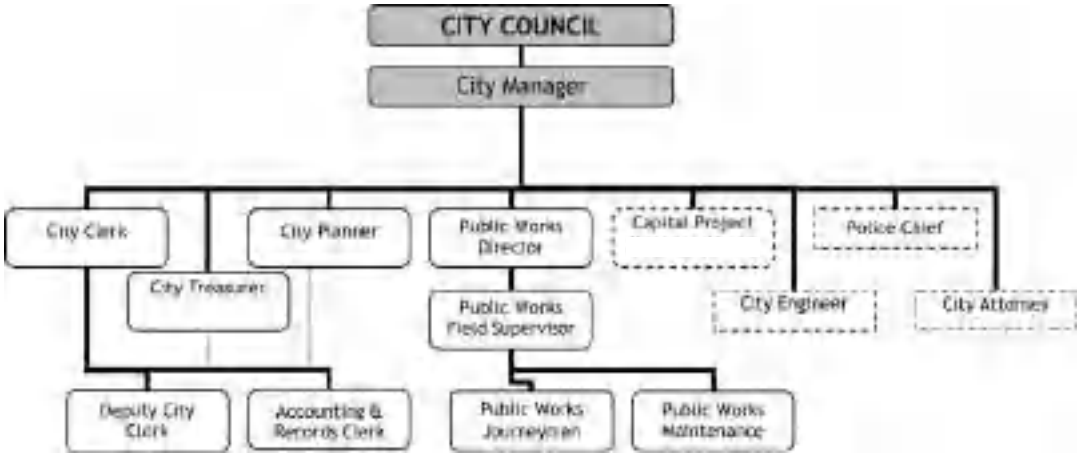
During a major emergency situation that extends beyond the normal departmental operations, the City's response will be directed through the Emergency Operation Center (EOC) located at City Hall: 4621 Tolt Avenue, Carnation, WA 98014-1238.

COMMAND STRUCTURE

The basic structure for the City's emergency response will be through the Incident Command System (ICS) which can be directed either from the EOC or onsite. The Incident Command System is used to stabilize an emergency by assigning a lead to provide strategic and tactical decisions. The lead of the ICS is an Incident Commander who can be based in any of the involved departments or agencies (though, most likely will depend on nature of situation).

This position may shift to reflect the fluid nature of each emergency situation and usually follows the path of the organization chart for the City of Carnation shown below. The Incident Commander is also typically selected as the overall spokesperson for the response. In an emergency event within the City, the City Manager or other designee is the ICS spokesperson.

Organizational Chart – City of Carnation



GENERAL COMMUNICATIONS

In the event of a major emergency event, it is highly likely that typical communications methods (land line telephones and cell phones) may be disrupted. Loss of power; physical damage to transmitters, towers, wires, and other equipment, as well as magnetic interference, may all affect communications.

It is natural, immediately after a major emergency event, for most people to attempt to contact family members, friends and others. However, these calls often result in undamaged phones lines becoming overwhelmed, thereby hindering the dissemination of important and possibly life saving information.

Federal agencies such as the National Oceanic and Atmospheric Administration (NOAA) and the Emergency Alert System (EAS) may be activated to provide news and information via local radio, television and cable broadcasters. KIRO Radio (710 FM) and KGHP (89.3) FM, 89.9 FM, and 104.5 FM are designated participants in the EAS and are recommended radio frequencies to monitor during an emergency or disaster.

In addition, localized information may be provided by door-to-door contact, loud speakers and public address systems.

The City of Carnation owns three 800 MHz radios. They are used to connect and establish a network of assistance in emergency situations with the City of Duvall and with the King County Emergency Center.

Internal (Staff) Communication

During a major emergency event, clear methods and protocols for internal communication should be followed. The field crew should have at their disposal contact numbers for all relevant individuals and agencies and at least one primary method for communication. These critical telephone numbers are included in this chapter.

In the event the land and cell phone lines are down, radio communications will be the primary source of crew to crew contact as well as contact with regional agencies.

When discovering a major emergency situation in the field, staff should immediately report the situation to City Hall.

If at any point there is a perceived threat to life and property, staff should immediately notify 9-1-1.

When reporting the situation, staff should clearly convey the size, magnitude and nature of the emergency, identify anyone who is with them, if deemed a relevant detail, and, if possible, identify a recommended course of action based on the initial assessment of the situation.

In the event that communication with City Hall cannot be made, the staff person should stabilize the situation, if it is safe to do so, and continue attempts to notify City Hall.

The public works department has an established on-call roster to handle emergencies that occur after working hours. At all times at least one person is on-call to respond to water system emergencies and one. The on-call number is located later in this chapter.

The on-call staff person must assess the situation, determine the appropriate level of response, and begin the response. If the emergency warrants, based on this assessment, the Public Works Field Supervisor should be notified immediately and all relevant staff should be called in to respond to the situation.

External (Public) Communication

The City of Carnation is responsible for continuous delivery of safe and reliable drinking water to its customers at all times. If the drinking water supply is restricted or becomes contaminated, people can become seriously ill or die. Any time the City's water system has a situation that poses a risk to public health, the City is required by state and federal law to notify customers. Additionally, notifying customers as quickly as possible when their water may not be safe to drink, gives them time to take actions to protect their health.

Recently, public notification requirements were revised to help ensure that customers will know if there is a problem with their drinking water that poses a risk to their health.

The new requirements apply to all Group A public water systems and must be implemented whenever a system is in violation of Drinking water quality or monitoring requirements,

Operating under a variance or exemption, or other situations that pose a public health risk, such as a disruption in service

Public Notification Requirements

The public notification rule sets timing and distribution requirements for notices and is based on the potential health impact of the violation or event. The violations and events are separated into three tiers based on potential health impact:

Immediate Notice (Tier 1): Any time a situation occurs where there is the potential for human health to be immediately impacted, water suppliers have 24 hours to notify people who may drink the water about the details of the situation. Water suppliers must use media outlets such as television, radio, and newspapers, post their notice in public places, or personally deliver a notice to their customers in these situations.

Violations that require 24-hour notification:

- Total coliform MCL violations where **fecal coliform** or ***E. coli*** are present, or failure to test for fecal coliform or *E. coli* when any repeat sample tests positive for coliform;
- **Nitrate**, **nitrite**, or **total nitrate and nitrite** MCL violations, or failure to take a confirmation sample for nitrate or nitrite within 24 hours after learning that an initial sample exceeded the MCL;
- Exceedance of the **nitrate MCL by non-community water systems** that have been granted permission by the primacy agency to continue to exceed the MCL of 10 mg/l, although they must not exceed 20 mg/l
- **Chlorine dioxide** MRDL violations when one or more of the samples **taken in the distribution system** on the day after exceeding the MRDL at the entrance of the distribution system or when required samples are not taken in the distribution system;
- **Turbidity** MCL violations of 5 NTU or more, **if elevated** to Tier 1 by the primacy agency, or if consultation does not occur within 24 hours of the violation;
- **Treatment technique** violations resulting from a single exceedance of turbidity limits, **if elevated** to Tier 1 by the primacy agency, or if consultation does not occur within 24 hours of the violation
- The occurrence of a **waterborne disease outbreak** or **other waterborne emergency** such as a treatment failure, chemical spill or overfeed, sewage spill, or natural disaster
- **Other violations or situations** which could cause serious health effects, **as determined by your primacy agency**.

Notice as soon as possible (Tier 2): Any time a water system provides water with levels of a contaminant that exceed EPA or state standards or that hasn't been treated properly, but that doesn't pose an immediate risk to human health, the water system must notify its customers as soon as possible, but at least within 30 days of the violation. Notice may be provided via the media, posting, or through the mail.

Annual Notice (Tier 3): When water systems violate a drinking water standard that does not have a direct impact on human health (for example, failing to take a required sample on time) the water supplier has up to a year to provide a notice of this situation to its customers. The extra time gives water suppliers the opportunity

to consolidate these notices and send them with annual water quality reports (consumer confidence reports).

All notices must include:

- A description of the violation that occurred, including the potential health effects
- The population at risk and if alternate water supplies need to be used
- What the water system is doing to correct the problem
- Actions consumers can take
- When the violation occurred and when the system expects it to be resolved
- How to contact the water system for more information
- Language encouraging broader distribution of the notice

Other aspects of the revised public notification rules include:

- An expanded list of violations and situations requiring 24-hour notification.
- Simplified health effects language.
- Standard language for monitoring violations.
- A requirement that purveyors send a copy of all public notifications and the certification of compliance with public notification regulations to the Department of Health.
- Allowing notices for individual violations to be combined into the annual Consumer Confidence Report, if public notification requirements can still be met.

The Public Works Field Supervisor, in coordination with the Public Works Director and the City Manager, is in charge of determining and facilitating the public notification requirements and procedures. This decision should be made after consulting with Public Health-Seattle and King County (the Health Department). Sample notification forms are located in **Appendix A**.

Communicating with the Media

During an emergency, the City of Carnation has designated the City Manager as the official City spokesperson, also known as the Public Information Officer (PIO). All contact with the media should be conducted through with the PIO. The PIO will work with the Public Works Director and the Public Works Field Supervisor to determine what, if any, announcements should be made to the media and the public. Such announcements could take the form of a press release, news conference, or interview.

The response should include:

- An initial statement to be issued to the media that includes basic information about the situation, including geographic boundaries and time frames.
- Contact information for release to the media.
- Reminder for employees to direct all media inquiries to the PIO.

Additionally, when speaking to the media, the Public Information Officer should:

- Be truthful and up-front about the situation
- Remain calm and answer questions as clearly as possible
- Do not hesitate to say that something needs to be verified before answering a question
- Provide only approved information
- Keep in mind that reporters may not be familiar with City services and be prepared to use "plain" language when describing the situation
- Be prepared to answer "likely" questions
- Do not answer hypothetical or "what if" questions
- If not all information is known, do not guess or make up information
- Remember, everything said to the media is "on-record"
- Do not assign blame
- Reinforce the fact that the City is working in a coordinated fashion to effectively respond to the situation
- Identify when the next media briefing will occur

General Tips on Writing a News Release

When writing a news release, include the following information:

- Identify designated media contact – the PIO
- Clearly state what has occurred
- Identify who has been affected
- Note what actions the City has taken
- Identify when operations will be returned to normal
- Include special instructions for the public
- Identify how and when additional information will be made available

TELEPHONE CONTACT LISTS

This section contains information for key contacts that the City may interact with during a major emergency event.

City of Carnation Personnel List (**Table 2.1**) **-** Identifies key water system personnel in a ranked order responsible for making decision in specific emergency situations.

Table 2.1 City of Carnation Personnel List				
Personnel	**Job Title/Responsibility**	**Telephone(Day)**	**Telephone(Night)**	**Email**
ON – Call Phone	Passed among personnel	(425) 333-4484	(425) 765-0508	clerk@carnationwa.gov

Local Notification List (Table 2.2) – Identifies critical organizations to be notified quickly in emergency situations.

Table 2.2 Local Notification List			
Organization	**Contact Name/Title**	**Telephone (Day)**	**Telephone (Night)**
Fire Department	East Side Fire & Rescue	(425) 333-3201 Station 87: 425 3334129	9-1-1
Police Department	KCSO Sheriff Communications Center	206 296 3311	9-1-1
Public Health-Seattle and King County	Drinking Water Program	(206) 296-4932	NONE
Local Hospital	Snoqualmie Valley Hospital	(425) 831-2300	9-1-1
EMS		9-1-1	9-1-1
Local Pharmacy	Safeway	(425) 844-1188	(425) 844-1188
Local Senior Center	Sno-Valley Senior Center Amara Oden	(425) 333-4152	(425) 765-9363 (Cell)
Local Schools	Riverview School District	(425) 844-4500 – Admin (425) 844-4530 - Maintenance	Same as day
Local Government Official	Phil messina	541 301 9642	
Local Hazmat Team	Eastside Fire	(425) 333-4129 (Fire)	9-1-1
Water System Operator	Bill Ferry	425 691 8353	425 691 8353
Neighboring Water System	KC Water District #119	(425) 788-2885	(206) 991-1867 (pager)
Neighboring Water System	Fall City Water System	(425) 222-7882	(425) 313-2138 (425) 417-8798 (425) 222-5040
Neighboring Water System	Ames Lake Water System	(425) 222-7003	(425) 864-3663
Neighboring Water System	City of Duvall	(425) 788-3434	(206) 977-8417
Neighboring Water System	City of Redmond	(425) 556-2846	(425) 556-2846

Contractor for Emergency Repairs List (Table 2.3) – Identifies contractors that in the case of emergency could provide assistance in repairs

Table 2.3
Emergency Repairs Contact List

Organization	Contact Name/Title	Telephone (Day)	Telephone (Night)	Email/Website
Electrician	Snoqualmie Valley Electric LLC / Mark Stevens / Owner	(425) 788-5887	(206) 856-2221	snovalleyelec@verizon.net
Telephone Utility Company	CenturyTel / Jack Ryan / Area Supervisor	(425) 888-0006	(425) 766-8135	Jack.ryan@centurytel.com
Plumber	Ground Hog Construction, LLC / Steve Mcfall / General Manager	(425) 333-4346	(206) 669-4865	steve@groundhogconstruction.com
Pump Specialist Primary	Pump Tech Inc. / Steve Skogmo (Primary) / Bob Williams (Secondary)	(425) 644-6501	(425) 864-1300 (Steve) (425) 864-1964 (Bob)	pumptech@seanet.com
"Dig Safe" or local equivalent	Underground Utility Locator (UULC)	(800) 424-5555	811	NA
Soil Excavator/Backhoe Operator	Earth to Earth LLC / Steve McFall / General Manager	(425) 333-6388	(425) 864-1340	steve@earthtoearthllc.com
Equipment Rental (Power Generators)	RCS Equipment Rental / Keith Wimmer / Sales Rep	(425) 885-4101	(425) 885-4101	Keith.wimmer@rscrental.com
Equipment Rental (Portable Fencing)	Security Contractor Services / Dave Bittner / Supervisor	(206) 767-7383	(206) 255-3117	NA
Equipment Repairman	GC Systems / Carol Wells / Tech Support / Gary Fletcher / Field Tech	(253) 939-8322	(206) 949-0253	NA
Radio/Telemetry Repair Service	KC Radio Communication Services / Tony Minor / Supervisor	(206) 205-8194	(206) 370-6136	NA
Bottled Water Source	Nestle (Arrowhead) – Tim Gates	(425) 844-3101	NA	NA
Bulk Water Hauler	Water Buffalo Inc.	(877) 278-2669	NA	NA
Bulk Water Hauler	McDonough and Sons Inc. 27218 Se Kent Kangley Rd Ravensdale, WA 98051	(425) 432-1054	NA	NA

Table 2.3
Emergency Repairs Contact List

Organization	Contact Name/Title	Telephone (Day)	Telephone (Night)	Email/Website
Pump Specialist Primary	Pump Tech Inc. / Steve Skogmo (Primary) / Bob Williams (Secondary)	(425) 644-6501	(425) 864-1300 (Steve) (425) 864-1964 (Bob)	pumptech@seanet.com
Well Drillers	Gregory Drilling 17611 NE 70th St Redmond, WA 98052	(425) 869-2372 (800) 433-9932	NA	http://www.gregorydrilling.com
Well Drillers	JKA Enterprises Inc. 21703 195th Avenue Southeast, Monroe, WA 98272	(360) 794-7300	NA	NA
Pipe Supplier	HD Fowler / Ryan Huff / Sales Rep	(425) 746-8400	(206) 255-4314	NA
Chemical Supplier	AirGas	(425) 487-3688	NA	NA
Local/Regional Analytical Laboratory	AmTest	(425) 885-1664	(425) 770-7037	NA
Water Engineer	Jorge Garcia Lochner	425 454 3160	206 200 3417	jgarcia@hwlocjner.com

Agency and Emergency Group List (Table 2.4) – Identifies agencies and groups that are designated to assist in emergency situations.

Table 2.4
Agency and Emergency Group List

Organization	Contact/Address	Telephone (Day)	Telephone (Night)
Washington State Department of Health	DOH Public Health Laboratories 1610 NE 150th St. Shoreline, WA 98155	(206) 418-5400	(877) 481-4901
Washington State Department of Ecology	3190-160th Avenue SE Bellevue, WA 98008 http://www.ecy.wa.gov/	(800) 272-3780 (425) 649-7000	(800) 258-5990
Certified Emergency Response Technicians (CERT) - Local Citizen Responders	Kathy Brasch (Primary) / Cherise Bromberg (Alternate #1) / Gene Laughlin (Alternate #2)	Kathy (425) 788-8260 Cherise (425) 333-0086 Gene (425) 844-9470	Kathy (425) 941-9295 Cherise (425) 333-0086 Gene (425) 947-1930
Public Health-Seattle and King County	Eastgate Public Health Ctr 14350 SE Eastgate Way Bellevue, WA 98007	(206) 296-4932	NONE
Chemical Spill	Chem Trec	(866) 734-3838	(866) 734-3838
Seattle Public Utilities Water Mgmt Section	George Schnedider – Water Resources	(206) 386-4041	(206) 780-1753
Emergency Management Agency	Emergency Management 24-Hr Operations Officer	(800) 258-5990	(800) 258-5990
Hazmat Hotline	Bellevue HAZMAT Team / Department of Ecology Northwest Regional Office	(425) 649-7000	(425) 649-7000

Media Notification List (**Table 2.5**) – Identifies designated personnel from Carnation to act as a spokesperson and media contacts in the area.

Table 2.5
Media Notification List

Organization	Contact Name / Title	Telephone	Email/Website
Designated Water System PIO	Phil Messina	(425) 333-4192 (office) 541 301 9642 (Cell)	philm@carnationwa.gov
Newspaper	Snoqualmie Valley Record / Leif Nesheim	(425) 888-2311 (425) 888-2427 (fax)	Leif.nesheim@valleyrecord.com www.valleyrecord.com
Newspaper	Valley View / Lisa Allen	(425) 483-0606 (425) 486-7593 (fax)	lallen@woodinville.com / www.nwnews.com
Newspaper	River Current News / Carol Ladwig	(206) 390-2101 (206) 914-2441 cell (866) 659-9105 (fax)	Cityliaison@rivercurrentnews.com editor@rivercurrent.news.com / www.rivercurrentnews.com
Newspaper	Seattle Times	(206) 464-2200	newstips@seattletimes.com
Newspaper	Seattle PI	(206) 448-8030	citydesk@seattlepi.com
Television	KCPQ – FOX Q-13 / Elizabeth Johnson	(206) 674-1461 (206) 674-1713	
Television	KIRO – CBS /	(206) 728-8308 (206) 441-4840	newstips@kirotv.com
Television	KING – NBC /	(206) 448-3850 (206) 448-4525	
Television	KOMO – ABC	(206) 404-4145 (206) 404-4422	
Radio	KIRO Newsradio – 710 AM	(206) 726-5446	

CHAPTER 3

VULNERABILITY ANALYSIS

This chapter provides basic guidance to help the City of Carnation respond to major emergency events that affect water services. The first section of the chapter outlines a summary of hazards and provides general responses to these major events. The second section of the chapter outlines specific action plans to those major events. Except for floods (Carnation is occasionally threatened by flooding) the Action Plans are general in nature and provide the City with an outline for a typical response to a known type of situation.

The major events that will be covered in this plan are:

- Earthquakes
- Severe Weather
- Floods
- Drought
- Contamination
- Hazardous Spill

SUMMARY OF HAZARDS

Earthquakes

Washington State, especially the Puget Sound Region, has a history of frequent earthquakes. More than 1,000 earthquakes are recorded annually in the state; a dozen or more causing noticeable shaking and occasional damage. The most recent large earthquake, on February 28, 2001, was a deep, 6.8 magnitude earthquake located 17.6 kilometers northeast of Olympia in Puget Sound.

The functionality of critical facilities will be even more vitally important than the immediate dollar losses following a major earthquake. Citizens are expected to be self-sufficient for up to three days following a major earthquake without reliance on government response agencies, utilities, private sector services and infrastructure components.

In the event of a damaging earthquake, disruption to the source, pumping, storage, and distribution components of the water system could occur. In addition, there may be power failures and interruption to the conventional transportation and communication systems.

Severe Weather

The Puget Sound area is subject to various types of local storms such as wind, snow, ice, hail and occasionally even tornados. Wind events occur with many different types of storms. Snow, ice, and hail storms occur occasionally both in Washington State and King County.

The general effects of most severe local storms are immobility and loss of utilities. Transportation routes can get blocked by fallen trees, commuters can get stranded and families can be separated. For gravity driven systems, a major threat are trees falling and breaking water lines. Other utilities, such as sewer systems, telephone systems and natural gas, may become inoperable during a power outage. The City has one portable electrical generator to power the chlorination during a power outage.

Flood

Flooding is a natural feature of the climate, topography and hydrology of Washington State and is a regular threat to the City of Carnation. There are basically three types of floods:

- A rising flood which occurs because of heavy prolonged rain, melting snow, or both
- Flash floods which are characterized by quick rise and fall of flood levels
- Wind-driven flood tides that combine wind and tides to flood coastal areas, which is not applicable to Carnation due to their inland location

Floods can cause loss of life and great damage to structures, crops, land resources, flood control structures, road and utilities. Flooding has the potential to damage critical City water system transmission and distribution mains.

Heavy snow melt and or rains have the potential to cause flooding and landslides in the City.

The South Fork Tolt River Dam failure would cause severe flooding in the City Carnation. The peak flow in Carnation would occur 1.4 hours after dam failure and would inundate the City with 20 feet of water. The citizens would need to evacuate to high ground, the best option being the Red Cross Facility shown on **Figure 1.3** directly east of the city and north of the reservoirs and maintenance facility.

Drought

Drought has the potential to affect nearly all areas of the state as well the majority of industry, agriculture and consumers. The City of Carnation is vulnerable to a

drought of several different levels. The drought action plan will address 5 different levels of severity ranging from mild to critical emergency.

Contamination

The premise of this threat is that the City has received a threat of, or discovered, contamination within the City's water system. (However, this plan can also be applied to suspected contamination events.) Threats are likely to be received in one of the following ways: notification from health professionals, witness account, notification by perpetrator, consumer complaint, unusual water quality, notification through the media, notification by law enforcement. Contamination can also occur through cross connections a or as a result of water main breaks.

Hazardous Materials Spill

City public works staff members are not equipped to respond, other than in a support role, to hazardous spills. Fortunately, the City's water source lies within a remote watershed and is not open to the public.

EARTHQUAKE ACTION PLAN

If an earthquake of significant magnitude occurs, the City's facilities may sustain damage. Specific elements of the system that should be of primary concern are transmission and distribution lines which may break and the reservoir, which may crack or otherwise be damaged, reducing the City's ability to provide water.

Immediately after an earthquake of any significance, the on-duty or on-call water system operator(s) shall inspect the system and report their findings back to the Public Works Director and the City Manager.

The following is a basic action plan related to water system damage assessment, stabilization, and recovery.

Assess the Situation

Step 1

Immediately after an earthquake, the City Manager should begin tracking employee locations and status. Staff members should attempt to contact City Hall as soon as possible to report on their location and status.

Staff members located inside structures during the earthquake should remain in the building and evacuate only after it is safe to do so. If there appear to be indications

that structural damage has occurred, staff members may need to evacuate the building. During an evacuation, staff should follow the evacuation routes and walk to the predetermined gathering place, or the parking on the south side of City Hall

Step 2

As staff member locations become clear and damage reports begin to surface, the City Manager (or designee) should initiate contact with the Public Works Field Supervisor and Public Works Director to provide a status report and initial response strategy.

Step 3

The Public Works Field Supervisor should begin implementing an initial response strategy to evaluate all critical facilities including:

- Well
- Springs
- Springs Horizontal Wells
- Transmission mains
- Reservoir
- Pressure Reducing/Sustaining Valve
- Generator
- River crossings

Evaluation of the facilities should include looking for structural damage (such as cracks), water outages, electrical damage (power outage), leaks, downed or potentially damaging trees, distribution system pressure monitoring, and customer/citizen reports.

Additionally, if the electrical power supply is disrupted, staff members should identify the location of available generators and fuel supplies and implement a schedule for pump and equipment service throughout the outage.

Stabilize

Step 4

As staff members encounter damage, they should identify, or if possible, undertake, corrective actions, if possible, to stabilize the situation. However, staff members should not attempt to undertake repairs for which they are not qualified.

Recommended stabilization actions may include isolating broken sections of pipe as they are located, evaluating reservoir levels, and shutting down the source.

Additionally, reservoirs should be checked for visual signs of structural damage, leakage and cracks. The reservoir may need to be isolated if suspected of significant structural damage, leaks or possible contamination.

As information is gathered, if there is any indication that water service or quality has been compromised, the Public Works Field Supervisor should notify the Public Works Director and City Manager and begin the process to ensure that proper public notification is issued. In the case of an earthquake, the quickest and most effective form of public communication will be door to door notification.

As staff members evaluate and repair the systems, they should remain in regular contact with the Public Works Field Supervisor to aid in further damage assessments and to help determine appropriate responses.

Step 5

As information regarding the damage and stabilization efforts is gathered, the Public Works Field Supervisor, in coordination with the Public Works Director and City Manager, should develop an immediate response plan that prioritizes repairs with the following in mind:

- Preventing additional damage/injuries
- Prioritizing emergency repairs, such as service to critical customers

The response plan should be continually monitored and adjusted as the stabilization and recovery efforts move forward.

Step 6

As more information becomes available, the Public Works Field Supervisor and Public Works Director should work with the City Manager to develop public and media statements that include information about the current situation within the City's water system.

Recover

Step 7

Throughout the entire process, work orders should be tracked and all damage documented (photographically if possible) as it may be possible for the City to be reimbursed by FEMA for the cost of repairing damage incurred during the event should the event be declared a disaster. Additionally, such record keeping represents good public policy and accounting of public monies.

All information that staff members can gather regarding damage and repairs will be essential in the City's efforts to track the costs of, and potentially recover financial damages from, the event.

Things to Consider When Evaluating the System

- Alternate water suppliers
- Back-up power
- Citizen, media and law enforcement/fire reports
- Collect all work orders to ensure accountability and reimbursement
- Labor Scheduling
- Public notification
- Monitor reservoir levels
- Structural and civil engineers

Other Considerations

- Coordinating with private contractors
- Coordinating with regulatory and law enforcement agencies
- Communications system failure
- Declaration of Emergency
- Evacuation
- Environmental pollution
- Equipment shortage
- Funding
- Large fire
- Loss of records
- Media relations
- Power outage
- Public health/Safety
- Public notification
- Staff shortage
- Transportation disruption
- Water rationing

SEVERE WEATHER ACTION PLAN

A severe storm can have significant effects on the City's ability to provide water services. However, typically, there is some warning of impending severe weather and the department can take steps to minimize the effects and prepare for responses.

Preparation for and Weathering the Storm

Step 1

All equipment should be fueled and ready to respond.

Step 2

The public works department should take appropriate steps to ensure that all facilities are sufficiently secured and prepared accordingly for the possibility of floods and power outages (sand bags, generator location and staff member scheduling).

Step 3

The Public Works Field Supervisor should direct the regular monitoring and evaluation of the City's systems, paying close attention to critical structures, facilities, and travel/transportation corridors. Monitoring should also include visually identifying potential hazards such as downed trees.

Step 4

If staff members become aware of an emergency situation, they should take corrective action to stabilize the problem and report to the Public Works Field Supervisor. However, staff should not attempt to undertake repairs for which they are not qualified.

If at any time the City's ability to provide water services is compromised, the Public Works Field Supervisor should work with the City Manager to issue a public statement with specific instructions for citizens.

Throughout the process, all staff should remain in regular contact with their supervisors.

Recovery

Step 5

As additional information regarding damage or potential damage is gathered, the Public Works Field Supervisor should develop an immediate response plan that prioritizes repairs with the following in mind:

- Preventing additional damage/injuries
- Prioritizing emergency repairs such as critical customers)

This plan may involve contacting appropriate contractors and staff members within other agencies.

The response plan should be appropriately adjusted and fine-tuned as new information is gathered and reported.

Step 6

As the storm subsides and the full extent of damage is known, the department should continue to coordinate with other City departments to develop a public statement regarding the City's systems.

Step 7

Throughout the entire process, work orders should be tracked and all damage documented (photographically if possible) as it may be possible to be reimbursed for the cost of repairing damage incurred during the event.

All information that the department can gather regarding damage and repairs will be essential in the City's efforts to recover financial damages from the event.

Things to Consider When Evaluating the System

- Alternate water suppliers
- Back-up power
- Citizen, media and law enforcement/fire reports
- Collect all work orders to ensure accountability and reimbursement
- Labor shifts
- Public notification
- Reservoir levels
- Structural and civil engineers

Other Considerations

- Communications system failure
- Coordinating with private contractors
- Coordinating with Regulatory and law Enforcement agencies
- Declaration of Emergency
- Environmental pollution
- Equipment shortage
- Evacuation
- Funding
- Loss of records
- Media relations

- Power outage
- Public health/safety
- Public notification
- Staff shortage
- Transportation disruption
- Water rationing

FLOOD ACTION PLAN

Floods within the City will typically be related to snow melt or heavy rains which may additionally result in landslides.

If a flood of significant proportions is anticipated or occurs, the City should follow these general steps:

Monitor

Step 1

The department should begin preparations for a possible flood by evaluating the most vulnerable locations listed below within the City, and taking steps to secure facilities (sand bags, etc.).

The department should continually monitor these priority locations throughout the situation.

Vulnerable locations that have been identified by Public Works staff, in ranked order:

- PRV Vault – Intersection of Carnation/Fall City Road and NE 32nd Street
- Above ground blow-off at dairy farm (Steve Foster's) on Tolt Hill Road
- Above ground blow-off in North end within Garden Tract subdivision

Assess

Step 2

If a flood or landslide occurs, the department should send all necessary staff to evaluate the situation and determine the appropriate next steps to:

- Prevent additional damage/injuries
- Prioritize emergency repairs

However, staff should not attempt to undertake any repairs for which they are not qualified.

The Public Works Field Supervisor should consult with the City Manager to develop a public statement related to the event.

Recover

Step 3

Throughout the entire process, work orders should be tracked as it may be possible to be reimbursed for damage incurred during the event. Once the event has ended, and recovery has begun, it is possible that state and federal agencies will be involved in assessing damage and financial reimbursement.

Written and photographic documentation are important components of the process.

Things to Consider When Evaluating the System

- Alternate suppliers
- Back-up power
- Citizen reports
- Labor shifts
- Mutual aid agreements
- Public notification
- Sand Bags
- Structural and civil engineers
- Collect all work orders to ensure accountability and possible reimbursement

Other Considerations

- Communications system failure
- Contamination of water system
- Coordinating with private contractors
- Coordinating with regulatory and law enforcement agencies
- Declaration of Emergency
- Environmental pollution
- Equipment shortage
- Evacuation
- Funding
- Loss of records
- Media relations
- Power outage

- Public health/safety
- Public notification
- Staff shortage
- Transportation disruption
- Water rationing

Additional Documents

- Facility Maps and Drawings
- Regional Emergency Plan
- Public Notification Forms

DROUGHT ACTION PLAN

The City follows a five stage plan for summer and fall water shortages:

- Stage 1 – Minor
- Stage 2 – Moderate
- Stage 3 – Serious
- Stage 4 – Severe
- Stage 5 – Critical Emergency

Summer Shortage Action Plan

Stage 1 – Minor Shortage Potential

- The overflow meter showing a lower than usual reading during the spring months may indicate a minor shortage in summer.

- Stream flow and snowmelt forecasts indicate that inflows would be inadequate to maintain historic stream flows during summer.

Action

- Eliminate all nonessential operating system water uses (i.e., pipeline flushing, reservoir overflow, etc.).

- Existing conservation programs should be used to primarily to stimulate public awareness of conservation without a specific message of a potential water shortage.

Stage 2 – Moderate Shortage Potential

- Total system storage is predicted to fall below the level required to meet demands during a 1-in-50 year drought.
- System inflows continue to be low.
- Weather forecasts predict a continuing trend of warmer, dryer than normal conditions.

Action

- The City should ask for **voluntary** reductions in outdoor water use by all customers (lawn watering, car washing, etc.).
- The City should also provide customers with information and ideas on how to curb water usage.

Stage 3 – Serious Shortage

- Total system storage drops below the level required to meet expected demands in a 1-in-50 year drought situation.
- System inflows continue to be low.
- Weather forecasts predict a continuing trend of warmer, dryer than normal conditions.

Action

- Decorative fountains and all amenity-type water uses should be shut down.
- The City should require outdoor water restrictions for all customers. Lawn irrigation would be limited, and customers would be asked to eliminate all other outdoor uses of water. Parks and golf courses would be placed on emergency schedules.
- Enforcement of water use restrictions should rely primarily on peer group pressure. However, if repeated violations occur in a specific neighborhood, the City should consider assigning a staff person to monitor the situation.
- Communication with the public and the media will be necessary.

Stage 4 – Severe Shortage

This stage is implemented when conditions as described in Stage 3 occur near the end of the peak use season. At this time, the amount of savings available from lawn watering reductions begins to decline sharply, making it necessary to generate savings in other ways.

Action

- Follow the same procedures for water management as identified in Stage 3.
- In addition to continuing outdoor water use restrictions, residential, commercial and industrial customers should be asked to voluntarily cut back on indoor water uses.
- Enforcement of water use restrictions should rely primarily on peer group pressure. However, if repeated violations occur in a specific neighborhood, the City should consider assigning a staff person to monitor the situation.
- Communication with the public and the media will be necessary.

Stage 5 – Critical Emergency

- This stage is implemented when demands on the system and system pressure requirements cannot be met and major water use reductions are necessary.

Action

- Follow the same procedures for water management as identified in Stage 3. Master meters should be read weekly. Additionally, system pressure may be reduced due to a lower availability of water. Local fire departments should be advised of any changes in system pressure which could impact fire flows.
- Water rationing may be required. When rationing is put into effect, user categories will be established and maximum water allocations will be set for each category. Customers will be required to reduce water use to the minimum amount possible.
- Communication with the public and the media will be necessary.
- Once rationing is in place, public information should be used to inform customers of enforcement measures and effective means of reducing water consumption while still maintaining personal health and safety.

- Enforcement measures should be strictly adhered to as adopted by the City Council.

Fall Shortage Action Plan

Stage 1 – Minor Shortage Potential

- Total system storage levels are dropping due to increased use associated with a warm, dry summer.
- Weather forecasts predict a continuing trend of warmer dryer than normal conditions.

Action

- Eliminate all nonessential operating system water uses (i.e., pipeline flushing, reservoir overflow, etc.).
- Existing conservation programs should be used to primarily to stimulate public awareness of conservation without a specific message of a potential water shortage.
- Communication with the public and the media will be necessary to inform customers of the situation.

Stage 2 – Moderate Shortage Potential

- Total system storage is expected to fall below the level required to meet expected demands during a 1-in-50 year drought.
- System inflows continue to be low.
- Weather forecasts predict a continuing trend of warmer and dryer than normal conditions.

Action

- The City should continue nonessential water use restriction.
- Customers should be asked to voluntarily reduce their outdoor water use by 20%.
- Communication with the public and the media will be necessary to inform customers of the situation.

Stage 3 – Serious Shortage Potential

- Stage 3 is implemented when conditions for Stage 2 occur near the end of the peak use season.

Action

- Decorative fountains and all amenity-type water uses should be shut down.
- The City should continue to ask customers to voluntarily reduce water usage.
- Enforcement of water use restrictions should rely primarily on peer group pressure. However, if repeated violations occur in a specific neighborhood, the City should consider assigning a staff person to monitor the situation.
- Communication with the public and the media will be necessary.

Stage 4 – Serious Shortage

- Total system storage drops below the level required to meet expected demands in a 1-in-50 year drought.
- System inflows continue to be low.
- Weather forecasts predict a continuing trend of dryer than normal conditions.

Action

- As in Stage 3, all nonessential water uses should be eliminated.
- Master meters should be read weekly and decorative fountains and amenity-type water uses should be discontinued.
- Residential customers should be asked to reduce usage by 30%.
- Commercial customers should be asked to reduce usage by 10%.
- Communication with the public and the media will be necessary.

Stage 5 – Critical Emergency

- Stage 5 is implemented when customer demands and system pressure requirements cannot be met and major reductions in water usage is required.

Action

- Water management techniques from Stage 4 should be followed and Fire Districts should be notified of any changes in system pressure which could impact fire flow.
- Water rationing may be required. When rationing is put into effect, user categories will be established and maximum water allocations will be set for each category. The goal for rationing should be a 40% reduction.
- Communication with the public and the media will be necessary.
- Once rationing is in place, public information should be used to inform customers of enforcement measures and effective means of reducing water consumption while still maintaining personal health and safety.
- Enforcement measures should be strictly adhered to as adopted by resolution of the Board of Commissioners.

CONTAMINATION ACTION PLAN

The City is likely to become aware of a contamination event in one of the following ways:

- Consumer complaint
- Notification from health professionals
- Notification by law enforcement
- Notification by perpetrator
- Notification through the media
- Unusual water quality
- Water samples
- Witness accounts
- Intrusion alarms
- Vandalism

Assess

Step 1

If a threat or possible notification of a threat is received in any way, staff should immediately contact their supervisor who will contact the Public Works Field Supervisor.

Step 2

The Public Works Field Supervisor should then bring together a team to evaluate the possibility of the threat. If the threat is determined to be not possible, then the City should notify law enforcement (9-1-1 and Federal Bureau of Investigation) and return to normal operations. If the threat is determined possible, move to Step 3.

Step 3

The director(s) should notify law enforcement (Carnation Police and Federal Bureau of Investigation) and relevant response agencies (Department of Health, and the Department of Ecology) that the City has received a "possible" threat. These agencies will be able to assist with the evaluation of the credibility of the threat.

At this point, operational responses should be considered, such as shutting off supply, meters, and main valves and potentially isolating relevant sections of the system to limit possible exposure.

Step 4

In conjunction with law enforcement and other agencies, the City should begin a "site characterization" that may include sample collection and testing, collection of physical evidence, documentation of evidence, and evaluation of environmental indicators to determine the credibility of the threat.

If the threat is at any point determined to be "not credible," the investigation should be closed, all actions documented and operations should return to normal. If the threat is determined "credible", move to Step 5.

Step 5

It is likely that the City will be receiving significant aid and direction from law enforcement and health agencies. At this point, the City, in coordination with other agencies, should work to determine the nature and possibility of contamination through samples, health reports, and any other means possible.

Samples can be evaluated by AmTest. However, it is highly recommended to work closely with the Department of Health and law enforcement agencies to determine what to test for and where to have the testing conducted.

If the threat is determined at any point to not be credible, the investigation should be closed, all actions documented and operations should return to normal.

If the threat is still credible, but not confirmed, the City, together with other agencies, should continue to take additional samples and pursue the investigation until such a time that the threat can be ruled out.

If, at any point, contamination is found, move to step 6.

Step 6

If a contaminant is confirmed, it is possible that the Department of Health or the Department of Ecology will take over the contamination response in coordination with law enforcement. However, the City should work closely with these agencies to ensure that proper notification is issued to the public.

Step 7

The City should work with involved agencies to develop an event-specific response to reduce possible exposure to the contaminant and recover from the event. Recovering from the event may include any of the following:

Cleaning up contaminated water:

- Treat to Use
- Mobile Treatment Units
- Off Site (piping or via truck) water sources
- Discard and flush
- Treat to dispose as wastewater, flush system
- Treat and discard as hazardous waste

Rehabilitation options for system components include:

- Flush the system
- Clean the system
- Pig system components
- Sandblast the system (reservoirs)
- Reline the system (reservoirs-future)
- Coat the system and piping if possible, as necessary
- Disinfect the system components
- Replace the system components
- Utilize current water system with new distribution system
- Condemn portions of, or the entire system

Step 8

As the situation is being resolved, the City, in coordination with other agencies, should keep the public notified about the status.

Throughout the entire process, work orders should be tracked as it may be possible to be reimbursed for damage incurred during the event. Once the event has ended, and recovery has begun, it is possible that state and federal agencies will be involved in assessing damage and financial reimbursement.

Things to Consider When Evaluating the System

- Alternate water suppliers
- Citizen and health agency reports
- Coordinate with other agencies
- Isolating facilities
- Labor shifts
- Moving water around
- Public notification
- Sample collection and testing
- Telemetry and visual system inspection

Other Considerations

- Coordinating with private contractors
- Coordinating with regulatory and law enforcement agencies
- Declaration of Emergency
- Evacuation
- Environmental pollution
- Funding
- Identification of contamination type
- Legal liability
- Media relations
- Public health/safety
- Public notification
- Staff shortage
- Water rationing

Additional Documents

- EPA Response Protocol Toolbox: *Planning for and Responding to Contamination Threats to Drinking Water Systems.* (http://www.epa.gov/safewater/watersecurity/pubs/rptb_response_guidelines.pdf)

- Public Notification Forms - Appendix A

HAZARDOUS MATERIAL SPILL ACTION PLAN

Hazardous materials spills are a very real hazard for the City. However, public works staff are not certified or trained to respond, other than in a supporting role, to hazardous spills.

Step 1

If staff members discover what appears to be a hazardous material spill, they should immediately contact their supervisor.

Step2

Staff should not attempt to stop or cleanup a hazardous material spill unless they are trained to do so and they can accomplish the task without subjecting anyone to any amount of danger.

Step 3

The department should immediately contact the City's HAZMAT responders and ensure that all employees are aware of the situation and instructed to avoid the area of the spill. Additionally, staff should be directed to evacuate the area if there is a health risk.

Step 4

When enough accurate information is known, the City, in coordination with other involved agencies, should evaluate whether or not to issue a public statement through the media. If no statement is made, a pre-written statement should be drafted to assist staff answering phones.

Additionally, it may be useful to contact residents and businesses in the immediate area.

In coordination with responding agencies, the department should support the area clean-up and then return to normal operations.

Other Considerations

- Contacting and coordinating with regulatory and response agencies
- Environmental pollution

- Evacuation
- Explosion
- Legal liability
- Media relations
- Public health/safety
- Public notification

Additional Documents

- Facility Maps and Drawings
- Regional Emergency Plan

CHAPTER 4

CONTINGENCY PLAN

Water contamination or disruption of supply may require that the water system get water from an alternative source to meet basic community needs. Carnation has planned ahead to provide alternate safe water during an emergency for short- and long-term outages. This chapter will cover the water system demand requirements, adjacent water systems, curtailing water use and additional supply sources.

WATER SYSTEM DEMAND REQUIREMENTS

Total annual water consumption in 2006 for Carnation's water system was 76.8 million gallons with single family accounting for 55.9 million gallons and multifamily accounting for 6.6 million gallons. Total water produced in 2006 was 134.9 million gallons, which is much greater than consumption, due to distribution leakage in Carnation's system.

Total daily consumption for Carnation's water system is 214,014 gallons, with single family accounting for 152,629 gallons, and multi-family accounting for 20,296. Non potable water can account for roughly half of the residential use making non-potable daily consumption approximately 71,338 gallons and potable daily consumption approximately 142,676 gallons.

SHORT TERM OUTAGES

Short-term outages might be due to contamination or electrical power outages. If Carnation's water system has been contaminated, a public health notification such as "Boil Water," "Do Not Drink, "or "Do Not Use," will be issued by Carnation. If a "Boil Water" notice is issued, no alternative water source is needed. If a "Do Not Drink" order is issued, then the suspect water can still be used for other activities that do not involve ingestion of the water. In this situation, it will only be necessary to provide an alternate drinking water supply for consumption

A "Do Not Use" order is much more restrictive. The City will need sufficient alternate water sources to supply water for consumption, hygiene, and emergency needs. A "Do Not Use" notice may also have implications with respect to water used for firefighting. Although a prohibition on use of water for firefighting is likely to occur only if the water is contaminated with certain toxic or dangerous substances, an alternate source of firefighting water, such as a pond, river, or stream, may be necessary in this event.

LONG-TERM OUTAGES

In the event that water supply is not accessible for over a week, a long-term solution to provide the City of Carnation with water must be found. Carnation has several nearby water suppliers, but has no interties with any of these systems. The local systems include King County Water District #119, Fall City Water System, Ames Lake Water System, and Duvall Water System.

Carnation maintains a friendly relationship with the City of Duvall and has an informal agreement between the two to assist one another in emergency situations.

Alternative Source of Water

Organization	Contact / Organization	Telephone (Day)	Email
Alternative Source	Tim Gates (Arrowhead)	(425) 844-3101	timgates@us.nestle.com
Bulk Water Hauler	Water Buffalo Inc.	(877) 278-2669	
Bulk Water Hauler	McDonough and Sons Inc. 27218 Se Kent Kangley Rd Ravensdale, WA 98051	(425) 432-1054	

Private Wells Within the City

Name	Address	Telephone (day)	Email	Water flow
Bob Gilbertson	4121 332nd AVE NE Carnation, WA 98014	(425) 333-4694		15 gpm

CURTAILING WATER USE

An emergency may require reducing water usage, therefore, Carnation has identified measures in advance. Carnation will require restrictions if necessary on landscape watering, car washing, filling swimming pools and hot tubs, and other nonessential activities such as cleaning driveways and sidewalks.

Carnation will use door to door postings to inform customers about the need to curtail water use.

Example Do Not Drink Notice

WARNING

DO NOT DRINK THE WATER

Bottled water can be obtained at [Tolt Middle School and 24 hours per day].

What should I do?

- Do NOT drink the water.
- Symptoms associated with cyanide include dry mouth, itchy throat, headache, sweating, flushed skin, muscle rigidity, fever, confusion, lethargy, seizures, loss of consciousness, coma, and death.
- If you or someone you know exhibits any of these symptoms, immediately contact your health care provider. In addition, please notify the Washington State Department of Health at 1.800.525.0127.

What happened? What is being done?

On October 10th, the water distribution system was contaminated with cyanide. We are working with law enforcement and the public health department to investigate/resolve this issue. We have tested the water in various parts of the distribution system to verify the extent of the cyanide contamination. Based on these tests, we have isolated the portion of the system located East of Tolt Avenue. Everyone in this portion of the system should not drink the water. We have implemented additional security procedures to protect the system against further contamination. We have turned off the water supply to all connections and homes in this area until further notice. .

For more information, please contact the City at (425) 333-4192. More information is also available from the EPA Safe Drinking Water Hotline at (800) 426-4794 and the Washington State Department of Health at (800)525-0127.

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.

This notice is being sent to you by the City of Carnation. Date distributed: [March XX, 200X].

Example Do Not Use Notice

WARNING

DO NOT USE THE WATER

City of Carnation water is contaminated with [parathion]

Bottled water can be obtained at the local middle school

Parathion was found in the water supply on [November 14]. This chemical can make you sick and may result in death.

What should I do?

- DO NOT USE THE WATER. You should not use the water for drinking, making ice, brushing teeth, washing dishes, washing clothes, bathing, food preparation, or watering lawns. Bottled water should be used for all of the above necessities until further notice.
- Parathion is a chemical usually used to kill insects. It can cause constriction of the pupils, blurred vision, muscle and abdominal cramps, excessive salivation, sweating, nausea, vomiting, dizziness, headaches, convulsions, diarrhea, weakness, labored breathing, wheezing, and unconsciousness. Exposure can even lead to death.
- If you or someone you know exhibits any of these symptoms, immediately contact your health care provider. In addition, please notify the Washington State Department of Health at 1.800.525.0127.

What happened? What is being done?

The water distribution system was contaminated with parathion. We are working with law enforcement and the public health department to investigate/resolve this issue. We have tested the water in various parts of the distribution system to verify the extent of the parathion contamination. Based on these tests, we have isolated the portion of the system located [east of Tolt Avenue]. Everyone in this portion of the system should not use the water. We have implemented additional security procedures to protect the system against further contamination.

For more information, please contact the City at (425) 333-4192. More information is also available from the EPA Safe Drinking Water Hotline at (800) 426-4794 and the Washington State Department of Health at (800) 525-0127.

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.

This notice is being sent to you by the City of Carnation. Date distributed: [March XX, 200X].

Example Boil Water Notice

WARNING

BOIL YOUR WATER BEFORE USING

City of Carnation is contaminated with [fecal coliform/E. coli]

[Fecal coliform or E. coli] bacteria were found in the water supply on [November 5]. These bacteria can make you sick and are a particular concern for people with weakened immune systems.

What should I do?

- DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a boil, let it boil for ten minutes, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and preparing food until further notice. Boiling kills bacteria and other organisms in the water.
- Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with organisms that can cause illness in humans. These organisms can cause diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
- Organisms in drinking water are not the only cause of the symptoms above. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care providers.

What happened? What is being done?

The water distribution system was contaminated with fecal coliform. We are working with law enforcement and the public health department to investigate/resolve this issue. We are currently increasing the chlorination levels at the treatment plant as well as at the chlorine booster stations throughout the system. In addition, we are evaluating all available information and conducting tests to confirm the extent of the contamination of the system. We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem within the next 48 hours.

For more information, please contact the City at (425) 333-4192. More information is also available from the EPA Safe Drinking Water Hotline at (800) 426-4794 and the Washington State Department of Health at (800)525-0127.

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. This notice is being sent to you by the City of Carnation. Date distributed: [March XX, 200X].

Example of Mandatory Conservation Notice

IMPORTANT NOTICE

To ensure that the integrity of the aquifer is not compromised, it is MANDATORY that you conserve water.

Our objective as a water utility is to provide water for household domestic use and Fire Protection. Unfortunately, a majority of the water usage during hot days is utilized for irrigation and other purposes.

If the last digit of your house number is even, then please water on even number days only. If the last digit of your house number is odd, then please water on odd number days only.

DO NOT IRRIGATE DURING "PEAK DEMAND" HOURS (5AM-9AM & 5PM-8PM). Again, this watering schedule is mandatory.

Thanks in advance for your cooperation.

Appendix G

Greenhouse Gas Emission Reduction Policy

TSW
06/20/16

RESOLUTION NO. 407

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CARNATION, WASHINGTON, ADOPTING GREENHOUSE GAS EMISSION REDUCTION POLICIES FOR THE CITY OF CARNATION.

WHEREAS, climate disruption of the magnitude now predicted by many in the scientific community threatens to cause an extremely costly disruption of human and natural systems throughout the world including: increased the risk of floods or droughts; sea-level rises that interact with coastal storms to erode beaches, inundate land and damage property; and more frequent and extreme heat waves and more frequent and greater concentration of smog; and

WHEREAS, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of greenhouse gas pollution; and

WHEREAS, many local governments throughout the nation, both large and small, are reducing the production of global warming pollutants through programs that provide economic and quality of life benefits, such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy; and

WHEREAS, many leading U.S. companies have adopted greenhouse gas reduction programs to demonstrate corporate social responsibility and have also publicly expressed a preference for the U.S. to adopt precise and mandatory emissions targets and timetables as a means

by which to remain competitive in the international marketplace, to mitigate financial risk and to promote sound investment decisions; and

WHEREAS, in 2007 and in 2008 the Washington State Legislature, through Engrossed Substitute Senate Bills 6001 and 6580 respectively, enacted legislation that includes aggressive goals for economy-wide reductions in greenhouse gas emissions and stringent performance standards to address climate change impacts; and

WHEREAS, the Washington State Department of Ecology is taking steps to assure climate change considerations are incorporated into environmental review under the State Environmental Policy Act (SEPA) Checklist and have established a Climate Advisory Team to clarify SEPA rules to include climate issues; and

WHEREAS, all state agencies must consider whether cities receiving capital funds have adopted policies to reduce greenhouse gas emissions per RCW 70.235.070; and

WHEREAS, the City Council finds the adoption of this resolution to be in the public's interest; NOW, THEREFORE,

IT IS HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF CARNATION AS FOLLOWS:

Section 1. Policy Adoption. Based on the foregoing findings, the City of Carnation hereby adopts the following policies as described in Exhibit "A", attached hereto and incorporated herein by this reference, for the benefit of the city's natural resources and the reduction of greenhouse gas emissions.

Section 2. Effective Date and Superseding Effect. This resolution shall become effective upon adoption by the Carnation City Council and shall supersede all previous local greenhouse gas emission reduction policies adopted by previous resolutions to the extent that

the same are inconsistent herewith.

ADOPTED BY THE CITY COUNCIL AT A REGULAR MEETING THEREOF

THIS 6TH DAY OF SEPTEMBER, 2016.

CITY OF CARNATION

MAYOR, JIM BERGER

ATTEST/AUTHENTICATED:

CITY CLERK, MARY MADOLE

RESOLUTION NO.: 407

Exhibit A

GREENHOUSE GAS EMISSION REDUCTION POLICIES FOR THE CITY OF CARNATION

Public Building Policies:

- Publicly funded buildings should incorporate cost-effective, energy- efficient design.
- Encourage energy conservation practices in buildings by raising the awareness of employees own energy use.

Employee Oriented Policies:

- Encourage ride-sharing, van-pooling and the use of flex-time schedules by employees
- Support voluntary, employer-based trip reduction programs.
- Encourage telecommuting options with new and existing employers, through project review and incentives, as appropriate.
- Encourage energy conservation practices in buildings by raising the awareness of employees own energy use.

Energy Source & Use Policies:

- Reduce greenhouse gases by expanding the use of conservation and alternative energy sources and by reducing vehicle miles traveled.
- Reduce pollutants from transportation activities, including through the use of cleaner fuels and vehicles
- Encourage energy conservation practices in buildings by raising the awareness of employees own energy use.

Fleet & Vehicle Policies:

- Encourage an energy-sensitive fleet management program.
- Encourage local purchasing to promote reductions in GHG emissions by the suppliers of its goods and services.

Equipment Oriented Policies:

- Manage street lighting needs by encouraging lighting standards and using lamps that will assure safe and effective illumination at minimum cost and energy use.
- Monitor the efficiency of the pumps in water and sewer systems, and operate and maintain them at peak efficiency. When cost effective options are possible, the one using the least amount of energy shall be preferred.

Waste Reduction & Use Oriented Policies:

- Implement a solid waste strategy which:
  - Reduces the solid waste stream by recycling and other means and
  - Promotes the purchase of recycled and recyclable goods
- Reduce GHG emissions waste through encouraging improved management of waste handling and reductions in waste generation.

Land Use Oriented Policies:

- Ensure that local Climate Action, Land Use, Housing, and Transportation Plans are aligned with, support, and enhance any regional plans that have been developed consistent with state guidance to achieve reductions in GHG emissions.
- Adopt and implement a development pattern that utilizes existing infrastructure where feasible.
- Seek to redirect new growth into existing city/urban growth areas.
- Encourage high-density, mixed-use, infill development and creative reuse of brownfield, under-utilized and/or defunct properties within the urban area.
- Whenever possible, urban development should occur only where urban public facilities and services exist or can be reasonably made available.

Public Education & Outreach Policies:

- Publicize energy conservation actions to raise public awareness of the value of wise energy use.
- Promote and encourage the expansion of recycling programs, purchasing policies, and employee education to reduce the amount of waste produced.

Transportation Oriented Policies:

- Give priority to transportation projects that will contribute to a reduction in vehicle miles traveled per capita, while maintaining economic vitality and sustainability.
- Provide safe and convenient access for pedestrians and bicyclists.
- Support voluntary, employer-based trip reduction programs.

Other Policies:

- Given the opportunity, coordinate with other agencies in region to develop and implement effective waste management strategies and waste-to-energy technologies.
- Establish programs and policies to increase the use of recycled water.
- Install water-efficient landscapes and irrigation.

Appendix H

Historical Water Production and Usage Data

Distribution System Leakage (DSL) Data Collection Worksheet - Year: 2008

Water Volume Entering Distribution System:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A.	Total Volume Produced - SPRINGS		844118	849866	1108957	880749	846390	1678075	1217647	1038235	1021791	830214	1006818	**11322860**
	Total Volume Produced - WELL		0	0	0	0	0	0	0	0	500	0	0	**500**
1 B.	Total Volume Purchased		0	0	0	0	0	0	0	0	0	0	0	**0**
1.	**Total Water Produced and Purchased (TP)**		**844118**	**849866**	**1108957**	**880749**	**846390**	**1678075**	**1217647**	**1038235**	**1022291**	**830214**	**1006818**	**11323360**

Total Volume Consumed:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A.	Water Volume Metered (billed and unbilled):													
	Single-family Residential		405600	410100	459900	551900	467111	1011289	828700	576650	499850	407160	668680	**6286940**
	Multi-family Residential		57700	59900	64300	69000	51600	70200	67000	95000	76900	68500	91200	**771300**
	Industrial/Commercial/ Institutional		112400	253500	149600	107400	138300	263800	314600	197000	54100	92800	148900	**1832400**
	Irrigation		300	300	6600	3100	56500	131100	148600	100200	55500	2600	0	**504800**
2 B.	Exported Water		0	0	0	0	0	0	0	0	0	0	0	**0**
2 C.	Estimated Authorized Uses (may be unbilled and unmetered):													
	Utility Flushing and Tank Cleaning		0	1960	1056	1500	0	0	100	100	0	0	0	**4716**
	Fire Fighting and Training		267	0	267	534	534	802	401	133	214	601	0	**3753**
	Storm or Sewer Cleaning		0	0	0	0	0	0	0	0	0	0	0	**0**
	Other		0	0	0	0	0	0	0	0	0	0	0	**0**
2.	**Total Authorized Consumption (AC)**		**576267**	**725760**	**681723**	**733434**	**714045**	**1477191**	**1359401**	**969083**	**686564**	**571661**	**908780**	**9403909**
3.	**Total Volume DSL**		**267851**	**124106**	**427234**	**147315**	**132345**	**200884**	**-141754**	**69152**	**335727**	**258553**	**98038**	**1919451**
4.	**Percent DSL**		**32%**	**15%**	**39%**	**17%**	**16%**	**12%**	**-12%**	**7%**	**33%**	**31%**	**10%**	**17%**

Distribution System Leakage (DSL) Data Collection Worksheet - Year: 2009

Water Volume Entering Distribution System:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A.	Total Volume Produced - SPRINGS	6025000	6121000	6358000	7430000	6742000	9699000	13760000	9471000	9874000	6196000	6239000	8850000	**96765000**
	Total Volume Produced - WELL	0	0	0	0	0	1246800	2506400	1234000	0	26800	0	0	**5014000**
1 B.	Total Volume Purchased	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1.	**Total Water Produced and Purchased (TP)**	**6025000**	**6121000**	**6358000**	**7430000**	**6742000**	**10945800**	**16266400**	**10705000**	**9874000**	**6222800**	**6239000**	**8850000**	**101779000**

Total Volume Consumed:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A.	Water Volume Metered (billed and unbilled):													
	Single-family Residential	2394348	3066052	2989756	3501388	3439304	5218048	6936204	7426144	4385524	3256044	2619496	3763188	**48995496**
	Multi-family Residential	324632	422620	430100	511632	451044	481712	614856	821304	534072	439076	374748	795124	**6200920**
	Industrial/Commercial/ Institutional	598026	661980	580448	759220	878900	2671108	3311396	6904040	1454112	689656	607376	1110780	**20227042**
	Irrigation	0	0	0	19448	38148	1074128	3565716	2253724	484704	184756	11220	36652	**7668496**
2 B.	Exported Water	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 C.	Estimated Authorized Uses (may be unbilled and unmetered):													
	Utility Flushing and Tank Cleaning	0	0	0	0	34386	57880	10494	18625	0	0	61628	11220	**194233**
	Fire Fighting and Training	0	0	0	0	5498	30997	41499	8998	20996	3598	0	0	**111587**
	Storm or Sewer Cleaning	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Other	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2.	**Total Authorized Consumption (AC)**	**3317006**	**4150652**	**4000304**	**4791688**	**4847279**	**9533873**	**14480165**	**17432836**	**6879408**	**4573130**	**3674468**	**5716964**	**83397774**
3.	**Total Volume DSL**	**2707994**	**1970348**	**2357696**	**2638312**	**1894721**	**1411927**	**1786235**	**-6727836**	**2994592**	**1649670**	**2564532**	**3133036**	**18381226**
4.	**Percent DSL**	**45%**	**32%**	**37%**	**36%**	**28%**	**13%**	**11%**	**-63%**	**30%**	**27%**	**41%**	**35%**	**18%**

Distribution System Leakage (DSL) Data Collection Worksheet - Year: 2010

Water Volume Entering Distribution System:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A.	Total Volume Produced - SPRINGS	8289000	6029000	7428000	6018000	6842000	6127000	10215000	11331000	7367000	6557000	5295000	7709000	**89207000**
	Total Volume Produced - WELL	500	0	0	0	33700	0	83000	305300	0	0	0	0	**422500**
1 B.	Total Volume Purchased	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1.	**Total Water Produced and Purchased (TP)**	**8289500**	**6029000**	**7428000**	**6018000**	**6875700**	**6127000**	**10298000**	**11636300**	**7367000**	**6557000**	**5295000**	**7709000**	**89629500**

Total Volume Consumed:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A.	Water Volume Metered (billed and unbilled):													
	Single-family Residential	3766928	3090736	2994244	3324112	3243328	3206676	5820936	6295168	3751220	2954600	2744412	3485680	**44678040**
	Multi-family Residential	513128	488444	439076	472736	364276	537064	563992	558756	510136	434588	384472	549780	**5816448**
	Industrial/Commercial/ Institutional	1274592	675444	633556	646272	729300	756976	2270928	3918772	1496000	715836	492184	744260	**14354120**
	Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 B.	Exported Water	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 C.	Estimated Authorized Uses (may be unbilled and unmetered):													
	Utility Flushing and Tank Cleaning	0	0	10996	12642	3838	748	0	1504	0	1003	255	0	**30986**
	Fire Fighting and Training	0	0	0	0	0	0	8003	501	3000	0	0	1609	**13113**
	Storm or Sewer Cleaning	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Other	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2.	**Total Authorized Consumption (AC)**	**5554648**	**4254624**	**4077872**	**4455762**	**4340742**	**4501464**	**8663859**	**10774701**	**5760356**	**4106027**	**3621323**	**4781329**	**64892707**
3.	**Total Volume DSL**	**2734852**	**1774376**	**3350128**	**1562238**	**2534958**	**1625536**	**1634141**	**861599**	**1606644**	**2450973**	**1673677**	**2927671**	**24736793**
4.	**Percent DSL**	**33%**	**29%**	**45%**	**26%**	**37%**	**27%**	**16%**	**7%**	**22%**	**37%**	**32%**	**38%**	**28%**

Distribution System Leakage (DSL) Data Collection Worksheet - Year: 2011

Water Volume Entering Distribution System:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A.	Total Volume Produced - SPRINGS	6887000	7179000	6415000	6349000	8106000	6114000	8228000	12472000	9605000	9741000	7908000	6721000	**95725000**
	Total Volume Produced - WELL	0	0	0	0	191400	260600	0	0	0	548600	0	0	**1000600**
1 B.	Total Volume Purchased	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1.	**Total Water Produced and Purchased (TP)**	**6887000**	**7179000**	**6415000**	**6349000**	**8297400**	**6374600**	**8228000**	**12472000**	**9605000**	**10289600**	**7908000**	**6721000**	**96725600**

Total Volume Consumed:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A.	Water Volume Metered (billed and unbilled):													
	Single-family Residential	2920940	3063060	3147584	2700280	3003968	3860428	4152148	6323592	4504456	3027904	3557488	2953852	**43215700**
	Multi-family Residential	448800	474232	512380	421872	453288	556512	546040	649264	519860	457028	636548	507892	**6183716**
	Industrial/Commercial/ Institutional	582692	756976	769692	726308	875160	899844	1521806	3459874	2714940	8484863	952204	771188	**22515547**
	Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 B.	Exported Water	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 C.	Estimated Authorized Uses (may be unbilled and unmetered):													
	Utility Flushing and Tank Cleaning	374	0	0	0	5505	135000	0	0	0	12000	0	0	**152879**
	Fire Fighting and Training	0	1000	1750	9100	6000	1700	4750	0	12000	1500	650	0	**38450**
	Storm or Sewer Cleaning	0												**0**
	Other	0												**0**
2.	**Total Authorized Consumption (AC)**	**3952806**	**4295268**	**4431406**	**3857560**	**4343921**	**5453484**	**6224744**	**10432730**	**7751256**	**11983295**	**5146890**	**4232932**	**72106292**
3.	**Total Volume DSL**	**2934194**	**2883732**	**1983594**	**2491440**	**3953479**	**921116**	**2003256**	**2039270**	**1853744**	**-1693695**	**2761110**	**2488068**	**24619308**
4.	**Percent DSL**	**43%**	**40%**	**31%**	**39%**	**48%**	**14%**	**24%**	**16%**	**19%**	**-16%**	**35%**	**37%**	**25%**

Distribution System Leakage (DSL) Data Collection Worksheet - Year: 2012

Water Volume Entering Distribution System:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A.	Total Volume Produced - SPRINGS	6498000	7666000	5810000	4767000	6437000	4723000	7686000	11706000	8446000	5690000	5787000	4811000	**80027000**
	Total Volume Produced - WELL	0	36700	0	0	0	0	50200	10200	0	0	0	0	**97100**
1 B.	Total Volume Purchased	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1.	**Total Water Produced and Purchased (TP)**	**6498000**	**7702700**	**5810000**	**4767000**	**6437000**	**4723000**	**7736200**	**11716200**	**8446000**	**5690000**	**5787000**	**4811000**	**80124100**

Total Volume Consumed:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A.	Water Volume Metered (billed and unbilled):													
	Single-family Residential	2983024	3449028	2805748	2961332	4086406	2848301	4701928	6793336	4377296	3627800	3357772	3027904	**45019875**
	Multi-family Residential	493680	580448	517616	520608	562496	427108	524348	616352	508640	460020	519112	466004	**6196432**
	Industrial/Commercial/ Institutional	2050268	939488	716584	752488	1177352	1319472	1669536	3774408	2859604	1179596	823548	594660	**17857004**
	Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 B.	Exported Water	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 C.	Estimated Authorized Uses (may be unbilled and unmetered):													
	Utility Flushing and Tank Cleaning	15000	910950	0	31000	148646	0	353400	520264	0	130836	732934	5000	**2848030**
	Fire Fighting and Training	3000	800	2500	12300	6400	5600	2500	10850	0	4000	0	350	**48300**
	Storm or Sewer Cleaning	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Other	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2.	**Total Authorized Consumption (AC)**	**5544972**	**5880714**	**4042448**	**4277728**	**5981300**	**4600481**	**7251712**	**11715210**	**7745540**	**5402252**	**5433366**	**4093918**	**71969641**
3.	**Total Volume DSL**	**953028**	**1821986**	**1767552**	**489272**	**455700**	**122519**	**484488**	**990**	**700460**	**287748**	**353634**	**717082**	**8154459**
4.	**Percent DSL**	**15%**	**24%**	**30%**	**10%**	**7%**	**3%**	**6%**	**0%**	**8%**	**5%**	**6%**	**15%**	**10%**

Distribution System Leakage (DSL) Data Collection Worksheet - Year: 2013

Water Volume Entering Distribution System:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A.	Total Volume Produced - SPRINGS	4892000	4257000	4252000	4534000	5665000	5737000	9199000	8510000	5052000	5415000	4559000	5442000	**67514000**
	Total Volume Produced - WELL	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1 B.	Total Volume Purchased	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1.	**Total Water Produced and Purchased (TP)**	**4892000**	**4257000**	**4252000**	**4534000**	**5665000**	**5737000**	**9199000**	**8510000**	**5052000**	**5415000**	**4559000**	**5442000**	**67514000**

Total Volume Consumed:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A.	Water Volume Metered (billed and unbilled):													
	Single-family Residential	2894012	2549184	2745160	2787796	3452020	3639790	6820264	5143996	3303168	3140104	2689808	3232108	**42397410**
	Multi-family Residential	534072	433840	449548	473484	645524	563992	741268	584936	608124	577456	533324	620092	**6765660**
	Industrial/Commercial/ Institutional	646272	795124	773432	718080	869176	933504	2288132	2633708	1091332	746504	653752	899844	**13048860**
	Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 B.	Exported Water	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 C.	Estimated Authorized Uses (may be unbilled and unmetered):													
	Utility Flushing and Tank Cleaning	535	0	0	28694	39000	0	94750	34200	13413	176000	2992	33586	**423170**
	Fire Fighting and Training	25500	5500	1000	7500	5500	6000	17150	10000	1200	0	5200	2000	**86550**
	Storm or Sewer Cleaning	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Other	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2.	**Total Authorized Consumption (AC)**	**4100391**	**3783648**	**3969140**	**4015554**	**5011220**	**5143286**	**9961564**	**8406840**	**5017237**	**4640064**	**3885076**	**4787630**	**62721650**
3.	**Total Volume DSL**	**791609**	**473352**	**282860**	**518446**	**653780**	**593714**	**-762564**	**103160**	**34763**	**774936**	**673924**	**654370**	**4792350**
4.	**Percent DSL**	**16%**	**11%**	**7%**	**11%**	**12%**	**10%**	**-8%**	**1%**	**1%**	**14%**	**15%**	**12%**	**7%**

Distribution System Leakage (DSL) Data Collection Worksheet - Year: 2014

Water Volume Entering Distribution System:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
1 A.	Total Volume Produced - SPRINGS	5811000	4931000	5096000	5163000	4778000	6297000	10473000	6635000	3610000	6796000	5390000	7306000	**72286000**
	Total Volume Produced - WELL	0	0	0	0	0	30900	11500	0	0	0	0	0	**42400**
1 B.	Total Volume Purchased	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1.	**Total Water Produced and Purchased (TP)**	**5811000**	**4931000**	**5096000**	**5163000**	**4778000**	**6327900**	**10484500**	**6635000**	**3610000**	**6796000**	**5390000**	**7306000**	72328400

Total Volume Consumed:

		JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
2 A.	Water Volume Metered (billed and unbilled):													
	Single-family Residential	3190220	2677840	2665124	3151324	3075028	4020500	6565196	5255448	3596384	3229116	2439228	3392180	**43257588**
	Multi-family Residential	532576	459272	549780	535568	480964	495176	661232	590920	474232	554268	435336	605880	**6375204**
	Industrial/Commercial/ Institutional	862444	1084600	761464	661232	895356	1279828	3105696	3377968	1291048	1008304	644028	676192	**15648160**
	Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 B.	Exported Water	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2 C.	Estimated Authorized Uses (may be unbilled and unmetered):													
	Utility Flushing and Tank Cleaning	835000	580000	4488	0	0	250	127183	0	0	23988	187000	71000	**1828909**
	Fire Fighting and Training	4800	8000	6000	0	3700	0	14000	5500	0	0	0	0	**42000**
	Storm or Sewer Cleaning	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Other	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2.	**Total Authorized Consumption (AC)**	**5425040**	**4809712**	**3986856**	**4348124**	**4455048**	**5795754**	**10473307**	**9229836**	**5361664**	**4815676**	**3705592**	**4745252**	67151861
3.	**Total Volume DSL**	**385960**	**121288**	**1109144**	**814876**	**322952**	**532146**	**11193**	**-2594836**	**-1751664**	**1980324**	**1684408**	**2560748**	5176539
4.	**Percent DSL**	**7%**	**2%**	**22%**	**16%**	**7%**	**8%**	**0%**	**-39%**	**-49%**	**29%**	**31%**	**35%**	7%

WATER CONNECTIONS BY CUSTOMER CLASS

CLASS	TOTAL	INSIDE	OUTSIDE	YEAR
SFR	708	539	169	
MFR	22	21	1	
COM	89	80	9	2014
SFR	707	538	169	
MFR	22	21	1	
COM	89	80	9	2013
SFR	707	538	169	
MFR	22	21	1	
COM	89	80	9	2012
SFR	707	538	169	
MFR	22	21	1	
COM	88	79	9	2011
SFR	707	538	169	
MFR	22	21	1	
COM	87	78	9	2010
SFR	707	538	169	
MFR	22	21	1	
COM	87	78	9	2009
SFR	705	536	169	
MFR	22	21	1	
COM	87	78	9	2008

NEW CONNECTIONS

	SFR	COM
2014	1	
2013		
2012		1
2011		1
2010		
2009	2	
2008		1
TOTAL	3	3

MFR total units served = 117

Inside city limits = 115 units

Outside city limits = 2 units

Appendix I

Planning Projections

Household and Population Projections
per City's Local Knowledge of Area

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1		2015 Forecast of Households and Population in UGA														
2																
3		**Sewer Basin**	**Ex HH**	**Proj New HH**	**Proj total HH**	**6 year Total HH**	**10 year Total HH**	**20 year Total HH**	**Comments**							
4	North Zone (229)	A	75	250	325	225	310	325	Includes Remlinger docket request - assume adoption in August							
5		B	72	5	77	75	77	77	In fill Old Plat							
6		C	86	10	96	92	95	96	In fill Old Plat							
7		D	12	15	27	22	25	27	Apts							
8		E	88	0	88	88	88	88	Regal Glen							
9		F	88	4	92	92	92	92	Brumbaugh + MHP							
10		G	0	0	0	0	0	0	Remlinger Farm							
11		H	18	0	18	18	18	18	Car Meadows + Delano							
12		I	2	118	120	76	100	120	The Estates	Note: request to expand UGA could add +/- 75 lots - may not happen but added to be conservative						
13		J	173	142	315	273	300	315	ex + new plats incl PAA East incl in 10 year							
14		K	2	0	2	2	2	2								
15		L	72	38	110	72	72	110	PAA/Garden Tracts							
16		M	2	98	100	2	2	100	PAA/Harvold							
17		N	8	2	10	8	10	10	Pfeiffer							
18		O	0	0	0	0	0	0	Open Space							
19		P	0	0	0	0	0	0	Open Space							
20		Q	0	0	0	0	0	0	Open Space							
21		R	2	0	2	2	2	2	Floodplain							
22		S	2	0	2	2	2	2								
23		**Total**	**702**	**682**	**1384**	**1049**	**1195**	**1384**								
24																
25		**In City**	**624**	**546**	**1170**	**971**	**1117**	**1170**								
26		**In PAA**	**78**	**136**	**214**	**78**	**78**	**214**								
27																
28		Population	1986.66	1930	3917	2969	3382	3917								
29		2.83	people per household													
30			= In City Limits													
31			= In PAA													
32																
33	South Zone (328)		**Ex HH***	**Proj New HH**	**Proj total HH**	**6 year Total HH**	**10 year Total HH**	**20 year Total HH**								
34		Single Family	82	22	104	95	104	104								
35		Multi-Family	3	1	4	4	4	4								
36		Mobile Home	15	2	17	16	17	17								
37		Comerial/ Institutional	3	0	3	3	3	3								
38		**Total**	**103**	**25**	**128**	**118**	**128**	**128**								
39																
40		Population	291	71	362	334	362	362								
41		In SA but outside UGA - very little new capacity. 25 new du's +/-. Would assume within next 10 years to be on the conservative side														
42		* Number per V:\2002\active\2002003728\003_plng and water demand frcstg\parcels_outside_uga_in wsa_20150321_bpw.xls														

Planning Data
Per Customer Class

Service Connections Inside UGA Boundary										
	Data Year	Planning Year	6-year Planning Period						10yr Planning	20yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single Family	539	598	652	706	761	816	870	921	1039	1200
Multifamily	21	22	24	25	27	28	30	31	41	51
Commercial	80	82	85	87	90	92	95	97	115	133
Total	640	702	761	819	878	936	995	1049	1195	1384

Service Connections Outside UGA Boundary										
	Data Year	Planning Year	6-year Planning Period						10yr Planning	20yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single Family	169	171	173	175	177	179	181	183	195	197
Multifamily	1	1	2	2	3	3	4	4	4	4
Commercial	9	9	9	9	9	9	9	9	9	9
Total	179	181	184	186	189	191	194	196	208	210

Total Service Connections										
	Data Year	Planning Year	6-year Planning Period						10yr Planning	20yr Planning
	2014	2015	2016	2017	2018	2019	2020	2021	2025	2035
Single Family	708	769	825	881	938	995	1051	1104	1234	1397
Multifamily	22	23	26	27	30	31	34	35	45	55
Commercial	89	91	94	96	99	101	104	106	124	142
Total	819	884	945	1005	1066	1127	1188	1245	1403	1594

CITY OF CARNATION, WA COMPREHENSIVE PLAN GROWTH & POPULATION FORECASTS - "A"

OFM City Population	2000	2007	2010	2011	2012	2013	2014	2015	2016	2017
	1890	1834	1786	1780	1785	1785	1790	1790	1850	2030

King Co. 2007 Buildable Lands	City Units + UGA Units = Total Units 430 + 369 = 799	(If City 2007 Pop. 1,834 + Current UGA 227 + New 2,237 = Future Pop. 4,298 ?)

PSRC/KING Co. 2006-2031 2011 Growth Forecast	New Units	Total Units	SF Units	MF Units	MU Units	2006-2031 UGA	2006-2031 Water
	+330	+800	+589	63	148	+369 units (100 Current)	O/S UGA 0

King Co. 2014 Update	City Units +330 Total Units w/ UGA +800	[1,834 pop. + 924 pop. (330) = 2,758 City pop. +227 Current UGA + 1,340 pop. (470) = 4,325 Future pop.

Carnation Comp. Plan Assumptions				
• 2013 Housing Element	2010 City & UGA Units 720-780	Future City& UGA Units 1,416-1,645	Future City & UGA Pop. 4,037-4,652	
• 2015 Land Use Element	2010 City/UGA/Total Pop 1,786/173/1,959	Future City/UGA/Total Pop 3,218/1,438/4,652		
• 2015 Water Forecast	2015 City Connects 702 2015 Total Connects 884	2020 City & UGA/Res. Connects 900 + 185 = 1,085	2031 Future Res. City & UGA + Commerical: 1,594 Connects	
• 2017 Water Service	2017 Water Connections: City/UGA/SA/Total 786/81/101/968	2035 Water Connections: City/UGA/SA/Total 1,384/210/1,594	2017 Res./Commercial/Total 891/76/967	2030 Pop. Served 4705

Carnation Comp. Plan 2017				
• 2020 City Limits Forecast	New Units 2030 Pop + 582	2020 Pop 2,612	PSRC City Forecast 2,770 (w/o UGA)	PSRC UGA Total 0 (227 Current)
• 2020 UGA Current & Forecast	81 Current units At 2.8 Pop/HH	Current UGA 227 Pop	New UGA + 2,382 (Pg. 2)	UGA 2035 = 2,609

• 2020-2031 Growth Forecast	City 2017	UGA 2017	Current 2017	Pop. + Growth = 2020 City	2017 UGA 2035 UGA	
	2,030	+ 227	= 2,257	2,030 + 582 = 2,612	+ 227	+ 2,382 = 5,221 + 210 Water S.A. = 5,431

5 YEAR CITY LIMITS BUILDOUT

	Total Units/Pop.	LTD Units	Q3 '17	Q4 '17	Q1 '18	Q2 '18	Q3 '18	Q4 '18	2019	2020	2021 Total Units/Pop.
Carnation 2017	2030 Pop.										
Tolt Town Site (Moritorium To 10/17)	20 / 57	12			4	2	2				
McKinley Corner	SF & MF 8 / 12					4	2	2			
Riverwalk	8 / 22					4	4				
Yarrington	80 / 228						10		30	40	
Anderson Short Plat	2 / 5							2			
Serene	11 / 32				3	4	4				
Davies	4 / 10						4				
Falkenberg	16 / 45								8	8	
Schomler	3 / 14								3		
Brooktree (16-17)	20 / 40	5 / 14	4	4	7						
Tolt Meadows (15-17)	25 / 80	22	3								
Sub-total Single Family Number of units / Population			11 / 31		58 / 165				41 / 117	48 / 137	158 / 450
Multi-family Number of Units / Population				12/22		12 / 22	24/44		12 / 22	12 / 22	72 / 132
Total New Units / Population			23 / 53		94 / 231				53 / 139	60 / 159	230 / 582

City Est: New 2017-2020	+582 population
Carnation 2020 Forecast Total City Limits Population (w/o UGA)	2612

PSRC 2007 City Limits (w/o UGA) Forecast 2006-2031:	Current UGA Pop. 227
2017: 1834 Pop. + 330 units/+940 (@2.85) Pop. = 2770 City Limits Total	PSRC UGA Pop. 0

FUTURE UGA POTENTIAL AT BUILDOUT

Current UGA / Forecast Beyond 2021	Number of Acres	Current Zone	Future Units	Future Population
Garden Tracts	61	R4	480	1043
Harvold Farms W	41	R6	322	917
Eastside Urban Growth Area	18 [14 in Buildable area]	R4	84	239
Harvold Farms E	19	R12	228	410
Future New UGA Total	135	R4-R12	720 - 1000 - 1114	1,626 - 2382 - 2609

City Limits 2021 Forecast (Pg. 1)	2,612
Current UGA Population	227 Population
Future UGA 2021 and Beyond	+2,609 population
Future Forecast Total Carnation Population (City & UGA)	5,221

Growth Forecast Summary		
PSRC Est.	CITY Est.	NOTES
N/A	2030	2017 OFM Pop.
N/A	582	2017-2020 City Limits
2,758 (See "A")	2,612	City Limits at Buildout
[227] *	227	Current UGA Pop.
[1,316 pop/420 units] *	1,626 - 2382 - 2609	Future UGA Growth
4,301 pop.	4,238 - 5221	Total City/UGA (Low - High)
[210] *	210 Current	Water Service Area O/S
4,511	4,705-5,431	Future Water Pop. (Low-High)

*Omitted (Included In City Limits Total)

	2021	2022	2023	2024
New Commercial Square Feet	4,000	7,000	7,000	7,000

Appendix J

Water Quality Data

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(4[illegible] 85-1664

AM TEST LABORATORIES

Drinking Water Report

CITY OF CARNATION
AUG 30 2010
RECEIVED

Professional Analytical Services

System ID No.: 11200B	System Name: City of Carnation City of Carnation		
Lab/Sample No: 06612802	Date Collected: 08/03/2010	DOH Source No: S01	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 8/ 3/10	Date Reported: 8/26/10		Supervisor: AY
Date Digested:	Date Analyzed (Nitrates):		Analyst:
County: King	Group: A		
Sample Location: 32610 NE 47th			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat O. PO Box 1238 Carnation, WA 98014		

Haloacetic Acids

Analyte	Result	Units	SRL	MCL	Analysis Date	Analyst
Monochloroacetic Acid	ND	ug/L	1.50		8/16/10	MO
Monobromoacetic Acid	ND	ug/L	1.00		8/16/10	MO
Dichloroacetic Acid	ND	ug/L	1.50		8/16/10	MO
Trichloroacetic Acid	ND	ug/L	0.50		8/16/10	MO
Dibromoacetic Acid	ND	ug/L	0.50		8/16/10	MO
Total HAA's	ND	ug/L	5.0	60.	8/16/10	MO

Surrogate

2-Bromopropionic Acid	70. %

Trihalomethanes

DOH#	Analyte	Result	Units	SRL	MCL	Exceeds MCL	Analysis Date	Analyst
27	Chloroform	ND	ug/L	0.5			8/17/10	CG
28	Bromodichloromethane	ND	ug/L	0.5			8/17/10	CG
29	Chlorodibromomethane	0.6	ug/L	0.5			8/17/10	CG
30	Bromoform	ND	ug/L	0.5			8/17/10	CG
31	Trihalomethane Total	0.6	ug/L	0.5	80.0	NO	8/17/10	CG

Surrogate

Bromofluorobenzene	96.7 %

NOTES:
SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH)
MCL (Maximum Contaminant Level): Indicates the maximum contaminant level specified by the Washington Department of Health (DOH)
NA (Not Analyzed): In the results column indicates this compound was no included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: [signature]

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

Drinking Water Report

CITY OF CARNATION
AUG 30 2010
RECEIVED

Professional Analytical Services

System ID No.: 11200B	System Name: City of Carnation City of Carnation		
Lab/Sample No: 06612803	Date Collected: 08/03/2010	DOH Source No: S01	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 8/ 3/10	Date Reported: 8/26/10		Supervisor: AY
Date Digested:	Date Analyzed (Nitrates):		Analyst:
County: King	Group: A		
Sample Location: Trip Blanks			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat O. PO Box 1238 Carnation, WA 98014		

Haloacetic Acids

Analyte	Result	Units	SRL	MCL	Analysis Date	Analyst
Monochloroacetic Acid	ND	ug/L	1.50		8/16/10	MO
Monobromoacetic Acid	ND	ug/L	1.00		8/16/10	MO
Dichloroacetic Acid	ND	ug/L	1.50		8/16/10	MO
Trichloroacetic Acid	ND	ug/L	0.50		8/16/10	MO
Dibromoacetic Acid	ND	ug/L	0.50		8/16/10	MO
Total HAA's	ND	ug/L	5.0	60.	8/16/10	MO

Surrogate

2-Bromopropionic Acid	76. %

Trihalomethanes

DOH#	Analyte	Result	Units	SRL	MCL	Exceeds MCL	Analysis Date	Analyst
27	Chloroform	ND	ug/L	0.5			8/17/10	CG
28	Bromodichloromethane	ND	ug/L	0.5			8/17/10	CG
29	Chlorodibromomethane	ND	ug/L	0.5			8/17/10	CG
30	Bromoform	ND	ug/L	0.5			8/17/10	CG
31	Trihalomethane Total	ND	ug/L	0.5	80.0	NO	8/17/10	CG

Surrogate

Bromofluorobenzene	96.9 %

NOTES:
SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH)
MCL (Maximum Contaminant Level): Indicates the maximum contaminant level specified by the Washington Department of Health (DOH)
NA (Not Analyzed): In the results column indicates this compound was no included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): Indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AM EST LABORATORIES

Professional Analytical Services

CITY OF CARNATION

RECEIVED AUG 15 2013

HALOACETIC ACID (HAA5) TEST PANEL

(HAA5'S by EPA Method 552.2)

Distribution System - Report of Analysis

HALOACETIC ACIDS	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11200B	System Name: CITY OF CARNATION
Source: S02 (Distribution samples)	County: KING
Sample Location: 31610 NE 47TH ST	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ - R - Routine/Compliance (satisfies monitoring requirements) ☐ - C - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received: 08/01/13 Date Analyzed: 8/ 8/13 Date Reported: 8/12/13 Comments:
Sample Composition: (Check Appropriate Box) ☐ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☑ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: CARL MUELLER Phone Number: 425-765-7104
Send Report To: CITY OF CARNATION PO BOX 1238 CARNATION, WA 98014	Bill To: CARL MUELLER PO BOX 1238 CARNATION, WA 98014

EPA REGULATED

DOH# ANALYTE	(0411) MCAA (ug/L)	(0412) DCAA (ug/L)	(0413) TCAA (ug/L)	(0414) MBAA (ug/L)	(0415) DBAA (ug/L)	(0416) HAA5's (ug/L)
SRL	2	1	1	1	1	6
Trigger Level	--	--	--	--	--	45*
MCL	--	--	--	--	--	60*
Analytical Method (Analyst Initials)	EPA 552.2 /JH	EPA 552.2 /SH	EPA 552.2 /JH	EPA 552.2 /JH	EPA 552.2 /JH	EPA 552.2 /JH

RESULTS

Lab Number / Sample Number	Date Collected	Location Where Sample Collected	MCAA (ug/L)	DCAA (ug/L)	TCAA (ug/L)	MBAA (ug/L)	DBAA (ug/L)	HAA5's (ug/L)
066 / 10722	08/01/2013	31610 NE 47TH ST	< 1.5	< 1.5	< 0.5	< 1	< 0.5	< 1
066 / 10723	08/01/2013	31610 NE 47TH ST TRIP BLANK	< 1.5	< 1.5	< 0.5	< 1	< 0.5	< 1

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1684

AMTEST LABORATORIES

Professional Analytical Services

HALOACETIC ACID (HAA5) TEST PANEL

(HAA5'S by EPA Method 552.2)

Distribution System - Report of Analysis

NOTES:

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your drinking water regional office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.

NA (Not Analyzed): In the results column, indicates this compound was no included in the current analysis.

ND (Not Detected): In the results column, indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab MRL).

~ Any existing value

Comments:

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1064

AM EST LABORATORIES

CITY OF CARNATION
SEP 09 2014
RECEIVED

Professional Analytical Services

HALOACETIC ACID (HAA5) TEST PANEL
(HAA5'S by EPA Method 552.2)
Distribution System - Report of Analysis

HALOACETIC ACIDS	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11200B	System Name: City of Carnation
Source: S02 (Distribution samples)	County: King
Sample Location: 31610 NE 47th St.	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ R - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O - Other (specify)	Date Received: 09/05/14 Date Analyzed: 9/ 2/14 Date Reported: 9/ 4/14 Comments:
Sample Composition: (Check Appropriate Box) ☐ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos field) ☐ C - Composite (Specify in Comments Field) ☑ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number: 425-765-7104
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014

EPA REGULATED

DOH# ANALYTE	(0411) MCAA (ug/L)	(0412) DCAA (ug/L)	(0413) TCAA (ug/L)	(0414) MBAA (ug/L)	(0415) DBAA (ug/L)	(0416) HAA5's (ug/L)
SRL	2	1	1	1	1	6
Trigger Level	--	--	--	--	--	45*
MCL	--	--	--	--	--	60*
Analytical Method (Analyst Initials)	EPA 552.2 /MLN	EPA 552.2 /MLN	EPA 552.2 /MLN	EPA 552.2 /MLN	EPA 552.2 /MLN	EPA 552.2 /MLN

RESULTS

Lab Number / Sample Number	Date Collected	Location Where Sample Collected	MCAA (ug/L)	DCAA (ug/L)	TCAA (ug/L)	MBAA (ug/L)	DBAA (ug/L)	HAA5's (ug/L)
066 / 11956	09/05/2014	31610 NE 47th St	< 1.5	< 1.5	< 0.5	< 1	1.39	1.4

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

Professional Analytical Services

HALOACETIC ACID (HAA5) TEST PANEL
(HAA5'S by EPA Method 552.2)
Distribution System - Report of Analysis

NOTES:
SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH).
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your drinking water regional office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.
NA **(Not Analyzed):** In the results column, indicates this compound was no included in the current analysis.
ND **(Not Detected):** In the results column, indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab MRL).
—(**existing value**

Comments:

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(42' '5-1664

AMTEST LABORATORIES

Professional Analytical Services

LEAD & COPPER IN DRINKING WATER

Date Collected: See Below	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11200B	System Name: City of Carnation
Lab--Sample No: 066--12734	County: King
Sample Location: #1 31816 West Morrison St.	Source Number(s): S03
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received: 09/01/11 Date Analyzed: 9/ 6/11 Date Reported: 9/ 9/11 Comments:
Sample Composition: (Check Appropriate Box) ☐ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☑ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: Homeowners Phone Number:
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014, WA 98014

DOH#	9 (Lead)	23 (Copper)
SRL	0.002 mg/L	0.20 mg/L
MCL	0.015 mg/L	1.3 mg/L

Lab sample #	Date Collected	Site/Location	SID	Lead mg/L (Method 200.8)	Copper mg/L (Method 200.8)
06612734	9/ 1/11	#1 31816 West Morrison St.	0230[illegible]	ND	ND
06612735	9/ 1/11	#2 32121 East Rutherford St.	0404000	ND	0.36
06612736	9/ 1/11	#3 4401 Royal Court	0473000	0.0024	0.42
06612737	9/ 1/11	#4 32011 Palace Court	0485000	ND	0.28
06612738	9/ 1/11	#5 32007 Palace Court	0493000	0.0030	0.47
06612739	9/ 1/11	#6 4203 Regency Place	0491000	ND	0.29
06612740	9/ 1/11	#7 4204 Regency Place	0493000	ND	0.33
06612741	9/ 1/11	#8 4209 Regency Place	0488000	ND	0.46
06612742	9/ 1/11	#9 4308 Royal Place Ct.	0464000	ND	0.38
06612743	9/ 1/11	#10 4412 Royal Court	0469000	ND	0.27

NOTES:
SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): in the results column indicates this compound was not included in the current analysis.
ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
< In indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Lead and copper consumer notice and certification form

Group A water systems that conduct lead and copper monitoring must provide individual sampling results to the persons at each sample location. You must also submit the form below to the Washington State Department of Health (DOH) to verify that you completed the notification. You should select all sites for lead and copper sampling from your current lead and copper sampling pool.

Notification of Results: The water system must provide the consumer notice as soon as possible, but no later than 30 days after learning the results.

Community water systems: You must provide individual sampling results to all residences where you collected lead and copper samples. In multi-unit structures, notify only each unit tested.

Nontransient noncommunity water systems (NTNCs): You must notify all consumers who use water from the sample tap, even if they do not receive a water bill. With prior approval from DOH, NTNC water systems can post the notice in public areas.

Certification to the state: DOH must receive a sample copy of one consumer notice and a signed certification form (below) within 90 days after the monitoring period ends.

To meet this reporting requirement, you may:

- Use the DOH Consumer Notice Template.
- Use the applicable EPA Consumer Notice template.
- Prepare your own Consumer Notice in conjunction with the state.

If you choose to produce your own Consumer Notice, it must include all of the following:

1. The sample results of the tap tested.
2. An explanation of the health effects of lead.
3. Steps consumers can take to reduce exposure to lead in drinking water.
4. The water system's contact information.
5. The maximum contaminant level goal (MCLG) and action level for lead, and the definitions of these two terms.

Lead and Copper Results: Consumer Notification Certification Form

The water system must complete this section. The signature below certifies that the notice contains all required elements.

Washington State Department of Health

Complete the following items (check all that apply):

- ☒ Results received from lab on ____/____/____.
- ☒ Notice mailed to water users at each sample site location on 4 / 16 / 2012
- ☐ Notice hand delivered to water users at each sample site location on 9 / 12 / 2011
- ☐ Notice posted at _____ on ___/___/___.

(By Department Approval Only)

112008	Lil [illegible]	Superintendent	4-19-12
PWS ID	Signature of owner or operator	Position	Date

Within 90 days after the monitoring period ends, send a copy of the completed notice and this certification form to: Washington State Department of Health, Office of Drinking Water, Water Quality Section, PO Box 47822, Olympia WA 98504-7822 or fax to (360) 236-2252.

DOH Form 331-462 (09/11)

If you need this publication in alternate format, call (800) 525-0127. For TTY/TDD, call (800) 833-6388

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 32121 E. Rutherford St.

are: lead ND (none detected) mg/L and copper 0.36 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

4621 TOLT AVENUE • P. O. BOX 1238 • CARNATION, WA • 98014-1238
PHONE: (425) 333-4192 • FAX: (425) 333-4334
WWW.CARNATIONWA.GOV

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 31816 W. Morrison St.

are: lead ND (none detected) mg/L and copper ND (none detected) mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

4621 TOLT AVENUE • P. O. BOX 1238 • CARNATION, WA • 98014-1238
PHONE (425) 333-4192 • FAX: (425) 333-4236
WWW.CARNATIONWA.GOV

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4401 Royal Ct.

are: lead 0.0024 mg/L and copper 0.42 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

4621 TOLT AVENUE · P. O. BOX 1238 · CARNATION, WA · 98014-1238
PHONE: (425) 333-4192 · FAX: (425) 333-4336
WWW.CARNATIONWA.GOV

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 32011 Palace Ct.

are: lead ND (none detected) mg/L and copper 0.29 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 32007 Palace Ct.

are: lead 0.0030 mg/L and copper 0.47 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

4621 TOLT AVENUE • P. O. BOX 1258 • CARNATION, WA • 98014-1258
PHONE: (425) 333-4192 • FAX: (425) 333-4526
WWW.CARNATIONWA.GOV

How Lead Gets into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4203 Regency Pl.

are: lead ND mg/L and copper 0.28 mg/L.

none detected

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

How Lead Gets into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4204 Regency Pl.

are: lead ND (none detected) mg/L and copper 0.33 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

4621 TOLT AVENUE • P. O. BOX 1238 • CARNATION, WA • 98014-1238
PHONE: (425) 333-4192 • FAX: (425) 333-4336
WWW.CARNATIONWA.GOV

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4209 Regency Pl.

are: lead ND (non detected) mg/L and copper 0.40 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4308 Royal Ct.

are: lead ND (none detected) mg/L and copper 0.33 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

4621 TOLT AVENUE • P. O. BOX 1238 • CARNATION, WA • 98014-1238
PHONE: (425) 333-4192 • FAX: (425) 333-4223
WWW.CARNATIONWA.GOV

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

CITY OF CARNATION

CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation, Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4412 Royal Ct.

are: lead ND (none detected) mg/L and copper 0.27 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. We will notify all water users if the lead or copper results from our water system exceed the action level.

*** *Please see the reverse side of this page for information regarding lead and copper.*

For more information, please contact: Bill Ferry, Public Works Field Superintendent at (425) 333 – 4192 or at Carnation City Hall, 4621 Tolt Avenue or via email at billf@ci.carnation.wa.us.

This notice is sent to you by City of Carnation Water System on April 18, 2012.

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's disease are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkl WA 98034
425, -1664

AMTEST LABORATORIES

Professional Analytical Services

LCR TEST PANEL
Lead and/or Copper

CITY OF CARNATION

RECEIVED AUG 14 2013

Distribution System - Report of Analysis

Lead and Copper Analyses	System Group Type: ☑ A ☐ 6 ☐ Other
Water System ID Number: 112089	System Name: CITY OF CARNATION
Source: S96 (Distribution Samples)	County: KING
	Consecutive System:
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received: 08/01/13 Date Analyzed: 8/ 6/13 Date Reported: 8/ 6/13 Comments:
Sample Composition: (Check Appropriate Box) ☐ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☑ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: CARL MUELLER Phone Number: 425-765-7104
Send Report To: CITY OF CARNATION PO BOX 1238 CARNATION, WA 98014	Bill To: CARL MUELLER PO BOX 1238 CARNATION, WA 98014

EPA REGULATED and STATE REGULATED OR REQUIRED

(DOH-5) Analyte	(0009) Lead	(0023) Copper
State Reporting Level (SRL)	0.001 mg/L	0.02 mg/L
Regulatory Action Level	0.015 mg/L	1.3 mg/L
Analytical Method / Analyst's Initials	EPA 200.8 / CG	EPA 200.8 / CG

Results

Lab Number / Sample Number	Date Collected	Sample Location	Lead (mg/L)	Copper (mg/L)
066-10729	07/26/2013	31816 WEST MORRISON ST.	ND	0.042
066-10730	07/26/2013	32121 EAST RUTHERFORD ST.	ND	0.47
066-10731	07/26/2013	4401 ROYAL COURT	ND	0.43
066-10732	07/25/2013	32011 PALACE COURT	ND	0.16
066-10733	07/25/2013	32007 PALACE COURT	0.0030	0.36
066-10734	07/31/2013	4203 REGENCY PLACE	ND	0.50
066-10735	07/29/2013	4204 REGENCY PLACE	ND	0.068
066-10736	07/24/2013	4209 REGENCY PLACE	ND	0.37
066-10737	07/29/2013	4308 ROYAL COURT	ND	0.33
066-10738	07/25/2013	4442 ROYAL COURT	ND	0.16

NOTES:
*Confirmation: Include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.
*State Reporting Level): The minimum reporting level established by the Washington Department of Health (DOH)
= Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): in the results column indicates this compound was not included in the current analysis.
ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 31816 West Morrison St

are: **lead** N.D. (Not Detected) **mg/L and copper** 0.042 **mg/L.**

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 (phone number) or PO Box 1238, Carnation, WA 98014 (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (**The longer water has been sitting in the pipes, the more dissolved metals it may contain**).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 32121 East Rutherford St.

are: lead ND (Not Detected) mg/L and copper 0.47 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 (phone number) or PO Box 1238, Carnation, WA 98014 (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4401 Royal Court

are: lead N.D. (Not Detected) mg/L and copper 0.43 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425)333-4192 (phone number) or PO Box 1238, Carnation, 98014 (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 32011 Palace Court

are: lead N.D. (Not Detected) mg/L and copper 0.116 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 (phone number) or PO Box 1238, Carnation, WA 98014 (address)

This notice is sent to you by City of Carnation Water System on 8/14/13.

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 32007 Palace Ct

are: lead 0.0030 mg/L and copper 0.36 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry
(owner or operator)

at (425) 333-4192 or PO Box 1238, Carnation, WA 98014
(phone number) (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4203 Regency Place

are: **lead** N.D. (Not Detected) **mg/L and copper** 0.10 **mg/L.**

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 or PO Box 1238, Carnation, WA 98014
(phone number) (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4204 Regency Place

are: lead N.D. (Not Detected) mg/L and copper 0.098 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 or PO Box 1238, Carnation, WA 98014-
(phone number) (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4209 Regency Pl

are: lead N.D. (Not Detected) mg/L and copper 0.39 mg/L.

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 (phone number) or PO Box 1238, Carnation, WA 98014 (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (**The longer water has been sitting in the pipes, the more dissolved metals it may contain**).
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4308 Royal Court

are: **lead** N.D. (Not Detected) **mg/L and copper** 0.33 **mg/L.**

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements: We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 (phone number) or PO Box 1238, Carnation, WA 98014 (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Community Water System
CONSUMER NOTICE
Lead and Copper Water Sample Results

The City of Carnation Water System, I.D. 11200B, is providing you with the lead and copper test results on the water sample collected at your location. Please share this notice with everyone who uses or drinks the water.

The results at 4412 Royal Court

are: **lead** N.D. (Not Detected) **mg/L and copper** 0.11 **mg/L.**

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The regulatory limits for lead and copper are called action levels. An exceedance occurs when the concentration of the lead or copper in more than 10 percent of the tap water samples exceeds an action level.

- The MCLG for lead is "0" and the action level is 15 ppb (or .015 mg/L).
- The MCLG and action level for copper is 1,300 ppb (or 1.3 mg/L).

Lead or copper action level exceedances will trigger corrosion control treatment or other requirements. We will notify all water users if our system exceeds the lead action level.

For more information, please contact: Bill Ferry (owner or operator)

at (425) 333-4192 (phone number) or PO Box 1258, Carnation, WA 98014 (address)

This notice is sent to you by City of Carnation Water System on 8/14/13

How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. Lead from other sources (such as lead-based paint and contaminated dust or soil) can increase a person's overall exposure, which adds to the effects of lead in water.

Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. **(The longer water has been sitting in the pipes, the more dissolved metals it may contain).**
- Use only cold water for drinking, cooking, and making baby formula. Hot water may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(42 5-1664

AMTEST LABORATORIES

CITY OF CARNATION Professional Analytical Services

Drinking Water Report

JUL 15 2010

RECEIVED

System ID No.: 11200B	System Name: City of Carnation City of Carnation Wellfield		
Lab/Sample No: 06609490	Date Collected: 06/21/2010	DOH Source No: S01	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 6/21/10	Date Reported: 7/12/10		Supervisor: AY
Date Digested:	Date Analyzed (Nitrates): 6/25/10		Analyst:
County: King	Group: A		
Sample Location: Water Shed - Chlorine House			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014		

EPA Regulated - IOC's

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	Exceeds MCL	Method	Analyst
114	Nitrite	ND	mg/l	0.500	0.500	1.00	NO	300.0	
20	Nitrate	0.866	mg/l	0.500	5.00	10.0	NO	SM-4500-NO3-F	
161	Nitrate + Nitrite	0.87	mg/l	0.50	5.0	10.	NO	353.2	

NOTES:
SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regenional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): Indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

*NOTE: A portion of the sample was chlorinated upon receipt to extend the holding time for nitrates.

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

CITY OF CARNATION

AMTEST LABORATORIES

Drinking Water Report

JUL 15 2010

RECEIVED

Professional Analytical Services

System ID No.: 11200B	System Name: City of Carnation City of Carnation Well		
Lab/Sample No: 06609493	Date Collected: 06/21/2010	DOH Source No: S02	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 6/21/10	Date Reported: 7/12/10		Supervisor: AY
Date Digested:	Date Analyzed (Nitrates): 6/25/10		Analyst: MO
County: King	Group: A		
Sample Location: Well House No Treatment			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014		

EPA Regulated - IOC's

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	Exceeds MCL	Method	Analyst
114	Nitrite	ND	mg/l	0.500	0.500	1.00	NO	300.0	MO
20	Nitrate	ND	mg/l	0.500	5.00	10.0	NO	SM-4500-NO3-F	MO
161	Nitrate + Nitrite	ND	mg/l	0.50	5.0	10.	NO	353.2	

NOTES:
SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): In the results column indicates this compound was no included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): Indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

*NOTE: A portion of the sample was chlorinated upon receipt to extend the holding time for nitrates.

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(42 J5-1564

AMTEST LABORATORIES

Professional Analytical Services

IOC Test Panel
Drinking Water Report

Date Collected: 07/06/11	System Group Type: ☑ A ☐ B ☐ Other.
Water System ID Number: 112008	System Name: City of Carnation
Lab--Sample No: 066--09368	County: King
Sample Location: Chlorine House	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received:07/06/11 Date Analyzed: 7/ 7/11 Nitrates Date Reported: 7/18/11 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☑ Pre-Treatment/Raw ☐ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number: 425-765-7104
Send Report To: City of Carnation c/o Carl Mueller Carnation, WA 98014	Bill To: c/o Carl Mueller Carnation, WA 98014

CITY OF CARNATION
JUL 22 2011
RECEIVED

EPA Regulated - IOC's

DOH	Analytes	Results	Units	SRL	Trigger	MCL	Exceeds MCL	Method	Analyst
1.	Nitrite	ND	mg/l	0.5	0.5	1	NO	300.0 EPA	MO
20	Nitrate	0.79	mg/l	0.5	5	10	NO	SM-4500-NO3-F	MO
161	Nitrate + Nitrite	0.79	mg/l	0.5	5	10	NO	353.2 EPA	

NOTES:
SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): Indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am Test Inc.
13600 NE 128TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

Professional Analytical Services

IOC Test Panel
Drinking Water Report

Date Collected: 07/06/11	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11200B	System Name: City of Carnation
Lab--Sample No: 066--09369	County: King
Sample Location: Well House	Source Number(s): S02
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O - Other (specify)	Date Received:07/06/11 Date Analyzed: 7/ 7/11 Nitrates Date Reported: 7/18/11 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☑ Pre-Treatment/Raw ☐ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number: 425-765-7104
Send Report To: City of Carnation c/o Carl Mueller Carnation, WA 98014	Bill To: c/o Carl Mueller Carnation, WA 98014

CITY OF CARNATION

JUL 22 2011

RECEIVED

EPA Regulated - IOC's

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	Exceeds MCL	Method	Analyst
114	Nitrite	ND	mg/l	0.5	0.5	1	NO	300.0 EPA	MO
20	Nitrate	0.61	mg/l	0.5	5	10	NO	SM-4500-NO3-F	MO
161	Nitrate + Nitrite	0.61	mg/l	0.5	5	10	NO	353.2 EPA	

NOTES:
SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminant Level): if the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.
ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am Test Inc.
13600 NE 125TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

TEST
LABORATORIES

Professional Analytical Services

IOC TEST PANEL
Complete Inorganics
Report of Analysis

CITY OF CARNATION
RECEIVED
SEP 21 2015

Date Collected: 09/09/15	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 112005	System Name: City of Carnation
Lab--Sample No: 066--14705	County: King
Sample Location: spring storage tank sample tap	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O - Other (specify)	Date Received: 09/09/15 Date Analyzed: 9/10/15 Nitrates Date Reported: 9/16/15 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number: 425-765-7104
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014

EPA Regulated AND STATE REGULATED OR REQUIRED

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	MCL Exceeded? (Check only if YES)	Method/Analyst
4	Arsenic	ND	mg/l	0.0014	0.01	0.01		EPA 200.8/CG
5	Barium	ND	mg/l	0.1	2	2		EPA 200.8/CG
6	Cadmium	ND	mg/l	0.001	0.005	0.005		EPA 200.8/CG
7	Chromium	ND	mg/l	0.007	0.1	0.1		EPA 200.8/CG
11	Mercury	ND	mg/l	0.0002	0.002	0.002		EPA 245.1/MR
12	Selenium	ND	mg/l	0.002	0.05	0.05		EPA 200.8/CG
110	Beryllium	ND	mg/l	0.0003	0.004	0.004		EPA 200.8/CG
112	Antimony	ND	mg/l	0.003	0.006	0.006		EPA 200.8/CG
113	Thallium	ND	mg/l	0.001	0.002	0.002		EPA 200.8/CG
115	Total Cyanide	ND	mg/l	0.01	0.2	0.2		EPA 335.4/MR
19	Fluoride	ND	mg/l	0.5	4	4		EPA 300.0/MR
114	Nitrite	ND	mg/l	0.1	0.5	1		EPA 300.0/MR
20	Nitrate	0.78	mg/l	0.5	5	10		EPA 300.0/MR
181	Nitrate + Nitrite	0.78	mg/l	0.5	10	10		EPA 300.0/
8	Iron	ND	mg/l	0.1	--	0.3		EPA 200.7/CG

LAB SAMPLE NO: 066-14706

TEST LABORATORIES

IOC ANALYSIS REPORT PAGE 2

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	MCL Exceeded? (Check only if YES)	Method/Analyst
10	Manganese	ND	mg/l	0.01	--	0.05		EPA 200.8 /CG
13	Silver	ND	mg/l	0.1	--	0.1		EPA 200.8 /CG
21	Chloride	ND	mg/l	20	--	250		EPA 300.0 /MR
22	Sulfate	ND	mg/l	50	--	250		EPA 300.0 /MR
24	Zinc	ND	mg/l	0.2	--	5		EPA 200.8 /CG
14	Sodium	ND	mg/l	5				EPA 200.7 /CG
15	Hardness (CaCO3)	51.	mg/l	10				EPA 200.7 calc /CG
16	Conductivity	100	umhos/cm	70	--	700		SM 2510B /MH
17	Turbidity	0.24	NTU	0.1				EPA 180.1 /MH
18	Color	ND	unit	15	--	15		SM 2120 B /MH
26	Total Dissolved Solids	ND	mg/l	100	--	500		SM 2540C /TN
111	Nickel	ND	mg/l	0.005				EPA 200.8 /CG
9	Lead	ND	mg/l	0.001	0.015	0.015		EPA 200.8 /CG
23	Copper	ND	mg/l	0.02	1.3	1.3		EPA 200.8 /CG
409	pH	6.6	unit					SM 4500H B /MH

NOTES:

*Confirmation: Include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.

SRL (State Reporting Level): The minimum reporting level established by the Washington Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): in the results column indicates this compound was not included in the current analysis.

ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkl WA 98034
(425) 885-1664

AMTEST LABORATORIES

Professional Analytical Services

NIT TEST PANEL
(Nitrate/Nitrite)
Report of Analysis

Date Collected: 07/06/12	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11206B	System Name: City of Carnation
Lab--Sample No: 668--09660	County: King
Sample Location: Chlorine House Sample Tap	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received: 07/06/12 Date Analyzed: 7/ 7/12 Date Reported: 7/27/12 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☑ Pre-Treatment/Raw ☐ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number:
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014

EPA Regulated AND STATE REGULATED OR REQUIRED

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	MCL Exceeded? (Check only if YES)	Method/Analyst
20	Nitrate	0.85	mg/l	0.5	5	10	-	SM-4500-NO3-F /MO
114	Nitrite	ND	mg/l	0.1	0.5	1		EPA 300.0 /MO
161	Nitrate + Nitrite	0.85	mg/l	0.5	--	10		EPA 353.2 /

NOTES:
*Confirmation: Include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.
SRL (State Reporting Level): The minimum reporting level established by the Washington Department of Health (DOH)
Trigger Level: DOH drinking water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): In the results column indicates this compound was not included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.002): The compound was not detected in the sample at or above the concentration indicated (usually the lab method reporting limit).
--: No existing value

Lab Comments:

Reviewed By: _____

JUL 31 2012
RECEIVED

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(4. 85-1654

AMTEST LABORATORIES

Professional Analytical Services

NIT TEST PANEL
(Nitrate/Nitrite)
Report of Analysis

CITY OF CARNATION
AUG 14 2013
RECEIVED

Date Collected: 08/01/13	System Group Type: ☑ A ☐ B ☐ Other
Water System ID Number: 11200B	System Name: CITY OF CARNATION
Lab--Sample No: 066--10717	County: KING
Sample Location: S01 STORAGE TANK SAMPLE TAP	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received:08/01/13 Date Analyzed: 8/ 2/13 Date Reported: 8/ 6/13 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: CARL MUELLER Phone Number: 425-765-7104
Send Report To: CITY OF CARNATION PO BOX 1238 CARNATION, WA 98014	Bill To: CARL MUELLER PO BOX 1238 CARNATION, WA 98014

EPA Regulated AND STATE REGULATED OR REQUIRED

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	MCL Exceeded? (Check only if YES)	Method/Analyst
20	Nitrate	0.80	mg/l	0.5	5	10		SM-4500-NO3-F /EB
114	Nitrite	ND	mg/l	0.1	0.5	1		EPA 300.0 /EB
161	Nitrate + Nitrite	0.80	mg/l	0.5	--	10		EPA 353.2 /

NOTES:
*Confirmation: Include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.
SRL (State Reporting Level): The minimum reporting level established by the Washington Department of Health (DOH).
Trigger Level: DOH drinking water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): In the results column indicates this compound was no included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab method reporting limit).
--: No existing value

Lab Comments:

Reviewed By: _____

Am Test Inc.
13600 NE 125TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

Professional Analytical Services

NIT TEST PANEL
(Nitrate/Nitrite)
Report of Analysis

Date Collected: 08/01/13	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11200B	System Name: CITY OF CARNATION
Lab--Sample No: 866--10718	County: KING
Sample Location: S02 WELL PUMP SAMPLE	Source Number(s): S02
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received:08/01/13 Date Analyzed: 8/ 2/13 Date Reported: 8/ 6/13 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☑ Pre-Treatment/Raw ☐ Post-Treatment/Finished ☐ Unknown Sample Collected by: CARL MUELLER Phone Number: 425-765-7104
Send Report To: CITY OF CARNATION PO BOX 1238 CARNATION, WA 98014	Bill To: CARL MUELLER PO BOX 1238 CARNATION, WA 98014

EPA Regulated AND STATE REGULATED OR REQUIRED

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	MCL Exceeded? (Check only if YES)	Method/Analyst
20	Nitrate	ND	mg/l	0.5	5	10		SM-4500-NO3-F /EB
114	Nitrite	ND	mg/l	0.1	0.5	1		EPA 300.0 /EB
181	Nitrate + Nitrite	ND	mg/l	0.5	--	10		EPA 353.2 /

NOTES:
*Confirmations: include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.
SRL (State Reporting Level): The minimum reporting level established by the Washington Department of Health (DOH)
Trigger Level: DOH drinking water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): in the results column indicates this compound was not included in the current analysis.
ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab method reporting limit).
--: No existing value

Lab Comments:

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(42 5-1664

AMTEST LABORATORIES

Professional Analytical Services

NIT TEST PANEL
(Nitrate/Nitrite)
Report of Analysis

Date Collected: 08/05/14	System Group Type: ☑ A ☐ B ☐ Other
Water System ID Number: 11200B	System Name: City of Carnation
Lab–Sample No: 066–11957	County: King
Sample Location: S01 Storage Tank Sample tap	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O - Other (specify)	Date Received: 08/05/14 Date Analyzed: 8/ 5/14 Date Reported: 9/ 4/14 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number 425-765-7104
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014

EPA Regulated AND STATE REGULATED OR REQUIRED

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	MCL Exceeded? (Check only if YES)	Method/Analyst
20	Nitrate	0.78	mg/l	0.5	5	10		EPA 300.0 /MR
114	Nitrite	ND	mg/l	0.1	0.5	1		EPA 300.0 /MR
161	Nitrate + Nitrite	0.78	mg/l	0.5	10	10		EPA 300.0 /

NOTES:
*Confirmation: Include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.
SRL (State Reporting Level): The minimum reporting level established by the Washington Department of Health (DOH)
Trigger Level: DOH drinking water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): In the results column indicates this compound was not included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab method reporting limit).
–: No existing value

Lab Comments:

Reviewed By: _____

CITY OF CARNATION
SEP 08 2014
RECEIVED

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

CITY OF CARNATION

Professional Analytical Services

JUL 14 2014

RECEIVED

NIT TEST PANEL
(Nitrate/Nitrite)
Report of Analysis

Date Collected: 07/09/14	System Group Type: ☑ A ☐ B ☐ Other.
Water System ID Number: 112006	System Name: City of Carnation
Lab--Sample No: 066--10147	County: King
Sample Location: Well House	Source Number(s): S02
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O - Other (specify)	Date Received:07/09/14 Date Analyzed: 7/ 9/14 Date Reported: 7/10/14 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☑ Pre-Treatment/Raw ☐ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number: 425-333-4192
Send Report To: City of Carnation P.O. Box 1238 Carnation, WA 98014	Bill To: Carl Mueller P.O. Box 1238 Carnation, WA 98014

EPA Regulated AND STATE REGULATED OR REQUIRED

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	MCL Exceeded? (Check only if YES)	Method/Analyst
20	Nitrate	ND	mg/l	0.5	5	10		EPA 300.0 /MR
114	Nitrite	ND	mg/l	0.1	0.5	1		EPA 300.0 /MR
161	Nitrate + Nitrite	ND	mg/l	0.5	10	10		EPA 300.0 /

NOTES:
*Confirmation: Include the original lab number, sample number, and collection date of original sample in either lab or sampler comments section.
SRL (State Reporting Level): The minimum reporting level established by the Washington Department of Health (DOH).
Trigger Level: DOH drinking water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): In the results column indicates this compound was not included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab method reporting limit).
--: No existing value

Lab Comments:

Reviewed By: _____

ENERGY LABORATORIES www.energylab.com Analytical Excellence Since 1952
Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

3 GA
1 RADIO

CITY OF CARNATION
JUL 28 2010
RECEIVED

RADIONUCLIDE ANALYSIS REPORT

System ID No.: 11200B	System Name: City of Carnation	
Lab/Sample No: 142-39081	Date Collected: 6/21/2010	DOH Source No: S02
Multiple Source Nos:	Sample Type: No Treatment	Sample Purpose: Compliance
Date Received: 06/24/2010	Date Reported: 07/19/2010	Supervisor: David Paulstra, Branch Mgr
	Date Analyzed: See Below	Analyst: See Below
County: King		Group : A
Sample Location: Well House		

Send Report To: AM Test Inc
13600 NE 126th Pl, Ste C
Kirkland, WA 98034

Bill To: AM Test Inc
13600 NE 126th Pl, Ste C
Kirkland, WA 98034

DOH #	ANALYTES	LAB MDA	RESULTS	UNITS	DATE ANALYZED	MCL	(ANALYST'S INITIALS) & METHOD USED
EPA/STATE REGULATED (These analyses should be performed in order as listed)							
165	Gross Alpha		0.7	pCi/L	07/07/2010	15	CGR / E900.0
166	Radium 228		0.5	pCi/L	07/07/2010	5	PLJ / RA-05
*Determine Radium 226 activity if Gross Alpha is greater than 5.0 pCi/L.**							
39	Radium 226*			pCi/L		5	
*Determine Uranium activity if Gross Alpha is greater than 15.0 pCi/L.***							
105	Uranium** (mass)			ug/L		30	
105	Uranium** (activity)			pCi/L		20**	
Depending on the foregoing data determine the following (must be completed if data is available):							
40	Radium 226 + 228			pCi/L			
40	Gross Alpha*** + Radium 228			pCi/L		5	
41	Gross Alpha minus Uranium			pCi/L		15	
Do the following only if specifically requested by the client or the state							
42	Gross Beta****			pCi/L		50	
43	Tritium****			pCi/L		20,000	
44	Strontium 90****			pCi/L		8	
107	Cesium 134****			pCi/L		***	
108	Iodine 131****			pCi/L		***	

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
MDA: Minimum Detectable Amount.
NA (Not Analyzed): use in the results column for compounds not included in the current analysis.
ND (Not Detected): use in the results column for compounds analyzed and not detected at a level greater than or equal to the MDA.
* If Gross Alpha is less than , or equal to, 5 pCi/L, it may be assumed that the Alpha activity is entirely due to Radium 226 (i.e., Radium 226 would not need to be run). The Alpha activity is then added to the Radium 228 activity (i.e., Beta activity) for MCL determinations. If the sum of the Alpha activity plus the Radium 228 activity is greater than 5 pCi/L, Radium 226 activity must then be determined for water system compliance purposes (i.e., Radium 226 + Radium 228 activity)
**Uranium's MCL is given in mass terms (µg/L). When Uranium is determined by mass methods, it must be converted to activity levels (pCi/L) for calculation of the MCL (Gross Alpha less Uranium). A conversion factor of 0.67 pCi/l per µg/L should be used. Uranium needs to be determined only when the Gross Alpha exceeds 15 pCi/L.
*** Use Gross Alpha in lieu of Radium 226 when the Gross Alpha is less than, or equal to, 5.0 pCi/L.
**** The MCL for beta particle and photon radioactivity from man-made radionuclides is the average annual concentration which shall not produce an annual dose equivalent to the total body or any internal organ greater than four millirem/yr.
Comments: Use back of page for comments

Am Test Inc.
13600 NE 126TH PL
Suite C
Kir' d, WA 98034
(4: 55-1664

AMTEST LABORATORIES

Professional Analytical Services

HERB1 TEST PANEL
(SOC - Herbicides by EPA Method 515.3)
Report of Analysis

Date Collected: 07/06/12	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 112008	System Name: City of Carnation
Lab–Sample No: 126–09661	County: King
Sample Location: Chlorine House Sample Tap	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O – Other (specify)	Date Received:07/06/12 Date Analyzed: 7/24/12 Date Reported: 7/27/12 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☑ Pre-Treatment/Raw ☐ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number:
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014

EPA REGULATED AND STATE REGULATED OR REQUIRED

C	Analytes	Results	Units	SRL	Trigger	MCL	Exceeds MCL	Method	Analyst
97	2,4-D	ND	ug/L	0.10	0.10	70.		515.3 EPA	ANATEK
39	2,4,5-TP (Silvex)	ND	ug/L	0.20	0.20	50.		515.3 EPA	ANATEK
134	Pentachlorophenol	ND	ug/L	0.04	0.04	1.0		515.3 EPA	ANATEK
137	Dalapon	ND	ug/L	1.0	1.0	200		515.3 EPA	ANATEK
139	Dinoseb	ND	ug/L	0.20	0.20	7.0		515.3 EPA	ANATEK
140	Pictoram	ND	ug/L	0.10	0.10	500		515.3 EPA	ANATEK
225	Dacthal (DCPA Acid Metab)	ND	ug/L	0.02	0.02	--	--	515.3 EPA	ANATEK
222	Total Dacthal	ND	ug/L	0.02	0.02	--	--	515.3 EPA	ANATEK
138	Dicamba	ND	ug/L	0.20	0.20	--	--	515.3 EPA	ANATEK
135	2,4-DB	ND	ug/L	1.0	1.0	--	--	515.3 EPA	ANATEK
223	Actifluorolen	ND	ug/L	2.0	2.0	--	--	515.3 EPA	ANATEK
224	Chloramben	ND	ug/L	0.20	0.20	--	--	515.3 EPA	ANATEK
226	3,5-Dichlorobenzoic Acid	ND	ug/L	0.50	0.50	--	--	515.3 EPA	ANATEK
228	4-Nitrophenol	ND	ug/L	0.50	0.50	--	--	515.3 EPA	ANATEK

NOTES:
SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office
NA (Not Analyzed): In the results column indicates this compound was no included in the current analysis.
ND (Not Detected): in the results column indicates the compound was analyzed and not detected at a level greater than or equal to the SRL.
<0.001: indicates the compound was not detected in the sample at or above the concentration indicated.

P ved By: _____

JUL 31 2012
RECEIVED

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

Professional Analytical Services

HERB1 TEST PANEL
(SOC - Herbicides by EPA Method 515.3)
Report of Analysis

Date Collected: 07/05/12	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11206B	System Name: City of Carnation
Lab--Sample No: 125--09662	County: King
Sample Location: Chlorine House Sample Tap	Source Number(s): S02
Sample Purpose: (Check Appropriate Box) ☑ RC - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O - Other (specify)	Date Received: 07/06/12 Date Analyzed: 7/24/12 Date Reported: 7/27/12 Comments:
Sample Composition: (Check Appropriate Box) ☑ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☐ D - Distribution Sample	Sample Type: (Check One) ☑ Pre-Treatment/Raw ☐ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number:
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014

EPA REGULATED AND STATE REGULATED OR REQUIRED

DOH#	Analytes	Results	Units	SRL	Trigger	MCL	Exceeds MCL	Method	Analyst
37	2,4-D	ND	ug/L	0.10	0.10	70.		515.3 EPA	ANATEK
38	2,4,5-TP (Silvex)	ND	ug/L	0.20	0.20	50.		515.3 EPA	ANATEK
134	Pentachlorophenol	ND	ug/L	0.04	0.04	1.0		515.3 EPA	ANATEK
137	Dalapon	ND	ug/L	1.0	1.0	200		515.3 EPA	ANATEK
139	Dinoseb	ND	ug/L	0.20	0.20	7.0		515.3 EPA	ANATEK
140	Pickram	ND	ug/L	0.10	0.10	500		515.3 EPA	ANATEK
225	Dacthal (DCPA Acid Metab)	ND	ug/L	0.02	0.02	--	--	515.3 EPA	ANATEK
222	Total Dacthal	ND	ug/L	0.02	0.02	--	--	515.3 EPA	ANATEK
138	Dicamba	ND	ug/L	0.20	0.20	--	--	515.3 EPA	ANATEK
135	2,4-DB	ND	ug/L	1.0	1.0	--	--	515.3 EPA	ANATEK
223	Actluorolen	ND	ug/L	2.0	2.0	--	--	515.3 EPA	ANATEK
224	Chloramben	ND	ug/L	0.20	0.20	--	--	515.3 EPA	ANATEK
226	3,5-Dichlorobenzoic Acid	ND	ug/L	0.50	0.50	--	--	515.3 EPA	ANATEK
228	4-Nitrophenol	ND	ug/L	0.50	0.50	--	--	515.3 EPA	ANATEK

NOTES:
SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): in the results column indicates the compound was no included in the current analysis.
ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

JUL 31 2012
RECEIVED

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

Professional Analytical Services

TTHM TEST PANEL

(Total Trihalomethanes by EPA Method 524.2)

Distribution System - Report of Analysis

TRIHALOMETHANE ANALYSIS	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11200B	System Name: City of Carnation
Source: S02 (Distribution samples)	County: King
Sample Location: Spring Storage Tank	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ - Routine/Compliance (satisfies monitoring requirements) ☐ - Confirmation (confirmation of chemical result) ☐ - I - Investigative (does not satisfy monitoring requirements) ☐ - O - Other (specify)	Date Received: 09/17/13 Date Analyzed: 9/23/13 Date Reported: 10/ 3/13 Comments:
Sample Composition: (Check Appropriate Box) ☐ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☑ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number: 425-765-7104
Send Report To: City of Carnation PO Box 1236 Carnation, WA 98014	Bill To: Bill F PO Box 1239 Carnation, WA 98014

CITY OF CARNATION
OCT 07 2013
RECEIVED

EPA REGULATED

DOH# ANALYTE	(0027) Chloroform (ug/L)	(0028) Bromodichloromethane (ug/L)	(0029) Dibromochloromethane (ug/L)	(0030) Bromoform (ug/L)	(0031) TTHM's (ug/L)
SRL	0.25	0.5	0.5	0.5	
Trigger Level	--	--	--	--	60*
MCL	--	--	--	--	80*
Analytical Method (Analyst Initials)	EPA 524.2/SET	EPA 524.2/SET	EPA 524.2/SET	EPA 524.2/SET	EPA 524.2/SET

RESULTS

Lab Number / Sample Number	Date Collected	Sample Location	(0027) Chloroform (ug/L)	(0028) Bromodichloromethane (ug/L)	(0029) Dibromochloromethane (ug/L)	(0030) Bromoform (ug/L)	(0031) TTHM's (ug/L)
197 / 13603	09/17/2013	Spring Storage Tank	< 0.25	< 0.5	< 0.5	< 0.5	< 0.5
197 / 13604	09/17/2013	Trip Blank	< 0.25	< 0.5	< 0.5	< 0.5	< 0.5

Am Test Inc
13500 NE 126th PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AM TEST LABORATORIES

Professional Analytical Services

TTHM TEST PANEL

(Total Trihalomethanes by EPA Method 524.2)

Distribution System - Report of Analysis

NOTES:
SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH).
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your drinking water regional office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.
NA (Not Analyzed): In the results column, indicates this compound was not included in the current analysis.
ND (Not Detected): In the results column, indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab MRL).
—: No existing value

Comments:

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

TTHM TEST PANEL

(Total Trihalomethanes by EPA Method 624.2)

Distribution System - Report of Analysis

CITY OF CARNATION — Professional Analytical Services

SEP 09 2014 RECEIVED

TRIHALOMETHANE ANALYSIS	System Group Type: ☑ A ☐ B ☐ Other:
Water System ID Number: 11200B	System Name: City of Carnation
Source: S02 (Distribution samples)	County: King
Sample Location: 31610 NE 47th St	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) ☑ R - Routine/Compliance (satisfies monitoring requirements) ☐ C - Confirmation (confirmation of chemical result) ☐ I - Investigative (does not satisfy monitoring requirements) ☐ O - Other (specify)	Date Received: 08/06/14 Date Analyzed: 8/10/14 Date Reported: 9/ 4/14 Comments:
Sample Composition: (Check Appropriate Box) ☐ S - Single Source ☐ B - Blended (List Multiple Source Numbers in Source Nos. field) ☐ C - Composite (Specify in Comments Field) ☑ D - Distribution Sample	Sample Type: (Check One) ☐ Pre-Treatment/Raw ☑ Post-Treatment/Finished ☐ Unknown Sample Collected by: Carl Mueller Phone Number: 425-765-7104
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Carl Mueller PO Box 1238 Carnation, WA 98014

EPA REGULATED

DOH# ANALYTE	(0027) Chloroform (ug/L)	(0028) Bromodichloromethane (ug/L)	(0029) Dibromochloromethane (ug/L)	(0030) Bromoform (ug/L)	(0031) TTHM's (ug/L)
SRL	0.25	0.5	0.5	0.5	
Trigger Level	--	--	--	--	80*
MCL	--	--	--	--	80*
Analytical Method (Analyst Initials)	EPA 524.2 MLM	EPA 524.2 MLM	EPA 524.2 MLM	EPA 524.2 MLM	EPA 524.2 MLM

RESULTS

Lab Number / Sample Number	Date Collected	Sample Location	(0027) Chloroform (ug/L)	(0028) Bromodichloromethane (ug/L)	(0029) Dibromochloromethane (ug/L)	(0030) Bromoform (ug/L)	(0031) TTHM's (ug/L)
066 / 11956	08/05/2014	31610 NE 47th St	0.51	0.55	0.76	< 0.5	1.8

Am Test Inc.
13600 NE 12L . PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AM EST LABORATORIES

Professional Analytical Services

SEP 03 2014

RECEIVED

TTHM TEST PANEL

(Total Trihalomethanes by EPA Method 624.2)

Distribution System - Report of Analysis

NOTES:

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your drinking water regional office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.

NA (Not Analyzed): In the results column, indicates this compound was no included in the current analysis.

ND (Not Detected): In the results column, indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.00X): The compound was not detected in the sample at or above the concentration indicated (usually the lab MRL).

--: Missing value

Comments:

Reviewed By:

Am Test Inc
13600 NE 126TH PL
Suite C
Kirkland WA 98034
(425) -1664

AMTEST LABORATORIES

Professional Analytical Services

CITY OF CARNATION
JUL 15 2010
RECEIVED

Drinking Water Report - VOC's
Method 524.2

System ID No.: 11200B	System Name: City of Carnation City of Carnation Watershed		
Lab/Sample No: 06609490	Date Collected: 06/21/2010	DOH Source No: S01	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 6/21/10	Date Reported: 7/12/10		Supervisor: AY
Date Digested:	Date Analyzed: 6/30/10		Analyst: CG
County: King	Group: A		
Sample Location: Water Shed - Chlorine House			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014		

EPA Regulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
45	Vinyl Chloride	ND	ug/l		0.5	0.5	2.0	NO	NO
46	1,1-Dichloroethylene	ND	ug/l		0.5	0.5	7.0	NO	NO
47	1,1,1-Trichloroethane	ND	ug/l		0.5	0.5	200.	NO	NO
48	Carbon Tetrachloride	ND	ug/l		0.5	0.5	5.0	NO	NO
49	Benzene	ND	ug/l		0.5	0.5	5.0	NO	NO
50	1,2-Dichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
51	Trichloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
52	1,4-Dichlorobenzene	ND	ug/l		0.5	0.5	600.	NO	NO
58	Methylene Chloride	ND	ug/l		0.5	0.5	5.0	NO	NO
57	Trans-1,2-Dichloroethene	ND	ug/l		0.5	0.5	100.	NO	NO
60	Cis-1,2-Dichloroethene	ND	ug/l		0.5	0.5	70.0	NO	NO
63	1,2-Dichloropropane	ND	ug/l		0.5	0.5	5.0	NO	NO
66	Toluene	ND	ug/l		0.5	0.5	1000	NO	NO
67	1,1,2-Trichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
68	Tetrachloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
71	Chlorobenzene	ND	ug/l		0.5	0.5	100.	NO	NO
73	Ethyl Benzene	ND	ug/l		0.5	0.5	700.	NO	NO
76	Styrene	ND	ug/l		0.5	0.5	100.	NO	NO
84	1,2-Dichlorobenzene	ND	ug/l		0.5	0.5	75.0	NO	NO
95	1,2,4-Trichlorobenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
160	Total Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
74	m+p Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
75	o-Xylene	ND	ug/l		0.5	0.5	10000	NO	NO

EPA Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds	
								TRIGGER	MCL
27	Chloroform	ND	ug/l		0.5	0.5		NO	
28	Bromodichloromethane	ND	ug/l		0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/l		0.5	0.5		NO	
30	Bromoform	ND	ug/l		0.5	0.5		NO	
53	Chloromethane	ND	ug/l		0.5	0.5		NO	
54	Bromomethane	ND	ug/l		0.5	0.5		NO	
55	Chloroethane	ND	ug/l		0.5	0.5		NO	
58	1,1-Dichloroethane	ND	ug/l		0.5	0.5		NO	
59	2,2-Dichloropropane	ND	ug/l		0.5	0.5		NO	
62	1,1-Dichloropropene	ND	ug/l		0.5	0.5		NO	
64	Dibromomethane	ND	ug/l		0.5	0.5		NO	
70	1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
72	1,1,1,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
78	Bromobenzene	ND	ug/l		0.5	0.5		NO	
79	1,2,3-Trichloropropane	ND	ug/l		0.5	0.5		NO	
80	1,1,2,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
81	2-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
82	4-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
83	1,3-Dichlorobenzene	ND	ug/l		0.5	0.5		NO	
154	1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	

State Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
85	Cis-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
89	Trans-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
85	Trichlorofluoromethane	ND	ug/l		0.5	0.5		NO	
86	Bromochloromethane	ND	ug/l		0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/l		0.5	0.5		NO	
88	n-Propylbenzene	ND	ug/l		0.5	0.5		NO	
89	1,3,5-Trimethylbenzene	ND	ug/l		0.5	0.5		NO	
90	Tert-Butylbenzene	ND	ug/l		0.5	0.5		NO	
91	1,2,4-Trimethylbenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
92	Sec-Butylbenzene	ND	ug/l		0.5	0.5		NO	
93	p-Isopropyltoluene	ND	ug/l		0.5	0.5		NO	
94	n-Butylbenzene	ND	ug/l		0.5	0.5		NO	
96	Naphthalene	ND	ug/l		0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/l		0.5	0.5		NO	
98	1,2,3-Trichlorobenzene	ND	ug/l		0.5	0.5		NO	
10	EDB	ND	ug/l		0.5	0.5		NO	
10	DBCP	ND	ug/l		0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/l		0.5	0.5		NO	
***	Methyl tert-butyl ether	ND	ug/l		0.5	0.5		NO	

Surrogates

D4-1,2-Dichloroethane	117. %
DB-Toluene	102. %
4-Bromofluorobenzene	96.3 %

NOTES:
SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level ar required to take additional samples. Contact your regenional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office
NA (Not Analyzed): In the results column indicates this compound was no included in the current analysis.
ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

Professional Analytical Services

JUL 15 2010 RECEIVED

Drinking Water Report - VOC's
Method 524.2

System ID No.: 11200B	System Name: City of Carnation City of Carnation Watershed		
Lab/Sample No: 06609491	Date Collected: 06/21/2010	DOH Source No: 301	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 6/21/10	Date Reported: 7/12/10		Supervisor: AY
Date Digested:	Date Analyzed: 6/30/10		Analyst: CG
County: King	Group: A		
Sample Location: Trip Blank			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014		

EPA Regulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
45	Vinyl Chloride	ND	ug/l		0.5	0.5	2.0	NO	NO
46	1,1-Dichloroethylene	ND	ug/l		0.5	0.5	7.0	NO	NO
47	1,1,1-Trichloroethane	ND	ug/l		0.5	0.5	200.	NO	NO
48	Carbon Tetrachloride	ND	ug/l		0.5	0.5	5.0	NO	NO
49	Benzene	ND	ug/l		0.5	0.5	5.0	NO	NO
50	1,2-Dichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
51	Trichloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
52	1,4-Dichlorobenzene	ND	ug/l		0.5	0.5	600.	NO	NO
56	Methylene Chloride	ND	ug/l		0.5	0.5	5.0	NO	NO
57	Trans-1,2-Dichloroethene	ND	ug/l		0.5	0.5	100.	NO	NO
60	Cis-1,2-Dichloroethene	ND	ug/l		0.5	0.5	70.0	NO	NO
63	1,2-Dichloropropane	ND	ug/l		0.5	0.5	5.0	NO	NO
66	Toluene	ND	ug/l		0.5	0.5	1000	NO	NO
67	1,1,2-Trichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
68	Tetrachloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
71	Chlorobenzene	ND	ug/l		0.5	0.5	100.	NO	NO
73	Ethyl Benzene	ND	ug/l		0.5	0.5	700.	NO	NO
76	Styrene	ND	ug/l		0.5	0.5	100.	NO	NO
84	1,2-Dichlorobenzene	ND	ug/l		0.5	0.5	75.0	NO	NO
95	1,2,4-Trichlorobenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
160	Total Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
74	m+p Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
75	o-Xylene	ND	ug/l		0.5	0.5	10000	NO	NO

EPA Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds	
								TRIGGER	MCL
27	Chloroform	ND	ug/l		0.5	0.5		NO	
28	Bromodichloromethane	ND	ug/l		0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/l		0.5	0.5		NO	
30	Bromoform	ND	ug/l		0.5	0.5		NO	
53	Chloromethane	ND	ug/l		0.5	0.5		NO	
54	Bromomethane	ND	ug/l		0.5	0.5		NO	
55	Chloroethane	ND	ug/l		0.5	0.5		NO	
58	1,1-Dichloroethane	ND	ug/l		0.5	0.5		NO	
59	2,2-Dichloropropane	ND	ug/l		0.5	0.5		NO	
62	1,1-Dichloropropene	ND	ug/l		0.5	0.5		NO	
64	Dibromomethane	ND	ug/l		0.5	0.5		NO	
70	1,3-Dichloropropane	ND	ug/l		0.5	0.5		NO	
72	1,1,1,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
78	Bromobenzene	ND	ug/l		0.5	0.5		NO	
79	1,2,3-Trichloropropane	ND	ug/l		0.5	0.5		NO	
80	1,1,2,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
81	2-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
82	4-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
83	1,3-Dichlorobenzene	ND	ug/l		0.5	0.5		NO	
154	1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	

State Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
65	Cis-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
69	Trans-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
85	Trichlorofluoromethane	ND	ug/l		0.5	0.5		NO	
86	Bromochloromethane	ND	ug/l		0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/l		0.5	0.5		NO	
88	n-Propylbenzene	ND	ug/l		0.5	0.5		NO	
89	1,3,5-Trimethylbenzene	ND	ug/l		0.5	0.5		NO	
90	Tert-Butylbenzene	ND	ug/l		0.5	0.5		NO	
91	1,2,4-Trimethylbenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
92	Sec-Butylbenzene	ND	ug/l		0.5	0.5		NO	
93	p-Isopropyltoluene	ND	ug/l		0.5	0.5		NO	
94	n-Butylbenzene	ND	ug/l		0.5	0.5		NO	
96	Naphthalene	ND	ug/l		0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/l		0.5	0.5		NO	
98	1,2,3-Trichlorobenzene	ND	ug/l		0.5	0.5		NO	
102	EDB	ND	ug/l		0.5	0.5		NO	
109	DBCP	ND	ug/l		0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/l		0.5	0.5		NO	
***	Methyl tert-butyl ether	ND	ug/l		0.5	0.5		NO	

Surrogates

D4-1,2-Dichloroethane	114. %
D8-Toluene	98.8 %
4-Bromofluorobenzene	92.0 %

NOTES:

SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level ar required to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office

NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.

ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkle WA 98034
425, -1664

AMTEST LABORATORIES

Professional Analytical Services

CITY OF CARNATION
JUL 15 2010
RECEIVED

Drinking Water Report - VOC's
Method 524.2

System ID No.: 11200B	System Name: City of Carnation City of Carnation Watershed		
Lab/Sample No: 06609492	Date Collected: 06/21/2010	DOH Source No: S01	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 6/21/10	Date Reported: 7/12/10		Supervisor: AY
Date Digested:	Date Analyzed: 6/30/10		Analyst: CG
County: King	Group: A		
Sample Location: Lab Blank			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014		

EPA Regulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
45	Vinyl Chloride	ND	ug/l		0.5	0.5	2.0	NO	NO
46	1,1-Dichloroethylene	ND	ug/l		0.5	0.5	7.0	NO	NO
47	1,1,1-Trichloroethane	ND	ug/l		0.5	0.5	200.	NO	NO
48	Carbon Tetrachloride	ND	ug/l		0.5	0.5	5.0	NO	NO
49	Benzene	ND	ug/l		0.5	0.5	5.0	NO	NO
50	1,2-Dichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
51	Trichloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
52	1,4-Dichlorobenzene	ND	ug/l		0.5	0.5	600.	NO	NO
56	Methylene Chloride	ND	ug/l		0.5	0.5	5.0	NO	NO
57	Trans-1,2-Dichloroethene	ND	ug/l		0.5	0.5	100.	NO	NO
60	Cis-1,2-Dichloroethene	ND	ug/l		0.5	0.5	70.0	NO	NO
63	1,2-Dichloropropane	ND	ug/l		0.5	0.5	5.0	NO	NO
66	Toluene	ND	ug/l		0.5	0.5	1000	NO	NO
67	1,1,2-Trichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
68	Tetrachloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
71	Chlorobenzene	ND	ug/l		0.5	0.5	100.	NO	NO
73	Ethyl Benzene	ND	ug/l		0.5	0.5	700.	NO	NO
76	Styrene	ND	ug/l		0.5	0.5	100.	NO	NO
84	1,2-Dichlorobenzene	ND	ug/l		0.5	0.5	75.0	NO	NO
95	1,2,4-Trichlorobenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
160	Total Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
74	m+p Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
75	o-Xylene	ND	ug/l		0.5	0.5	10000	NO	NO

EPA Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds	
								TRIGGER	MCL
27	Chloroform	ND	ug/l		0.5	0.5		NO	
28	Bromodichloromethane	ND	ug/l		0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/l		0.5	0.5		NO	
30	Bromoform	ND	ug/l		0.5	0.5		NO	
53	Chloromethane	ND	ug/l		0.5	0.5		NO	
54	Bromomethane	ND	ug/l		0.5	0.5		NO	
55	Chloroethane	ND	ug/l		0.5	0.5		NO	
58	1,1-Dichloroethane	ND	ug/l		0.5	0.5		NO	
59	2,2-Dichloropropane	ND	ug/l		0.5	0.5		NO	
62	1,1-Dichloropropene	ND	ug/l		0.5	0.5		NO	
64	Dibromomethane	ND	ug/l		0.5	0.5		NO	
70	1,3-Dichloropropane	ND	ug/l		0.5	0.5		NO	
72	1,1,1,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
78	Bromobenzene	ND	ug/l		0.5	0.5		NO	
79	1,2,3-Trichloropropane	ND	ug/l		0.5	0.5		NO	
80	1,1,2,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
81	2-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
82	4-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
83	1,3-Dichlorobenzene	ND	ug/l		0.5	0.5		NO	
154	1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	

State Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
65	Cis-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
69	Trans-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
85	Trichlorofluoromethane	ND	ug/l		0.5	0.5		NO	
86	Bromochloromethane	ND	ug/l		0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/l		0.5	0.5		NO	
88	n-Propylbenzene	ND	ug/l		0.5	0.5		NO	
89	1,3,5-Trimethylbenzene	ND	ug/l		0.5	0.5		NO	
90	Tert-Butylbenzene	ND	ug/l		0.5	0.5		NO	
91	1,2,4-Trimethylbenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
92	Sec-Butylbenzene	ND	ug/l		0.5	0.5		NO	
93	p-Isopropyltoluene	ND	ug/l		0.5	0.5		NO	
94	n-Butylbenzene	ND	ug/l		0.5	0.5		NO	
96	Naphthalene	ND	ug/l		0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/l		0.5	0.5		NO	
98	1,2,3-Trichlorobenzene	ND	ug/l		0.5	0.5		NO	
10[illegible]	EDB	ND	ug/l		0.5	0.5		NO	
1[illegible]	DBCP	ND	ug/l		0.5	0.5		NO	
152	Dichlorodifluoromethane	ND	ug/l		0.5	0.5		NO	
[illegible]	Methyl tert-butyl ether	ND	ug/l		0.5	0.5		NO	

Surrogates

D4-1,2-Dichloroethane	108. %
D8-Toluene	100. %
4-Bromofluorobenzene	97.4 %

NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.

ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am. Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

CITY OF CARNATION

Professional Analytical Services

Drinking Water Report - VOC's
Method 524.2

JUL 15 2010
RECEIVED

System ID No.: 11200B	System Name: City of Carnation City of Carnation Well		
Lab/Sample No: 06609493	Date Collected: 06/21/2010	DOH Source No: S02	
Multiple Source Nos.:	Sample Type:	Sample Purpose: C	
Date Received: 6/21/10	Date Reported: 7/12/10		Supervisor: AY
Date Digested:	Date Analyzed: 6/30/10		Analyst: CG
County: King	Group: A		
Sample Location: Well House No Treatment			
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014		

EPA Regulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
45	Vinyl Chloride	ND	ug/l		0.5	0.5	2.0	NO	NO
46	1,1-Dichloroethylene	ND	ug/l		0.5	0.5	7.0	NO	NO
47	1,1,1-Trichloroethane	ND	ug/l		0.5	0.5	200.	NO	NO
48	Carbon Tetrachloride	ND	ug/l		0.5	0.5	5.0	NO	NO
49	Benzene	ND	ug/l		0.5	0.5	5.0	NO	NO
50	1,2-Dichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
51	Trichloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
52	1,4-Dichlorobenzene	ND	ug/l		0.5	0.5	600.	NO	NO
56	Methylene Chloride	ND	ug/l		0.5	0.5	5.0	NO	NO
57	Trans-1,2-Dichloroethene	ND	ug/l		0.5	0.5	100.	NO	NO
60	Cis-1,2-Dichloroethene	ND	ug/l		0.5	0.5	70.0	NO	NO
63	1,2-Dichloropropane	ND	ug/l		0.5	0.5	5.0	NO	NO
66	Toluene	ND	ug/l		0.5	0.5	1000	NO	NO
67	1,1,2-Trichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
68	Tetrachloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
71	Chlorobenzene	ND	ug/l		0.5	0.5	100.	NO	NO
73	Ethyl Benzene	ND	ug/l		0.5	0.5	700.	NO	NO
76	Styrene	ND	ug/l		0.5	0.5	100.	NO	NO
84	1,2-Dichlorobenzene	ND	ug/l		0.5	0.5	75.0	NO	NO
95	1,2,4-Trichlorobenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
160	Total Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
74	m+p Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
75	o-Xylene	ND	ug/l		0.5	0.5	10000	NO	NO

EPA Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds	
								TRIGGER	MCL
27	Chloroform	ND	ug/l		0.5	0.5		NO	
28	Bromodichloromethane	ND	ug/l		0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/l		0.5	0.5		NO	
30	Bromoform	ND	ug/l		0.5	0.5		NO	
53	Chloromethane	ND	ug/l		0.5	0.5		NO	
54	Bromomethane	ND	ug/l		0.5	0.5		NO	
55	Chloroethane	ND	ug/l		0.5	0.5		NO	
58	1,1-Dichloroethane	ND	ug/l		0.5	0.5		NO	
59	2,2-Dichloropropane	ND	ug/l		0.5	0.5		NO	
62	1,1-Dichloropropene	ND	ug/l		0.5	0.5		NO	
64	Dibromomethane	ND	ug/l		0.5	0.5		NO	
70	1,3-Dichloropropane	ND	ug/l		0.5	0.5		NO	
72	1,1,1,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
78	Bromobenzene	ND	ug/l		0.5	0.5		NO	
79	1,2,3-Trichloropropane	ND	ug/l		0.5	0.5		NO	
80	1,1,2,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
81	2-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
82	4-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
83	1,3-Dichlorobenzene	ND	ug/l		0.5	0.5		NO	
154	1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	

State Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
65	Cis-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
69	Trans-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
85	Trichlorofluoromethane	ND	ug/l		0.5	0.5		NO	
86	Bromochloromethane	ND	ug/l		0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/l		0.5	0.5		NO	
88	n-Propylbenzene	ND	ug/l		0.5	0.5		NO	
89	1,3,5-Trimethylbenzene	ND	ug/l		0.5	0.5		NO	
90	Tert-Butylbenzene	ND	ug/l		0.5	0.5		NO	
91	1,2,4-Trimethylbenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
92	Sec-Butylbenzene	ND	ug/l		0.5	0.5		NO	
93	p-Isopropyltoluene	ND	ug/l		0.5	0.5		NO	
94	n-Butylbenzene	ND	ug/l		0.5	0.5		NO	
96	Naphthalene	ND	ug/l		0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/l		0.5	0.5		NO	
98	1,2,3-Trichlorobenzene	ND	ug/l		0.5	0.5		NO	
102	EDB	ND	ug/l		0.5	0.5		NO	
103	DBCP	ND	ug/l		0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/l		0.5	0.5		NO	
***	Methyl tert-butyl ether	ND	ug/l		0.5	0.5		NO	

Surrogates

D4-1,2-Dichloroethane	117. %
D8-Toluene	100. %
4-Bromofluorobenzene	95.7 %

NOTES:

SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level ar required to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office

NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.

ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Revelwed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(42 5-1664

AMTEST LABORATORIES

Professional Analytical Services

CITY OF CARNATION

JUL 15 2010

RECEIVED

Drinking Water Report - VOC's
Method 524.2

System ID No.: 11200B	System Name: City of Carnation City of Carnation Well	
Lab/Sample No: 06609494	Date Collected: 06/21/2010	DOH Source No: 902
Multiple Source Nos.:	Sample Type:	Sample Purpose: C
Date Received: 6/21/10	Date Reported: 7/12/10	Supervisor: AY
Date Digested:	Date Analyzed: 6/30/10	Analyst: CG
County: King	Group: A	
Sample Location: Trip Blank		
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014	

EPA Regulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds	
								TRIGGER	MCL
46	Vinyl Chloride	ND	ug/l		0.5	0.5	2.0	NO	NO
48	1,1-Dichloroethylene	ND	ug/l		0.5	0.5	7.0	NO	NO
47	1,1,1-Trichloroethane	ND	ug/l		0.5	0.5	200.	NO	NO
43	Carbon Tetrachloride	ND	ug/l		0.5	0.5	5.0	NO	NO
4[illegible]	Benzene	ND	ug/l		0.5	0.5	5.0	NO	NO
50	1,2-Dichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
51	Trichloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
52	1,4-Dichlorobenzene	ND	ug/l		0.5	0.5	600.	NO	NO
56	Methylene Chloride	ND	ug/l.		0.5	0.5	5.0	NO	NO
57	Trans-1,2-Dichloroethene	ND	ug/l		0.5	0.5	100.	NO	NO
60	Cis-1,2-Dichloroethene	ND	ug/l		0.5	0.5	70.0	NO	NO
63	1,2-Dichloropropane	ND	ug/l		0.5	0.5	5.0	NO	NO
66	Toluene	ND	ug/l		0.5	0.5	1000	NO	NO
67	1,1,2-Trichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
68	Tetrachloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
71	Chlorobenzene	ND	ug/l		0.5	0.5	100.	NO	NO
73	Ethyl Benzene	ND	ug/l		0.5	0.5	700.	NO	NO
76	Styrene	ND	ug/l		0.5	0.5	100.	NO	NO
84	1,2-Dichlorobenzene	ND	ug/l		0.5	0.5	76.0	NO	NO
85	1,2,4-Trichlorobenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
100	Total Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
74	m+p Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
75	o-Xylene	ND	ug/l		0.5	0.5	10000	NO	NO

EPA Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds	
								TRIGGER	MCL
27	Chloroform	ND	ug/l		0.5	0.5		NO	
28	Bromodichloromethane	ND	ug/l		0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/l		0.5	0.5		NO	
30	Bromoform	ND	ug/l		0.5	0.5		NO	
53	Chloromethane	ND	ug/l		0.5	0.5		NO	
54	Bromomethane	ND	ug/l		0.5	0.5		NO	
55	Chloroethane	ND	ug/l		0.5	0.5		NO	
58	1,1-Dichloroethane	ND	ug/l		0.5	0.5		NO	
59	2,2-Dichloropropane	ND	ug/l		0.5	0.5		NO	
62	1,1-Dichloropropene	ND	ug/l		0.5	0.5		NO	
64	Dibromomethane	ND	ug/l		0.5	0.5		NO	
70	1,3-Dichloropropane	ND	ug/l		0.5	0.5		NO	
72	1,1,1,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
78	Bromobenzene	ND	ug/l		0.5	0.5		NO	
79	1,2,3-Trichloropropane	ND	ug/l		0.5	0.5		NO	
80	1,1,2,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
81	2-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
82	4-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
83	1,3-Dichlorobenzene	ND	ug/l		0.5	0.5		NO	
154	1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	

State Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
85	Cis-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
89	Trans-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
85	Trichlorofluoromethane	ND	ug/l		0.5	0.5		NO	
86	Bromochloromethane	ND	ug/l		0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/l		0.5	0.5		NO	
88	n-Propylbenzene	ND	ug/l		0.5	0.5		NO	
89	1,3,5-Trimethylbenzene	ND	ug/l		0.5	0.5		NO	
90	Tert-Butylbenzene	ND	ug/l		0.5	0.5		NO	
91	1,2,4-Trimethylbenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
92	Sec-Butylbenzene	ND	ug/l		0.5	0.5		NO	
93	p-Isopropyltoluene	ND	ug/l		0.5	0.5		NO	
94	n-Butylbenzene	ND	ug/l		0.5	0.5		NO	
98	Naphthalene	ND	ug/l		0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/l		0.5	0.5		NO	
96	1,2,3-Trichlorobenzene	ND	ug/l		0.5	0.5		NO	
102	EDB	ND	ug/l		0.5	0.5		NO	
16	DBCP	ND	ug/l		0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/l		0.5	0.5		NO	
***	Methyl tert-butyl ether	ND	ug/l		0.5	0.5		NO	

Surrogates

D4-1,2-Dichloroethane	111. %
D8-Toluene	97.1 %
4-Bromofluorobenzene	96.7 %

NOTES:
SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH)
Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level ar required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office
NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.
ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.
<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

AMTEST LABORATORIES

CITY OF CARNATION

Professional Analytical Services

JUL 15 2010

RECEIVED

Drinking Water Report - VOC's
Method 524.2

System ID No.: 11200B	System Name: City of Carnation City of Carnation Well	
Lab/Sample No: 06609495	Date Collected: 06/21/2010	DOH Source No: S02
Multiple Source Nos.:	Sample Type:	Sample Purpose: C
Date Received: 6/21/10	Date Reported: 7/12/10	Supervisor: AY
Date Digested:	Date Analyzed: 6/30/10	Analyst: CG
County: King	Group: A	
Sample Location: Lab Blank		
Send Report To: City of Carnation PO Box 1238 Carnation, WA 98014	Bill To: Pat Osborne PO Box 1238 Carnation, WA 98014	

EPA Regulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
45	Vinyl Chloride	ND	ug/l		0.5	0.5	2.0	NO	NO
46	1,1-Dichloroethylene	ND	ug/l		0.5	0.5	7.0	NO	NO
47	1,1,1-Trichloroethane	ND	ug/l		0.5	0.5	200.	NO	NO
48	Carbon Tetrachloride	ND	ug/l		0.5	0.5	5.0	NO	NO
49	Benzene	ND	ug/l		0.5	0.5	5.0	NO	NO
50	1,2-Dichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
51	Trichloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
52	1,4-Dichlorobenzene	ND	ug/l		0.5	0.5	600.	NO	NO
56	Methylene Chloride	ND	ug/l		0.5	0.5	5.0	NO	NO
57	Trans-1,2-Dichloroethene	ND	ug/l		0.5	0.5	100.	NO	NO
60	Cis-1,2-Dichloroethene	ND	ug/l		0.5	0.5	70.0	NO	NO
63	1,2-Dichloropropane	ND	ug/l		0.5	0.5	5.0	NO	NO
66	Toluene	ND	ug/l		0.5	0.5	1000	NO	NO
67	1,1,2-Trichloroethane	ND	ug/l		0.5	0.5	5.0	NO	NO
68	Tetrachloroethylene	ND	ug/l		0.5	0.5	5.0	NO	NO
71	Chlorobenzene	ND	ug/l		0.5	0.5	100.	NO	NO
73	Ethyl Benzene	ND	ug/l		0.5	0.5	700.	NO	NO
76	Styrene	ND	ug/l		0.5	0.5	100.	NO	NO
84	1,2-Dichlorobenzene	ND	ug/l		0.5	0.5	75.0	NO	NO
95	1,2,4-Trichlorobenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
160	Total Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
74	m+p Xylene	ND	ug/l		0.5	0.5	10000	NO	NO
75	o-Xylene	ND	ug/l		0.5	0.5	10000	NO	NO

EPA Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds	
								TRIGGER	MCL
27	Chloroform	ND	ug/l		0.5	0.5		NO	
28	Bromodichloromethane	ND	ug/l		0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/l		0.5	0.5		NO	
30	Bromoform	ND	ug/l		0.5	0.5		NO	
53	Chloromethane	ND	ug/l		0.5	0.5		NO	
54	Bromomethane	ND	ug/l		0.5	0.5		NO	
55	Chloroethane	ND	ug/l		0.5	0.5		NO	
58	1,1-Dichloroethane	ND	ug/l		0.5	0.5		NO	
59	2,2-Dichloropropane	ND	ug/l		0.5	0.5		NO	
62	1,1-Dichloropropene	ND	ug/l		0.5	0.5		NO	
64	Dibromomethane	ND	ug/l		0.5	0.5		NO	
70	1,3-Dichloropropane	ND	ug/l		0.5	0.5		NO	
72	1,1,1,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
78	Bromobenzene	ND	ug/l		0.5	0.5		NO	
79	1,2,3-Trichloropropane	ND	ug/l		0.5	0.5		NO	
80	1,1,2,2-Tetrachloroethane	ND	ug/l		0.5	0.5		NO	
81	2-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
82	4-Chlorotoluene	ND	ug/l		0.5	0.5		NO	
83	1,3-Dichlorobenzene	ND	ug/l		0.5	0.5		NO	
154	1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	

State Unregulated - VOC's

DOH#	Analytes	Results	Units	Q	SRL	Trigger	MCL	Exceeds TRIGGER	Exceeds MCL
65	Cis-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
69	Trans-1,3-Dichloropropene	ND	ug/l		0.5	0.5		NO	
85	Trichlorofluoromethane	ND	ug/l		0.5	0.5		NO	
86	Bromochloromethane	ND	ug/l		0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/l		0.5	0.5		NO	
88	n-Propylbenzene	ND	ug/l		0.5	0.5		NO	
89	1,3,5-Trimethylbenzene	ND	ug/l		0.5	0.5		NO	
90	Tert-Butylbenzene	ND	ug/l		0.5	0.5		NO	
91	1,2,4-Trimethylbenzene	ND	ug/l		0.5	0.5	70.0	NO	NO
92	Sec-Butylbenzene	ND	ug/l		0.5	0.5		NO	
93	p-Isopropyltoluene	ND	ug/l		0.5	0.5		NO	
94	n-Butylbenzene	ND	ug/l		0.5	0.5		NO	
96	Naphthalene	ND	ug/l		0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/l		0.5	0.5		NO	
98	1,2,3-Trichlorobenzene	ND	ug/l		0.5	0.5		NO	
102	EDB	ND	ug/l		0.5	0.5		NO	
103	DBCP	ND	ug/l		0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/l		0.5	0.5		NO	
***	Methyl tert-butyl ether	ND	ug/l		0.5	0.5		NO	

Surrogates

D4-1,2-Dichloroethane	108. %
D8-Toluene	100. %
4-Bromofluorobenzene	97.4 %

NOTES:

SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH)

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level ar required to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office

NA (Not Analyzed): in the results column indicates this compound was no included in the current analysis.

ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.001): indicates the compound was not detected in the sample at or above the concentration indicated.

Reviewed By: _____

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year	12 - 2010
King County	ID No. 11200B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Treatment Requirements:		Signature:	
Cl2 Residual - 0.2 mg/L Flow Rate - 388 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 559,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.8	0.07	0.08			0.5	
2				7.8	0.08	0.09			0.4	
3				7.5	0.07	0.08			0.5	
4										
5										
6	268,775,000	1562,000		7.7	0.07	0.07	137	3	0.3	
7				7.8	0.07	0.08			0.4	
8				7.4	0.06	0.07			0.4	
9				7.7	0.06	0.08			0.2	
10				7.7	0.07	0.08			0.3	
11										
12										
13	270,311,000	1,536,000		9.2	0.08	0.09	132	5	0.4	
14				9.3	0.07	0.08			0.2	
15				7.4	0.09	0.10			0.3	
16				7.5	0.08	0.09			0.3	
17				7.6	0.07	0.08			0.4	
18										
19										
20	271,807,000	1,496,000		7.6	0.07	0.08	129	3	0.5	
21				7.5	0.06	0.09			0.4	
22				7.5	0.07	0.08			0.4	
23				7.5	0.07	0.08			0.4	
24		—		HOLIDAY						
25										
26										
27	273,331,000	1,524,000		7.5	0.06	0.08	125	4	0.4	
28				7.6	0.08	0.09			0.3	
29				7.5	0.07	0.08			0.5	
30				7.7	0.07	0.08			0.3	
31		—		HOLIDAY						
Total										
Avg										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Committee: City of		Month/Year: 11 - 2010	
King County	ID No. 33140Is	Report submitted by: CARL MUELLER	
Cumaclaw Springs	Source No. 01	Operator Certification #: 10286	
DOH Water Quality Parameter Requirement		Signature:	
Cl residual - 0.2 mg/L Flow rate - 188 gpm		Telephone #: (425) 765-7104	
Total Water Treated - 547,381 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1	261140000	1476000		7.6	0.06	0.07	8	4	0.5	
2				7.9	0.07	0.07			0.2	
3				7.8	0.08	0.09			0.2	
4				7.9	0.08	0.10			0.2	
5				7.5	0.07	0.08			0.3	
6										
7										
8	262680000	1478000		7.9	0.08	0.09	3	5	0.3	
9				8.0	0.08	0.09			0.2	
10				7.6	0.06	0.08			0.5	
11	—	— VETERANS DAY - HOLIDAY —								
12				7.9	0.07	0.08			0.2	
13										
14										
15	264,126,000	1,508,000		7.9	0.07	0.08	146	4	0.3	
16				7.9	0.07	0.08			0.3	
17				7.5	0.07	0.08			0.5	
18				7.6	0.07	0.08			0.5	
19				7.6	0.07	0.08			0.5	
20										
21										
22	265622000	1496000		7.6	0.06	0.08	143	3	0.5	
23				7.5	0.07	0.07			0.5	
24				7.7	0.07	0.08			0.2	
25		— THANKSGIVEN - HOLIDAY —								
26		— DAY AFTER - HOLIDAY —								
27										
28										
29	267,231,010	1,609,000		7.7	0.07	0.08	140	3	0.3	
30				7.9	0.09	0.10			0.4	
31										
Total	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
Avg.	[redacted]						[redacted]			

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

[redacted] GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	10- 2010
King County	ID No. 1124003	Report submitted by:	Bob Gilbertson
Carnation Springs	Source No. 01	Operator Certification #	5672
DOH Water Quality Parameter Requirements		Signature:	[redacted]
Cl- Residual - 0.2 mg/L Flow rate - 380 gpm		Telephone #:	425-265-0505
Total Water Treated - 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.9	0.11	0.14			0.3	
2										
3										
4	265243...	1473...		7.6	0.10	0.21	24	4	0.4	
5				8.0	0.11	0.13			0.3	
6				7.8	0.08	0.15			0.3	
7				7.7	0.08	0.11			0.4	
8				8.6	0.11	0.12			0.4	
9										
10										
11	265713...	1475...		8.0	0.12	0.14	20	4	0.4	
12				6.9	0.14	0.17			0.1	
13				7.8	0.11	0.14			0.2	
14				7.6	0.10	0.10			0.4	
15				7.6	0.10	0.11			0.3	
16										
17										
18	265819...	1472...		7.8	0.10	0.11	16	4	0.5	
19				7.9	0.9	0.10			0.3	
20				7.8	0.9	0.09			0.5	
21				7.9	0.10	0.13			0.3	
22				7.7	0.13	0.20			0.4	
23										
24										
25	259,665,000	1,474,000		7.4	0.19	0.15	12	4	0.2	
26				7.3	0.07	0.08			0.4	
27				7.6	0.07	0.08			0.5	
28				7.6	0.07	0.09			0.4	
29				7.4	0.08	0.10			0.4	
30										
31										
Total	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	
Ave	[redacted]						[redacted]			

Mail completed form by the 10th of the following month to:

Washington State Department of Health
DW Drinking Water Operations
[redacted] 2nd Avenue South, Suite 300
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	9-2010
King County	ID No. 11200B	Report submitted by:	Bob Gilbertson
Carnation Springs	Source No. 01	Operator Certification #:	5622
DOH Water Quality Parameter Requirements:		Signature:	
Cl2 Residual – 0.2 mg/L Flow Rate – 300 gpm		Telephone #:	425-765-0508
Total Water Treated – 543,200 gal			

Day	Water Production (Outputs)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				8.1	0.10	0.10			0.1	
2				7.8	0.11	0.13			0.4	
3				8.1	0.11	0.16			0.3	
4										
5										
6					HOLIDAY					
7	2496190gal	2049gal		7.9	0.11	0.17	41	5	0.4	
8				7.6	0.12	0.13			0.4	
9				7.8	0.11	0.13			0.2	
10				8.1	0.09	0.09			0.3	
11										
12										
13	2809+17gal	1328gal		7.6	0.09	0.13	36	5	0.2	
14				7.4	0.12	0.18			0.4	
15				8.1	0.09	0.09			0.4	
16				7.8	0.18	0.25			0.4	
17				8.0	0.08	0.09			0.4	
18										
19										
20	3520gal	1496gal		8.2	0.15	0.20	31	5	0.4	
21				8.6	0.13	0.14			0.4	
22				7.9	0.11	0.22			0.4	
23				7.9	0.14	0.15			0.3	
24				8.1	0.09	0.15			0.4	
25										
26										
27	4583gal	1447gal		7.7	0.09	0.09	28	5	0.3	
28				7.8	0.09	0.13			0.3	
29				7.5	0.09	0.15			0.3	
30				7.9	0.09	0.13			0.3	
31										
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	AUGUST 2010
King County	ID No. 112008	Report submitted by:	BOB GILBERTSON
Carnation Springs	Source No. 01	Operator Certification #:	5672
DOH Water Quality Parameter Requirements:		Signature:	
Cl2 Residual - 0.2 mg/L Flow Rate - 380 gpm		Telephone #:	425 - 765 0506
Total Water Treated - 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1										
2	237767000	2695000		8.1	0.19	0.21	61	3	0.3	
3				8.4	0.19	0.22			0.3	
4				8.1	0.11	0.21			0.4	
5				7.7	0.10	0.11			0.3	
6				7.8	0.25	0.27			0.3	
7										
8										
9	240204 est	2437000		7.9	0.17	0.21	58	3	0.1	
10				7.6	0.23	0.26			0.2	
11				7.9	0.25	0.35			0.2	
12				7.9	0.14	0.18			0.4	
13				7.8	0.14	0.20			0.2	
14										
15										
16	242500 est	2696 est		7.5	0.14	0.19	54	4	0.3	
17				7.5	0.24	0.28			0.3	
18				7.6	0.16	0.19			0.3	
19				7.4	0.14	0.21			0.3	
20				7.8	0.12	0.18			0.4	
21										
22										
23	245239000	2439 est		7.9	0.12	0.13			0.3	
24				7.7	0.19	0.20			0.2	
25				7.9	0.14	0.24			0.2	
26				7.8	0.16	0.17			0.3	
27				7.7	0.11	0.16			0.2	
28										
29										
30	247470 est	2231 est		7.7	0.15	0.21	48		0.2	
31				7.8	0.12	0.15			0.3	
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	July 2010
King County	ID No. 11200B	Report submitted by:	Bob Gilbertson
Carnation Springs	Source No. 01	Operator Certification #:	5672
DOH Water Quality Parameter Requirements:		Signature:	[signature]
Cl2 Residual = >0.2 mg/L Flow Rate = 388 gpm		Telephone #:	425 - 765 0508
Total Water Treated = 542,386 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				8.0	0.18	0.20			0.3	
2				7.9	0.17	0.21			0.3	
3										
4					July	4th				
5										
6	228186 gal	211800		7.8	0.12	0.14	78	5	0.5	
7				8.0	0.20	0.26			0.4	
8				8.2	0.19	0.25			0.2	
9				8.4	0.16	0.19			0.3	
10										
11										
12	229238 gal	2060 avg		8.6	0.19	0.28	74	4	0.3	
13				7.9	0.15	0.21			0.4	
14				7.5	0.11	0.17			0.3	
15				7.9	0.14	0.14			0.4	
16				8.1	0.11	0.15			0.4	
17										
18										
19	232407 gal	2379000		7.8	0.10	0.12	69	5	0.3	
20				7.8	0.18	0.19			0.4	
21				8.6	0.13	0.14			0.3	
22				7.9	0.14	0.16			0.4	
23				8.2	0.22	0.27			0.3	
24										
25										
26	225672 gal	2455000		7.6	0.21	0.24	64	5	0.3	
27				7.4	0.12	0.17			0.2	
28				7.1	0.13	0.20			0.4	
29				8.1	0.15	0.24			0.3	
30				8.0	0.16	0.19			0.3	
31										
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year	June 2010
King County	ID No. 11200B	Report submitted by:	B. G. Gibbons
Carnation Springs	Source No. 01	Operator Certification #:	5673
DOH Water Quality Parameters (approximate):		Signature:	
Cl2 residual – 0.2 mg/L Flow Rate – 350 gpm		Telephone #:	425-333-4192
Total Water Treated – 347,280 gpd		cell 425-765-0508	

Day	Water Production (Chlorox)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp °F	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl_2 Residual mg/L	
1	2199805 gal	1375000	7.6		0.14	0.18	96	2	0.2	
2			8.1		0.15	0.17			0.2	
3			8.0		0.10	0.10			0.3	
4			7.8		0.16	0.19			0.4	
5										
6										
7	2212411 gal	1336 gal	7.8		0.10	0.11	93	3	0.1	
8			7.9		0.10	0.13			0.2	
9			8.0		0.20	0.21			0.2	
10			7.7		0.08	0.10			0.3	
11			7.6		0.10	0.12			0.2	
12										
13										
14	2229340 gal	1513000	8.0		0.11	0.11	97	4	0.4	
15			7.8		0.14	0.17			0.2	
16			7.9		0.10	0.17			0.4	
17			8.1		0.17	0.17			0.1	
18			7.8		0.07	0.08			0.3	
19										
20										
21	2249373 gal	1539000	8.0		0.10	0.15	90	7	0.4	
22			7.8		0.10	0.17			0.6	
23			8.0		0.11	0.11			0.6	
24			7.7		0.15	0.19			0.4	
25			7.9		0.10	0.14			0.5	
26										
27										
28	2266670 gal	1697000	8.1		0.12	0.13	83	7	0.3	
29			7.9		0.20	0.24			0.5	
30			8.4		0.21	0.24			0.4	
31										
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	5 - 2010
King County	ID No. 11200B	Report submitted by:	Bob Gilbertson
Carnation Springs	Source No. 01	Operator Certification #:	5672
DOH Water Quality Parameter Requirements:		Signature:	Bob Gilbertson
Cl2 Residual - 0.2 mg/L Flow Rate - 330 gpm		Telephone #:	425 - 765 - 0504
Total Water Treated - 3672811 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1										
2										
3	21357900	149 1000		7.4	0.14	0.22	103	4	0.3	
4				7.4	0.10	0.17			0.4	
5				7.8	0.09	0.09			0.4	
6				7.9	0.12	0.19			0.4	
7				7.6	0.10	0.11			0.4	
8										
9										
10	21491200	1833000		7.6	0.06	0.10	102	1	0.4	
11				7.7	0.09	0.13			0.3	
12				7.9	0.15	0.18			0.2	
13				7.9	0.15	0.18			0.5	
14				7.7	0.16	0.18			0.3	
15										
16										
17	21721900	1667000		7.8	0.14	0.18	100	2	0.3	
18				7.4	0.09	0.11			0.4	
19				7.6	0.07	0.09			0.2	
20				7.7	0.10	0.12			0.3	
21				7.6	0.08	0.08			0.2	
22										
23										
24	21981300	1551000		8.0	0.12	0.12	98	2	0.4	
25				7.8	0.13	0.20			0.3	
26				7.6	0.17	0.24			0.4	
27				7.9	0.16	0.17			0.4	
28				7.9	0.07	0.07			0.3	
29										
30										
31				Weekend						
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	4 - 2010
King County	ID No. 11200B	Report submitted by:	Bob Gilbertson
Carnation Springs	Source No. 01	Operator Certification #:	5720
DOH Water Quality Parameters Requirements:		Signature:	Bob Gilbertson
Cl2 residual - >0.2 mg/L Flow Rate - 300 gpm		Telephone #:	425-765-0508
Total Water Treated - 547208 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.4	0.14	0.20		----	0.3	
2				8.2	0.12	0.18			0.3	
3										
4										
5	2073420	1972000		7.7	0.24	0.27	120	3	0.4	
6				8.1	0.17	0.25			0.3	
7				7.5	0.11	0.15			0.3	
8				7.9	0.13	0.14			0.4	
9				8.0	0.11	0.14			0.4	
10										
11										
12	2085210	1480000		7.5	0.09	0.14	116	4	0.4	
13				7.8	0.11	0.17			0.4	
14				7.4	0.12	0.18			0.4	
15				7.6	0.12	0.18			0.3	
16				7.6	0.11	0.16			0.4	
17										
18										
19	2103520	1638000		7.6	0.17	0.24	112	4	0.4	
20				8.4	0.10	0.12			0.3	
21				7.6	0.09	0.12			0.4	
22				7.8	0.13	0.14			0.3	
23				7.9	0.15	0.17			0.3	
24										
25										
26	2118890	1536000		7.6	0.21	0.29	108	4	0.3	
27				7.8	0.22	0.28			0.3	
28				7.9	0.18	0.23			0.4	
29				7.6	0.20	0.22			0.4	
30				7.9	0.11	0.14			0.4	
31										
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	3 - 2010
King County	ID No. 11260B	Report submitted by:	Bob Gilbertson
Carnation Springs	Source No. 01	Operator Certification #:	5677
DOH Water Quality Parameter Requirements:		Signature:	Bob Gilbertson
Cl2 Residual - ≥0.2 mg/L Flow Rate 330 gpm		Telephone #:	425 - 765 - 0508
Total Water Treated – 247,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1	1999280	1496000		7.4	0.12	0.15	135	3	0.5	
2				7.4	0.10	0.21			0.5	
3				7.7	0.08	0.09			0.5	
4				7.3	0.09	0.13			0.5	
5				7.5	0.07	0.07			0.4	
6										
7										
8	2011160	1478000		7.6	0.08	0.08	132	3	0.4	
9				7.6	0.08	0.09			0.4	
10				7.8	0.08	0.08			0.4	
11				7.6	0.06	0.07			0.5	
12				7.7	0.13	0.17			0.4	
13										
14										
15	2025820	1466000		7.2	0.09	0.09	129	3	0.3	
16				7.7	0.07	0.08			0.2	
17				7.7	0.15	0.12			0.5	
18				7.5	0.09	0.20			0.3	
19				7.7	0.09	0.13			0.3	
20										
21										
22	2043780	1496000		7.6	0.09	0.10	126	3	0.3	
23				7.3	0.09	0.11			0.3	
24				7.5	0.09	0.10			0.3	
25				7.5	0.07	0.07			0.4	
26				7.5	0.07	0.09			0.4	
27										
28										
29	2059700	1472000		7.6	0.14	0.15	123	3	0.3	
30				7.5	0.10	0.11			0.3	
31				7.7	0.09	0.12			0.4	
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	2 - 2010
King County	ID No. 11200H	Report submitted by:	Bob G. Heatwole
Carnation Springs	Source No: 01	Operator Certification #:	5627
DOH Water Quality Parameter Requirements:		Signature:	Bob G. Heatwole
Cl2 Residual - >0.2 mg/L Flow Rate - 388 gpm		Telephone #:	425 - 765 - 0508
Total Water Treated - 547,300 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1	193966 000	1623000		7.5	0.07	0.21	149	3	0.4	
2				7.6	0.09	0.09			0.4	
3				7.4	0.07	0.08			0.5	
4				7.8	0.10	0.12			0.5	
5				7.7	0.11	0.14			0.4	
6										
7										
8	195460 000	1514000		7.4	0.10	0.11	146	4	0.4	
9				7.4	0.08	0.11			0.4	
10				7.7	0.06	0.06			0.4	
11				7.6	0.07	0.08			0.3	
12				7.6	0.08	0.13			0.4	
13										
14										
15					Well Off					
16	197150 000	1698 000		7.5	0.08	0.12	142	3	0.5	
17				7.3	0.07	0.07			0.5	
18				7.7	0.08	0.09			0.5	
19				7.4	0.17	0.19			0.4	
20										
21										
22	198962 000	1292 000		7.6	0.08	0.08	138	4	0.5	
23				7.7	0.10	0.13			0.5	
24				7.7	0.12	0.13			0.5	
25				7.5	0.07	0.08			0.5	
26				7.4	0.08	0.09			0.4	
27										
28										
29										
30										
31										
Total										
Ave										

Mail completed form by the 10th of the following month to

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year: 1 - 2010	
King County	ID No. 11200B	Report submitted by: Bob Gilbertson	
Carnation Springs	Source No. 01	Operator Certification #: 5672	
DOH Water Quality Parameter Requirements:		Signature: Bob Gilbertson	
Cl₂ Residual – 0.2 mg/L Flow Rate – 330 gpm		Telephone #: 425 765-0506	
Total Water Treated – 567,300 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Total Weight (Pounds)	Gas Used (Pounds)	Cl₂ Residual mg/L	
1										
2										
3										
4	1976150	1734000		7.6	0.13	0.18	12	4	0.4	
5				7.4	0.08	0.12			0.3	
6				7.2	0.20	0.24			0.4	
7				7.6	0.15	0.14			0.4	
8				7.5	0.08	0.08			0.3	
9										
10										
11	1992450	1634000		7.4	0.10	0.12	8	4	0.4	
12				7.5	0.13	0.15			0.3	
13				7.4	0.20	0.21			0.3	
14				7.5	0.10	0.12			0.4	
15				7.6	0.10	0.13			0.3	
16										
17										
18					No Data					
19	1991060	1911000		7.8	0.11	0.18	6	2	0.3	
20				7.4	0.15	0.20			0.2	
21				7.3	0.10	0.12			0.4	
22				7.6	0.09	0.10			0.4	
23										
24										
25	1924130	1353000		7.6	0.19	0.24	2	4	0.4	
26				7.6	0.10	0.10			0.4	
27				7.8	0.16	0.18			0.4	
28				7.2	0.10	0.12	150		0.5	
29				7.2	0.15	0.15			0.2	
30										
31										
Total										
Ave.										

Mail completed forms by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Consulting, City of		Month/Year:	DECEMBER - 2011
King County	ID No. 112108K	Report submitted by:	CARL MUELLER
Cumulative Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl2 Residual - 0.2 mg/l Flow Rate - 300 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 347,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.8	0.07	0.08			0.3	
2				7.8	0.07	0.08			0.3	
3										
4										
5	363,968,000	1,633,000		7.9	0.06	0.07	80	3	0.3	
6				7.8	0.07	0.08			0.3	
7				7.8	0.07	0.08			0.4	
8				7.9	0.07	0.08			0.4	
9				7.8	0.07	0.08			0.3	
10										
11										
12	365,590,000	1,622,000		7.7	0.06	0.07	76	4	0.3	
13				7.8	0.07	0.08			0.3	
14				7.8	0.07	0.08			0.4	
15				7.8	0.06	0.07			0.3	
16				7.9	0.07	0.08			0.4	
17										
18										
19	367,206,000	1,616,000		7.8	0.06	0.07	73	3	0.3	
20				7.8	0.06	0.07			0.2	
21				7.8	0.06	0.07			0.3	
22				7.8	0.09	0.10			0.3	
23				7.8	0.07	0.08			0.4	
24										
25										
26				HOLIDAY						
27	369,056,000	1,850,000		7.9	0.06	0.07	64	4	0.4	
28				7.8	0.07	0.08			0.4	
29				7.8	0.07	0.08			0.3	
30				7.8	0.07	0.08			0.3	
31										
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
DW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUNDWATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	NOVEMBER - 2011
King County	ID No. 11200L	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl₂ Residual = >0.2 mg/L Flow Rate = 385 gpm		Telephone #:	(425) 765-7104
Total Water Treated = 567,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl₂ Residual mg/L	
1				7.8	0.07	0.08			0.4	
2				7.9	0.06	0.07			0.3	
3				7.8	0.06	0.07			0.3	
4				7.8	0.06	0.07			0.3	
5										
6										
7	356258000	1831000		7.8	0.07	0.08	94	4	0.3	
8				7.9	0.07	0.08			0.3	
9				7.9	0.07	0.08			0.4	
10				7.8	0.07	0.08			0.3	
11		—	HOLIDAY				—	—		
12										
13										
14	358562,000	2,304,000		7.8	0.07	0.08	91	3	0.2	
15				7.8	0.08	0.09			0.3	
16				7.8	0.08	0.09			0.2	
17				7.8	0.07	0.08			0.3	
18				7.8	0.07	0.08			0.3	
19										
20										
21	360693000	2,131,000		7.8	0.07	0.08	87	4	0.3	
22				7.8	0.06	0.07			0.3	
23				7.8	0.06	0.07			0.4	
24										
25			HOLIDAY							
26										
27										
28	362335,000	1,642,000		7.8	0.07	0.08	83	4	0.3	
29				7.8	0.07	0.08			0.3	
30				7.8	0.07	0.08			0.3	
31										
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 310
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	OCTOBER - 2011
King County	ID No. 11300H:	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Treatment Requirements:		Signature:	
Cl2 Required: 0.2 mg/L Pipe Size: 384 gpm		Telephone #:	(425) 765-7104
Total Water Treated = 847,000 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water in Gallons	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1										
2										
3	346,562,000	1,876,000		7.8	0.07	0.08	115	3	0.3	
4				7.8	0.06	0.07			0.3	
5				7.9	0.07	0.08			0.3	
6				7.9	0.07	0.08			0.3	
7				7.9	0.07	0.08			0.3	
8										
9										
10	348,351,000	1,789,000		7.9	0.07	0.08	111	4	0.3	
11				7.8	0.07	0.08			0.4	
12				7.9	0.06	0.07			0.3	
13				7.9	0.06	0.07			0.3	
14				7.9	0.06	0.07			0.3	
15										
16										
17	350,113,000	1,762,000		7.8	0.06	0.07	107	4	0.3	
18				7.8	0.06	0.07			0.4	
19				7.9	0.06	0.07			0.3	
20				7.9	0.07	0.08			0.3	
21	(FLUSHING NE 45TH MAIN)			7.9	0.14	0.16			0.3	
22										
23										
24	352,189,000	2,076,000		7.8	0.19	0.20	103	4	0.2	
25	(WELL ON)			7.5	0.19	0.20			0.2	
26				7.2	0.07	0.08			0.2	
27				7.3	0.10	0.11			0.2	
28				7.8	0.08	0.09			0.2	
29										
30										
31	354427,000	2,238,000		7.5	0.16	0.17	98	5	0.4	
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	SEPTEMBER - 2011
King County	ID No. 03803	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl Residual - 0.2 mg/L Flow Rate - 386 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 542,201 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Plant Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.6	0.07	0.08			0.3	
2				7.8	0.07	0.08			0.4	
3										
4										
5			HOLIDAY							
6	337974000	2,893,000		8.0	0.09	0.11	130	5	0.2	
7				8.0	0.09	0.10			0.2	
8				8.0	0.10	0.11			0.2	
9				8.1	0.10	0.11			0.2	
10										
11										
12	340,237,000	2,263,000		8.0	0.11	0.12	126	4	0.2	
13				7.6	0.10	0.11			0.2	
14				7.8	0.08	0.09			0.4	
15				7.8	0.08	0.09			0.4	
16				7.8	0.09	0.10			0.5	
17										
18										
19	342529000	2,283,000		8.0	0.07	0.08	122	4	0.3	
20				7.9	0.07	0.08			0.2	
21				7.9	0.07	0.08			0.2	
22				7.9	0.07	0.08			0.2	
23				7.9	0.11	0.12			0.3	
24										
25										
26	344,686,000	2,166,000		7.8	0.07	0.08			0.3	
27				7.9	0.07	0.08			0.3	
28				7.8	0.07	0.08			0.4	
29				7.9	0.07	0.08			0.4	
30				7.9	0.07	0.08			0.4	
31										
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	AUGUST - 2011
King County	ID No. 11200B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl2 Residual - 0.2 mg/L Flow Rate - 380 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1	324,752,000	2,143,000		7.7	0.08	0.09	148	3	0.3	
2				7.7	0.03	0.11			0.3	
3				7.8	0.07	0.08			0.3	
4				7.8	0.06	0.07			0.2	
5				7.8	0.06	0.07			0.2	
6										
7										
8	327,206,000	2,454,000		7.7	0.07	0.08	146	2	0.2	
9				7.7	0.07	0.08			0.2	
10				7.8	0.06	0.07			0.2	
11				7.6	0.06	0.07			0.3	
12				7.7	0.06	0.07			0.3	
13										
14										
15	329,687,000	2,481,000		7.8	0.07	0.08	143	3	0.2	
16				7.7	0.06	0.07			0.3	
17				7.7	0.07	0.08			0.2	
18				7.9	0.09	0.10			0.2	
19				7.8	0.07	0.08			0.2	
20										
21										
22	332,457,000	2,770,000		8.1	0.12	0.13	139	4	0.2	
23				8.2	0.12	0.13			0.2	
24				7.8	0.06	0.07			0.3	
25				8.0	0.11	0.12			0.2	
26				8.1	0.11	0.12			0.2	
27										
28										
29	335,081,000	2,624,000		8.2	0.11	0.12	135	4	0.2	
30				7.9	0.07	0.08			0.3	
31				7.9	0.07	0.08			0.4	
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 310
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	JULY - 2011
King County	ID No. 11300B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Treatment Requirements:		Signature:	
Cl. Residual - 0.2 mg/L Fluoride - .7 ppm		Telephone #:	(425) 765-7104
Total Water Treated - 547,300 gpd			

Day	Water Production (Outflow)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water in System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.7	0.08	0.09			0.3	
2										
3										
4			—	HOLIDAY	—					
5	316649000	2268000		7.7	0.07	0.08	12	5	0.4	
6				7.7	0.07	0.08			0.4	
7				7.6	0.07	0.08			0.4	
8				7.8	0.07	0.08			0.3	
9										
10										
11	318560000	1911000		7.8	0.08	0.09	8	4	0.3	
12				7.7	0.09	0.10			0.3	
13				7.5	0.06	0.07			0.3	
14				7.6	0.08	0.09			0.4	
15				7.8	0.07	0.08			0.3	
16										
17										
18	320514000	1954000		7.7	0.07	0.08	5	3	0.3	
19				7.7	0.07	0.08			0.3	
20				7.7	0.07	0.08			0.3	
21				7.8	0.07	0.08			0.2	
22				7.7	0.07	0.08			0.3	
23										
24										
25	322609000	2095000		7.6	0.07	0.08	1	4	0.3	
26				7.7	0.07	0.08			0.2	
27				7.8	0.06	0.07			0.2	
28				7.7	0.07	0.08			0.3	
29				7.7	0.06	0.07			0.3	
30										
31										
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	JUNE, 2011
King County	ID No. 11200B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	Carl Mueller
Cl2 Residual = 0.2 mg/L Flow Rate = 350 gpm		Telephone #:	(425) 765-7104
Total Water Treated = 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.8	0.07	0.08			0.2	
2				7.7	0.06	0.07			0.4	
3				7.7	0.07	0.08			0.4	
4										
5										
6	309653000	1386000		7.8	0.07	0.08	33	3	0.3	
7				7.7	0.06	0.07			0.3	
8				7.7	0.07	0.08			0.4	
9				7.7	0.08	0.09			0.4	
10				7.7	0.07	0.08			0.4	
11										
12										
13	311237000	1584000		7.6	0.21	0.22	28	5	0.4	
14				7.7	0.07	0.08			0.4	
15				7.7	0.06	0.07			0.4	
16				7.7	0.08	0.09			0.3	
17				7.7	0.07	0.08			0.3	
18										
19										
20	312,850,000	1613,000		7.7	0.06	0.07	22	6	0.4	
21				7.8	0.07	0.08			0.4	
22				7.7	0.23	0.24			0.2	
23				7.2	0.14	0.15			0.2	
24				7.6	0.17	0.18			0.5	
25										
26										
27	314381000	1531000		7.7	0.06	0.07	17	5	0.4	
28				7.8	0.07	0.08			0.4	
29				7.7	0.12	0.14			0.4	
30				7.6	0.15	0.16			0.2	
31										
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	MAY, 2011
King County	ID No. 11210B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl_2 Residual – 0.2 mg/L Flow Rate – 380 gpm		Telephone #:	(425) 765-7104
Total Water Treated – 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl_2 Residual mg/L	
1										
2	301,748,000	1587000		7.8	0.08	0.09	53	4	0.3	
3				7.8	0.10	0.11			0.3	
4				7.8	0.10	0.10			0.3	
5				7.7	0.09	0.10			0.3	
6				7.8	0.07	0.08			0.3	
7										
8										
9	303351000	1603000		7.7	0.07	0.08	49	4	0.3	
10				7.8	0.07	0.08			0.3	
11				7.8	0.08	0.09			0.3	
12				7.8	0.08	0.09			0.3	
13				7.9	0.07	0.08			0.3	
14										
15										
16	305017000	1666000		7.9	0.07	0.08	44	5	0.3	
17				7.8	0.07	0.08			0.3	
18				7.8	0.07	0.08			0.3	
19				7.7	0.07	0.11			0.3	
20				7.8	0.06	0.07			0.3	
21										
22										
23	306640000	1623000		7.8	0.07	0.08	40	4	0.3	
24				7.9	0.06	0.07			0.3	
25				7.8	0.07	0.08			0.3	
26				7.9	0.07	0.08			0.3	
27				7.1	0.10	0.11			0.2	
28										
29										
30	—	HOLIDAY		—	—	—	—	—		
31	308267000	1627000		7.6	0.14	0.15	36	4	0.2	
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
PWS Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	APRIL, 2011
King County	ID No. 112608	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	C.L. M
Cl Residual - 0.2 mg/L Flow Rate - 300 gpm		Telephone #:	(425) 765-7104
Total Water Treated = 542,300 gal			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water in System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl Residual mg/L	
1				7.9	0.07	0.09			0.3	
2										
3										
4	295,396,000	1,584,000		7.8	0.07	0.08	69	3	0.4	
5				7.7	0.08	0.09			0.4	
6				7.7	0.08	0.09			0.3	
7				7.8	0.07	0.08			0.2	
8				7.7	0.06	0.07			0.4	
9										
10										
11	296,961,000	1,565,000		7.4	0.07	0.08	65	4	0.3	
12				7.8	0.07	0.08			0.3	
13				7.7	0.08	0.09			0.3	
14				7.9	0.07	0.08			0.3	
15				7.8	0.07	0.08			0.3	
16										
17										
18	298,561,000	1,600,000		7.7	0.07	0.08	61	4	0.3	
19				7.8	0.07	0.08			0.3	
20				7.7	0.08	0.09			0.4	
21				7.7	0.07	0.08			0.4	
22				7.8	0.07	0.08			0.4	
23										
24										
25	300,961,000	1,600,000		7.7	0.07	0.08	57	4	0.4	
26				7.8	0.07	0.08			0.3	
27				7.7	0.08	0.09			0.3	
28				7.8	0.08	0.09			0.3	
29				7.9	0.09	0.10			0.3	
30										
31										
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
WW Drinking Water Operations
20425 72nd Avenue South, Suite 310
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	MARCH 2011
King County	ID No. 33208E	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl2 Residual - 0.3 mg/L Flow Rate - 389 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 847,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water in Gallons	Temp (°F)	pH	Low Turbidity (NTU's)	High Turbidity (NTU's)	Total Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.9	0.07	0.07			0.3	
2				7.9	0.07	0.08			0.3	
3				7.9	0.07	0.08			0.3	
4				7.8	0.08	0.09			0.3	
5										
6										
7	288,989,000	1,592,000		7.9	0.07	0.08	86	4	0.3	
8				7.7	0.07	0.09			0.3	
9				7.9	0.07	0.08			0.3	
10				7.8	0.06	0.08			0.3	
11				7.9	0.07	0.08			0.3	
12										
13										
14	290,597,000	1,608,000		7.7	0.07	0.08	81	5	0.4	
15				8.0	0.07	0.08			0.3	
16				7.6	0.08	0.09			0.3	
17				7.7	0.08	0.09			0.4	
18				7.7	0.07	0.08			0.4	
19										
20										
21	292,212,000	1,614,000		7.6	0.07	0.08	77	4	0.3	
22				7.8	0.07	0.08			0.3	
23				7.8	0.07	0.08			0.4	
24				7.7	0.07	0.08			0.4	
25				7.9	0.07	0.08			0.3	
26										
27										
28	293,812,000	1,600,000		7.5	0.06	0.07	72	5	0.4	
29				7.8	0.06	0.07			0.3	
30				7.9	0.07	0.07			0.4	
31				7.9	0.07	0.08			0.4	
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUNDWATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year	2 - 2011
King County	ID No. 113068	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl Residual - 0.2 mg/L Flow Rate - 300 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 349.280 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality
	Main Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L
1				7.7	0.07	0.08			0.3
2				7.6	0.08	0.09			0.4
3				7.7	0.07	0.08			0.3
4				7.7	0.08	0.09			0.4
5									
6									
7	282,664,000	1,575,000		7.7	0.07	0.09	101	4	0.4
8				7.7	0.07	0.08			0.4
9				7.6	0.08	0.09			0.4
10				7.7	0.09	0.11			0.4
11				8.0	0.06	0.07			0.4
12									
13									
14	284,251,000	1,587,000		8.0	0.07	0.09	97	4	0.5
15				8.0	0.06	0.07			0.4
16				8.0	0.07	0.08			0.4
17				7.9	0.07	0.08			0.3
18				7.8	0.07	0.08			0.5
19					[illegible]	[illegible]			
20				PAGE	MENTS	DAY			
21									
22	286,051,000	1,780,000		7.9	0.08	0.09	93	4	0.3
23				7.9	0.07	0.08			0.3
24				7.9	0.07	0.08			0.3
25				7.8	0.07	0.07			0.4
26									
27									
28	287,397,000	1,346,000		8.0	0.07	0.08	90	3	0.3
29									
30									
31									
Total	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Ave.	[illegible]						[illegible]		

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 310
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year	1 - 2011
King County	ID No. 11200R	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl- Residual - 0.2 mg/L Flow Rate - 380 gpm		Telephone #:	(425) 765-7104
Total Water Treated = 347,360 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1										
2										
3	274899,000	1,568,000		7.5	0.07	0.08	121	4	0.4	
4				7.7	0.07	0.08			0.2	
5				7.7	0.07	0.08			0.2	
6				7.8	0.07	0.08			0.3	
7				7.8	0.07	0.08			0.2	
8										
9										
10	276446,000	1,547,000		7.7	0.08	0.09	117	4	0.4	
11				7.8	0.08	0.10			0.2	
12				7.4	0.07	0.09			0.5	
13				7.7	0.07	0.08			0.2	
14				7.6	0.07	0.08			0.4	
15										
16										
17			HOLIDAY MLK DAY							
18	278,190,000	1,744,000		7.7	0.07	0.07	113	4	0.2	
19				7.7	0.07	0.08			0.4	
20				7.8	0.07	0.09			0.2	
21				7.6	0.08	0.09			0.3	
22										
23										
24	279,534,000	1,344,000		7.7	0.08	0.09	110	3	0.3	
25				7.8	0.09	0.10			0.2	
26				7.7	0.07	0.08			0.4	
27				7.7	0.08	0.09			0.3	
28				7.8	0.07	0.08			0.3	
29										
30										
31	281,089,000	1,555,000		7.8	0.08	0.09	105	5	0.3	
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200
Kent, WA 98032

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City Of		Month/Year: December 2012
County: King	PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #:10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature:
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Lowries/ Samples/Notes
1/												
2/												
3/	442,247,000	480,000	48.5	1.0	49.4	7.7	.08	7.7	.08	.5	.2	
4/	442,398,000	151,000	47	.5	50.9	7.6	.08	7.6	.08	.4	.4	
5/	442,549,000	151,000	46.5	.5	50.4	7.5	.08	7.6	.08	.4	.3	
6/	442,708,000	159,000	46	.5	50.4	7.5	.08	7.7	.08	.4	.2	
7/	442,866,000	158,000	45.5	.5	49.3	7.4	.09	7.6	.08	.4	.3	
8/												
9/												
10/	443,370,000	504,000	44	1.5	50.2	7.5	.08	7.6	.08	.4	.3	
11/	443,531,000	161,000	43.5	.5	50.0	7.5	.08	7.6	.09	.4	.3	
12/	443,697,000	166,000	43	.5	49.8	7.5	.08	7.6	.08	.4	.3	
13/	443,857,000	160,000	42.5	.5	49.4	7.6	.08	7.7	.06	.4	.3	
14/	444,023,000	166,000	42	.5	49.6	7.6	.07	7.6	.06	.4	.3	
15/												
16/												
17/	444,534,000	511,000	41	1	48.5	7.6	.07	7.7	.07	.4	.3	
18/	444,688,000	154,000	40.75	.25	48.5	7.5	.07	7.6	.07	.4	.3	
19/	444,844,000	156,000	40.5	.25	48.7	7.5	.07	7.6	.07	.4	.3	
20/	445,000,000	156,000	40.25	.25	49.8	7.6	.08	7.8	.07	.5	.4	
21/	445,146,000	146,000	40	.25	49.4	7.6	.08	7.6	.07	.4	.3	
22/												
23/												
24/	445,626,000	480,000	39	1	48.2	7.6	.07	7.7	.06	.4	.4	
25/												
26/	445,941,000	315,000	38.5	.5	49.6	7.6	.08	7.8	.06	.5	.4	
27/	446,096,000	155,000	38.25	.25	50.3	7.5	.07	7.7	.06	.4	.3	
28/	446,246,000	150,000	38	.25	49.6	7.6	.07	7.6	.07	.4	.3	
29/												
30/												
31/	446,697,000	451,000	36.75	1.25	48	7.5	.07	7.4	.07	.5	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE **KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:**

Northwest Regional Office* 20425 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: November 2012
County: King	PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	436,653,000	60,000	63	.5	51.2	7.4	.08	7.4	.07	.5	.4	
2/	436,812,000	159,000	62.75	.25	50.9	7.5	.10	7.5	.08	.4	.3	
3/												
4/												
5/	437,297,000	485,000	61	1.75	49.5	7.9	.10	7.7	.09	.4	.3	
6/	437,457,000	160,000	60.5	.5	51.3	7.6	.10	7.7	.12	.4	.3	
7/	437,611,000	154,000	60	.5	50.9	7.6	.08	7.7	.08	.5	.4	
8/	437,767,000	156,000	59.75	.25	50.5	7.6	.08	7.6	.08	.5	.4	
9/	437,927,000	160,000	59.5	.25	49.4	7.5	.09	7.7	.08	.5	.4	
10/												
11/												
12/												
13/	438,587,000	660,000	57	2.5	50.0	7.5	.08	7.6	.07	.5	.4	
14/	438,923,000	336,000	56.5	.5	51.2	7.6	.07	7.6	.10	.4	.2	
15/	439,280,000	357,000	56	.5	49.8	7.6	.08	7.7	.08	.4	.3	
16/	439,557,000	277,000	55.75	.25	50	7.6	.09	7.7	.08	.5	.2	
17/												
18/												
19/	440,031,000	474,000	54.5	1.25	50	7.6	.09	7.7	.07	.4	.3	
20/	440,181,000	150,000	54	.5	50.9	7.6	.07	7.7	.07	.4	.3	
21/	440,334,000	153,000	53.5	.5	50.7	7.6	.09	7.7	.11	.5	.4	
22/												
23/												Holiday
24/												Holiday
25/												
26/	441,124,000	790,000	51	2.5	48.3	7.6	.09	7.8	.08	.6	.3	
27/	441,275,000	151,000	50.5	.5	50.1	7.6	.08	7.7	.10	.4	.3	
28/	441,435,000	311,000	50	.5	50.1	7.6	.08	7.7	.09	.4	.3	Line Repair
29/	441,598,000	163,000	49.75	.25	51.8	7.5	.09	7.7	.10	.5	.2	
30/	441,767,000	169,000	49.5	.25	51.2	7.6	.08	7.7	.08	.4	.3	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20425 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: October 2012
County: King / PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001 / Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)	Signature: Bill Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample#/Notes
1/	430,876,000	650,000	75.5	.2	49.8	7.4	.06	7.6	.09	.5	.4	City Hall
2/	431,082,000	206,000	75	.5	51.2	7.6	.09	7.7	.08	.5	.4	City Shop
3/	431,294,000	212,000	74.5	.5	50.1	7.6	.07	7.6	.09	.3	.4	City Hall
4/	431,509,000	215,000	74.25	.25	49.6	7.5	.07	7.5	.09	.4	.5	City Shop
5/	431,726,000	217,000	74	.25	50.0	7.5	.09	7.5	.09	.3	.3	City Hall
6/												
7/												
8/	432,373,000	647,000	72.5	1.5	49.2	7.7	.08	7.8	.09	.4	.2	City Hall
9/	432,560,000	187,000	72	.5	51.0	7.7	.07	7.8	.07	.3	.3	City Shop
10/	432,761,000	201,000	71.75	.25	50.7	7.6	.08	7.7	.09	.4	.3	City Hall
11/	432,967,000	206,000	71.5	.25	50.9	7.5	.08	7.7	.07	.4	.3	City Shop
12/	433,162,000	195,000	71.25	.25	50.7	7.9	.08	7.7	.07	.4	.3	City Shop
13/												
14/												
15/	433,739,000	577,000	70	1.25	50.5	7.4	.08	7.5	.08	.3	.3	City Hall
16/	433,938,000	199,000	69.75	.25	51.2	7.5	.09	7.6	.08	.4	.3	City Shop
17/	434,124,000	186,000	69.5	.25	50.7	7.5	.08	7.6	.08	.4	.3	City Hall
18/	434,309,000	185,000	69	.5	50.7	7.5	.08	7.6	.12	.5	.3	City Shop
19/	434,464,000	155,000	68.75	.25	51.4	7.5	.09	7.8	.08	.5	.4	City Hall
20/												
21/												
22/	434,956,000	492,000	67	1.75	49.2	7.6	.08	7.7	.08	.4	.3	City Shop
23/	435,122,000	166,000	66.75	.25	49.8	7.6	.08	7.6	.09	.4	.4	City Shop
24/	435,291,000	169,000	66.5	.25	50.1	7.5	.09	7.6	.08	.4	.3	City Hall
25/	435,468,000	171,000	66.25	.25	50.3	7.5	.09	7.5	.08	.4	.3	City Hall
26/	435,648,000	180,000	66	.25	50.5	7.5	.09	7.6	.09	.3	.4	City Shop
27/												
28/												
29/	436,179,000	531,000	64.5	1.5	50.9	7.4	.08	7.7	.09	.4	.2	City Hall
30/	436,332,000	153,000	64.25	.25	51.8	7.5	.08	7.7	.08	.4	.4	City Shop
31/	436,493,000	161,000	64	.25	51.6	7.5	.08	7.6	.09	.4	.4	City Hall
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: September 2012
County: King	**PWS ID No: 11200**	Report submitted by: Bill Ferry
Treatment Plant No: 001	**Source No: 01**	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)		Signature: Bill Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/												
3/												
4/	423,885,000	1,226,000	91.5	3.5	50.9	7.4	.05	7.6	.09	.4	.3	City Shop
5/	424,188,000	303,000	91	.5	51.8	7.8	.08	7.7	.07	.4	.2	City Hall
6/	424,486,000	298,000	90.5	.5	50.7	7.7	.06	7.7	.08	.4	.4	City Shop
7/	424,792,000	306,000	90	.5	51.2	7.7	.08	7.6	.07	.4	.3	City Hall
8/												
9/												
10/	425,552,000	760,000	88.5	1.5	49.4	7.6	.06	7.7	.06	.6	.3	City Hall
11/	425,712,000	160,000	88	.5	50.7	7.7	.06	7.9	.09	.3	.2	City Shop
12/	425,973,000	261,000	87	1	50.7	7.7	.08	7.8	.08	.3	.3	City Hall
13/	426,255,000	282,000	86.5	.5	49.8	7.8	.06	7.8	.07	.3	.4	City Shop
14/	426,530,000	275,000	86	.5	50.9	7.7	.07	7.8	.07	.3	.3	City Hall
15/												
16/												
17/	427,401,000	871,000	83	3	50.7	7.3	.06	7.8	.08	.4	.3	City Hall
18/	427,691,000	290,000	82.5	.5	51.4	7.6	.08	7.7	.08	.4	.3	City Shop
19/	428,006,000	315,000	82	.5	51.9	7.4	.07	7.6	.09	.4	.3	City Hall
20/	428,280,000	274,000	81.5	.5	51.4	7.6	.08	7.7	.08	.4	.4	City Shop
21/	428,545,000	265,000	81	.5	52.3	7.6	.07	7.6	.07	.3	.3	City Hall
22/												
23/												
24/	429,209,000	664,000	79.5	1.5	50.9	7.6	.07	7.6	.09	.5	.3	City Hall
25/	429,455,000	246,000	79	.5	50.9	7.6	.07	7.7	.07	.5	.3	City Shop
26/	429,656,000	201,000	78.5	.5	50.3	7.6	.08	7.6	.09	.4	.5	City Hall
27/	429,958,000	302,000	78	.5	51.2	7.7	.09	7.7	.09	.3	.3	City Shop
28/	430,226,000	268,000	77.5	.5	50.7	7.7	.11	7.7	.09	.4	.2	City Hall
29/												
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO

Northwest Regional Office* *20425 72nd Ave South, Suite 200 Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: August 2012
County: King — PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001 — Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)	Signature: Bill Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTUs)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample Notes
1/	412,692,000	265,000	114	.75	51	7.6	.07	7.7	.05	.3	.2	
2/	412,977,000	285,000	113.5	.5	52	7.6	.06	7.7	.07	.3	.2	
3/	413,266,000	289,000	113	.5	51	7.7	.07	7.5	.07	.2	.2	
4/												
5/												
6/	414,288,000	1,022,000	112	1	50	7.8	.06	7.7	.08	.3	.3	
7/	414,647,000	359,000	111	1	52	7.5	.08	7.9	.07	.4	.2	
8/	414,965,000	318,000	110	1	52	7.7	.08	7.6	.07	.2	.2	
9/	415,260,000	295,000	109.5	.5	52	7.6	.08	7.7	.07	.2	.2	
10/	415,574,000	314,000	109	.5	52	7.5	.04	7.6	.06	.2	.2	
11/												
12/												
13/	416,566,000	992,000	107	2	50	7.5	.05	7.6	.05	.2	.2	
14/	416,899,000	333,000	106	1	55	7.6	.03	7.7	.05	.4	.2	
15/	417,229,000	330,000	105	1	52	7.6	.02	7.6	.05	.3	.2	
16/	417,577,000	348,000	104	1	52	7.6	.02	7.7	.05	.4	.2	
17/	418,005,000	428,000	103	1	54	7.7	.06	7.6	.06	.5	.3	
18/												
19/												
20/	419,270,000	1,265,000	102	1	50	7.5	.01	7.7	.06	.4	.3	
21/	419,636,000	366,000	100	1	52	7.6	.03	7.5	.07	.3	.3	
22/	419,945,000	309,000	100	1	52	7.5	.05	7.8	.06	.3	.3	
23/	420,242,000	297,000	99	1	50	7.6	.06	7.6	.06	.3	.2	
24/	420,578,000	336,000	98	1	51	7.8	.05	7.7	.06	.5	.3	
25/												
26/												
27/	421,453,000	875,000	97	1	48	8.3	.06	8.2	.06	.3	.3	
28/	421,780,000	327,000	96.5	.5	50	8.0	.05	8.5	.07	.3	.5	Shop
29/	422,076,000	296,000	96	.5	52	8.0	.06	8.5	.07	.4	.4	City Hall
30/	422,367,000	291,000	95.5	.5	50	8.1	.05	8.4	.04	.4	.4	Shop
31/	422,659,000	292,000	95	.5	50	8.0	.05	8.5	.05	.5	.4	City Hall
Tot		9,432,000										
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office*			For ODW use only
20435 72nd Ave South, Suite 200			
Kent WA 98032-2358			
Fax: (253) 395-6760			
Phone: (253) 395-6750			
E-mail: dwnwro@doh.wa.gov			

*Counties are listed on back page

DRINKING WATER TREATMENT PLANT REPORT

Cumberland, City of		Month/Year:	JULY - 2012
King County	ID No. 11200B	Report submitted by:	CARL MUELLER
Cumberland Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Treatment Requirements		Signature:	
Cl2 Residual - 2.0 mg/L Flow Rate - 700 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 54,218 gal			

Day	Water Production (Outlets)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1										
2	405,364,000	1,215,000		7.6	0.07	0.08	124	3	0.4	
3				7.7	0.08	0.09			0.4	
4			HOLIDAY							
5				7.7	0.06	0.07			0.4	
6				7.7	0.06	0.07			0.3	
7										
8										
9	406,911,000	1,547,000		7.6	0.07	0.08	121	3	0.3	
10				7.6	0.07	0.08			0.2	
11				7.6	0.06	0.07			0.2	
12				7.7	0.07	0.08			0.3	
13				7.6	0.06	0.07			0.4	
14										
15										
16	408,747,000	1,836,000		7.7	0.07	0.08	117	4	0.3	
17				7.7	0.08	0.10			0.2	
18				7.6	0.09	0.10			0.2	
19				7.5	0.12	0.13			0.3	
20				7.8	0.11	0.12			0.2	
21										
22										
23	410,385,000	1,638,000		7.6	0.10	0.12	114	3	0.2	
24				7.8	0.09	0.12			0.4	
25				7.6	0.09	0.10			0.2	
26				7.6	0.09	0.12			0.2	
27				7.7	0.08				0.2	
28										
29										
30	412,179,000	1,794,000		7.8	0.07		111	3	0.3	
31				7.7	0.07				0.2	
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
DW Drinking Water Operations
20425 72nd Avenue South, Suite 310
Kent, WA 98032

GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year	JUNE - 2012
King County	ID No. 11200B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #	16286
DOH Water Quality Treatment Requirements:		Signature:	C.M
Cl₂ Residual = 0.2 mg/L Flow Rate = 1811 gpm		Telephone #:	(425) 765-7104
Total Water Treated = 582,240 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Usage		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Total Weight (Pounds)	Gas Used (Pounds)	Cl₂ Residual mg/L	
1				7.7	0.13	0.14			0.4	
2										
3										
4	400,585,000	1,161,000		7.6	0.07	0.08	137	3	0.4	
5				7.6	0.07	0.08			0.4	
6				7.7	0.06	0.07			0.4	
7				7.6	0.06	0.07			0.4	
8				7.6	0.07	0.08			0.4	
9										
10										
11	401,712,000	1,187,000		7.7	0.07	0.08	134	3	0.4	
12				7.6	0.07	0.08			0.4	
13				7.7	0.07	0.08			0.4	
14				7.8	0.07	0.08			0.4	
15				7.7	0.07	0.08			0.4	
16										
17										
18	402,907,000	1,195,000		7.5	0.07	0.08	130	4	0.4	
19				7.7	0.08	0.09			0.4	
20				7.7	0.07	0.08			0.4	
21				7.7	0.07	0.08			0.3	
22				7.6	0.07	0.08			0.4	
23										
24										
25	404,149,000	1,242,000		7.6	0.06	0.07	127	3	0.3	
26				7.6	0.07	0.08			0.4	
27				7.7	0.07	0.08			0.3	
28				7.7	0.17	0.18			0.3	
29				7.7	0.13	0.14			0.3	
30										
31										
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
DWI Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	MAY - 2012
King County	ID No. 19300B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl2 Residual = 0.2 mg/L Raw Flow = 180 gpm		Telephone #:	(425) 765-7104
Total Water Treated = 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Testing				Chlorine Used		Treated Water Quality	
	Meter Readings	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.6	0.06	0.07			0.4	
2				7.5	0.07	0.08			0.4	
3				7.6	0.06	0.07			0.4	
4				7.8	0.07	0.08			0.4	
5										
6										
7	395,100,000	1,112,000		7.5	0.07	0.08	150	5	0.4	
8				7.7	0.07	0.08			0.3	
9				7.5	0.06	0.07			0.2	
10				7.6	0.06	0.07			0.4	
11				7.6	0.06	0.07			0.4	
12										
13										
14	396,419,000	1,319,000		7.6	0.07	0.08	147	3	0.3	
15				7.6	0.07	0.08			0.4	
16				7.5	0.07	0.08			0.3	
17				7.6	0.06	0.07			0.4	
18				7.6	0.07	0.08			0.4	
19										
20										
21	397,829,000	1,410,000		7.7	0.07	0.08	144	3	0.4	
22				7.6	0.06	0.07			0.4	
23				7.7	0.07	0.08			0.4	
24				7.6	0.07	0.08			0.4	
25				7.7	0.06	0.07			0.4	
26										
27										
28			HOLIDAY							
29	399,364,000	1,535,000		7.6	0.07	0.08	140	4	0.4	
30				7.7	0.06	0.07			0.4	
31				7.7	0.07	0.08			0.5	
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year	APRIL - 2012
King County	ID No. 11200B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Performance Requirements:		Signature:	
Fe Limit = .3 mg/L Mn Limit = .05 mg/L		Telephone #:	(425) 765-7104
Total Water Treated = 543,281 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Total Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1										
2	389,368,000	1,134,000		7.7	0.07	0.08	20	4	0.4	
3				7.5	0.07	0.08			0.4	
4				7.7	0.06	0.07			0.5	
5				7.7	0.09	0.10			0.3	
6				7.7	0.07	0.08			0.3	
7										
8										
9	390,467,000	1,099,000		7.6	0.07	0.08	17	3	0.4	
10				7.6	0.07	0.08			0.4	
11				7.6	0.07	0.08			0.4	
12				7.5	0.06	0.07			0.4	
13				7.8	0.07	0.08			0.3	
14										
15										
16	391,675,000	1,208,000		7.5	0.06	0.07	13	4	0.4	
17				7.5	0.06	0.07			0.4	
18				7.8	0.13	0.14			0.3	
19				7.7	0.08	0.09			0.4	
20				7.7	0.06	0.07			0.4	
21										
22										
23	392,837,000	1,162,000		7.6	0.07	0.08	9	4	0.4	
24				7.7	0.07	0.08			0.4	
25				7.6	0.07	0.08			0.4	
26				7.6	0.07	0.08			0.4	
27				7.7	0.06	0.07			0.3	
28										
29										
30	393,988,000	1,151,000		7.6	0.07	0.08	5	4	0.4	
31										
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
WA Drinking Water Operations
20425 72nd Avenue South Suite 200
Kent, WA 98032

DOH GROUNDWATER TREATMENT PLANT REPORT

Connection: City of		Month/Year: MARCH - 2012	
King County	ID No. 1120068	Person submitting rpt: CARL MUELLER	
Covington Springs	Source No. 01	Operator Certification #: 10286	
DOH Water Quality Treatment Requirement:		Signature:	
Cl2 Residual = 0.2 mg/L Flow Rate = 380 gpm		Telephone #: (425) 765-7104	
Total Water Treated = 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl2 Residual mg/L	
1				7.8	0.07	0.08			0.3	
2	-- FLUSHING HYDRANTS --			8.1	0.23	0.24			0.2	
3										
4										
5	384,031,000	1,478,000		7.9	0.09	0.10	34	4	0.2	
6				7.8	0.07	0.08			0.3	
7				7.7	0.07	0.08			0.3	
8				7.7	0.06	0.07			0.4	
9				7.7	0.07	0.08			0.4	
10										
11										
12	385,478,000	1,447,000		7.7	0.07	0.08	31	3	0.3	
13				7.6	0.07	0.08			0.3	
14				7.6	0.07	0.08			0.3	
15				7.6	0.07	0.08			0.2	
16				7.6	0.07	0.08			0.4	
17										
18										
19	386,918,000	1,470,000		7.7	0.07	0.08	27	4	0.3	
20				7.6	0.06	0.07			0.3	
21				7.7	0.07	0.08			0.4	
22				7.6	0.07	0.08			0.4	
23				7.7	0.07	0.08			0.4	
24										
25										
26	388,234,000	1,286,000		7.6	0.07	0.08	24	3	0.4	
27				7.6	0.06	0.07			0.4	
28				7.7	0.07	0.08			0.4	
29				7.5	0.07	0.08			0.4	
30				7.6	0.06	0.07			0.5	
31										
Total										
Ave										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 205
Kent WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	FEBRUARY - 2012
King County	ID No. 11200B	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Treatment Requirements:		Signature:	
Cl₂ Residual - 0.2 mg/L Flow Rate - 280 gpm		Telephone #:	(425) 765-7104
Total Water Treated - 547,201 gal			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water in System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Total Weight (Pounds)	Gas Used (Pounds)	Cl₂ Residual mg/L	
1				7.8	0.07	0.08			0.3	
2				7.7	0.07	0.08			0.3	
3				7.7	0.07	0.08			0.4	
4										
5										
6	377,965,000	1,679,000		7.7	0.07	0.08	48	3	0.3	
7				7.7	0.07	0.08			0.3	
8				7.8	0.07	0.08			0.4	
9	FLUSHING SYSTEM →			7.7	0.56	0.58			0.3	
10	FLUSHING SYSTEM →			7.8	1.00	1.16			0.2	
11										
12										
13	379,590,000	1,625,000		7.7	0.06	0.07	44	4	0.3	
14				7.7	0.07	0.08			0.4	
15				7.7	0.07	0.08			0.4	
16				7.7	0.07	0.08			0.4	
17				7.6	0.06	0.07			0.4	
18										
19										
20			— HOLIDAY —							
21	381,280,000	1,690,000		7.8	0.07	0.08	40	4	0.3	
22				7.8	0.07	0.08			0.4	
23				7.7	0.07	0.08			0.3	
24				7.7	0.07	0.08			0.3	
25						0.08				
26										
27	382,553,000	1,273,000		7.8	0.07	0.08			0.3	
28				7.7	0.07	0.08			0.3	
29				7.8	0.07	0.08			0.3	
30										
31										
Total										
Avg.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 200
Kent, WA 98032

DOH GROUND WATER TREATMENT PLANT REPORT

Carnation, City of		Month/Year:	JANUARY - 2012
King County	ID No 112402	Report submitted by:	CARL MUELLER
Carnation Springs	Source No. 01	Operator Certification #:	10286
DOH Water Quality Parameter Requirements:		Signature:	
Cl2 Residual - 0.2 mg/L Trace Rate - 3gpm		Telephone #:	(425) 765-7104
Total Water Treated - 547,200 gpd			

Day	Water Production (Gallons)		Raw Water Quality				Chlorine Used		Treated Water Quality	
	Meter Reading	Total Treated Water to System	Temp (°F)	pH	Low Turbidity (NTUs)	High Turbidity (NTUs)	Tank Weight (Pounds)	Gas Used (Pounds)	Cl_2 Residual mg/L	
1										
2			HOLIDAY							
3	370,705,000	1,649,000		7.8	0.07	0.08	65	4	0.3	
4				7.8	0.07	0.08			0.3	
5				7.8	0.07	0.08			0.3	
6				7.8	0.06	0.07			0.3	
7										
8										
9	372,127,000	1,422,000		7.9	0.07	0.08	62	3	0.2	
10				7.8	0.06	0.07			0.3	
11				7.8	0.07	0.08			0.3	
12				7.9	0.07	0.08			0.4	
13				7.9	0.07	0.08			0.4	
14										
15										
16			HOLIDAY							
17	373,795,000	1,868,000		7.6	0.06	0.07	58	4	0.2	
18				7.7	0.07	0.08			0.3	
19				7.7	0.07	0.08			0.3	
20			POWER OUTAGE							
21										
22										
23				7.7	0.17	0.18			0.0	
24	374,857,000	862,000		7.8	0.07	0.08	55	3	0.1	
25				7.6	0.07	0.08			0.5	
26				7.8	0.07	0.08			0.8	
27				7.8	0.07	0.08			0.6	
28										
29										
30	376,286,000	1,429,000		7.7	0.07	0.08	51	4	0.3	
31				7.8	0.06	0.07			0.3	
Total										
Ave.										

Mail completed form by the 10th of the following month to:

Washington State Department of Health
NW Drinking Water Operations
20425 72nd Avenue South, Suite 210
Kent, WA 98032

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: December 2013
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample/Notes
1/												
2/	509,325,000	848,000	33.5	3	48.3	7.3	.07	7.3	.07	.4	.5	
3/	509,498,000	173,000	33	.5	49.1	7.3	.09	7.3	.08	.5	.4	
4/	509,672,000	174,000	32.5	.5	47.1	7.3	.09	7.4	.07	.5	.4	
5/	509,840,000	168,000	32	.5	48.2	7.3	.07	7.4	.06	.5	.4	
6/	510,024,000	184,000	31.5	.5	47.1	7.4	.09	7.6	.07	.3	.3	
7/												
8/												
9/	510,576,000	552,000	30	1.5	47.3	7.5	.11	7.6	.09	.3	.3	
10/	510,779,000	203,000	29.5	.5	45.1	7.4	.08	7.4	.07	.4	.4	
11/	510,975,000	196,000	29	.5	48.0	7.4	.10	7.5	.10	.4	.3	
12/	511,151,000	176,000	28.5	.5	48.3	7.4	.10	7.4	.08	.4	.3	
13/	511,324,000	173,000	28	.5	49.1	7.4	.10	7.4	.09	.4	.3	
14/												
15/												
16/	511,857,000	533,000	27	1	48.2	7.2	.09	7.3	.08	.4	.4	
17/	512,020,000	163,000	26.75	.25	48.7	7.3	.09	7.3	.09	.4	.3	
18/	512,200,000	180,000	26.5	.25	49.2	7.3	.09	7.3	.09	.4	.2	
19/	512,374,000	174,000	26	.5	48.7	7.3	.09	7.4	.09	.4	.3	
20/	512,547,000	173,000	25.5	.5	48.7	7.3	.08	7.4	.08	.4	.3	
21/												
22/												
23/	513,062,000	515,000	24	1.5	50.0	7.3	.09	7.4	.09	.3	.3	
24/	513,224,000	162,000	23.5	.5	48.3	7.3	.08	7.4	.09	.4	.3	
25/												Holiday
26/	513,585,000	361,000	23.0	.5	48.2	7.1	.09	7.1	.09	.5	.4	
27/	513,760,000	175,000	22.5	.5	48.3	7.2	.10	7.2	.10	.5	.4	
28/												
29/												
30/	514,290,000	530,000	21.5	1	49.1	7.3	.10	7.3	.10	.4	.4	
31/	514,461,000	171,000	21	.5	48.3	7.2	.07	7.3	.09	.4	.4	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO.

Northwest Regional Office*			For ODW use only
20435 72nd Ave South, Suite 200			
Kent WA 98032-2358			
Fax: (253) 395-6760			
Phone: (253) 395-6750			
E-mail: dw.nwro@doh.wa.gov			

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: November 2013	
County: King	PWS ID No: 11200	Report submitted by: William Ferry	
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699	
Water Quality Parameter Requirements: Cl$_2$ Residual Detectable Residual (>0.2 mg/L)		Signature: William Ferry	
		Telephone No: 425-333-4192	

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl$_2$ Residual (mg/L)	Dist. Cl$_2$ Residual (mg/L)	Location/ Sampler/Notes
1/	504,247,000	155,000	48	.5	49.4	7.1	.09	7.3	.08	3	.2	
2/												
3/												
4/	504,749,000	502,000	47	1	48.3	7.2	.09	7.3	.09	.4	.3	
5/	504,901,000	152,000	46.5	.5	50.0	7.2	.09	7.3	.09	.3	.4	
6/	505,051,000	150,000	46	.5	48.9	8.2	.09	7.3	.09	.4	.3	
7/	505,209,000	158,000	45.5	.5	50.0	7.1	.09	7.3	.08	.3	.3	
8/	505,365,000	156,000	45	.5	50.1	7.2	.08	7.3	.08	.3	.3	
9/												
10/												
11/												Holiday
12/	506,013,000	648,000	43	2	49.2	7.3	.08	7.3	.08	.3	.2	
13/	506,159,000	146,000	42.5	.5	49.6	7.1	.08	7.3	.08	.4	.3	
14/	506,313,000	154,000	42	.5	49.1	7.1	.07	7.3	.08	.3	.3	
15/	506,482,000	169,000	41.5	.5	48.9	7.1	.09	7.2	.09	.4	.3	
16/												
17/												
18/	506,988,000	506,000	40.5	1	48.7	7.1	.09	7.3	.09	.3	.4	
19/	507,149,000	161,000	40	.5	48.7	7.1	.08	7.3	.09	.3	.2	
20/	507,336,000	187,000	39.5	.5	48.5	7.2	.08	7.2	.08	.4	.2	
21/	507,494,000	158,000	39	.5	48.9	7.2	.07	7.3	.07	.4	.3	
22/	507,648,000	154,000	38.5	.5	48.7	7.1	.08	7.2	.09	.3	.2	
23/												
24/												
25/	508,160,000	458,000	37.5	1	48.3	7.2	.09	7.2	.07	.5	.3	
26/	508,318,000	158,000	37	.5	49.1	7.2	.08	7.3	.07	.5	.4	
27/	508,477,000	159,000	36.5	.5	49.6	7.2	.08	7.3	.07	.5	.3	
28/												Holiday
29/												Holiday
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of			Month/Year: October 2013
County: King	PWS ID No: 11200		Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01		Operator Certification #: 10699
Water Quality Parameter Requirements: Cl$_2$ Residual: Detectible Residual (>0.2 mg/L)			Signature: William Ferry
			Telephone No: 425-3334192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl$_2$ Residual (mg/L)	Dist. Cl$_2$ Residual (mg/L)	Location/ Samples/Notes
1/	499,123,000	134,000	63.5	1	49.8	7.3	.09	7.7	.09	.5	.3	
2/	499,274,000	151,000	63	.5	50.3	7.0	.10	7.0	.10	.5	.4	
3/	499,424,000	150,000	62.5	.5	50.1	7.1	.08	7.1	.08	.6	.4	
4/	499,579,000	155,000	62	.5	49.8	7.1	.08	7.3	.09	.5	.3	
5/												
6/												
7/	500,052,000	473,000	60	2	50.7	7.1	.10	7.3	.09	.4	.3	
8/	500,202,000	150,000	59.5	.5	49.2	7.1	.10	7.2	.10	.5	.4	
9/	500,354,000	152,000	59	.5	49.8	7.1	.09	7.2	.09	.4	.3	
10/	500,511,000	157,000	58.5	.5	50.1	7.1	.09	7.2	.09	.6	.5	
11/	500,651,000	140,000	58	.5	50.3	7.1	.09	7.2	.08	.5	.4	
12/												
13/												
14/	501,143,000	492,000	57	1	48.5	7.2	.07	7.5	.08	.6	.4	
15/	501,375,000	232,000	56.5	.5	49.5	7.1	.08	7.3	.09	.7	.4	
16/	501,623,000	248,000	56	.5	49.4	7.1	.09	7.4	.09	.5	.3	
17/	501,741,000	118,000	55.5	.5	49.4	7.2	.09	7.3	.09	.5	.3	
18/	501,841,000	100,000	55	.5	50.0	7.2	.10	7.4	.08	.3	.3	
19/												
20/												
21/	502,352,000	511,000	54	1	50	7.1	.08	7.3	.09	.3	.3	
22/	502,648,000	296,000	53.5	.5	48.7	7.2	.09	7.3	.09	.3	.2	
23/	502,806,000	158,000	53	1	50.1	7.2	.09	7.4	.09	.3	.2	
24/	502,963,000	157,000	52	1	49.6	7.1	.09	7.3	.09	.3	.2	
25/	503,104,000	141,000	51	1	50.1	7.1	.08	7.3	.09	.6	.3	
26/												
27/												
28/	503,601,000	497,000	50	1	48.9	7.1	.07	7.2	.09	.4	.4	
29/	503,759,000	158,000	49.5	.5	49.1	7.2	.09	7.3	.08	.4	.3	
30/	503,913,000	154,000	49	.5	49.6	7.2	.09	7.3	.09	.4	.4	
31/	504,092,000	179,000	48.5	.5	50.0	7.1	.09	7.2	.09	.4	.2	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties **are listed on back page**

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: September 2103
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual - Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Samples/Notes
1/												
2/												
3/	494,471,000	845,000	77.5	1	51.8	7.3	.08	7.8	.09	.4	.3	
4/	494,647,000	176,000	77	.5	51.4	7.3	.12	7.8	.09	.4	.3	
5/	494,813,000	166,000	76.5	.5	50.9	7.3	.10	7.7	.09	.4	.3	
6/	494,973,000	160,000	76	.5	51.0	7.3	.09	7.7	.09	.5	.4	
7/												
8/												
9/	495,470,000	497,000	74	2	49.8	7.3	.09	7.7	.09	.5	.4	
10/	495,645,000	175,000	73.5	.5	50.7	7.3	.09	7.7	.08	.6	.4	
11/	495,820,000	175,000	73	.5	50.7	7.3	.09	7.7	.08	.5	.3	
12/	496,024,000	204,000	72.5	.5	50.7	7.3	.09	7.6	.08	.6	.4	
13/	496,238,000	214,000	72	.5	50.9	7.3	.10	7.6	.07	.5	.4	
14/												
15/												
16/	496,773,000	535,000	70.5	1.5	50	7.2	.09	7.8	.08	.5	.4	
17/	496,934,000	161,000	70	.5	50.7	7.3	.10	7.7	.08	.4	.3	
18/	497,084,000	150,000	69.5	.5	50.3	7.3	.08	7.6	.08	.4	.3	
19/	497,225,000	141,000	69	.5	50.3	7.3	.08	7.7	.08	.4	.2	
20/	497,399,000	174,000	68.5	.5	50.3	7.3	.09	7.7	.08	.4	.3	
21/												
22/												
23/	497,886,000	487,000	68	.5	50.9	7.3	.11	7.7	.09	.5	.4	
24/	498,023,000	137,000	67.5	.5	50.3	7.3	.08	7.8	.07	.5	.4	
25/	498,179,000	156,000	67	.5	50.3	7.4	.09	7.8	.09	.5	.5	
26/	498,344,000	165,000	66.5	.5	50	7.4	.09	7.7	.11	.5	.4	
27/	498,494,000	150,000	66	.5	50.3	7.4	.09	7.8	.09	.5	.5	
28/												
29/												
30/	498,969,000	475,000	64.5	1.5	49.4	7.5	.11	7.8	.08	.4	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office*			For ODW use only
20435 72nd Ave South, Suite 200			
Kent WA 98032-2358			
Fax: (253) 395-6760			
Phone: (253) 395-6750			
E-mail: dw.nwro@doh.wa.gov			

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of			Month/Year: August 2013
County: King	PWS ID No: 11200		Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01		Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)			Signature: William J Ferry
			Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample/Notes
1/	485,679,000	274,000	96.5	.5	50.7	7.4	.09	7.7	.06	.5	.4	
2/	485,968,000	289,000	96	.5	50.9	6.9	.09	7.4	.06	.4	.4	
3/												
4/												
5/	486,717,000	749,000	93	3	50	7.2	.09	7.5	.06	.5	.3	
6/	487,030,000	313,000	92	1	50.7	7.3	.08	7.5	.08	.4	.2	
7/	487,423,000	393,000	91	1	50.9	7.2	.08	7.5	.08	.4	.2	
8/	487,805,000	382,000	90.5	.5	50.9	7.2	.08	7.5	.08	.5	.4	
9/	488,143,000	338,000	90	.5	51.0	7.2	.09	7.5	.08	.4	.4	
10/												
11/												
12/	489,090,000	947,000	89	1	50	7.3	.08	7.6	.09	.5	.3	
13/	489,378,000	288,000	88.5	.5	50.7	7.2	.08	7.5	.10	.4	.3	
14/	489,695,000	317,000	88	.5	51.4	7.2	.09	7.5	.09	.4	.3	
15/	489,973,000	278,000	87.5	.5	51.0	7.2	.07	7.5	.08	.5	.4	
16/	490,189,000	216,000	87	.5	51.4	7.0	.08	7.5	.08	.6	.4	
17/												
18/												
19/	490,999,000	810,000	86	1	51.7	.08	7.5	7.5	.08	.3	.2	
20/	491,273,000	274,000	85.5	.5	51.6	7.3	.11	7.6	.10	.3	.2	
21/	491,551,000	278,000	85	.5	51.1	7.2	.09	7.6	.09	.3	.3	
22/	491,834,000	283,000	84.5	.5	51.4	7.2	.09	7.6	.08	.3	.2	
23/	492,123,000	289,000	84	.5	51.6	7.2	.09	7.5	.08	.3	.2	
24/												
25/												
26/	492,879,000	756,000	81.5	2.5	50.9	7.2	.09	7.7	.09	.4	.5	
27/	493,086,000	207,000	81	.5	50.9	7.3	.08	7.7	.09	.4	.4	
28/	493,292,000	206,000	79.5	.5	51.0	7.3	.11	7.7	.11	.4	.2	
29/	493,455,000	163,000	79	.5	51.2	7.3	.09	7.6	.09	.4	.2	
30/	493,626,000	171,000	78.5	.5	50.9	7.3	.08	7.7	.08	.5	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: July 2013
County: King	PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Feed (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Samples/Notes
1/	476,593,000	825,000	112	1.5	51.4	7.4	.08	7.7	.08	.3	.3	
2/	476,887,000	294,000	111.5	.5	51.9	7.4	.09	7.6	0.8	.5	.3	
3/	477,174,000	287,000	111	.5	50.0	7.4	.06	7.6	.07	.5	.3	
4/												
5/	477,692,000	518,000	110	1	50.5	7.4	.06	7.7	.06	.5	.3	
6/												
7/												
8/	478,516,000	824,000	109	1	50	7.4	.07	7.7	.07	.4	.3	
9/	478,809,000	291,000	109.5	.5	51.2	7.4	.09	7.7	.09	.3	.2	
10/	479,088,000	281,000	108.5	1	50.7	7.3	.08	7.7	.06	.4	.3	
11/	479,377,000	289,000	108	.5	50.5	7.3	.08	7.7	.07	.5	.4	
12/	479639000	262,000	107	1	50.3	7.4	.07	7.8	.07	.4	.4	
13/												
14/												
15/	480,549,000	910,000	106	1	50.0	7.4	.07	7.7	.07	.3	.3	
16/	480,840,000	291,000	105	1	50.5	7.4	.08	7.7	.07	.4	.3	
17/	481,160,000	320,000	104	1	50.0	7.4	.08	7.7	.07	.4	.3	
18/	481,401,000	241,000	103.5	.5	50.9	7.4	.07	7.7	.07	.5	.3	
19/	481,676,000	275,000	103	.5	51.0	7.4	.07	7.6	.06	.4	.3	
20/												
21/												
22/	482,563,000	887,000	102	1	50	7.4	.09	7.7	.08	.4	.3	
23/	482,830,000	267,000	101.5	.5	50.7	7.3	.09	7.7	.07	.3	.3	
24/	483,136,000	306,000	101	.5	50.7	7.3	.08	7.7	.07	.3	.2	
25/	483,475,000	339,000	100	1	50.7	7.4	.08	7.6	.06	.3	.3	
26/	483,800,000	325,000	99	1	50.5	7.3	.08	7.6	.06	.3	.3	
27/												
28/												
29/	484,782,000	982,000	98	1	49.8	7.4	.09	7.6	.09	.4	.3	
30/	485,075,000	293,000	97.5	.5	50.7	7.4	.09	7.7	.08	.4	.3	
31/	485,403,000	330,000	97	.5	50.7	7.3		7.7	.07	.5	.4	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6769 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: June 2013
County: King PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001 Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/												
3/	470,754,000	554,000	124	1.5	49.4	7.4	.07	7.6	.07	.6	.4	
4/	470,950,000	196,000	123.5	.5	50.3	7.3	.07	7.6	.07	.6	.5	
5/	471,167,000	216,000	123	.5	50.9	7.3	.08	7.6	.07	.5	.3	
6/	471,370,000	203,000	122.5	.5	50.3	7.3	.07	7.6	.06	.5	.2	
7/	471,596,000	226,000	122.0	.5	50.3	7.3	.08	7.6	.06	.5	.3	
8/												
9/												
10/	472,259,000	663,000	121	1	48.9	7.4	.08	7.7	.07	.3	.3	
11/	472,461,000	202,000	120.5	.5	50.5	7.3	.07	7.7	.07	.3	.3	
12/	472,651,000	190,000	120	.5	50.3	7.3	.08	7.7	.07	.3	.2	
13/	472,830,000	179,000	119.5	.5	50.3	7.3	.08	7.7	.07	.5	.3	
14/	473,028,000	198,000	119	.5	50.5	7.3	.08	7.7	.07	.5	.3	
15/												
16/												
17/	473,684,000	656,000	118.5	.5	49.2	7.4	.08	7.7	.07	.4	.3	
18/	473,893,000	209,000	118.5	.5	50.7	7.3	.07	7.6	.07	.4	.4	
19/	474,095,000	202,000	117.5	.5	50.5	7.3	.07	7.6	.07	.4	.3	
20/	474,280,000	185,000	117	.5	50.5	7.3	.07	7.7	.06	.4	.3	
21/	474,459,000	179,000	116.5	.5	50.5	7.3	.08	7.7	.07	.4	.3	
22/												
23/												
24/	475,053,000	594,000	115.5	1	51.2	7.3	.09	7.7	.08	.3	.3	
25/	475,233,000	180,000	115	.5	50.5	7.3	.08	7.6	.07	.3	.3	
26/	475,410,000	177,000	114.5	.5	50.5	7.3	.08	7.5	.07	.4	.3	
27/	475,583,000	173,000	114	.5	50.9	7.3	.08	7.6	.07	.4	.3	
28/	475,768,000	185,000	113.5	.5	51.4	7.3	.07	7.7	.08	.5	.3	
29/												
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200 Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: May 2013
County: King — PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001 — Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)	Signature: Bill Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Cl2 Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	464,992,000	157,000	139	.5	49.8	7.5	.07	7.6	.06	.5	.3	
2/	465,135,000	143,000	138.5	.5	49.8	7.4	.07	7.6	.07	.4	.4	
3/	465,315,000	162,000	138	.5	50.0	7.4	.06	7.7	.08	.4	.3	
4/												
5/												
6/	465,861,000	546,000	137	1	49.4	7.5	.07	7.6	.07	.4	.3	
7/	466,046,000	185,000	136.5	.5	50.0	7.4	.06	7.6	.07	.4	.3	
8/	466,237,000	191,000	136.0	.5	50.5	7.4	.07	7.6	.07	.3	.3	
9/	466,408,000	171,000	135.5	.5	50.5	7.4	.06	7.6	.07	.3	.2	
10/	466,598,000	188,000	135.0	.5	49.8	7.4	.08	7.7	.08	.5	.3	
11/												
12/												
13/	467,199,000	603,000	133.5	1	50.1	7.3	.09	7.6	.08	.3	.2	
14/	467,331,000	132,000	133	.5	50.1	7.4	.07	7.7	.08	.3	.2	
15/	467,509,000	178,000	132.5	.5	49.8	7.4	.07	7.7	.09	.5	.2	
16/	467,663,000	154,000	132	.5	50.3	7.4	.07	7.7	.09	.5	.2	
17/	467,830,000	167,000	131.5	.5	50.3	7.4	.07	7.7	.07	.4	.2	
18/												
19/												
20/	468,334,000	504,000	130.5	1.0	49.6	7.4	.07	7.6	.06	.3	.3	
21/	468,513,000	179,000	130	.5	50.0	7.4	.08	7.7	.07	.5	.4	
22/	468,670,000	157,000	129.5	.5	49.8	7.3	.08	7.7	.07	.5	.4	
23/	468,829,000	159,000	129.0	.5	50	7.3	.07	7.7	.07	.5	.3	
24/	468,996,000	167,000	128.5	.5	50.1	7.3	.07	7.7	.07	.5	.3	
25/												
26/												
27/												
28/	469,692,000	696,000	127	1.5	49.4	7.4	.08	7.6	.07	.6	.3	
29/	469,846,000	154,000	126.5	.5	50.3	7.3	.07	7.7	.08	.5	.3	
30/	470,011,000	165,000	126	.5	50.0	7.3	.07	7.6	.07	.4	.3	
31/	470,200,000	189,000	125.5	.5	50.3	7.3	.07	7.6	.08	.5	.4	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20425 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	**Month/Year:** April 2013
County: King — **PWS ID No:** 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001 — **Source No:** 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample#/Notes
1/	460,449,000	484,000	148.25	.75	48.5	7.6	.07	7.8	.06	.4	.3	
2/	460,607,000	158,000	147.75	.5	50	7.5	.07	7.7	.07	.5	.4	
3/	460,758,000	151,000	147.5	.25	50.1	7.6	.07	7.7	.08	.3	.4	
4/	460,891,000	133,000	147.25	.25	50.1	7.5	.06	7.6	.08	.6	.4	
5/	461,034,000	143,000	147	.25	50.1	7.5	.06	7.6	.06	.3	.4	
6/												
7/												
8/	461,487,000	453,000	146.25	.75	49.2	7.5	.06	7.7	.06	.4	.3	
9/	461,627,000	140,000	145.75	.5	50.0	7.6	.06	7.7	.08	.4	.3	
10/	461,772,000	145,000	145.5	.25	50.3	7.5	.07	7.6	.08	.6	.3	
11/	461,915,000	143,000	145.25	.25	50.5	7.6	.06	7.6	.07	.5	.4	
12/	462,056,000	141,000	145	.25	50.1	7.5	.06	7.7	.07	.5	.3	
13/												
14/												
15/	462,509,000	453,000	144	1	48.7	7.5	.06	7.6	.06	.4	.5	
16/	462,650,000	141,000	143.75	.25	49.1	7.5	.07	7.6	.07	.5	.3	
17/	462,794,000	144,000	143.5	.25	49.2	7.5	.07	7.7	.07	.5	.3	
18/	462,943,000	149,000	143.25	.25	49.8	7.4	.06	7.6	.06	.5	.4	
19/	463,085,000	142,000	143.0	.25	50.5	7.4	.07	7.6	.06	.5	.3	
20/												
21/												
22/	463,547,000	462,000	142	1	48.3	7.5	.06	7.6	.06	.4	.2	
23/	463,683,000	136,000	141.75	.25	49.6	7.5	.07	7.7	.08	.5	.2	
24/	463,859,000	176,000	141.5	.25	49.6	7.5	.07	7.7	.07	.5	.4	
25/	464,016,000	157,000	141.25	.25	50.5	7.5	.07	7.6	.07	.4	.4	
26/	464,181,000	165,000	141	.25	50.1	7.4	.06	7.6	.07	.4	.3	
27/												
28/												
29/	464,672,000	491,000	140	1	50	7.4	.07	7.5	.07	.3	.2	
30/	464,835,000	163,000	139.5	.5	49.4	7.4	.07	7.7	.08	.4	.3	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only:

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: March 2013
County: King — FWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001 — Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Calorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	455,686,000	153,000	13	.5	50.0	7.6	0.07	7.7	.07	.5	.4	
2/												
3/												
4/	456,145,000	459,000	12	1	47.8	7.6	.08	7.6	.08	.4	.3	
5/	456,296,000	151,000	11.5	.5	49.1	7.5	.08	7.7	.08	.5	.4	
6/	456,446,000	150,000	11.25	.25	49.2	7.6	.08	7.7	.08	.5	.5	
7/	456,595,000	149,000	11	.25	49.2	7.5	.09	7.7	.07	.5	.3	
8/	456,745,000	150,000	10.75	.25	49.1	7.6	.09	7.6	.08	.4	.3	
9/												
10/												
11/	457,229,000	484,000	9	1.75	49.1	7.6	.08	7.7	.08	.5	.4	
12/	457,398,000	169,000	8.75	.25	51.1	7.7	.08	7.7	.08	.3	.3	
13/	457,547,000	149,000	8.5	.25	51.1	7.7	.09	7.7	.09	.4	.4	
14/	457,705,000	158,000	8.25	.25	50.5	7.7	.08	7.7	.08	.4	.3	
15/	457,856,000	151,000	8	.25	50.5	7.7	.10	7.6	.09	.4	.3	
16/												
17/												
18/	458,323,000	467,000	7	1	48.7	7.7	.09	7.6	.09	.4	.3	
19/	458,479,000	156,000	6.75	.25	49.4	7.7	.07	7.6	.09	.4	.3	
20/	458,632,000	153,000	6.5	.25	50.3	7.7	.09	7.6	.09	.4	.3	
21/	458,734,000	102,000	6	.5	49.1	7.5	.09	7.6	.09	.5	.3	
22/	458,874,000	140,000	5.5	.5	49.1	7.5	.08	7.5	.07	.5	.4	
23/												
24/												
25/	459,357,000	483,000	150	1	49.4	7.6	.07	7.8	.06	.4	.3	
26/	459,512,000	155,000	149.75	.25	49.4	7.6	.09	7.7	.08	.4	.3	
27/	459,647,000	135,000	149.5	.25	50.0	7.5	.07	7.7	.08	.4	.3	
28/	459,798,000	151,000	149.25	.25	49.6	7.5	.07	7.7	.07	.3	.3	
29/	459,965,000	167,000	149	.25	49.6	7.5	.07	7.6	.07	.4	.4	
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office*			For ODW use only
20435 72nd Ave South, Suite 200			
Kent WA 98032-2358			
Fax: (253) 395-6760			
Phone: (253) 395-6750			
E-mail: dw.nwro@doh.wa.gov			

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: February 2013
County: King	PWS ID No: 11200	Report submitted by: Bill Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)		Signature: Bill Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	451,436,000	142,000	24.75	.25	49.2	7.5	.07	7.6	.08	.5	.4	
2/												
3/												
4/	451,911,000	475,000	23	1.25	48.2	7.6	.07	7.7	.07	.5	.3	
5/	452,052,000	141,000	22.75	.25	49.2	7.6	.08	7.7	.07	.5	.3	
6/	452,189,000	137,000	22.5	.25	49.4	7.5	.08	7.7	.09	.5	.3	
7/	452,385,000	196,000	22.25	.25	50	7.5	.08	7.6	.10	.5	.3	
8/	452,597,000	212,000	21	.25	50.0	7.6	.08	7.7	.09	.4	.2	
9/												
10/												
11/	453,077,000	480,000	20	1	49.6	7.4	.08	7.5	.09	.5	.3	
12/	453,227,000	150,000	19.75	.25	49.6	7.6	.08	7.6	.08	.6	.4	
13/	453,353,000	126,000	19.5	.25	50.1	7.6	.07	7.6	.08	.5	.4	
14/	453,489,000	136,000	19.25	.25	49.8	7.6	.08	7.6	.09	.6	.4	
15/	453,624,000	135,000	19	.25	49.6	7.5	.08	7.6	.09	.6	.5	
16/												
17/												
18/												Holiday
19/	454,255,000	601,000	18	1	48.7	7.5	.09	7.7	.09	.5	.4	
20/	454,363,000	138,000	17.75	.25	49.6	7.6	.08	7.6	.08	.5	.3	
21/	454,509,000	146,000	17.25	.5	49.4	7.5	.07	7.7	.08	.4	.5	
22/	454,657,000	148,000	17	.25	49.8	7.5	.08	7.6	.07	.5	.5	
23/												
24/												
25/	455,114,000	457,000	16	1	48.9	7.5	.07	7.6	.07	.5	.5	
26/	455,259,000	145,000	15.75	.25	50.0	7.5	.08	7.6	.07	.5	.5	
27/	455,395,000	136,000	15.5	.25	50.0	7.5	.08	7.7	.08	.4	.5	
28/	455,533,000	138,000	15.0	.5	49.6	7.6	.07	7.6	.07	.5	.3	
29/												
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of			Month/Year: January 2013
County: King	PWS ID No: 11200		Report submitted by: Bill Ferry
Treatment Plant No: 001	Source No: 01		Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual / Detectable Residual (>0.2 mg/L)			Signature: William Ferry
			Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl2 Residual (mg/L)	Dist. Cl2 Residual (mg/L)	Location/ Samples/Notes
1/												Holiday
2/	446,987,000	290,000	36	.75	49.1	7.6	.08	7.7	.07	.4	.4	
3/	447,128,000	141,000	35.75	.25	48.7	7.6	.07	7.7	.07	.5	.4	
4/	447,269,000	141,000	35.5	.25	49.8	7.6	.07	7.7	.07	.6	.4	
5/												
6/												
7/	447,705,000	436,000	34	.5	49.4	7.6	.08	7.7	.06	.6	.4	
8/	447,837,000	132,000	33.5	.5	49.6	7.6	.10	7.7	.09	.4	.3	
9/	447,970,000	133,000	33	.5	49.2	7.6	.08	7.7	.08	.5	.3	
10/	448,113,000	143,000	32.5	.5	49.1	7.6	.08	7.7	.07	.5	.2	
11/	448,262,000	149,000	32	.5	48.9	7.7	.07	7.7	.08	.5	.3	
12/												
13/												
14/	448,717,000	455,000	31	1	46.9	7.7	.08	7.7	.08	.5	.4	
15/	448,850,000	133,000	30.5	.5	46.9	7.5	.08	7.5	.08	.5	.3	
16/	448,978,000	128,000	30	.5	48.2	7.5	.08	7.6	.08	.5	.4	
17/	449,134,000	156,000	29.75	.25	48.3	7.6	.08	7.6	.08	.5	.3	
18/	449,272,000	141,000	29.5	.25	48.2	7.6	.07	7.7	.07	.5	.4	
19/												
20/												
21/												Holiday
22/	449,890,000	618,000	28.75	.75	46.7	7.6	.07	7.7	.07	.5	.4	
23/	450,054,000	164,000	28.25	.5	46.9	7.6	.07	7.6	.09	.5	.4	
24/	450,206,000	152,000	27.75	.5	48.3	7.6	.07	7.7	.09	.5	.4	
25/	450,350,000	144,000	27	.75	49.2	7.6	.08	7.7	.08	.5	.5	
26/												
27/												
28/	450,824,000	474,000	25.75	1.25	48.5	7.6	.08	7.7	.07	.4	.3	
29/	450,978,000	154,000	25.5	.25	49.4	7.6	.07	7.5	.07	.5	.3	
30/	451,138,000	160,000	25.25	.25	49.1	7.6	.09	7.6	.07	.6	.4	
31/	451,296,000	156,000	25	.25	49.4	7.5	.08	7.6	.09	.5	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20425 72nd Ave. S, Suite 200 Kent, WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dwnwro@doh.wa.gov			For DW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of			Month/Year: December 2014
County: King	PWS ID No: 11200		Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01		Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)			Signature: William Ferry
			Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	579,748,000	1,067,000	129	3	49.6	7.2	.12	7.2	.11	.5	.5	
2/	579,956,000	208,000	128.5	.5	47.3	7.2	.10	7.3	.11	.8	.5	
3/	580,161,000	205,000	128	.5	47.3	7.2	.10	7.2	.10	.7	.5	
4/	580,408,000	247,000	127.5	.5	48.5	7.2	.12	7.3	.12	.7	.4	
5/	580,652,000	244,000	127	.5	48.5	7.2	.12	7.3	.14	.6	.2	
6/												
7/												
8/	581,306,000	654,000	126	1	49.2	7.0	.12	7.1	.13	.7	.4	
9/	581,436,000	130,000	125.5	.5	49.2	7.1	.12	7.2	.15	.4	.2	
10/	581,744,000	308,000	125	.5	49.2	7.1	.12	7.3	.15	.4	.2	
11/	581,960,000	216,000	124.5	.5	48.9	7.1	.11	7.2	.13	.4	.3	
12/	582,158,000	196,000	124	.5	48.5	7.1	.11	7.2	.12	.5	.3	
13/												
14/												
15/	582,777,000	619,000	121.5	2.5	47.6	7.2	.11	7.3	.13	.5	.3	
16/	582,984,000	207,000	121	.5	48.9	7.1	.13	7.2	.12	.7	.5	
17/	583,182,000	198,000	120.5	.5	48.7	7.2	.12	7.2	.12	.5	.3	
18/	583,361,000	179,000	120	.5	48.7	7.2	.11	7.3	.10	.5	.3	
19/	583,551,000	190,000	119.5	.5	48.7	7.2	.12	7.3	.10	.6	.4	
20/												
21/												
22/	584,186,000	635,000	118	1.5	48.2	7.1	.12	7.3	.11	.6	.4	
23/	584,391,000	205,000	117.5	.5	48.2	7.1	.12	7.3	.13	.5	.3	
24/	584,592,000	201,000	117	.5	48.9	7.1	.12	7.2	.13	.7	.5	
25/												Holiday
26/	584,985,000	393,000	116	1	48.5	7.2	.13	7.4	.14	.6	.2	
27/												
28/												
29/	585,591,000	606,000	114	2	47.8	7.1	.12	7.4	.12	.6	.3	
30/	585,790,000	199,000	113.5	.5	48.3	7.2	.12	7.4	.12	.6	.4	
31/	585,996,000	206,000	113	.5	47.6	7.1	.13	7.2	.12	.6	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200 Kent WA 98032-2358* **Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov**			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: November 2014
County: King — PWS ID No: 11200	Report submitted by: William Perry
Treatment Plant No: 001 — Source No: 01	Operator Certification # 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)	Signature: [signature]
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/												
3/	573,917,000	620,000	144.5	1.5	49.4	7.0	.13	7.1	.12	.5	.4	
4/	574,121,000	204,000	144	.5	49.4	7.0	.12	7.2	.12	.5	.4	
5/	574,318,000	197,000	143.5	.5	49.6	7.0	.12	7.1	.12	.5	.4	
6/	574,508,000	190,000	143	.5	49.4	7.2	.12	7.2	.12	.5	.4	
7/	574,747,000	239,000	142	1	49.6	7.0	.10	7.2	.13	.6	.4	
8/												
9/												
10/	575,338,000	591,000	140.5	1.5	49.1	7.1	.11	7.2	.11	.5	.4	
11/												
12/	575,740,000	402,000	139.5	1	48.9	7.1	.12	7.2	.11	.4	.3	
13/	575,973,000	233,000	139	.5	48.9	7.1	.11	7.2	.11	.5	.3	
14/	576,210,000	237,000	138.5	.5	48.3	7.2	.12	7.2	.12	.5	.3	
15/												
16/												
17/	576,825,000	615,000	137	1.5	47.1	7.2	.12	7.3	.12	.5	.3	
18/	577,034,000	209,000	136.5	.5	48.3	7.2	.11	7.2	.10	.5	.4	
19/	577,245,000	211,000	136	.5	49.2	7.2	.12	7.3	.11	.5	.4	
20/	577,448,000	203,000	135.5	.5	49.2	7.2	.11	7.2	.10	.5	.4	
21/	577,655,000	207,000	135	.5	49.4	7.2	.11	7.2	.10	.5	.4	
22/												
23/												
24/	578,282,000	627,000	133	2	49.6	7.4	.14	7.5	.13	.5	.4	
25/	578,484,000	202,000	132.5	.5	50.5	7.3	.14	7.3	.13	.4	4	
26/	578,681,000	197,000	132	.5	50.4	7.2	.17	7.2	.13	.5	.4	
27/												Holiday
28/												Holiday
29/												
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: October 2014
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample/Notes
1/	566,913,000	95,000	72.25	.25	49.6	7.1	.11	7.1	.14	.6	.5	
2/	567,093,000	180,000	72	.25	49.6	7.1	.12	7.2	.13	.6	.4	
3/	567,335,000	242,000	71.75	.25	49.4	6.9	.12	7.2	.11	.7	.7	
4/												
5/												
6/	567,934,000	599,000	71	.75	49.4	6.9	.11	7.1	.12	.6	.4	
7/	568,162,000	228,000	70.75	.25	49.6	.10	7.1	.12	.12	.7	.6	
8/	568,363,000	201,000	70.5	.25	49.8	7.0	.10	7.1	.11	.6	.6	
9/	568,563,000	200,000	70.25	.25	49.8	7.1	.11	7.2	.12	.5	.5	
10/	568,799,000	236,000	70	.25	49.6	7.1	.10	7.2	.11	.4	.3	
11/												
12/												
13/	569,445,000	646,000	69.5	.5	49.2	7.0	.12	7.2	.12	.6	.3	
14/	569,658,000	213,000	69.25	.25	49.6	7.1	.12	7.2	.11	.6	.4	
15/	569,866,000	208,000	69	.25	50	7.1	.11	7.2	.13	.6	.4	
16/	570,061,000	195,000	68.75	.25	49.6	7.1	.11	7.1	.12	.6	.4	
17/	570,274,000	213,000	68.5	.25	49.8	7.1	.12	7.2	.12	.7	.5	
18/												
19/												
20/	570,885,000	611,000	68.0	.5	49.4	7.0	.13	7.2	.12	.7	.5	
21/	571,091,000	206,000	67.5	.5	49.4	7.0	.12	7.2	.12	.4	.4	
22/	571,316,000	225,000	150.0	.5	49.6	7.1	.12	7.2	.12	.3	.3	
23/	571,533,000	217,000	149.5	.5	50.0	7.0	.13	7.1	.12	.3	.2	
24/	571,751,000	218,000	149	.5	50.0	7.0	.12	7.0	.10	.6	.2	
25/												
26/												
27/	572,421,000	670,000	148.25	.75	48.9	7.0	.11	7.1	.12	.4	.3	
28/	572,644,000	223,000	147.75	.5	49.8	7.0	.12	7.1	.12	.5	.3	
29/	572,870,000	226,000	147	.75	49.6	7.0	.12	7.1	.12	.6	.3	
30/	573,094,000	224,000	146.5	.5	49.8	7.1	.12	7.3	.11	.6	.4	
31/	573,297,000	203,000	146	.5	49.4	7.0	.11	7.2	.12	.6	.4	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200 Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: September 2014
County: King PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001 Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl2 Residual (mg/L)	Dist. Cl2 Residual (mg/L)	Location/ Sampler/Notes
1/												Holiday
2/	563,747,000	401,000	76.5	.75	50.1	7.3	.10	7.4	.14	.3	.4	
3/	563,864,000	117,000	76.25	.25	50.1	7.2	.16	7.4	.16	.8	.3	
4/	563,962,000	98,000	76	.25	50.3	7.3	.16	7.3	.16	.5	.2	
5/	564,049,000	87,000	75.75	.25	50	7.3	.17	7.4	.17	.7	.2	
6/												
7/												
8/	564,400,000	351,000	75.5	.25	51.2	7.3	.14	7.4	.11	.5	.3	
9/	564,501,000	101,000	75.5	.25	50.3	7.3	.14	7.4	.13	.6	.4	
10/	564,597,000	96,000	75.25	.25	50.3	7.3	.12	7.5	.18	.6	.4	
11/	564,700,000	103,000	75	.25	49.6	7.3	.16	7.4	.17	.6	.6	
12/	564,811,000	111,000	74.25	.25	50.1	7.4	.12	7.5	.12	.6	.4	
13/												
14/												
15/	565,174,000	363,000	73.25	1	50	7.0	.12	7.3	.12	.6	.5	
16/	565,295,000	121,000	73	.25	50.3	7.1	.10	7.2	.10	.5	.3	
17/	565,398,000	103,000	72.75	.25	50.1	7.2	.12	7.2	.11	.5	.3	
18/	565,505,000	107,000	72.5	.25	50.9	7.1	.10	7.2	.10	.7	.3	
19/	565,605,000	100,000	72.25	.25	51.0	7.1	.10	7.2	.10	.6	.3	
20/												
21/												
22/	566,011,000	406,000	72	.25	50.1	7.1	.10	7.1	.17	.6	.4	
23/	566,114,000	103,000	71.75	.25	50.3	7.3	.09	7.1	.16	.6	.4	
24/	566,210,000	96,000	71.5	.25	49.8	7.1	.14	7.1	.16	.6	.4	
25/	566,298,000	88,000	71.25	.25	49.8	7.0	.13	7.2	.13	.7	.4	
26/	566,398,000	100,00	71	.25	49.8	7.0	.13	7.2	.13	.7	.4	
27/												
28/												
29/	566,704,000	306,000	70.5	.5	49.1	7.2	.18	7.2	.13	.4	.3	
30/	566,818,000	114,000	70.25	.25	49.6	7.0	.12	7.3	.10	.6	.5	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: August
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	557,351,000	440,000	82	.5	51.2	7.1	.11	7.2	.11	.4	.4	
2/												
3/												
4/	558,453,000	1,102,000	81	1	49.6	7.2	.12	7.3	.12	.8	.2	
5/	558,857,000	404,000	80.5	.5	50.9	7.2	.12	7.5	.12	.7	.2	
6/	559,282,000	425,000	80.25	.25	50.9	7.1	.09	7.3	.08	.7	.3	
7/	559,631,000	349,000	80	.25	50.9	7.2	.09	7.3	.09	.5	.2	
8/	560,031,000	400,000	79.75	.25	50.7	7.2	.10	7.3	.10	.3	.3	
9/												
10/												
11/	561,156,000	1,125,000	78.75	1	51.0	7.3	.11	7.3	.10	.4	.2	
12/	561,358,000	202,000	78.5	.25	51.0	7.3	.13	7.3	.12	.3	.2	
13/	561,431,000	73,000	78.5	.25	51.0	7.1	.11	7.3	.18	.8	.2	
14/	561,501,000	70,000	78.25	.25	51.0	7.3	.11	7.3	.12	.8	.4	
15/	561,576,000	75,000	78	.25	51	7.3	.14	7.3	.15	.7	.3	
16/												
17/												
18/	561,803,000	227,000	77.75	.75	50.7	7.2	.11	7.3	.11	.5	.3	
19/	561,892,000	89,000	77.5	.25	51.4	7.3	.13	7.3	.13	.6	.4	
20/	562,006,000	114,000	77.25	.25	50.5	7.2	.13	7.3	.12	.5	.4	
21/	562,113,000	107,000	77	.25	50	7.4	.10	7.4	.10	.5	.4	
22/	562,200,000	87,000	76.75	.25	50	7.4	.15	7.4	.13	.7	.5	
23/												
24/												
25/	562,701,000	501,000	76.5	.25	50.7	7.4	.12	7.3	.13	.6	.3	
26/	562,856,000	155,000	76.25	.25	51.0	7.2	.12	7.4	.13	.4	.2	
27/	563,047,000	191,000	76.0	.25	51.0	7.3	.13	7.4	.13	.5	.4	
28/	563,208,000	161,000	75.75	.25	51.6	7.3	.12	7.4	.12	.5	.3	
29/	563,346,000	138,000	75.5	.25	50.3	7.2	.13	7.4	.12	.4	.4	
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200 Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: July 2014
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	546,800,000	244,000	91	.5	50.0	7.3	.10	7.5	.10	.3	.2	
2/	547,125,000	325,000	90.5	.5	51.4	7.3	.09	7.3	.09	.4	.2	
3/	547,420,000	295,000	90	.5	51.4	7.4	.11	7.3	.10	.4	.2	
4/												
5/												
6/												
7/	548,556,000	1,136,000	89.5	.5	52.3	7.0	.12	7.3	.12	.2	.5	
8/	548,854,000	298,000	89	.5	50.9	7.3	.14	7.3	.14	.3	.3	
9/	549,128,000	274,000	88.5	.5	50.7	7.3	.14	7.3	.14	.3	.3	
10/	549,468,000	340,000	87	.5	50.3	7.3	.09	7.3	.09	.4	.4	
11/	549,813,000	343,000	87.5	.5	50.9	7.3	.09	7.3	.09	.4	.4	
12/												
13/												
14/	550,950,000	1,139,000	86.5	1	51.8	7.3	.13	7.3	.13	.4	.3	
15/	551,348,000	398,000	86.25	.25	51.2	7.3	.09	7.3	.09	.4	.3	
16/	551,741,000	393,000	86	.25	51.4	7.3	.11	7.4	.09	.3	.2	
17/	552,177,000	436,000	85.75	.25	52.3	7.4	.10	7.4	.09	.2	.2	
18/	552,515,000	338,000	85.5	.25	51.2	7.2	.11	7.3	.09	.5	.3	
19/												
20/												
21/	553,600,000	1,085,000	84.5	1	50.7	7.4	.14	7.5	.13	.3	.2	
22/	553,917,000	317,000	84	.5	50.5	7.1	.10	7.3	.11	.5	.2	
23/	554,237,000	340,000	83.5	.5	50.9	7.3	.09	7.4	.10	.6	.2	
24/	554,503,000	246,000	83.25	.25	50.5	7.3	.09	7.4	.09	.7	.3	
25/	554,785,000	282,000	83	.25	50.7	7.2	.11	7.5	.10	.6	.3	
26/												
27/												
28/	555,756,000	971,000	82	1	50.7	7.3	.09	7.4	.09	.4	.2	
29/			81.5	.5	50.9	7.0	.10	7.2	.11	.2	.3	
30/	556,573,000	422,000	81	.5	50.5	7.3	.10	7.3	.10	.5	.2	
31/	556,911,000	338,000	80	1	50.9	7.2	.12	7.3	.12	.6	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office*			For ODW use only
20425 72nd Ave South, Suite 200			
Kent WA 98032-2358			
Fax: (253) 395-6760			
Phone: (253) 395-6750			
E-mail: dw.nwro@doh.wa.gov			

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: June 2014
County: King — PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001 — Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl₂ Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4152

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/	540,279,000	595,000	101	1	50.7	7.4	.08	7.4	.09	.4	.3	
3/	540,525,000	246,000	100.5	.5	50.7	7.4	.08	7.4	.09	.3	.3	
4/	540,737,000	212,000	100.5	.5	50.4	7.3	.09	7.4	.09	.2	.2	
5/	540,985,000	248,000	99.5	1	49.8	7.0	.11	7.1	.11	.5	.2	
6/	541,226,000	241,000	98.5	.5	57.4	7.2	.17	7.2	.11	.4	.2	
7/												
8/												
9/	542,002,000	776,000	97.5	1	49.8	7.2	.09	7.2	.12	.5	.2	
10/	542,259,000	257,000	97	.5	51.4	7.2	.15	7.2	.13	.3	.2	
11/	542,536,000	277,000	96.5	.5	50.9	7.2	.13	7.2	.13	.5	.2	
12/	542,710,000	174,000	96	.5	50.7	7.2	.14	7.2	.12	.4	.3	
13/	542,292,000	210,000	95.5	.5	50.2	7.2	.13	7.2	.12	.4	.2	
14/												
15/												
16/	543,512,000	592,000	94	1.5	50.2	7.2	.15	7.2	.11	.4	.3	
17/	543,694,000	182,000	93.5	.5	50.0	7.2	.13	7.2	.11	.4	.3	
18/	543,884,000	190,000	93	.5	50.0	7.2	.12	7.2	.11	.4	.3	
19/	544,066,000	182,000	92.5	.5	49.4	7.3	.11	7.4	.09	.3	.3	
20/	544,283,000	217,000	92	.5	50.9	7.4	.11	7.5	.11	.4	.3	
21/												
22/												
23/	544,900,000	617,000	90	.2	50.0	7.0	.10	7.1	.09	.4	.3	
24/	545,113,000	213,000	89.5	.5	49.8	7.2	.10	7.2	.09	.4	.2	
25/	545,339,000	226,000	89	.5	50.3	7.3	.15	7.3	.10	.3	.2	
26/	545,678,000	339,000	88.5	.5	51.2	7.3	.11	7.4	.11	.4	.3	
27/	545,903,000	225,000	88	.5	50.9	7.3	.13	7.4	.11	.3	.2	
28/												
29/												
30/	546,556,000	653,000	87	1	50.1	7.3	.11	7.5	.10	.4	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: May 2014
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: Bill Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	534,947,000	186,000	114	.5	50.3	7.1	.09	7.2	.09	.4	.4	
2/	535,133,000	186,000	113.5	.5	50.1	7.2	.09	7.3	.09	.4	.3	
3/												
4/												
5/	535,665,000	532,000	112.5	1	50.1	7.2	.09	7.3	.09	.4	.4	
6/	535,837,000	172,000	112	.5	49.6	7.3	.09	7.4	.09	.4	.3	
7/	535,972,000	135,000	111.5	.5	50.7	7.3	.09	7.3	.09	.4	.3	
8/	536,129,000	157,000	111	.5	51.2	7.2	.08	7.3	.09	.4	.3	
9/	536,288,000	159,000	110.5	.5	49.8	7.2	.08	7.2	.08	.4	.5	
10/												
11/												
12/	536,766,000	478,000	109.5	.5	50.5	7.3	.10	7.4	.09	.4	.3	
13/	536,902,000	136,000	109	.5	49.2	7.3	.08	7.3	.09	.5	.4	
14/	537,078,000	176,000	108.5	.5	51.2	7.3	.08	7.4	.09	.4	.3	
15/	537,275,000	197,000	108	.5	51.8	7.2	.09	7.2	.09	.5	.4	
16/	537,413,000	138,000	107.5	.5	51.2	7.3	.09	7.3	.09	.5	.3	
17/												
18/												
19/	537,935,000	522,000	106.75	.75	49.4	7.3	.09	7.3	.10	.5	.3	
20/	538,098,000	163,000	106.5	.25	49.6	7.2	.08	7.2	.09	.4	.3	
21/	538,266,000	168,000	106	.5	49.6	7.1	.08	7.2	.08	.4	.4	
22/	538,453,000	187,000	105.5	.5	50.5	7.3	.09	7.3	.08	.4	.3	
23/	538,628,000	175,000	105	.5	50.9	7.3	.08	7.3	.08	.4	.3	
24/												
25/												
26/												
27/	539,261,000	633,000	103	2	49.4	7.2	.09	7.3	.09	.3	.3	
28/	539,381,000	120,000	102.5	.5	49.6	7.3	.09	7.3	.09	.4	.2	
29/	539,488,000	107,000	102	.5	50.5	7.3	.11	7.3	.11	.4	.3	
30/	539,684,000	196,000	101.5	.5	50.7	7.3	.10	7.3	.10	.5	.5	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: April 2014
County: King / PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001 / Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	530,336,000	156,000	126.5	.5	49.8	7.4	.08	7.4	.09	.6	.5	
2/	530,470,000	134,000	126	.5	48.7	7.3	.06	7.4	.06	.6	.5	
3/	530,628,000	158,000	125.5	.5	49.2	7.2	.08	7.2	.08	.5	.6	
4/	530,769,000	141,000	125	.5	50.1	7.3	.08	7.3	.08	.4	.4	
5/												
6/												
7/	531,219,000	450,000	124	1	49.8	7.2	.06	7.2	.08	.4	.4	
8/	531,388,000	169,000	123.5	.5	50.3	7.2	.07	7.2	.09	.4	.4	
9/	531,530,000	142,000	123	.5	49.8	7.2	.07	7.2	.09	.5	.3	
10/	531,665,000	135,000	122.5	.5	48.9	7.3	.06	7.3	.07	.4	.5	
11/	531,815,000	150,000	121	.5	50.0	7.3	.07	7.3	.07	.4	.4	
12/												
13/												
14/	532,329,000	514,000	120	1	49.1	7.3	.07	7.4	.09	.4	.4	
15/	532,472,000	143,000	119.5	.5	49.4	7.3	.07	7.4	.09	.5	.4	
16/	532,618,000	146,000	119	.5	50.1	7.3	.06	7.4	.09	.5	.3	
17/	532,790,000	172,000	118.5	.5	50.3	7.4	.09	7.4	.10	.5	.3	
18/	532,930,000	140,000	118	.5	49.4	7.4	.08	7.4	.09	.4	.3	
19/												
20/												
21/	533,403,000	473,000	117.5	.5	48.7	7.4	.07	7.4	.08	.5	.4	
22/	533,539,000	136,000	117.25	.25	48.7	7.3	.07	7.4	.08	.4	.4	
23/	533,706,000	167,000	117	.25	50.7	7.4	.09	7.4	.09	.4	.4	
24/	533,852,000	146,000	116.5	.5	49.2	7.4	.09	7.4	.09	.3	.4	
25/	533,996,000	144,000	116	.5	49.2	7.4	.09	7.4	.09	.3	.4	
26/												
27/												
28/	534,459,000	463,000	115.5	.5	49.4	7.4	.08	7.4	.08	.3	.3	
29/	534,603,000	144,000	115	.5	50.7	7.3	.08	7.3	.09	.3	.3	
30/	534,761,000	158,000	114.5	.5	50.3	7.3	.08	7.3	.08	.4	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200 Kent WA 98032-2358* **Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov**			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: March 2014
County: King — PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001 — Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/												
3/	525,163,000	515,000	139	1.5	51.2	7.5	.09	7.6	.07	.5	.7	
4/	525,335,000	172,000	138.5	.5	49.8	7.2	.07	7.3	.07	.7	.8	
5/	525,663,000	328,000	138	.5	49.8	7.2	.09	7.2	.08	.3	.3	
6/	526,073,000	410,000	137	1	49.4	7.2	.06	7.2	.09	.4	.3	
7/	526,343,000	270,000	136	1	49.8	7.2	.06	7.2	.08	.8	.8	
8/												
9/												
10/	526,858,000	515,000	135	1	49.8	7.2	.07	7.2	.07	.5	.5	
11/	527,047,000	189,000	134.5	.5	49.8	7.2	.06	7.3	.06	.4	.5	
12/	527,197,000	150,000	134	.5	48.3	7.3	.06	7.5	.09	.5	.3	
13/	527,355,000	158,000	133.5	.5	48.5	7.2	.07	7.3	.08	.4	.3	
14/	527,496,000	141,000	133	.5	49.2	7.2	.06	7.3	.07	.4	.3	
15/												
16/												
17/	527,996,000	500,000	132	1	49.8	7.4	.07	7.4	.06	.5	.4	
18/	528,184,000	188,000	131.5	.5	49.8	7.3	.07	7.4	.07	.4	.3	
19/	528,336,000	152,000	131	.5	49.8	7.3	.06	7.3	.07	.4	.2	
20/	528,475,000	139,000	130.5	.5	49.4	7.2	.07	7.3	.07	.3	.2	
21/	528,653,000	178,000	130	.5	48.7	7.3	.07	7.4	.07	.5	.4	
22/												
23/												
24/	529,191,000	538,000	129	1	48.9	7.3	.06	7.4	.07	.4	.3	
25/	529,256,000	65,000	128.75	.25	50	7.3	.09	7.4	.09	.4	.3	
26/	529,434,000	178,000	128.5	.25	49.4	7.3	.06	7.3	.08	.6	.5	
27/	529,598,000	164,000	128.25	.25	49.2	7.3	.06	7.3	.07	.4	.4	
28/	529,732,000	134,000	128	.25	50.3	7.3	.08	7.3	.08	.4	.4	
29/												
30/												
31/	530,180,000	448,000	127	1	49.4	7.3	.07	7.3	.07	.4	.4	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20425 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: February 2014
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/												
3/	520,434,000	529,000	6	1	48.3	7.3	.07	7.4	.07	.4	.3	
4/	520,610,000	176,000	5.5	.5	48.3	7.3	.07	7.4	.07	.4	.3	
5/	520,765,000	155,000	150	.5	48.3	7.4	.07	7.4	.07	.4	.3	
6/	520,925,000	160,000	149.5	.5	41.8	7.4	.07	7.4	.07	.3	.4	
7/	521,088,000	163,000	149	.5	45.3	7.3	.07	7.3	.07	.4	.3	
8/												
9/												
10/	521,654,000	566,000	148	1	48.3	6.9	.07	7.1	.06	.3	.3	
11/	521,837,000	183,000	147.5	.5	48.5	7.1	.06	7.2	.06	.4	.4	
12/	522,007,000	170,000	147	.5	49.4	7.1	.06	7.3	.05	.4	.2	
13/	522,179,000	172,000	146.5	.5	50.1	7.1	.07	7.2	.08	.4	.3	
14/	522,366,000	187,000	146	.5	49.2	7.0	.07	7.0	.07	.5	.4	
15/												
16/												
17/	522,863,000	497,000	145	1	48.3	7.2	.07	7.2	.06	.5	.3	
18/	523,033,000	170,000	144.5	.5	48.9	7.0	.06	7.1	.05	.4	.4	
19/	523,194,000	161,000	144	.5	48.5	7.1	.07	7.2	.07	.5	.3	
20/	523,349,000	155,000	143.5	.5	48.9	7.1	.06	7.1	.06	.4	.3	
21/												
22/												
23/												
24/	523,998,000	649,000	142	1.5	48.3	7.4	.06	7.4	.06	.4	.3	
25/	524,159,000	161,000	141.5	.5	48.5	7.3	.07	7.3	.07	.4	.3	
26/	524,320,000	161,000	141	.5	49.6	7.3	.06	7.4	.06	.4	.4	
27/	524,502,000	182,000	140.75	.25	50.7	7.3	.08	7.6	.09	.4	.3	
28/	524,648,000	146,000	140.5	.25	50.7	7.2	.07	7.6	.09	.4	.3	
29/												
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: January 2014
County: King PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001 Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: C_{12} Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												Holiday
2/	514,822,000	361,000	20	1	49.1	7.2	.09	7.3	.09	.4	.3	
3/	514,995,000	173,000	19.5	.5	49.2	7.2	.05	7.3	.06	.4	.4	
4/												
5/												
6/	515,542,000	547,000	18.5	1	48.7	7.2	.08	7.3	.07	.4	.4	
7/	515,721,000	179,000	18	.5	47.8	7.2	.07	7.3	.07	.4	.3	
8/	515,896,000	175,000	17.5	.5	49.8	7.1	.06	7.2	.07	.4	.4	
9/	516,071,000	175,000	17	.5	49.4	7.3	.06	7.3	.06	.4	.3	
10/	516,250,000	177,000	16.5	.5	49.8	7.3	.07	7.3	.05	.4	.3	
11/												
12/												
13/	516,777,000	527,000	15.5	1	48.9	7.3	.06	7.3	.07	.4	.4	
14/	516,949,000	172,000	15	.5	48.7	7.3	.06	7.3	.06	.4	.3	
15/	517,115,000	166,000	14.5	.5	48.7	7.3	.07	7.3	.07	.4	.3	
16/	517,272,000	157,000	14	.5	48.5	7.1	.06	7.1	.07	.4	.3	
17/	517,432,000	160,000	13.5	.5	48.7	7.3	.05	7.4	.06	.4	.3	
18/												
19/												
20/												
21/	518,118,000	686,000	11.5	2	47.8	7.3	.06	7.4	.06	.5	.4	Holiday
22/	518,291,000	173,000	11	.5	48.7	7.2	.07	7.4	.07	.4	.3	
23/	518,459,000	168,000	10.5	.5	50	7.3	.07	7.4	.07	.5	.4	
24/	518,628,000	169,000	10	.5	48.3	7.4	.06	7.4	.06	.4	.3	
25/												
26/												
27/	519,217,000	589,000	9	1	49.2	7.4	.07	7.4	.07	.4	.3	
28/	519,383,000	166,000	8.5	.5	48.7	7.4	.06	7.4	.06	.4	.3	
29/	519,571,000	188,000	8	.5	48.7	7.4	.07	7.4	.06	.5	.4	
30/	519,735,000	164,000	7.5	.5	48.5	7.4	.07	7.4	.08	.5	.3	
31/	519,905,000	170,000	7	.5	50	7.4	.07	7.4	.07	.4	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent, WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: December 2015
County: King — PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001 — Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Tuthidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample/Notes
1/	673,659,000	289,000	55.5	.5	52.7	7.2	.07	7.3	.07	.4	.3	
2/	673,932,000	273,000	55	.5	53.1	7.1	.07	7.4	.07	.4	.3	
3/	674,209,000	277,000	53.5	1.5	53.8	7.2	.08	7.4	.8	.4	.3	
4/	674,507,000	298,000	52.5	1	54.3	7.3	.07	7.4	.07	.4	.3	
5/												
6/												
7/	675,384,000	877,000	51	1.5	54.7	7.3	.09	7.4	.09	.5	.3	
8/	675,682,000	298,000	50	1	54.9	7.3	.13	7.4	.13	.4	.3	
9/												Road Closed
10/	676,305,000	623,000	49	1	54	7.5	.16	7.5	.12	.3	.2	
11/	676,466,000	161,000	48.5	.5	52.2	7.3	.11	7.4	.12	.4	.2	
12/												
13/												
14/	677,298,000	832,000	47	1.5	53.2	7.1	.06	7.5	.11	.4	.2	
15/	677,575,000	277,000	46.5	.5	51.8	7.1	.06	7.6	.07	.5	.3	
16/	677,858,000	283,000	46	.5	52.0	7.2	.07	7.2	.07	.4	.2	
17/	678,152,000	294,000	45	1	52.5	7.2	.07	7.2	.07	.5	.3	
18/	678,452,000	300,000	44	1	52.2	7.5	.08	7.6	.07	.4	.3	
19/												
20/												
21/	679,345,000	893,000	41.5	2.5	52.2	7.3	.08	7.3	.07	.4	.3	
22/	679,656,000	311,000	40.5	1	52.7	7.3	.08	7.4	.07	.4	.3	
23/	679,933,000	277,000	40	.5	52.5	7.3	.09	7.3	.07	.4	.3	
24/	680,242,000	309,000	39.5	.5	52.9	7.2	.07	7.4	.07	.4	.2	
25/												Holiday
26/												
27/												
28/	681,473,000	1,231,000	37	2.5	50.2	7.4	.08	7.4	.07	.4	.3	
29/	681,778,000	305,000	36.5	.5	50.7	7.3	.08	7.4	.07	.4	.3	
30/	682,080,000	302,000	36	.5	50.4	7.4	.08	7.5	.08	.4	.3	
31/	682,378,000	298,000	35.5	.5	49.5	7.4	.08	7.4	.08	.4	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: November 2015
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual:. Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/	666,591,000	495,000	73.5	1.5	60.6	7.6	.05	7.6	.10	.6	.2	
3/	666,818,000	227,000	73	.5	54.7	7.6	.06	7.4	.07	.6	.3	
4/	667,043,000	225,000	72	1	54.7	7.2	.08	7.5	.07	.6	.3	
5/	667,281,000	238,000	71.5	.5	54.1	7.2	.07	7.4	.07	.6	.3	
6/	667,504,000	223,000	71	.5	54.7	7.3	.08	7.5	.07	.6	.3	
7/												
8/												
9/	668,221,000	717,000	69	2	54.5	7.3	.07	7.3	.09	.4	.3	
10/	668,450,000	229,000	68.5	.5	55.9	7.3	.07	7.5	.08	.5	.3	
11/												Holiday
12/	668,902,000	452,000	67.5	1	55.7	7.4	.09	7.6	.09	.5	.3	
13/	669,153,000	251,000	67	.5	57.7	7.3	.08	7.3	.11	.4	.3	
14/												
15/												
16/	669,856,000	703,000	65	2	52.2	7.3	.09	7.4	.08	.4	.2	
17/	670,087,000	231,000	64	1	53.4	7.2	.13	7.4	.09	.5	.2	
18/	670,184,000	97,000	63.5	.5	52.0	7.2	.09	7.4	.09	.6	.2	
19/	670,410,000	226,000	62	1.5	53.1	7.2	.07	7.2	.09	.5	.4	
20/	670,625,000	215,000	61.5	.5	53.1	7.4	.06	7.5	.11	.5	.2	
21/												
22/												
23/	671,404,000	779,000	59.5	2	51.1	7.3	.07	7.2	.08	.4	.4	
24/	671,678,000	274,000	59	.5	50.9	7.3	.07	7.3	.07	.4	.3	
25/	671,954,000	276,000	58.5	.5	52.0	7.2	.07	7.3	.09	.5	.3	
26/												Holiday
27/												Holiday
28/												
29/												
30/	673,370,000	1,416,000	56	2.5	50	7.2	.07	7.3	.11	.5	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of			Month/Year: January 2015
County: King	PWS ID No: 11200		Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01		Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)			Signature: [signature]
			Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample/Notes
1/	659,430,000	236,000	92.5	.5	55.6	7.3	.07	7.5	.07	.5	.3	
2/	659,667,000	237,000	92	.5	54.3	7.6	.09	7.6	.07	.4	.3	
3/												
4/												
5/	660,395,000	728,000	90	2	53.2	7.4	.08	7.6	.07	.4	.3	
6/	660,627,000	232,000	89.5	.5	57.7	7.3	.08	7.5	.09	.5	.4	
7/	660,861,000	234,000	89	.5	55.3	7.3	.06	7.5	.06	.5	.4	
8/	661,082,000	221,000	88.5	.5	52.7	7.5	.09	7.8	.10	.4	.3	
9/	661,309,000	227,000	88	.5	53.2	7.5	.05	7.7	.10	.4	.3	
10/												
11/												
12/	661,987,000	678,000	85	3	52.7	7.4	.08	7.5	.08	.4	.3	
13/	662,250,000	263,000	84.5	.5	53.2	7.4	.09	7.5	.09	.4	.3	
14/	662,461,000	211,000	84	.5	55.8	7.5	.06	7.4	.10	.4	.3	
15/	662,685,000	224,000	83.5	.5	55.2	7.3	.07	7.4	.10	.4	.3	
16/	662,897,000	212,000	83	.5	55.1	7.3	.07	7.4	.08	.4	.3	
17/												
18/												
19/	663,596,000	699,000	81	2	57.9	7.1	.07	7.4	.07	.5	.4	
20/	663,819,000	223,000	80.5	.5	57.4	7.1	.08	7.3	.08	.4	.3	
21/	664,042,000	223,000	80	.5	57.1	7.1	.07	7.3	.07	.4	.3	
22/	664,273,000	231,000	79.5	.5	55.6	7.3	.07	7.3	.07	.4	.3	
23/	664,477,000	204,000	79	.5	55.4	7.2	.08	7.4	.08	.4	.3	
24/												
25/												
26/	665,183,000	706,000	77.5	.5	54.9	7.3	.06	7.5	.09	.3	.2	
27/	665,416,000	233,000	77	.5	54.9	7.3	.07	7.4	.08	.4	.3	
28/	665,635,000	219,000	76.5	.5	55.5	7.3	.08	7.5	.08	.4	.3	
29/	665,850,000	215,000	76	.5	56.7	7.4	.07	7.6	.07	.5	.4	
30/	666,096,000	246,000	75	1	56.5	7.4	.08	7.6	.07	.5	.5	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: September 2015
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	651,992,000	251,000	111.5	.5	58.5	7.3	.06	7.5	.08	.6	.3	
2/	652,245,000	253,000	111	.5	58.1	7.4	.07	7.6	.07	.6	.5	
3/	652,499,000	254,000	110.5	.5	57.8	7.4	.07	7.5	.07	.5	.4	
4/	652,722,000	223,000	110	.5	57.5	7.4	.07	7.5	.06	.4	.3	
5/												
6/												
7/												
8/	653,752,000	1,030,000	108	2	57.6	7.6	.06	7.6	.07	.5	.3	
9/	653,998,000	246,000	107.5	.5	57.9	7.3	.06	7.7	.06	.5	.3	
10/	654,255,000	257,000	107	.5	57.9	7.4	.06	7.6	.06	.5	.3	
11/	654,520,000	265,000	106.5	.5	55.4	7.5	.07	7.5	.07	.4	.3	
12/												
13/												
14/	655,358,000	838,000	103.5	3	55.4	7.5	.08	7.6	.08	.5	.4	
15/	655,603,000	245,000	103	.5	55.1	7.5	.10	7.6	.13	.6	.5	
16/	655,853,000	250,000	102.5	.5	54.0	7.5	.07	7.7	.08	.5	.4	
17/	656,098,000	245,000	102	.5	54.2	7.5	.07	7.7	.07	.5	.4	
18/	656,328,000	230,000	101	1	54.1	7.5	.07	7.6	.08	.5	.4	
19/												
20/												
21/	657,041,000	713,000	99	2	57.4	7.6	.06	7.7	.07	.4	.3	
22/	657,266,000	225,000	98.5	.5	57.7	7.6	.06	7.7	.06	.4	.3	
23/	657,507,000	241,000	98	.5	57.2	7.6	.08	7.6	.08	.4	.3	
24/	657,764,000	257,000	97.5	.5	53.4	7.3	.07	7.4	.07	.4	.3	
25/	658,004,000	240,000	97	.5	55.6	7.3	.07	7.5	.07	.4	.3	
26/												
27/												
28/	658,712,000	708,000	94	3	55.6	7.3	.06	7.4	.06	.4	.3	
29/	658,940,000	228,000	93.5	.5	54.5	7.3	.08	7.6	.08	.5	.4	
30/	659,194,000	254,000	93	.5	55.8	7.2	.07	7.5	.07	.5	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: August 2015
County: King / PWS ID No: 11200	Report submitted by: William Perry
Treatment Plant No: 001 / Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (≥0.2 mg/L)	Signature: [signature]
	Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/												
3/	642,036,000	1,098,000	132	1	62.6	7.5	.11	7.4	.12	.2	.2	
4/	642,411,000	375,000	131	1	60.4	7.2	.10	7.3	.11	.4	.2	
5/	642,785,000	374,000	130.5	.5	59.5	7.2	.10	7.3	.10	.3	.2	
6/	643,162,000	377,000	130	.5	59.3	7.2	.11	7.2	.10	.3	.2	
7/	643,534,000	372,000	129	1	59.5	7.2	.10	7.3	.10	.3	.3	
8/												
9/												
10/	644,670,000	1,136,000	128	1	57.7	7.4	.07	7.4	.08	.3	.3	
11/	645,039,000	369,000	127.5	.5	58.3	7.4	.09	7.4	.09	.3	.2	
12/	645,413,000	374,000	127	.5	59.4	7.2	.08	7.3	.08	.5	.3	
13/	645,792,000	379,000	126.5	.5	59.5	7.2	.09	7.4	.08	.5	.3	
14/	646,172,000	380,000	126	.5	59.4	7.1	.07	7.2	.06	.3	.3	
15/												
16/												
17/	647,103,000	931,000	124	2	54.9	7.3	.09	7.4	.08	.4	.2	
18/	647,441,000	338,000	123.5	.5	56.5	7.2	.09	7.4	.06	.3	.3	
19/	647,795,000	354,000	123	.5	57.2	7.3	.10	7.5	.07	.2	.2	
20/	648,133,000	338,000	122	1	56.7	7.1	.09	7.2	.08	.5	.2	
21/	648,484,000	351,000	121	1	56.1	7.3	.09	7.5	.08	.3	.4	
22/												
23/												
24/	649,525,000	1,041,000	119	2	57.7	7.3	.05	7.3	.08	.5	.5	
25/	649,868,000	343,000	118	1	57.2	7.3	.06	7.5	.07	.4	.3	
26/	650,203,000	335,000	117	1	57.9	7.4	.07	7.3	.06	.5	.4	
27/	650,559,000	356,000	116	1	57.5	7.4	.06	7.3	.06	.4	.3	
28/	650,898,000	339,000	115	1	60.3	7.2	.11	7.4	.12	.4	.4	
29/												
30/												
31/	651,741,000	843,000	112	3	57.4	7.6	.06	7.7	.07	.6	.4	
Tot:												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.ewro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: July 2015
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectible Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	629,349,000	296,000	5	1	59.9	7.1	.10	7.1	.17	.5	.2	
2/	629,752,000	403,000	4	1	58.8	7.4	.17	7.4	.19	.5	.2	
3/												Holiday
4/												
5/												
6/	631,350,000	1,598,000	148	3	58.1	7.4	.09	7.6	.17	.5	.2	
7/	631,741,000	391,000	147	1	59.1	7.1	.10	7.3	.11	.5	.3	
8/	632,126,000	385,000	146	1	59.1	7.4	.10	7.4	.12	.4	.3	
9/	632,535,000	409,000	145	1	58.5	7.5	.10	7.3	.11	.3	.2	
10/	632,928,000	393,000	144.5	.5	59.1	7.4	.10	7.3	.09	.3	.2	
11/												
12/												
13/	634,133,000	1,205,000	143.5	1.0	59.5	7.4	.08	7.6	.08	.5	.3	
14/	634,496,000	363,000	143	.5	59.5	7.2	.10	7.2	.10	.5	.3	
15/	634,897,000	401,000	142.5	.5	59.6	7.3	.09	7.3	.11	.5	.2	
16/	635,276,000	379,000	142	.5	59.5	7.3	.11	7.5	.14	.3	.2	
17/	635,663,000	387,000	141.5	.5	58.5	7.3	.11	7.4	.13	.4	.2	
18/												
19/												
20/	636,821,000	1,158,000	140	1.5	58.5	7.3	.12	7.4	.13	.4	.2	
21/	637,209,000	388,000	139.5	.5	59.7	7.2	.08	7.6	.08	.3	.2	
22/	637,584,000	375,000	139	.5	59.5	7.4	.08	7.5	.08	.3	.2	
23/	637,983,000	399,000	138	1	59.5	7.2	.11	7.6	.10	.4	.4	
24/	638,361,000	378,000	137.5	.5	59.1	7.2	.10	7.5	.10	.2	.2	
25/												
26/												
27/	639,449,000	1,088,000	136.5	1	58.5	7.3	.13	7.6	.14	.5	.4	
28/	639,817,000	368,000	136	.5	58.5	7.3	.09	7.4	.08	.4	.2	
29/	640,185,000	368,000	135	1	57.7	7.2	.12	7.2	.10	.4	.2	
30/	640,566,000	381,000	134	1	58.8	7.3	.10	7.4	.10	.4	.3	
31/	640,944,000	378,000	133	1	58.9	7.3	.11	7.3	.10	.4	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office*			For ODW use only
20435 72nd Ave South, Suite 200			
Kent WA 98032-2358			
Fax: (253) 395-6760			
Phone: (253) 395-6750			
E-mail: dw.nwro@doh.wa.gov			

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: June 2015
County: King	PWS ID No: 11200	Report submitted by: William Perry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Perry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	618,503,000	1,032,000	29.5	1.5	57.9	7.1	.09	7.2	.10	.4	.3	
2/	618,789,000	286,000	29	.5	56.1	7.2	.09	7.4	.13	.5	.3	
3/	619,059,000	270,000	28	1	56.1	7.3	.09	7.6	.08	.4	.3	
4/	619,408,000	349,000	27	1	56.3	7.1	.08	7.3	.08	.5	.4	
5/	619,681,000	273,000	26.5	.5	56.3	7.1	.09	7.3	.09	.4	.3	
6/												
7/												
8/	620,856,000	1,175,000	24.5	2	57.9	7.2	.09	7.3	.09	.4	.4	
9/	621,259,000	403,000	23	1.5	57.4	7.0	.15	7.2	.09	.4	.2	
10/	621,609,000	350,000	22	1	57.9	7.1	.12	7.3	.09	.4	.3	
11/	622,000,000	391,000	21	1	57.5	7.2	.12	7.6	.11	.4	.3	
12/	622,388,000	388,000	20	1	57.9	7.1	.12	7.3	.10	.3	.2	
13/												
14/												
15/	623,560,000	1,172,000	19	1	63.9	7.3	.12	7.6	.11	.3	.2	
16/	623,949,000	389,000	18	1	63.9	7.2	.11	7.6	.10	.3	.2	
17/	624,328,000	379,000	17	1	57.5	7.4	.13	7.5	.10	.5	.3	
18/	624,754,000	429,000	16	1	57.9	7.4	.09	7.6	.11	.5	.3	
19/	625,153,000	399,000	15	1	57.5	7.4	.09	7.6	.11	.6	.4	
20/												
21/												
22/	626,270,000	1,117,000	12.5	2.5	56.7	7.4	.10	7.6	.11	.4	.3	
23/	626,687,000	417,000	11.5	1	55.8	7.3	.11	7.6	.12	.4	.3	
24/	627,093,000	406,000	10	1.5	57.4	7.4	.10	7.7	.10	.4	.3	
25/	627,500,000	407,000	9	1	57.6	7.5	.09	7.8	.09	.4	.3	
26/	627,910,000	410,000	8	1	57.9	7.3	.10	7.4	.10	.3	.2	
27/												
28/												
29/	628,725,000	815,000	7	1	59.7	7.3	.09	7.4	.09	.5	.2	
30/	629,053,000	328,000	6	1	59.7	7.4	.15	7.4	.15	.5	.5	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200 Kent WA 98032-2358* **Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov**			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of	Month/Year: May 2015
County: King — PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001 — Source No: 01	Operator Certification #: 10499
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)	Signature: William Ferry
	Telephone No: 425-333-9172

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/	610,747,000	217,000	48	.5	54.9	7.4	.14	7.6	.12	.4	.4	
2/												
3/												
4/	610,465,000	718,000	47	1	55.8	7.3	.11	7.3	.10	.4	.4	
5/	611,684,000	219,000	46.5	.5	55.8	7.3	.12	7.5	.12	.4	.3	
6/	611,886,000	202,000	46	.5	54.5	7.0	.11	7.1	.13	.4	.3	
7/	612,110,000	224,000	45.5	.5	54.9	7.1	.10	7.4	.13	.4	.3	
8/	612,336,000	226,000	44	.5	55.9	7.0	.09	7.1	.12	.5	.4	
9/												
10/												
11/	613,070,000	734,000	43	1	57.2	7.2	.11	7.2	.11	.3	.2	
12/	613,289,000	219,000	42	1	55.9	7.4	.12	7.4	.12	.5	.3	
13/	613,516,000	227,000	41	1	55.8	7.4	.11	7.4	.13	.4	.3	
14/	613,725,000	209,000	40	1	55.4	7.4	.10	7.2	.10	.4	.3	
15/	613,968,000	243,000	39.5	.5	56.1	7.1	.11	7.2	.12	.5	.2	
16/												
17/												
18/	614,614,000	646,000	38	1.5	57.4	7.2	.12	7.2	.11	.4	.4	
19/	614,852,000	238,000	37	1	56.5	7.4	.12	7.3	.11	.4	.2	
20/	615,094,000	242,000	36.5	.5	56.5	7.4	.12	7.4	.12	.4	.3	
21/	615,346,000	252,000	36	.5	56.3	7.2	.13	7.2	.13	.4	.4	
22/	615,610,000	264,000	35	1	56.7	7.1	.12	7.3	.10	.4	.4	
23/												
24/												
25/												Holiday
26/	616,618,000	1,008,000	33	2	55.6	7.1	.12	7.2	.12	.3	.3	
27/	616,880,000	262,000	32	1	56.8	7.2	.11	7.2	.11	.9	.3	
28/	617,185,000	305,000	31.5	.5	58.5	7.4	.11	7.5	.11	.4	.4	
29/	617,471,000	286,000	31	.5	58.5	7.3	.11	7.4	.11	.4	.4	
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: April 2015
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-4192

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sample/Notes
1/	604,621,000	192,000	65	.5	54.1	7.2	.11	7.5	.11	.5	.4	
2/	604,817,000	196,000	64.5	.5	52.5	7.4	.12	7.5	.12	.4	.3	
3/	605,023,000	206,000	64	.5	54.7	7.2	.11	7.2	.11	.5	.4	
4/												
5/												
6/	605,613,000	590,000	61.5	2.5	54.1	7.2	.12	7.2	.11	.4	.3	
7/	605,819,000	206,000	61	.5	54.7	7.1	.11	7.3	.11	.3	.2	
8/	606,015,000	196,000	60.5	.5	55.4	7.3	.12	7.3	.11	.5	.3	
9/	606,210,000	195,000	60	.5	55.4	7.2	.11	7.3	.10	.5	.4	
10/	606,415,000	205,000	59.5	.5	54.7	7.3	.11	7.3	.10	.5	.3	
11/												
12/												
13/	607,006,000	591,000	58	1.5	53.4	7.1	.11	7.3	.11	.5	.4	
14/	607,193,000	187,000	57.5	.5	54.5	7.4	.13	7.4	.13	.5	.4	
15/	607,378,000	185,000	57	.5	54.7	7.2	.10	7.3	.10	.5	.4	
16/	607,568,000	190,000	56.5	.5	54.1	7.2	.15	7.3	.12	.5	.5	
17/	607,768,000	200,000	56	.5	54.7	7.3	.12	7.4	.11	.4	.3	
18/												
19/												
20/	608,411,000	643,000	53.5	2.5	55.0	7.3	.13	7.5	.11	.4	.2	
21/	608,628,000	217,000	53	.5	55.1	7.2	.12	7.4	.11	.4	.3	
22/	608,835,000	207,000	52	1	55.4	7.3	.12	7.5	.11	.4	.3	
23/	609,050,000	215,000	51.5	.5	55.0	7.4	.11	7.5	.11	.4	.3	
24/	609,238,000	188,000	51	.5	55.4	7.4	.14	7.5	.15	.4	.3	
25/												
26/												
27/	609,896,000	658,000	50	1	55.4	7.2	.11	7.6	.17	.5	.4	
28/	610,110,000	214,000	49.5	.5	58.8	7.3	.12	7.5	.15	.5	.4	
29/	610,318,000	208,000	49	.5	58.8	7.3	.12	7.4	.14	.5	.4	
30/	610,530,000	212,000	48.5	.5	57.7	7.3	.12	7.4	.13	.5	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20425 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: March 2015	
County: King	PWS ID No: 11200	Report submitted by: William Ferry	
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699	
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry	
		Telephone No: 425-333-4192	

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/	598,446,000	617,000	80	1	48.5	7.1	.12	7.2	.13	.4	.3	
3/	598,662,000	216,000	79.5	.5	48.3	7.1	.12	7.2	.14	.5	.4	
4/	598,881,000	219,000	79	.5	48.2	7.2	.14	7.3	.14	.5	.4	
5/	599,079,000	198,000	78.5	.5	48.2	7.2	.14	7.2	.14	.3	.4	
6/	599,358,000	279,000	78	.5	48.3	7.2	.14	7.2	.15	.5	.2	
7/												
8/												
9/	600,052,000	694,000	77	1	48.5	7.2	.14	7.4	.13	.5	.4	
10/	600,244,000	192,000	76.5	.5	48.9	7.2	.13	7.3	.13	.5	.3	
11/	600,446,000	202,000	76	.5	49.1	7.2	.12	7.3	.12	.5	.3	
12/	600,638,000	192,000	75.5	.5	49.1	7.1	.13	7.2	.13	.5	.3	
13/	600,826,000	188,000	75	.5	49.1	7.2	.12	7.3	.12	.5	.3	
14/												
15/												
16/	601,428,000	612,000	72	3	48.9	7.2	.13	7.3	.12	.5	.5	
17/	601,634,000	196,000	71.5	.5	48.9	7.1	.11	7.2	.10	.5	.4	
18/	601,827,000	193,000	71	.5								
19/	602,021,000	194,000	70.5	.5	49.2	7.5	.13	7.5	.13	.4	.3	
20/	602,221,000	200,000	70	.5	49.4	7.7	.11	7.7	.11	.5	.4	
21/												
22/												
23/	602,827,000	606,000	69	1	55.4	7.6	.12	7.7	.10	.5	.4	
24/	603,020,000	193,000	68.5	.5	55.0	7.5	.12	7.6	.11	.5	.4	
25/	603,213,000	193,000	68	.5	55.4	7.5	.11	7.7	.10	.5	.4	
26/	603,408,000	195,000	67.5	.5	57.2	7.3	.14	7.5	.12	.3	.4	
27/	603,614,000	206,000	67	.5	57	7.4	.13	7.6	.13	.4	.4	
28/												
29/												
30/	604,230,000	616,000	66	1	59.1	7.2	.11	7.5	.12	.4	.3	
31/	604,429,000	199,000	65.5	.5	59.4	7.2	.12	7.7	.12	.4	.3	
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Washington State Department of Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: February 2015	
County: King	PWS ID No: 11200	Report submitted by: William Ferry	
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10699	
Water Quality Parameter Requirements: Cl2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry	
		Telephone No: 425-333-4192	

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTUs)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												
2/	592,902,000	585,000	96.5	1.5	48.7	7.3	.12	7.2	.11	.6	.3	
3/	593,098,000	196,000	96	.5	48.7	7.3	.13	7.4	.11	.5	.4	
4/	593,292,000	194,000	95.5	.5	48.9	7.2	.13	7.3	.13	.6	.4	
5/	593,489,000	197,000	94.5	1	48.9	7.2	.13	7.3	.12	.6	.4	
6/	593,701,000	212,000	94	.5	48.7	7.2	.13	7.4	.13	.6	.4	
7/												
8/												
9/	594,302,000	601,000	92	2	49.6	7.2	.13	7.3	.13	.5	.3	
10/	594,494,000	192,000	91.5	.5	49.6	7.2	.13	7.3	.12	.6	.4	
11/	594,597,000	103,000	91	.5	48.9	7.2	.13	7.3	.12	.4	.2	
12/	594,781,000	184,000	90.5	.5	48.9	7.2	.13	7.3	.16	.6	.2	
13/	595,018,000	237,000	90	.5	49.2	7.3	.11	7.3	.15	.7	.5	
14/												
15/												
16/												Holiday
17/	595,874,000	856,000	88	2	48.9	7.2	.12	7.3	.13	.6	.4	
18/	596,069,000	195,000	87.5	.5	48.7	7.2	.15	7.3	.13	.5	.5	
19/	596,262,000	193,000	87	.5	48.7	7.2	.14	7.2	.13	.6	.4	
20/	596,463,000	201,000	86	1	49.5	7.3	.18	7.5	.14	.3	.3	
21/												
22/												
23/	597,070,000	607,000	85	1	48.9	7.3	.12	7.4	.13	.5	.2	
24/	597,266,000	196,000	84	1	48.9	7.2	.13	7.2	.12	.6	.3	
25/	597,459,000	193,000	83.5	.5	48.7	7.2	.13	7.3	.13	.7	.4	
26/	597,648,000	189,000	82.5	.5	48.9	7.2	.13	7.3	.13	.6	.4	
27/	597,829,000	181,000	81	.5	48.7	7.2	.14	7.3	.13	.6	.4	
28/												
29/												
30/												
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* 20435 72nd Ave South, Suite 200 Kent WA 98032-2358 Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Health

GROUNDWATER TREATMENT PLANT REPORT FORM

Water System Name: Carnation Water System, City of		Month/Year: January 2015
County: King	PWS ID No: 11200	Report submitted by: William Ferry
Treatment Plant No: 001	Source No: 01	Operator Certification #: 10697
Water Quality Parameter Requirements: Cl_2 Residual: Detectable Residual (>0.2 mg/L)		Signature: William Ferry
		Telephone No: 425-333-1972

Day	Water Production (Gallons)		Chlorine Solution Used		Raw Water Quality			Treated Water Quality				
	Source Meter Reading	Total Treated Water to System	Tank Weight (Pounds)	Gas Used (Pounds)	Temp (°F)	pH	Turbidity (NTU's)	pH	Turbidity (NTU's)	Entry Cl_2 Residual (mg/L)	Dist. Cl_2 Residual (mg/L)	Location/ Sampler/Notes
1/												Holiday
2/	586,413,000	417,000	112	1	48.0	7.1	.18	7.2	.12	.2	.3	
3/												
4/												
5/	587,094,000	681,000	111	1	48.3	7.1	.14	7.2	.12	.2	.2	
6/	587,300,000	206,000	110.5	.5	48.6	7.1	.13	7.2	.12	.5	.2	
7/	587,521,000	221,000	110.25	.25	48.5	7.1	.11	7.3	.10	.5	.2	
8/	587,741,000	220,000	110	.25	48.5	7.1	.15	7.2	.10	.5	.2	
9/	587,947,000	206,000	109.5	.5	48.6	7.1	.12	7.3	.12	.7	.5	
10/												
11/												
12/	588,566,000	619,000	108.5	1	48.3	7.2	.12	7.3	.13	.6	.5	
13/	588,775,000	207,000	108	.5	48.3	7.2	13	7.3	.12	.6	.4	
14/	588,965,000	192,000	107.5	.5	48.7	7.2	.12	7.3	.12	.6	.4	
15/	589,162,000	197,000	107	.5	48.7	7.3	.15	7.4	.12	.7	.5	
16/	589,408,000	246,000	106.5	.5	48.7	7.3	.14	7.3	.11	.5	.3	
17/												
18/												
19/												Holiday
20/	590,208,000	800,000	104	2.5	47.8	7.1	.11	7.2	.11	.6	.6	
21/	590,404,000	196,000	103	1	48.5	7.2	.11	7.3	.12	.5	.4	
22/	590,641,000	237,000	102	1	48.7	7.2	.12	7.2	.12	.6	.4	
23/	590,857,000	216,000	101.5	.5	48.7	7.2	.11	7.3	.11	.6	.4	
24/												
25/												
26/	591,477,000	620,000	100	1.5	48.2	7.2	.13	7.3	.14	.6	.4	
27/	591,681,000	204,000	99.5	.5	48.7	7.2	.13	7.3	.13	.6	.4	
28/	591,920,000	239,000	99	.5	48.7	7.2	.14	7.3	.14	.7	.5	
29/	592,120,000	200,000	98.5	.5	48.7	7.2	.14	7.3	.14	.6	.4	
30/	592,317,000	197,000	98	.5	48.5	7.2	.12	7.3	.12	.5	.4	
31/												
Tot												
Av												

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

Northwest Regional Office* *20435 72nd Ave South, Suite 200* *Kent WA 98032-2358* Fax: (253) 395-6760 Phone: (253) 395-6750 E-mail: dw.nwro@doh.wa.gov			For ODW use only

*Counties are listed on back page

Appendix K

Sanitary Survey

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent, Washington 98032-2358

SYSTEM INSPECTION / MEETING SUMMARY
Date: July 12, 2012

CARNATION WATER SYSTEM, CITY OF - King County (ID# 11200B)

Persons Attending:
Ken Carter, Bill Ferry, Carl Mueller – Carnation Water System, City of (the City)
Paige Igoe - Washington State Department of Health

Purpose: Routine Sanitary Survey

WATER FACILITIES INVENTORY:

Group A Community System

Existing Connects	=	923 Total (831 single family residential; 92 non-residential)
Population	=	1,898
Engineering Capacity	=	Unspecified (see Water System Plan)

LAST SANITARY SURVEY:

The last sanitary survey was conducted by Washington State Department of Health (the Department staff) on August 16, 2007. The following recommendations were made:

- Recommendation: Keep area around horizontal well points clear and inspect on a regular basis. *Status: Complete.*
- Recommendation: Aboveground transmission line from springs is vulnerable; plan for transmission line breaks in Emergency Response Plan. *Status: Transmission line has been replaced; buried.*
- Recommendation: Remove debris that has collected around pump intake in wetwell. *Status: Complete.*
- Recommendation: Seal hole at base of wellhead which was used for sounding. Install screened vent at wellhead. *Status: Not complete.*
- Recommendation: Submit design documents for disinfection at well. *Status: Not complete.*
- Recommendation: As growth occurs, be sure to update Coliform Monitoring Plan. *Status: Not complete.*
- Recommendation: Please comply with Water Use Efficiency Rule requirements including calculation and tracking of non-revenue water. *Status: Ongoing.*

SYSTEM OVERVIEW:
The City of Carnation owns and operates a municipal, Group A water system. In the last Water System Plan (WSP), the original CWSP planning area for the City was proposed to be reduced to approximately 9 square miles, due to topography and limited water rights. The planning area includes the Snoqualmie and Tolt River Valleys. The area is bordered by Water District 119 to the north, Ames Lake Water District to the west, Water District 127 to the south, and the unclaimed Cascade foothills to the east. The service area includes the City and a small portion of unincorporated King County.

The Carnation water system consists three spring collection points, two horizontally drilled wells, one groundwater well, and three reservoirs. Two of the reservoirs are new since the last survey. The GWI determination completed in July 2001, resulted in the spring source being designated as groundwater. Disinfection for detectable residual is provided. The system is comprised of two pressure zones; the distribution system is served by gravity and the pumped well source (seasonal in nature). All of the facilities were visited during the survey; please see the photos included at the end of this report.

SOURCES AND INTERTIES:
Currently, the City receives its water from its spring source (S01), two horizontal drilled wells and one drilled groundwater well (S02).

Spring Collection description: The spring source (S01) is located southeast of the downtown Carnation on 80 acres owned by the City. The collection area is fenced with a locked gate. No recreational trails are located in this area.

The springs consist of three individual collection boxes (or concrete manholes) which have 4 to 5 lateral pipes feeding water into each manhole. Each collection box has a gasketed manhole lid; we did not open them during the survey. Staff keep collection boxes free from debris and check the gasket/seal on the lids once per year. Each collection box produces water at different rates; the box located across the creek from the entry gate is currently the best producer; total flow is currently estimated to be 350 gpm. The spring collection boxes manifold into one line and water is conveyed to an overflow structure at the chlorination facility by gravity. The overflow has a flapper valve; typically used in irrigation systems. A standpipe with a shutoff valve is located at the junction of the three collection lines. The vulnerable above-ground transmission line was recently replaced with a buried 8-inch HDPE line.

The groundwater under the influence (GWI) determination completed on July 18, 2001 resulted in the source being designated at groundwater. Disinfection (for detectable residual) is provided at the chlorination building.

Horizontal Drilled Wells: The City drilled two horizontal wells to supplement the spring collection system sometime in the last 10 years. The wells are estimated to produce 70 gpm or less. The wells are manifolded and flow by gravity to connect to the transmission line downstream of where the three spring collection boxes join. The wellheads are protected with a locked fence structure (see photos).

It appears that when the horizontal drilled wells were added as additional points of withdrawal, they were considered part of the spring collection system and thus were considered to be under (or a part of) the existing spring source designation (S01 – Carnation Spring Source). However, due to their different nature of construction and the possibility that they may draw from a different portion of the aquifer, it may be appropriate to distinguish and separate them from the original spring collection construction. This would mean designating the springs and the horizontal drilled wells as springs of a springfield, a designation which was not developed at the time the wells were added. We will let you know if we believe this source designation change should occur, and may request that you provide additional as-built information, collect additional water quality samples and/or conduct a hydrogeologic assessment of the spring collection system to determine if this change may not be needed. In addition, these wells may need to undergo a GWI determination similar to what was done at the springs from 2000 to 2001.

Well description: The City's well (S02) is located in a City park; the sanitary control area consists of un-fertilized grass. The wellhead is enclosed by a concrete building. Well has source meter and a raw water sample tap. A hole in the wellhead, which appears to be used for a sounding tube, is also acting as a well vent; screen in place. **Recommend installation of an appropriate well vent such as a screened gooseneck pipe.**

No treatment is currently provided at the wellhead. The City has considered installation of sodium hypochlorite disinfection. **The Department would recommend provision of disinfection (to maintain a consistent chlorine residual throughout the distribution system) if the well is used on a more regular basis.** If the City decides to make this an emergency source, please inform the Department and change your WFI. To designate it as an emergency well, it must be physically disconnected from the distribution system (which could be done by removing the source meter for example).

Operations: The well is called on when pressure in the distribution system drop below a set pressure. Considered a seasonal well, the well kicks on a few times during the summer. Staff operate well once per month; flush for approximately 10 to 20 minutes.

Interties: The system does not currently have any emergency sources or interties with adjacent purveyors.

TREATMENT:
The spring source (S01) was determined to be groundwater. The City provides disinfection for a blend of the spring and horizontal drilled well water at the chlorination building. Use one 150-lb gaseous chlorine cylinder; manual controls. Feed water is drawn by small pump in chlorination building from overflow structure. Spring flow varies but chlorine dose is constant; can be changed manually. **Need chlorinator upgrade to allow flow pacing and failure alarm.** Gas and water mixed inline; chlorine solution is injected in a manhole structure downstream of the overflow structure. Try to maintain residual of 0.3 mg/L; measure residual with Hach colorimeter daily at shop facility. Visit chlorination facility daily to conduct water quality tests (measure temperature, conductivity, pH of raw water and nearby surface water), read meter and change/clean filter.

STORAGE:
Historically, a 238,000 gallon Mount Baker Silo tank has provided storage for the City. We did not climb this facility; it is reported to have a well-sealed access hatch and screened vent. An internal overflow drains into a catch basin on site, which is screened. Inspected and cleaned in 2008; used diving system so tank could stay in service. No seismic protection provided.

Two new tanks were recently constructed, the 100K Spring Tank and the 600K Entwistle Tank. The Spring Tank provides storage for the upper zone; went into service in June 2012. The steel tank has several screened reservoir vents, a sealed access hatch and an external overflow that has an air-gap and is screened appropriately. The tank is filled by gravity from the spring source; an altitude valve controls fill. Inlet pipe feeds water at several elevations through tide-flex valves. Tank provides fire flow storage for upper pressure zone.

The new 600K Entwistle Tank is located in the lower pressure zone, in the same location as the existing 238K Tank. This facility was under construction during the survey.

All storage tanks need to have appropriate hatch seals (such as neoprene or similar gasket or seal to prevent insects and invertebrates from entering tanks) and vents that are screened and adequately protected from rain and windborne contamination. All storage overflows should drain to daylight/air gap through a screen or flapper valve. The screens should be visible to an operator. **The integrity of hatch seals, vent screens and overflow screens should be inspected on a regular basis by District staff.** Next time you climb the tanks for inspection, please take photos of the reservoir vents and access hatches and send photos to the Department for our files.

Operations: With the 238K Tank, staff routinely drop the level of the tank intentionally to promote turnover (especially in the winter). This operational tool is challenging because the seasonal well kicks on when pressure drops in the system. With the amount of new storage being brought online, water quality will need to be monitored closely. **Recommend the City hire an engineer to determine how to promote tank turnover and look at changing the PRV setting and/or downtown well on/off controls.**

DISTRIBUTION:
The City's distribution system is comprised of newer 8-inch and 12-inch ductile iron mains and older 4-inch and 6-inch mains, which are mainly comprised of steel. The service area is divided into two pressure zone, separated by a PRV. The spring source feeds the upper pressure zone. The well provides water to the lower pressure zone when necessary. The spring source can feed all of the reservoirs by gravity. The Spring Reservoir is located in the upper pressure zone while the existing 238K and the new 600K Reservoirs are located in the lower pressure zone.

UPCOMING CIP:
The City has recently instituted a new inclining block rate structure; water revenues are starting to rise. Revenue is sufficient to fund debt, operations and capital improvement program. Upcoming CIP projects for the City include the following: replace transmission line

from Spring Tank into City, include valves; continue to fix leaks and reduce DSL; new distribution main in Commercial Street to improve grid and fire flow; and implementation of the meter replacement program.

WATER QUALITY MONITORING:
A short summary of recent water quality sampling results and monitoring compliance is provided below. Water quality results entered into our Sentry data system can be reviewed at http://www.doh.wa.gov/ehp/dw/sentry.htm.

Distribution System Monitoring Requirements

Coliform Monitoring:
The City has an excellent coliform monitoring history, the last five years of coliform history have been clean; last positive coliform sample occurred in 1996. Required to take 2 samples per month at representative locations in the distribution system. Staff take 3 samples per month for compliance and typically two investigative samples quarterly (in most north and east ends of system).

The coliform monitoring program includes instructions on how to collect routine samples, repeat samples. The current plan included in appendix of the 2008 WSP does not address the Groundwater Rule, which in the event of a positive total coliform sample requires raw water source samples at each source (in operation during the time of sample collection). Six routine sample locations; staff rotate sites; use hose bibs and kitchen faucets as sampling locations. We talked about adding another site to get decent geographic coverage in the upper and lower zones. **Please submit an updated Coliform Monitoring Plan including the new sample location(s) and include how the City plans to address the Groundwater Rule requirements.** City has ability to deliver public notification to customers by mail, by website, postings and social media.

Lead and Copper: The City is on a three year reduced monitoring schedule and is required to collect 10 samples from specific homes in the distribution system between January 2012 and December 2014. The City collected 10 samples in September 2011 and the results were all below the action level of 0.015 mg/L for lead and 1.3 mg/L for copper.

Disinfection By Products: On reduced monitoring for Stage 1 DBP Rule, collect one sample (for TTHM and HAA5) every three years. Last sample taken in 2010 – HAA5 was non-detect and TTHM of 1 mg/L. Must develop Stage 2 DBP monitoring plan and begin sampling for compliance by October 2013. Guidance on how to develop a monitoring plan can be found on our website or contact our DBP Program Lead, Iolyn Leslie, at (253) 395-6762.

Source Monitoring Requirements

Nitrate: Low levels (less than 1.0 mg/L) observed in both S01 and S02 historically.

Arsenic: Sample results for all sources are less than detection limit.

Inorganic Chemicals: All analytes below MCL or non-detect for both S01 and S02.

Volatile Organic Chemicals: Low levels of total trihalomethane components observed in spring source (S01). No other analytes detected.

Synthetic Organic Chemicals: No analytes detected.

Radionuclides: Low levels of gross alpha (0.25 pCi/L) and gross beta (5.65 pCi/L) found in S01. Low levels of gross alpha (0.70 pCi/L) and radium 228 (0.50 pCi/L) found in S02.

Please refer to the source monitoring requirements outlined in the Water Quality Monitoring Report (WQMR) sent to you by DOH earlier this year.

MANAGEMENT & OPERATIONS:
The water system is managed by the City Public Works Department, which is responsible for day-to-day operations.

Item	Status
Water System Plan	• Water System Plan was approved by Department on July 27, 2009. Next Plan Update due on July 27, 2015. • **Please plan to hold a pre-plan meeting with your engineer and the Department sometime in 2014 to discuss the appropriate level of planning required for your next Plan Update.**
WFI Update	• WFI sent out annually to system for review and updato • We made updates to the primary contact during the survey.
Treatment Overview	• Disinfection (detectable residual) at spring source. • Currently, no treatment for downtown well.
Water Quality Monitoring/Management	• Starting to develop a regulat flushing program, would like to get through system once per year. • Monitor chlorine residual in system. In system, see 0.2 to 0.3 mg/L at furthest points. • Plan to take regular chlorine residual measurements at the reservoirs to monitor water quality/turnover.
Consumer Confidence Report	In compliance, 2011 CCR submitted April 2012.
Operating Permit	Green
Overall Design Approval	Yes, unspecified. See WSP.
Certified Operator	• WDM2 required. In compliance. Three staff members hold WDM2 certification.
Operations and Maintenance Procedures	• Details for system components included below. • Working to develop standard operating procedures for all O&M practices.
Flushing Program	• City developing regular flushing program for system.
Valves	• Starting program to regularly exercise valves. • PRV between pressure zones will be rebuilt on a 3 to 5 year basis.
Hydrants	• Starting program to regularly exercise hydrants.

Reservoirs	• Regulat visits to check security. • Look at seals aud screens once per year. • Clean and inspect reservoir interior and exterior on an as-needed basis.
Meters	• Working on meter replacement program; 30 to 40 meters per year (3/4-inch to 2-inch size).
Telemetry	• Limited telemetry in place.
Water Use Efficiency	• Goal set in public forum held May 20, 2008. • Goal is to reduce ERU consumption by 1% per year. • Customers have reduced water consumption by 9% in between 2009 and 2011. • Have inclined block rate billing structure. • Include water conservation information in bills to educate customers on importance of conserving water.
Production Data	• Source meters read daily (M-F).
Consumption Data	• System is fully metered. • Customers are billed monthly.
Distribution System Leakage	• In 2009, leakage reported as 18.1%. • In 2010, leakage reported as 27.6%. • In 2011, leakage reported as 25.5%. • Three year annual average – 23.7%. • Conduct leak detection in system once evety year; cover 90% of system. • Now tracking non-revenue water (fire flow, contractor use, etc.). • **City will be required to develop and implement a Water Loss Control Action Plan, which will detail how and when DSL will be less than 10%; include in upcoming WSP Update.**
Cross Connection Control Program	• Written program, but not fully implemented. Staff turnover have caused delays • Conducting inventory on existing devices, don't have testing program up and running yet. • **The City must make this program a priority to ensure the water system is protected from contamination.** • Refer to WAC 246 290 490 to determine elements required for this program.
Wellhead Protection Program	• Did not discuss in detail. • **Recommend that the City reevaluate and/or update their Wellhead Protection Plan with their upcoming WSP Update.** Source contaminant inventory should be updated every two years; the City should send out correspondence describing responsibility of users to protect the well sources.
Financial Viability Program	• Water revenue starting to rise; recently instituted new rate structure; planning for rate increases in 2013 and 2014.

Reliability	• Spring source conveys water to system by gravity; have ability to bring a generator to power chlorination equipment in the event of a power outage. • Plans for backup generator at downtown well are on hold until further evaluation.
Emergency Response Program	• Did not discuss in detail. • Refer to WAC 246-290-420 and Emergency Response Packet (which can be found on our website) for more information: http://www.doh.wa.gov/ehp/dw/Publications/331-400-pack.htm.
Complaints	• No complaints received by DOH in last 5 years.
Asset Management	• Informal asset management program in place to determine which pipes get priority for replacement – focusing on leaks and steel pipe replacement. • Working on developing GIS for water and sewer infrastructure.

RECOMMENDATIONS/REQUIREMENTS:

1. Biological contamination can enter a water system via insects, birds, bats, and unsealed openings vulnerable to rainwater runoff. Since we were unable to climb each reservoir, please verify that all seals and screens on the storage tank roof vents, access hatches, overflows, and access points where the level gauge wire enters each tank are in excellent condition. Next time you visit each reservoir for routine inspection, please take a photo of the seals and screens in place and send them to the Department. Recommend you regularly inspect the seals and screens at each storage facility (i.e., twice per year).

2. The Carnation Water System Plan Update is due in July 2015. Please contact the Department to schedule a pre-plan meeting to discuss the appropriate level of planning for your system sometime in 2014.

3. Please install an appropriate well vent at your downtown well. Please refer to our publication 'Simple Fixes for Wellhead Openings' which can be found on our website here: http://www.doh.wa.gov/portals/1/Documents/pubs/331-232.pdf.

4. We discussed changing your routine coliform sampling sites to get better geographic coverage for both pressure zones in your system. Please update your sample sites and address how the City plans to comply with the Groundwater Rule and submit to the Department a revised Coliform Monitoring Plan for your system within the next six months.

5. The City has a written Cross Connection Control Program but staff turnover has made it challenging to implement the program. The City must make it a priority to implement this program to ensure its water system is protected from contamination.

6. The distribution system leakage observed in the City's system is greater than 20%. Please provide information describing how leakage will be lowered to less than 10%. Please refer to our WUE guidance manual (which can be found on our website) to develop a Water Loss Control Action Plan. This information can be provided as part of the WSP Update submittal.

7. Two new storage facilities went online in 2012. The tanks were designed to meet demands of 350,000 gallons per day, which likely incorporated high distribution system leakage numbers observed in the past. The City has been working on lowering their DSL number, and now see demands more like 150,000 to 200,000 gallons per day. We discussed a few options to ensure turnover in each of the tanks throughout the year. Please work with your engineer to evaluate alternatives on how to best operate your sources and tanks to promote optimum water quality. As an operator, you can monitor tank levels and take regular chlorine residual at each of your storage facilities. Please keep the Department informed of any major operational changes that you institute.

8. The source designation of the horizontal direction wells may need to be changed to be a spring of a springfield (similar to a well of a wellfield). The Department will evaluate this requirement and follow up with City staff outside of the context of this sanitary survey.

Spring and Chlorination Building Overview: View of chlorination building, looking back towards springs. Overflow vault on far left; overflows to creek.

Spring Chlorination Equipment: (L) Interior piping/equipment showing chlorine analyzer and controls for disinfection. (R) Pump and chlorine gas cylinder for disinfection. Pump draws stream of water from overflow vault, mixes chlorine gas in line.

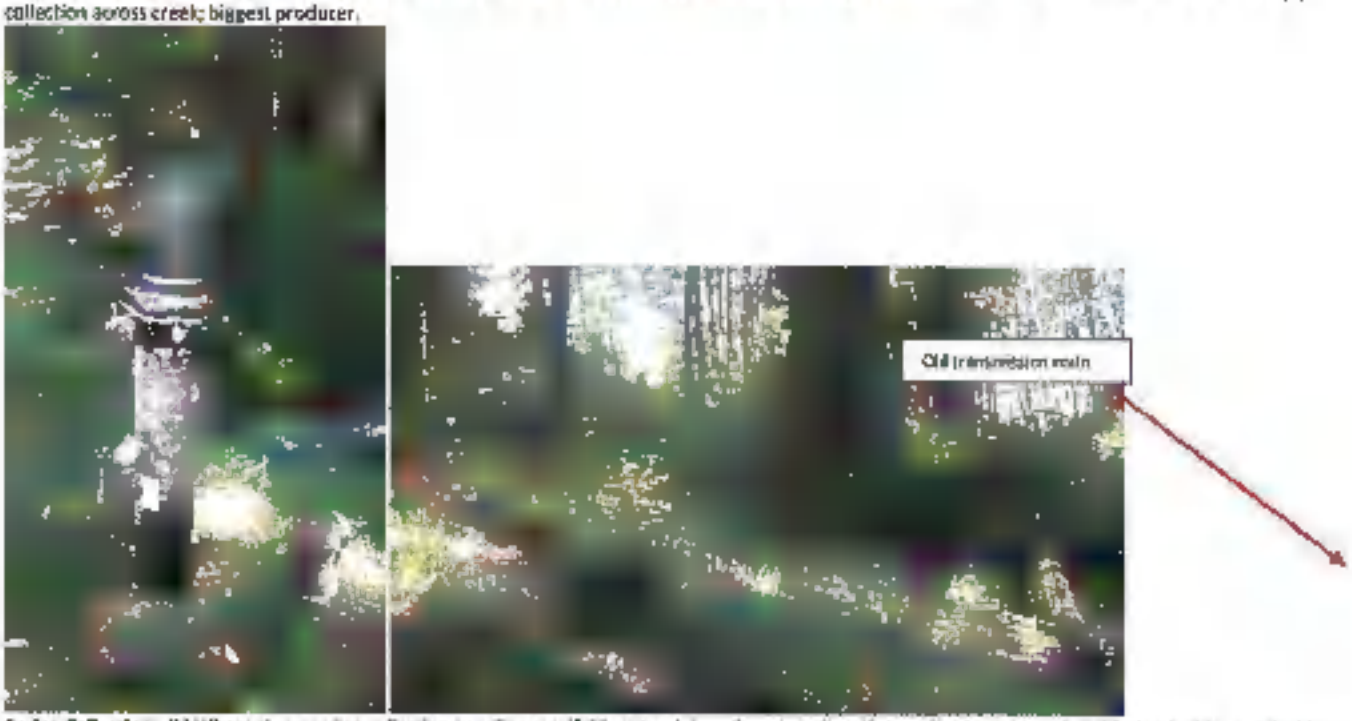
Spring Chlorination Equipment: (L) Chlorine gas cylinder for disinfection; typically use less than ½ lb per day; try to maintain residual 0.3 mg/L. (R) Regulator valve; manual controls. Measure chlorine residual at shop facility daily.

Horizontal Wellpoints: Overview of horizontal well points which also provide flow into system. Connect with transmission main which carries spring water th chlorination facility. **May need to gather information on this source to determine if it is drawing water from same location as spring collection boxes; the Department will follow up with the City regarding this issue.**

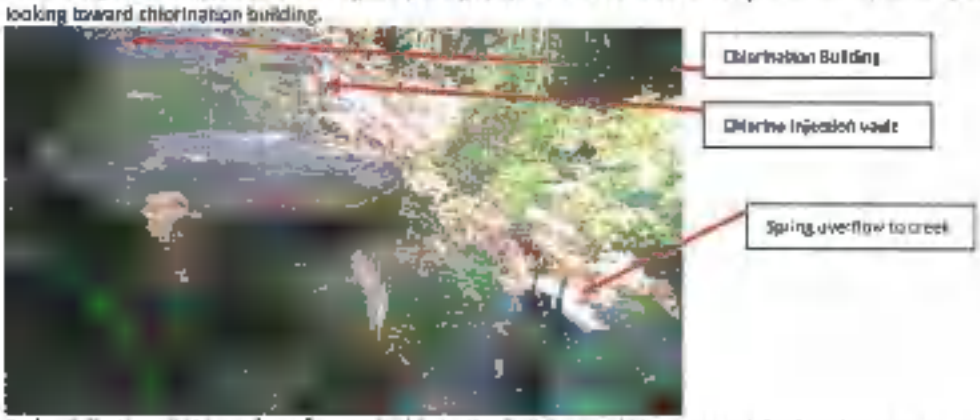
Horhontal Wellpoints: (L) and (R) Close up of well point piping. Sample tap shown on whit hn left.

Spring Collection: (L) Spring collection, in middle of spring collection area; 2nd biggest producer. Box is old data logger used for data collection to determine if source is considered GWI, since removed.

Spring Collection: (L) Spring collection closest to fence; pipe is spr ad datalogger used for data collection to determine if source is considered GWI. (R) Spring collection across creek; biggest producer.



Spring Collection: (L) Where three spring collection supplies manifold, a standpipe allows overflow if shutoff valve is closed at chlorine building. (R) Old transmission line above ground is capped (shown at right of photograph). New transmission line alignment runs to left of radar tree. Photo taken at spring collection standpipe, looking toward chlorination building.



Spring Collection: (L) View of overflow vault, chlorination building would be on upper left. Overview to creek shown on right. Overflow vault has screen with vect. Locked access.


Spring Collection: (L) Inside of overflow vault; overflow through standpipe to creek. Sump in vault should keep water level down; fix sump pump. (R) A pump in the chlorination building draws a stream of water from this structure (through the PVC pipe); chlorine is injected and mixed inline; injection point is in separate vault downstream.


Spring Collection: (L) Overflow vault looking at creek, showing overflow meter vault and piping. (R) Vault contains magmeter to measure flow.


Spring Collection: (L) Overflow pipe with irrigation flapper valve. (R) Vault contains magmeter to measure flow to town and injection point for chlorination.

Spring Collection Tank (0.26MG): Overview of new Spring Tank.


Spring Collection Tank (0.1 MG): (L) External overflow with air gap and horizontal screen. (R) Close up of reservoir vent with screen; one of several installed at top of tank; did not climb.

Well #2 Facility: (L) Overview of building located in park; not locked (check). (R) Pump discharge; not screened.


Well #1 Facility: (L) Overview of wellhead and piping. (R) Close up of sounding tube with tattered screen; fit with screened vent with gooseneck shape.



Well #1 Facility: (L) Well piping including source meter and raw water sample tap. (C) Mercury switch. (R) DOE Well identification tag.

Existing 238K Reservoir: (L) Existing concrete tanks (see notes). (R) Existing overflow exits into catch basin with screen. Daylight with air gap and appropriate screening.

New 600K Reservoir: (L) Overview of new tank; not online during survey. (R) Picture of interior inlet pipe (or overflow) taken from manway at bottom of tank.

New 600K Reservoir: (L) Overview of overflow pipe daylighting above ground with air gap and screen. (R) Close up of vertical screen. **Recommend installation of horizontal screen to prevent critters from crawling up pipe.**

Appendix L

Coliform Monitoring Plan

City of Carnation
Coliform Monitoring Plan

A. System Information

Date Plan Modified: November 2017

Water System Name City of Carnation Water System	**County** King	**System I.D. Number** 11200B
Name of Plan Preparer Bill Ferry	**Position** Public Works Field Superintendent	**Daytime Phone #** 425-333-4192
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S01 Springs / 350 gpm S02 Well / 700 gpm	
Storage: List and Describe	Storage Tank 1 - 600,000 gallons storage capacity Storage Tank 2 – 100,000 gallons storage capacity	
Treatment: Source Number & Process	S01 – Chlorine S02 - None	
Pressure Zones: Number and name	North Pressure Zone South Pressure Zone	
Population by Pressure Zone	North – approx.740 homes South – approx.100 homes	
Number of Routine Samples Required Monthly by Regulation: 2	**Number of Sample Sites Needed to Represent the Distribution System:** 6	
***Request DOH Approval of Triggered Source Monitoring Plan?**	**Yes** ☐ **No** ☒	

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name AM Test Laboratories.	**Office Phone #** 425-885-1664
Address 13600 NE 126th Pl, Suite C Kirkland, WA 98034	**After Hours #** Kathy Fugil 425-770-7037
Hours of Operation 7:00AM to 5:00PM, Monday-Friday	

Contact Name Aaron Young	
Emergency Laboratory Name	**Office Phone #**
Address	**After Hours #**
Hours of Operation	
Contact Name	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Sources for **Triggered Sample Sites****
X1. 3740 Tolt Ave Kitchen Faucet	**1-1.** 3740 Tolt Ave – Kitchen Faucet	S01
	1-2. 3440 Tolt Ave – Front Gate, Hose Bib (Upstream)	S01
	1-3. 3832 Tolt Ave – Front Hose Bib (Downstream)	S01
X2. 32610 NE 47th St Front Hose Bib	**2-1.** 32610 NE 47th St – Front Hose Bib	S01
	2-2. 32511 NE 46th Pl – Front Hose Bib (Upstream)	S01
	2-3. 4920 326th Ave NE - Front Hose Bib (Downstream)	S01
X3. 31612 W Morrison St Rear Hose Bib	**3-1.** 31612 W Morrison St – Rear Hose Bib	S01
	3-2. 31517 W Commercial St – Rear Hose Bib (Upstream)	S01
	3-3. 31738 W Morrison St – Rear Hose Bib (Downstream)	S01
X4. 5721 320th Ave NE Front Hose Bib	**4-1.** 5721 320th Ave NE – Front Hose Bib	S01
	4-2. 5623 320th Ave NE – Front Hose Bib (Upstream)	S01
	4-3. 5804 320th Ave NE – Front Hose Bib (Downstream)	S01
X5. 33100 NE 45th St Tub Sink Faucet	**5-1.** 33100 NE 45th St – Tub Sink Faucet	S01
	5-2. 32502 NE 45th St – Front Hose Bib (Upstream)	S01
	5-3. 33326 NE 45th St – Front Hose Bib (Downstream)	S01

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Sources for **Triggered Sample Sites****
X6. 32311 NE 16th St Front Hose Bib	**6-1.** 32311 NE 16th St – Front Hose Bib	S01
	6-2. 1818 324th Ave NE – Front Hose Bib (Upstream)	S01
	6-3. 32218 NE 16th St – Front Hose Bib (Downstream)	S01

**** When you collect the repeats, you must sample every source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

The water system has two sources – permanent spring and a seasonal well, which rarely gets used. Sample from ALL SOURCES that were in use the day that the unsatisfactory routine sample was collected.

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

The City of Carnation Water System does not have Reduced Triggered Source Monitoring.

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1, X2, X6, X3	July	X1, X2, X6, X3
February	X1, X2, X6, X4	August	X1, X2, X6, X4
March	X1, X2, X6, X5	September	X1, X2, X6, X5
April	X1, X2, X6, X3	October	X1, X2, X6, X3
May	X1, X2, X6, X4	November	X1, X2, X6, X4
June	X1, X2, X6, X5	December	X1, X2, X6, X5

F. E. coli-present response plans

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

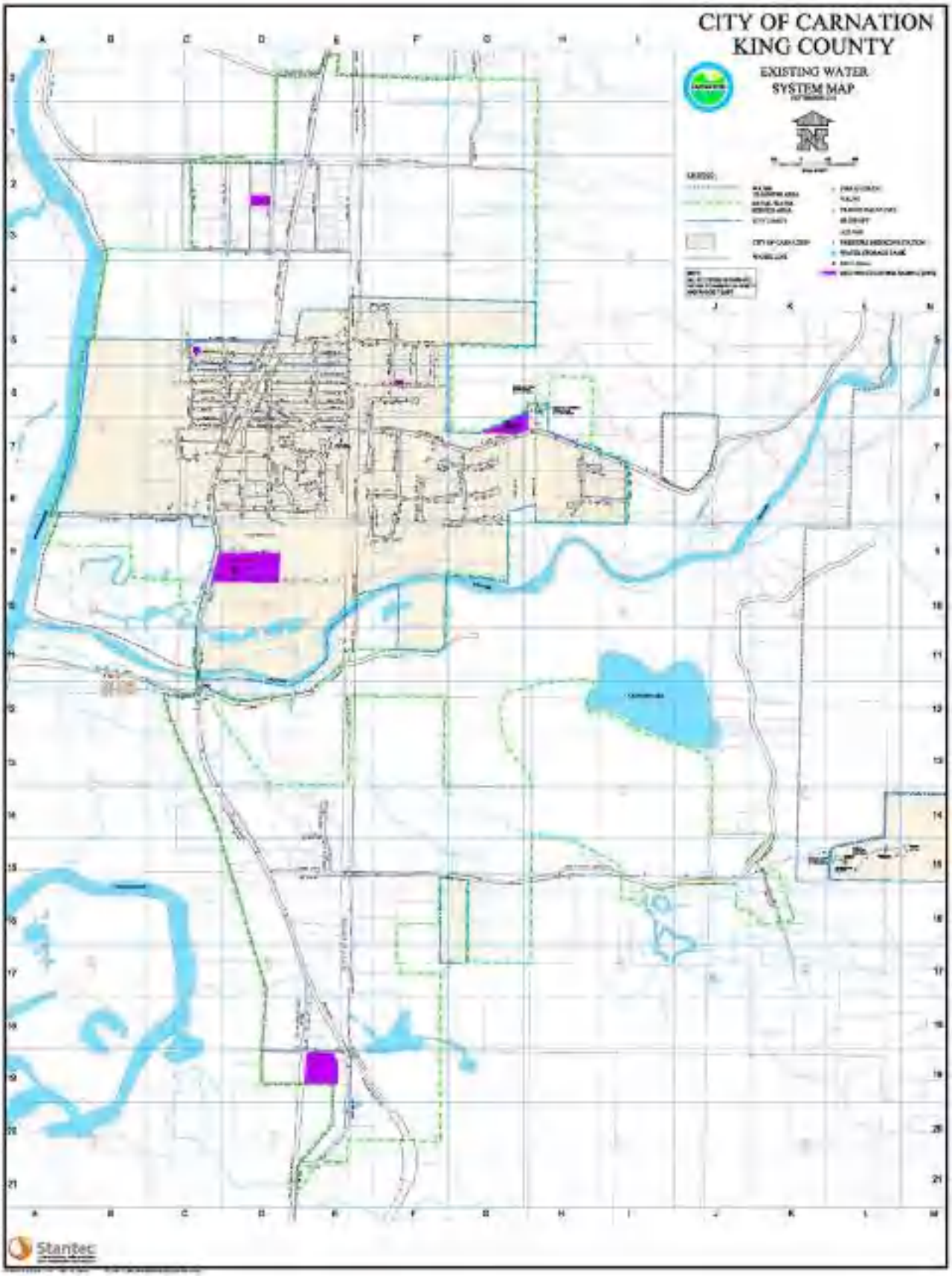
1. Call DOH.
2. Notify customers
3. Determine cause
4. Take action directed by Department of Health
5. Take repeat samples
6.
7.

E. coli-Present Triggered Source Sample Response Plan – Source 01

If we have *E. coli* in Source 01 water we will immediately:

1. Call DOH.
2. Switch to Well S02
3. Determine cause and correct
4. Collect repeat samples

G. System Map


CITY OF CARNATION
KING COUNTY
EXISTING WATER
SYSTEM MAP
Stantec

Appendix M

Water Use Efficiency Public Notice

LEGAL NOTICE
CITY OF CARNATION

-NOTICE OF PUBLIC HEARING-

NOTICE IS HEREBY GIVEN that the Carnation City Council will hold a hearing to receive public comment regarding proposed Water Use Efficiency goals. The City's goal is to reduce water usage by 1% per year per equivalent residential unit for the next six years, and maintain a three-year average distribution system leakage of less than 10%. The Water Use Efficiency goals will be incorporated into the 2015 Comprehensive Water System Plan.

The hearing will be conducted at the regular meeting of the Carnation City Council on September 6, 2016, at 7:00 PM or soon thereafter, in the Council Chambers at Carnation City Hall located at 4621 Tolt Avenue in Carnation. The hearing may be continued to subsequent City Council meetings.

The hearing is open to the public. All persons wishing to comment on the proposed Water Use Efficiency goals may submit comment in writing or verbally at the scheduled public hearing. The full text of the proposed Water Use Efficiency chapter to the draft 2015 Comprehensive Water System Plan is available for public review during normal business hours from the city clerk at Carnation City Hall.

CITY OF CARNATION
Mary Madole, City Clerk
Publish 08/17 & 08/24/16 in the Snoqualmie Valley Record.

STATE OF WASHINGTON, COUNTY OF KING }
AFFIDAVIT OF PUBLICATION

PUBLIC NOTICE
Linda M Mills, being first duly sworn on oath that she is the Legal Advertising Representative of the

Snoqualmie Valley Record

a weekly newspaper, which newspaper is a legal newspaper of general circulation and is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language continuously as a weekly newspaper in King County, Washington. The Snoqualmie Valley Record has been approved as a Legal Newspaper by order of the Superior Court of the State of Washington for King County.
The notice in the exact form annexed was published in regular issues of the Snoqualmie Valley Record (and not in supplement form) which was regularly distributed to its subscribers during the below stated period. The annexed notice, a:

Public Notice

was published on August 17, 2016 and August 24, 2016,

The full amount of the fee charged for said foregoing publication is the sum of $151.98.

Linda Mills
Legal Advertising Representative, Snoqualmie Valley Record
Subscribed and sworn to me this 24th day of August, 2016.

Gale Gwin, Notary Public for the State of Washington, Residing in Puyallup, Washington

GALE GWIN NOTARY PUBLIC STATE OF WASHINGTON

PUBLIC NOTICE #1693860
LEGAL NOTICE
CITY OF CARNATION
-NOTICE OF
PUBLIC HEARING-

NOTICE IS HEREBY GIVEN that the Carnation City Council will hold a hearing to receive public comment regarding proposed Water Use Efficiency goals. The City's goal is to reduce water usage by 1% per year per equivalent residential unit for the next six years, and maintain a three-year average distribution system leakage of less than 10%. The Water Use Efficiency goals will be incorporated into the 2015 Comprehensive Water System Plan.

The hearing will be conducted at the regular meeting of the Carnation City Council on September 6, 2016, at 7:00 PM or soon thereafter, in the Council Chambers at Carnation City Hall located at 4621 Tolt Avenue in Carnation. The hearing may be continued to subsequent City Council meetings.

The hearing is open to the public. All persons wishing to comment on the proposed Water Use Efficiency goals may submit comment in writing or verbally at the scheduled public hearing. The full text of the proposed Water Use Efficiency chapter to the draft 2015 Comprehensive Water System Plan is available for public review during normal business hours from the city clerk at Carnation City Hall.

CITY OF CARNATION
Mary Madole, City Clerk
Publish August 17, 2016 and August 24, 2016 in the Snoqualmie Valley Record

CITY OF CARNATION
SEP 01 2016
RECEIVED

CITY OF CARNATION

MINUTES OF THE REGULAR CITY COUNCIL MEETING
September 6, 2016

CALL TO ORDER: The regular meeting of the Carnation City Council was called to order at 7:00 PM by Mayor Jim Berger in the Council Chambers at Carnation City Hall.

PLEDGE OF ALLEGIANCE: Led by Deputy Mayor Fred Bereswill.

ROLL CALL: Mayor Jim Berger, Deputy Mayor Fred Bereswill, Councilmember Dustin Green, Councilmember Lee Grumman, City Manager Phil Messina, City Planner Tim Woolett, City Clerk Mary Madole, and citizens present. Councilmember Kim Lisk was absent and excused.

APPROVAL OF AGENDA: MOTION BY COUNCILMEMBER GRUMMAN AND SECOND BY DEPUTY MAYOR BERESWILL TO APPROVE THE AGENDA AS PRESENTED. MOTION PASSED UNANIMOUSLY (4-0).

CONSENT AGENDA: MOTION BY COUNCILMEMBER GRUMMAN AND SECOND BY COUNCILMEMBER GREEN TO ADOPT THE CONSENT AGENDA AS PRESENTED. MOTION PASSED UNANIMOUSLY (4-0), THE FOLLOWING ITEMS WERE APPROVED:

- Minutes of the Regular City Council Meeting – August 16, 2016.
- Claims Check Vouchers numbered 32788 – 32823 in the amount of $77,574.23.
- August 2016 Payroll Direct Deposits and Checks numbered 13674 – 13690 in the amount of $87,025.57.
- **AB16-25 – Proclamation.** Designating September 2016 as Recovery Month.

STAFF REPORTS: City Manager Messina reported that construction on the East Rutherford Street Improvement Project will begin on September 8, and the East Entwistle Street Overlay Project started earlier in the day. He attended the CERT earthquake training exercise at City Hall on August 27, and CERT will also be assisting the City with an earthquake preparedness event in October. The plans showing 30% design of the Tolt Avenue CBD Improvement Project have been received and are available for review.

CITIZEN COMMENTS & REQUESTS: Shane Fortney, Fortwest LLC, 22013 NE 143rd Street – Woodinville, is the developer of Tolt Crossing and has also been working on a short plat at Myrtle & McKinley. He has entered into a contract for development of the Falkenberg property that is in the City's UGA off East Entwistle, and is interested in annexation of that property and the neighboring parcels. He inquired if the City is interested in a new annexation, since there hasn't been one for nearly 20 years. Mayor Berger directed staff to include the topic as a discussion item on the next meeting agenda.

Pat Grady, 5604 322nd Avenue NE, said that Saturday, September 10, is National Day of Service and there are several projects planned in town.

PUBLIC HEARING: WATER USE EFFICIENCY GOALS. Mayor Berger asked if all persons who wished to be heard during the public hearing had signed-in to speak, introduced the hearing subject, opened the public hearing at 7:16 PM, and referred to the Rules of Order which were posted at the sign-in sheet and speakers' rostrum. City Manager Messina delivered the staff report and described the amount of water system leakage over the last few years. The City's Water Use Efficiency goal in the 2015 Comprehensive Water System Plan is to reduce water usage by 1% per year per equivalent residential unit for the next six years, and maintain a three-year average distribution system leakage of less than 10%. Mayor Berger called for public comment at 7:20 PM. No speakers had signed in to speak. Mayor Berger called for persons who wished to speak during the public heading. No speakers came forward. Mayor Berger closed the public hearing at 7:21

PM.

AGENDA BILLS:

AB16-26 – RESOLUTION 407. ADOPTING A GREENHOUSE GAS EMISSION REDUCTION POLICY.

Mayor Berger read the text of the proposed resolution by title. MOTION BY DEPUTY MAYOR BERESWILL AND SECOND BY COUNCILMEMBER GRUMMAN TO APPROVE A RESOLUTION ADOPTING GREENHOUSE GAS EMISSION REDUCTION POLICIES FOR THE CITY OF CARNATION. Discussion took place. Councilmember Grumman would like to see a citizens advisory group formed to identify ways that the policies could be accomplished and made more substantive. Mayor Berger expressed objection to some of the broad, politically subjective statements made in the recitals to the resolution, though he does not have particular objections to the policies themselves in Exhibit A. MOTION PASSED (3-1). MAYOR BERGER VOTED NAY. Resolution No. 407 assigned.

AB16-27 – RESOLUTION 408. PORT OF SEATTLE ECONOMIC DEVELOPMENT PARTNERSHIP PROGRAM GRANT.

Mayor Berger read the text of the proposed resolution by title. MOTION BY DEPUTY MAYOR BERESWILL AND SECOND BY COUNCILMEMBER GRUMMAN TO APPROVE A RESOLUTION EXPRESSING SUPPORT FOR THE CITY'S GRANT APPLICATION TO THE PORT OF SEATTLE ECONOMIC DEVELOPMENT PARTNERSHIP PROGRAM. MOTION PASSED (4-0). Resolution No. 408 assigned.

ADDITIONAL BUSINESS & DISCUSSION ITEMS:

The Councilmembers briefly reviewed and discussed the items on the upcoming business list.

ADJOURNMENT:

There being no further business before the City Council, the meeting adjourned by common consent at 8:02 PM.

SIGNATURES:

Approved at the regular meeting of the Carnation City Council on September 20, 2016.

MAYOR, JIM BERGER

CITY CLERK, MARY MADOLE

Appendix N

Water Reclamation Evaluation Checklist

For questions, call Kristina Westbrook,
King County Reclaimed Water Program Manager at (206) 296-5279
www.kingcounty.gov/reclaimedwater

King County

Water Reclamation Evaluation Checklist
For Systems with 1,000 or more Connections

The County and State recognize that changing conditions could initiate a need to respond in new ways to future water quality standards, wastewater discharge requirements, take advantage of advances in treatment technologies and/or allow our region to be positioned to respond to changes associated with climate change and population growth.

In 2003, Chapter 90.46 of the Revised Code of Washington (RCW) was amended to require public water systems serving 1,000 or more connections to evaluate opportunities for reclaimed water when completing their water system plans. Please use this checklist to meet King County consistency requirements in responding to this legislation.

Please use this checklist, including the inventory template, to ensure that your water system plan includes sufficient information about opportunities for reclaimed water and your system's efforts to develop those opportunities. If a question is not applicable or the information is unavailable, then answer, "unknown" or "n/a." King County will consider the checklist completed if each answer is filled in with the best available information, even if the utility states that it is not aware of any reclaimed water opportunities within its service area.

Water System Name: City of Carnation Water System
Date: _____
PWS ID# 11200b
Contact: William Ferry

1. **Identifying Potential Future Demand for Reclaimed Water:** King County maintains a database and map of potential reclaimed water users for evaluating future projects. Please use the template below, or similar table, to provide information to assist King County in further researching these potential uses.
   - **Large Utility Water Users** (choose one):
     - ☐ Attached is an inventory of twenty large (above 20,000 gallons/month on average), non single-family residential, water users served by our utility that have a potential for reclaimed water use, or
     - ☑ Attached is an inventory of our utility's top twenty water users, or
     - ☐ The information requested is unknown or not available.

       Additional Comments: _____
   - **Large Self Suppliers** (choose one):
     - ☐ Attached is an inventory of large, self-supplied water users within our water utility's service boundaries - especially those near wastewater treatment plants, mainlines, outfalls, and pump stations or similar reclaimed water facilities), or
     - ☐ The information requested is unknown or not available.

       Additional Comments: _____
   - **Other** (choose one):
     - ☐ Attached is an inventory of other water users (such as those that are clustered near one another and could be served by a single system) that may be likely candidates for reclaimed water use, or
     - ☐ The information requested is unknown or not available.

       Additional Comments: _____

2. **Environmental Commitment**: Are you a city/town, or providing water service to a city/town, that has made commitments within resource management plans, salmon recovery plans, or other environmental initiatives for which there is a potential opportunity for using reclaimed water to assist in meeting commitments? (choose one)

   ☐ Yes, here are plans that have potential for reclaimed water use in our service area to meet the above commitments:

   _____

   _____

   ☑ The information requested is unknown, not available.
   Additional Comments: _____

3. **Identifying Areas of Potential Use of Reclaimed Water for Environmental Benefit:**
   Below are ***examples*** of uses of reclaimed water ***that comply with State, Federal and other reclaimed water environmental, health and safety standards***. All of these uses are currently in effect somewhere in Washington State. To the best of your knowledge, are any of these potential uses for reclaimed water applicable to your area?

   River Augmentation (choose one):

   ☐ Yes, our water rights are limited by instream flows. For more information, King County may contact:

   _____

   _____

   ☐ The information requested is unknown, or not available.
   Additional Comments: _____

   Groundwater Recharge (choose one):

   ☑ Yes, we withdraw water from an aquifer that is in a groundwater management area, or from a declining aquifer, where water levels may need to be replenished or to maintain aquifer storage. For more information, King County may contact:

   _____

   ☐ The information requested is unknown, or not available.
   Additional Comments: _____

   Water Rights Mitigation (choose one):

   ☐ Yes, our area is pursuing, or planning to pursue, new or additional water rights, and there may be an opportunity to use reclaimed water for mitigation of those new water rights. For more information, King County may contact:

   _____

   ☐ The information requested is unknown, or not available.
   Additional Comments: _____

   Potential Areas of Environmental Need (choose one):

   ☐ Yes, parts of our service area include potential environmental enhancement locations, such as wetlands enhancement, aquifer recharge, stream flow augmentation, that might be candidates for reclaimed water use. For more information, King County may contact:

   _____

   ☐ The information requested is unknown, or not available.
   Additional Comments: _____

4. **Local Reclaimed Water Legislation**: If water reclamation is mandated for this water system through local government agreement, contract, local regulations, ordinances, or other mechanisms, please provide a copy of the governing mechanism (choose one).

   ☐ Yes, local legislation exists in our area in support of reclaimed water use. The following relevant legislation is attached (please list titles of documents):

   _____

   _____

   ☑ No water reclamation legislation exists, or is known to exist, at a local level in our service area.

5. **Coordination with Local Wastewater Utility:** Include a brief description of your interactions with any wastewater or reclaimed water utility (King County or other) adjacent to your service area to evaluate any potential opportunities to develop reclaimed water (choose one).

   ☐ Describe if applicable:

   _____

   _____

   ☐ None. Additional Comments: _____

Template for
Inventory of Water Users and Identification of Potential Reclaimed Water Users

Site Owner or Site Name	Site Address (for general mapping purposes)	Estimated Annual Water Use	Water uses not requiring potable water[1]	Is this a Potential Reclaimed Water Customer?

[1] See Washington State Reclamation and Reuse Standards, September 1997, Section 1, Articles 1-5 for allowable uses of reclaimed water. http://www.ecy.wa.gov/PROGRAMS/WQ/reclaim/standards.html

Appendix O

Susceptibility Assessment Forms, Wellhead Protection Plan

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

IMPORTANT! **Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.**

PART I: System Information

Well owner/manager : City of Carnation/John Aronica

Water system name : City of Carnation

County: King

Water system number: 11200B Source number: SO1

Well depth: N/A (ft.) *(From WFI form)*

Source name: Underground Springs

WA well identification tag number: N/A

_____ well not tagged

Number of connections: 623 Population served: 1,690

Township: 25N Range: 7E

Section: 23 1/4 1/4 Section: SW of SW

Latitude/longitude (if available): _____/_____

How was lat./long. determined?

_____ global positioning device _____ survey _____ topographic map
_____other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 06 / __ /25 month/day/year

last reconstruction: 06 / __ /79 month/day/year

_____ information unavailable

2) Well driller: N/A

__ well driller unknown

3) Type of well:

__Drilled: __ rotary __ bored __ cable (percussion) __ Dug

__ Other: X spring(s) __ lateral collector (Ranney)

__ driven __ jetted X other: perforated pipe in underground trenches

Additional comments: Underground Springs

4) Well report available? __ YES (attach copy to form) __ NO N/A

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average ~~pumping~~ Capacity: 380 (gallons/min)

Source of information: Meter and recording clock

If not documented, how was pumping rate determined? _____

__ Pumping rate unknown

6) Is this source treated? Yes

If so, what type of treatment:

X disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Safety factor. Control coliform bacteria, if any from raw source

7) If source is chlorinated, is a chlorine residual maintained: X YES __ NO

Residual level: 0.4 (*At the point closest to the source.*)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one] N/A

___ < 20 ft ___ 20-50 ft ___ 50-100 ft ___ 100-200 ft ___ > 200 ft

___ information unavailable ('< ' *means less than;* '> ' *means greater than*)

2) Depth to ground water (static water level): N/A

___ < 20 ft ___ 20-50 ft ___ 50-100 ft ___ >100 ft

___ flowing well/spring (artesian)

How was water level determined?

___ well log ___ other: _____

___ depth to ground water unknown

3) If source is a ~~flowing well~~ or spring, what is the confining pressure:

0.2 psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a ~~flowing well~~ spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES X NO

5) Wellhead elevation (height above mean sea level): 428 (ft)

How was elevation determined? ___ topographic map ___ Drilling/Well Log ___ altimeter

X other: Level Loop

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

___ evidence of a confining layer in well log N/A

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? ___ YES ___ NO

___ information unavailable

7) Sanitary setback:

___ < 100 ft* ___ 100-120 ft ___ 120-200 ft _x_ > 200 ft
* if less than 100 ft describe the site conditions:

Entire spring intake area fenced inside a protected watershed area

8) Wellhead construction: N/A

___ wellhead enclosed in a wellhouse

___ controlled access (describe): _____

___ other uses for wellhouse (describe): _____

___ no wellhead control

9) Surface seal: N/A

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('<' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('<' *means less than*)

___ > 18 ft ('>' *means greater than*)

___ depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

___ < 10 in/yr ___ 10-25 in/yr _X_ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water collected pumped 91600M (gallons)

How was this determined?

X meter

___ estimated: ___ pumping rate (_____)

___ pump capacity (_____)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : ___980___(ft)

1 year ground water travel time : ___1390___(ft)

5 year ground water travel time: ___3110___(ft)

10 year ground water travel time: ___4400___(ft)

Information available on length of screened/open interval? N/A

___ YES ___ NO

Length of screened/open interval: _____(ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES X NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	NO	No	No	
stormwater injection wells	"	"	"	
other injection wells	"	"	"	
abandoned ground water well	"	"	"	
landfills, dumps, disposal areas	"	"	"	
known hazardous materials clean-up site	"	"	"	
water system(s) with known quality problems	"	"	"	
population density > 1 house/acre	"	"	"	
residences commonly have septic tanks	"	"	"	
Wastewater treatment lagoons	"	"	"	
sites used for land application of waste	"	"	"	

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	____	X
< 2 mg/liter nitrate	____	X
2-5 mg/ther nitrate	____	X
> 5 mg/liter nitrate	____	X
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	____	X
VOCs detected at least once	____	X
VOCs never detected	____	X
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	____	____
EDB/DBCP detected above MCL at least once	____	____
EDB/DBCP never detected	____	____
___ EDB/DBCP tests required but not yet completed		
___ EDB/DBCP tests not required		

D Other SOCs (Pesticides):	YES	NO
Other SOCs detected	___	X
(pesticides and other synthetic organic chemicals)		
___ Other SOC tests performed but none detected		
(list test methods in comments		
___ Other SOC tests not performed		

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	X	___
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

__ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

__X__ YES ___ NO

Describe with references to map produced in Part IV:

As indicated on the map, the ground slopes up to the north and east and down to the south and west

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the ~~well~~ springs is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES X NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the ~~well~~ springs is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

X YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

X YES ___ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	X	___
6 month - 1 year travel time	___	X	___
1 - 5 year travel time	___	X	___
5 - 10 year travel time	___	X	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	X	___
1 - 5 year travel time	___	X	___
5 - 10 year travel time	___	X	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV

Hydrogeologic exploration indicates this aquifer originates deep coming to the surface in the vicinity of the springs and going deep again as it goes toward Lake Langlois.

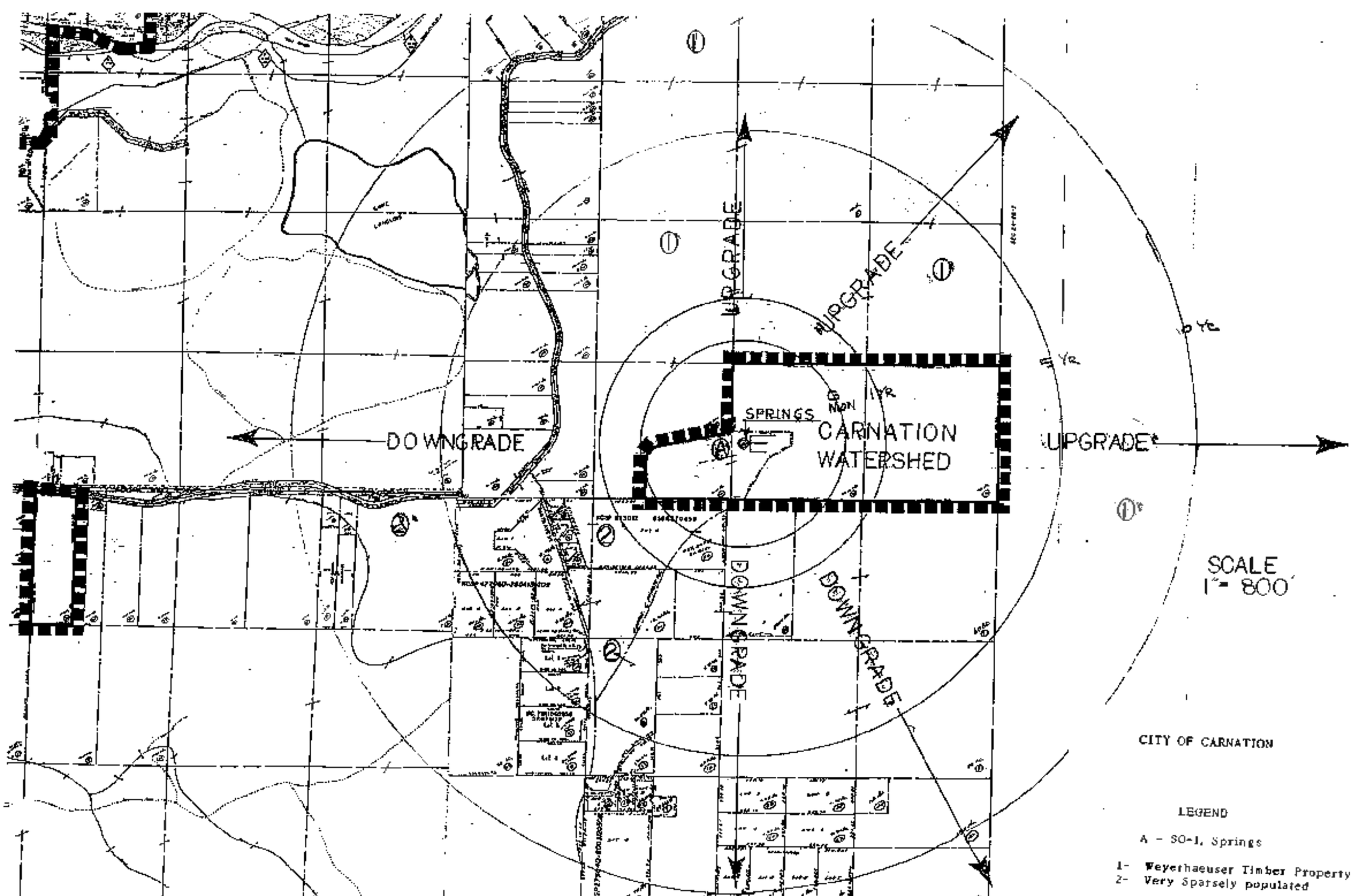
Suggestions and Comments

Did you attend one of the susceptibility workshops? ___ YES X NO

Did you find it useful? ___ YES ___ NO

Did you seek outside assistance to complete the assessment? X YES ___ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.


DOWNGRADE
SPRINGS
CARNATION
WATERSHED
UPGRADE
UPGRADE
UPGRADE
DOWNGRADE
DOWNGRADE
SCALE
1" = 800'
CITY OF CARNATION
LEGEND
A - SO-1, Springs
1- Weyerhaeuser Timber Property
2- Very Sparsely populated

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : City of Carnation/John Aronica

Water system name : City of Carnation

County: King

Water system number: 11200B Source number: S02

Well depth: 111 (ft.) *(From WFI form)*

Source name: Well No. 1

WA well identification tag number: ___ ___ ___-___ ___ ___

_____ well not tagged

Number of connections: 623 Population served: 1,690

Township: 25N Range: 7E

Section: 16 1/4 1/4 Section: NE of SE

Latitude/longitude (if available): _____/_____

How was lat./long. determined?

_____ global positioning device _____ survey _____ topographic map
____other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 01 / 30 / 78 month/day/year

last reconstruction: ___ / ___ / ___ month/day/year

_____ Information unavailable

2) Well driller: H. O. Meyers Drilling Co. Inc.
Kirkland, Washington

__ well driller unknown

3) Type of well:

X Drilled: __ rotary __ bored __ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other: _____

Additional comments: _____

4) Well report available? X YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 700 (gallons/min)

Source of information: Well Driller's Log

If not documented, how was pumping rate determined? _____

__ Pumping rate unknown

6) Is this source treated? No

If so, what type of treatment:

__ disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Test reports do not indicate a need for treatment

7) If source is chlorinated, is a chlorine residual maintained: __ YES __ NO

Residual level: _____ *(At the point closest to the source.)*

PART III: Hydrogeologic Information

1) Depth to top of open interval: (check one)

___ < 20 ft ___ 20-50 ft X 50-100 ft ___ 100-200 ft ___ > 200 ft

___ information unavailable (*'<' means less than; '>' means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft X 20-50 ft ___ 50-100 ft ___ > 100 ft

___ flowing well/spring (artesian)

How was water level determined?

X well log ___ other: _____

___ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure: N/A

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES ___ NO N/A

5) Wellhead elevation (height above mean sea level): 95 (ft)

How was elevation determined? ___ topographic map ___ Drilling/Well Log ___ altimeter

X other: Level Loop

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

X evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? X YES ___ NO (See drillers log)

___ information unavailable

7) Sanitary setback:

___ < 100 ft* X 100-120 ft ___ 120-200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

8) Wellhead construction:

X wellhead enclosed in a wellhouse

X controlled access (describe): Building locked at all times

___ other uses for wellhouse (describe): None

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('< ' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('< ' *means less than*)

X > 18 ft See Well Log ('> ' *means greater than*)

___ depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

___ < 10 in/yr ___ 10-25 in/yr X > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 290M (gallons)

How was this determined?

X meter

__ estimated: __ pumping rate (_____)

__ pump capacity (_____)

__ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 210 (ft)

1 year ground water travel time : 310 (ft)

5 year ground water travel time: 700 (ft)

10 year ground water travel time: 980 (ft)

Information available on length of screened/open interval?

X YES __ NO

Length of screened/open interval: 15 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? __ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? __ YES X NO (mark and identify on map).

Comments: _____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application Lawn Fertilizer	Yes	Yes	Yes	
stormwater injection wells	No	No	Yes	
other injection wells	"	"	No	
abandoned ground water well	"	"	"	
landfills, dumps, disposal areas	"	"	"	
known hazardous materials clean-up site	"	"	"	
water system(s) with known quality problems	"	"	"	
population density > 1 house/acre	Yes	Yes	Yes	
residences commonly have septic tanks	"	"	"	
Wastewater treatment lagoons	No	No	No	
sites used for land application of waste	"	"	"	

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

None

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	No
< 2 mg/liter nitrate	Yes	___
2-5 mg/liter nitrate	___	No
> 5 mg/liter nitrate	___	No
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	X
VOCs never detected	___	X
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	___
___ EDB/DBCP tests required but not yet completed		
___ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected	___	___
(pesticides and other synthetic organic chemicals)		

___ Other SOC tests performed but none detected
(list test methods in comments

_X_ Other SOC tests not performed

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

___ YES X NO

Describe with references to map produced in Part IV:

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES X NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

X YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

__ YES _X_ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within ..

	YES	NO	unknown
< 6 month travel time	__	X"	__
6 month–1 year travel time	__	X	__
1–5 year travel time	__	X	__
5–10 year travel time	__	X	__

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	__	X	__
1–5 year travel time	X	__	__
5–10 year travel time	__	X	__

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

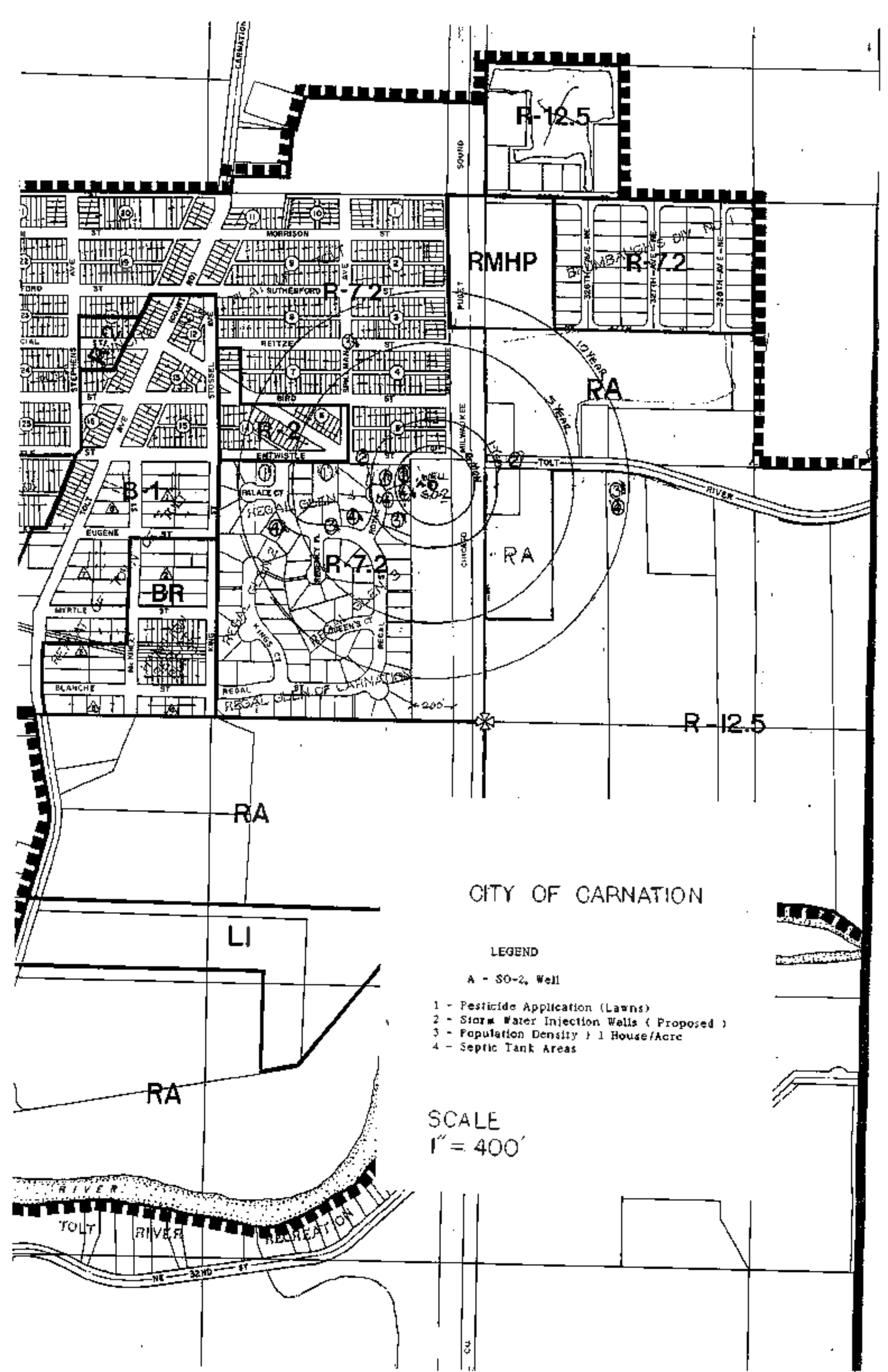
Suggestions and Comments

Did you attend one of the susceptibility workshops? ___ YES X NO

Did you find it useful? ___ YES ___ NO

Did you seek outside assistance to complete the assessment? X YES ___ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.


R-12.5
RMHP
R-7.2
RA
B-1
BR
R-7.2
RA
R-12.5
RA
LI
RA
CITY OF CARNATION
LEGEND
A - SO-2, Well
1 - Pesticide Application (Lawns)
2 - Storm Water Injection Wells (Proposed)
3 - Population Density) 1 House/Acre
4 - Septic Tank Areas
SCALE
1" = 400'
TOLT RIVER
RIVER
TOLT RIVER RECREATION
NE 32ND ST
CARNATION
MORRISON
REITZE
BIRD
ENTWISTLE
EUGENE
MYRTLE
BLANCHE
REGAL GLEN
REGAL GLEN OF CARNATION
PALACE CT
KINGS CT
QUEENS CT
MILWAUKEE
CHICAGO
SOUND
PUGET
10 YEARS
5 YEARS
328TH AVE NE
327TH AVE NE
326TH AVE NE

June 3, 1999

City of Carnation

Carnation, Washington

Dear Business Owner or Operator:

The City of Carnation Water District is developing a Wellhead Protection Plan. These plans, as required by the Federal Safe Drinking Water Act and administered by the Washington State Department of Health, are intended to help protect our public drinking water supply from potential contamination. Part of this plan requires the District to inventory and document existing potential sources of contamination that could enter our water supply.

The Wellhead Protection Plan requires us to notify business owners and operators which may be potential sources of contamination and are located within our defined Wellhead Protection Area. The purpose of this letter is to inform you of the location of your business/operation within a City of Carnation Wellhead Protection Area. For your reference, we have also included a map showing where the wells are located within your part of the water district. The map also displays and explains the "Time of Travel" zones around each well and the Wellhead Protection Area.

The Carnation Water District obtains water from several groundwater water sources, The springs SE of town and the well at Nick Loutsis Park Springs and wells are susceptible to contamination from hazardous substances that might be released onto the ground within the well's capture zone. Contamination can come from a variety of sources:

- Dumping of motor oil, gasoline, antifreeze, or other spent solvents or chemical on the ground.
- A Leaking underground or aboveground storage tanks or containers.
- Overuse or improper use of pesticides or agricultural chemicals.
- Accidental spillage of chemicals.
- Improper use of septic systems for disposal of hazardous materials.

The Carnation Water District is fortunate to have an abundant supply of clean, fresh drinking water. Loss of a well or spring through contamination usually requires extremely costly measures to develop alternate supplies. costs that must ultimately be borne by the users. We have enclosed a brochure that helps explain the Wellhead Protection Program and provides some guidelines for preventing groundwater contamination. Because everyone plays a role in the Wellhead Protection Plan, local residents within the Wellhead Protection Area are also being contacted with similar information.

Protecting our existing water supply by following a few simple guidelines is a sensible and reasonable way to ensure that we have clean, high quality water far into the future. We appreciate your interest in preserving our water supply and look forward to your comments or questions.

Sincerely,
City of Carnation

Richard Deccio P.E.
City Engineer/Public Works Director

July 8, 1998

City of Carnation

Dear City of Carnation Water District Customer:

The City of Carnation Water District is required by law to develop a Wellhead Protection Plan. These plans, as required by the Federal Safe Drinking Water Act and administered by the Washington State Department of Health, are intended to help protect our public drinking water supply from potential contamination.

The Carnation Water District obtains water from several groundwater water sources, The springs, SE of town and the well at Nick Lousis Park. Springs and wells are susceptible to contamination from hazardous substances that might be released onto the ground within the springs and well's capture zone. A valuable part of the Wellhead Protection Plan we are adopting is a public education and notification program. We believe it is important for our customers and other residents within the Wellhead Protection Area to understand the mechanics of how our springs and well work and what kinds of activities could harm them. Our public education program is intended to inform you:

1. Where our wells and their associated capture zones are located;

2. The kinds of activities that could cause hazardous substances to enter the groundwater.

The Carnation Water District is fortunate to have an abundant supply of clean, fresh drinking water. As the area develops and more consumers join the District, it becomes increasingly important to protect our water supply. Loss of a well or spring through contamination usually requires extremely costly measures to develop alternate supplies; costs that must ultimately be borne by the users. We have enclosed a brochure that helps explain the wellhead Protection Program what you can do to help ensure that we continue to have clean, high quality water in the future. For your reference, we have also included a map showing where the well and spring, their capture zones and the Wellhead Protection Area are located within your section of the Water District.

Protecting our existing water supply by following a few simple guidelines is a sensible and reasonable way to safeguard this resource far into the future. We appreciate your interest in preserving our water supply and look forward to your comments or questions.

Sincerely,
City of Carnation

Richard Deccio P.E.
City Engineer/Public Works Director

City of Carnation

June 30, 1999

King County Fire District #
P.O. Box
Carnation, WA 98024

Dear Emergency Responder or Regulatory Agency

The Carnation Water District is required by law to develop a Wellhead Protection Plan. These plans, as required by the Federal Safe Drinking Water Act and administered by the Washington State Department of Health, are intended to help protect our public drinking water supply from potential contamination. Part of this plan requires the District to coordinate with agencies responsible for emergency response and planning related to hazardous materials spills or regulation. By coordinating our efforts, we can consider if any modifications are warranted in emergency response procedures to better protect groundwater within our Wellhead Protection Area.

The Carnation Water District obtains water from groundwater well and springs. their locations are shown on the attached maps (see attached). Wells and springs are susceptible to contamination from hazardous substances that might be released onto the ground within the well's and spring's capture zone. Contamination can come from a variety of sources, including deliberate dumping, misuse of septic systems, accidental spillage, or structure fire.

Emergency responders may encounter several types of situations that could result in chemical releases to the ground surface and/or groundwater.

- Traffic accidents involving commercial vehicles hauling bulk industrial or agricultural chemicals.
- Traffic accidents that result in leakage of motor fuel, engine lubricants, and/or coolants.
- Building fires, particularly involving commercial businesses, that result in breaching of chemical containers or containment systems, with subsequent release.

Releases of the kind listed above have the potential to infiltrate into the ground enter the groundwater. If this occurs within one of the Water District's well and spring capture zones, it could result in contamination of the well and spring if prompt action is not taken. If an emergency situation develops that could result in chemical releases within a Wellhead Protection Area, several important actions should be completed as part of the response:

Mobilize a HazMat Team. Almost all emergency responders have operations-level training to provide emergency containment and establish site exclusion zones, etc Depending on the circumstances of the release, the first responder to the site (typically fire department or police) will determine if a significant release has occurred. If so, the Washington State Patrol may be notified to assume command-and-control of the mitigation activities on a state highway or the Eastside HazMat Team will be notified to provide technician-level assistance for containment and transfer activities. The Washington State Department of Ecology or the Washington State Department of Transportation may also be notified to mobilize an in-house or contracted HazMat team to initiate cleanup activities.

Contain the release and recover free product. For example, if a tanker truck overturns and releases its contents, it is important to prevent the bulk chemical from flowing down roadside ditches. The more dispersed a release

is, the more difficult it will be to clean it up. If free product is present and can be safely recovered, this should be done as soon as practicable. Every moment that a contaminant source

is in contact with the ground surface provides additional opportunity for infiltration and eventual contact with the groundwater.

Notify the Water District. Although few emergencies of this nature pose an instantaneous threat to our water supply, quick response can greatly reduce the risk of damage to the groundwater source. The sooner the Water District is aware of a release, the sooner we can activate our contingency plans.

The Carnation Water District is fortunate to have an abundant supply of clean, fresh drinking water. As the area develops and more consumers join the District, it becomes increasingly important to protect our water supply. Loss of a well or spring through contamination usually requires extremely costly measures to develop alternate supplies: costs that must ultimately be borne by the users. For your reference, we have included a map showing where all of the wells are located within our water district (see attached). The map also displays the Wellhead Protection Areas and explains the "Time of Travel" zones around each well.

We appreciate your service to the community and your efforts to protect it from harm. Preservation of our groundwater resources is another important aspect of this community service. We look forward to meeting with you in the near future to discuss your operating procedures in case of a release and how they would relate to groundwater protection.

Sincerely,
City of Carnation

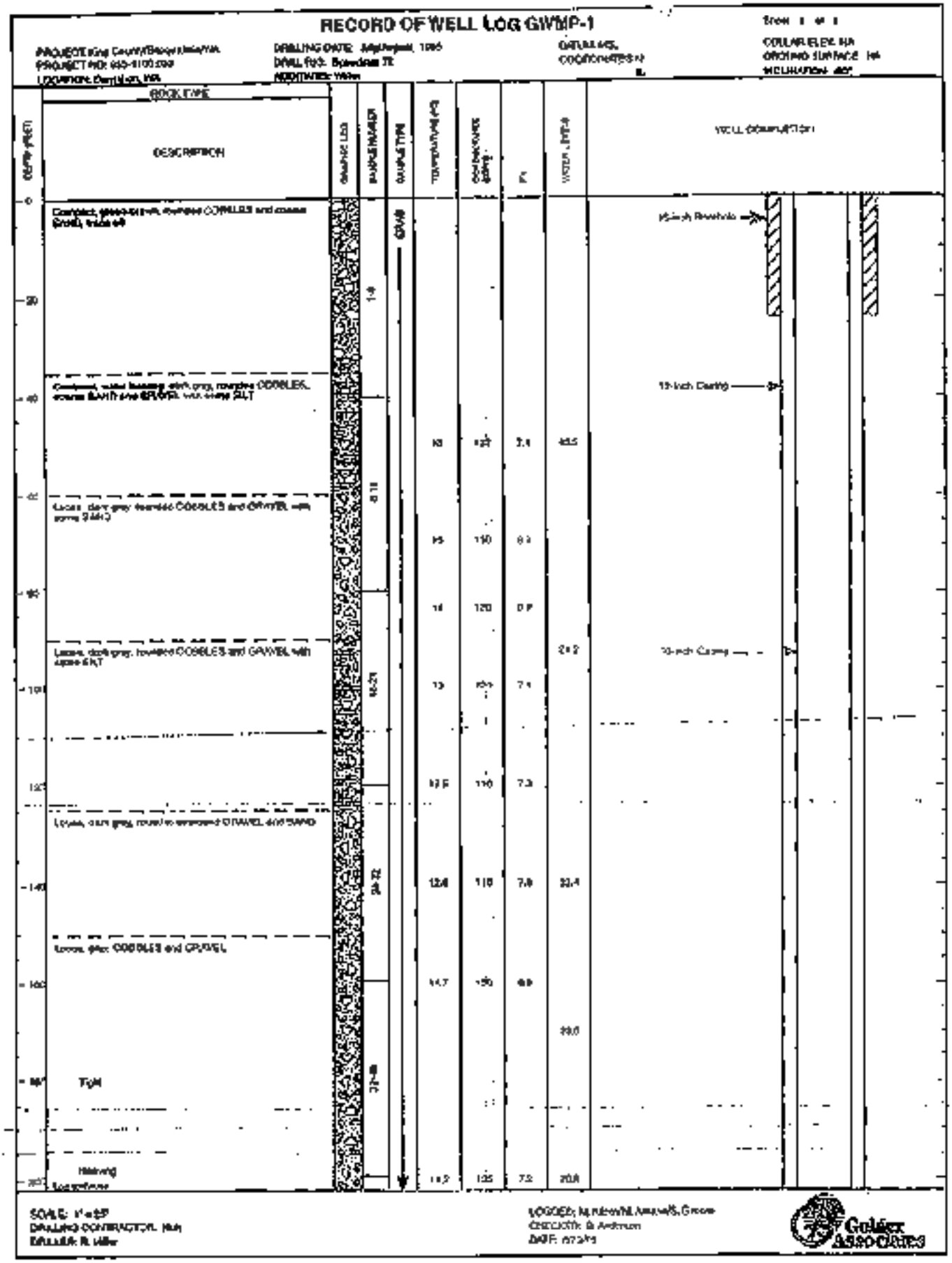
Richard Deccio P.E.
City Engineer/Public Works Director

cc: Washington State Patrol
Washington State Dept. of Ecology, Env. Report Tracker
Washington State Dept. of Ecology, Spills Supervisor

WELL LOGS & PUMP DATA

NICK LOUTSIS PARK

RECORD OF WELL LOG GWMP-1



RECORD OF WELL LOG GWMP-1

Sheet 2 of 5

PROJECT: King County/Snoqualmie/WA
PROJECT NO: 053-1400-002
LOCATION: Carnation, WA

DRILLING DATE: July/August, 1995
DRILLING: Bennett #2
ACQUIFER: Alluvial

DRILLING
COORDINATES:

COLLAR ELEV: NA
GROUND SURFACE: NA
INCLINATION: -90°

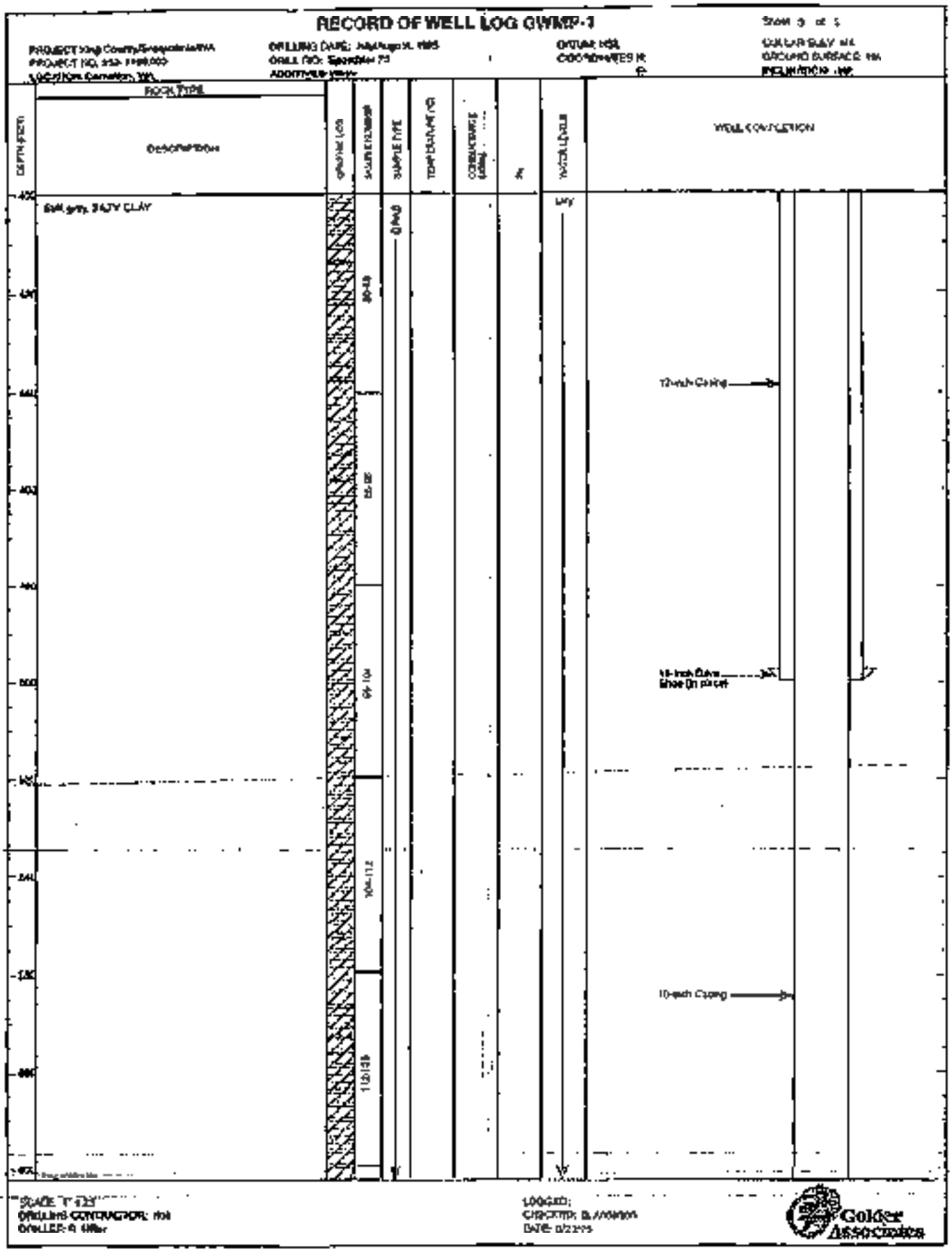
DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	TEMPERATURE (°C)	CONDUCTANCE (µS/cm)	pH	WATER LEVELS	WELL COMPLETION
0	Loose, gray COBBLES and GRAVEL			GRAB	13	135	7.5		
200			AD-48		11.5	130	7.9	30.2	
210					11.7	115	7.8		12-inch Casing
220			48-56		11.9	140	7.5		
230	Loose, silty fine SAND, some to some GRAVEL and COBBLES				11.8	140	7.5		
235									10-inch Casing
240	Soft, gray sandy SILT and CLAY		1044		12.3	150	7.5	31.4	
300			64-72						
360			72-80						
400	Log complete								

SCALE: 1" = 25'
DRILLING CONTRACTOR: N/A
DRILLER: R. Miller

LOGGED: S. Grant
CHECKED: K. Antonelli
DATE: 4/25/96

Golder Associates

RECORD OF WELL LOG GWMP-1



RECORD OF WELL LOG GWMP-1

Sheet 1 of 1

PROJECT: King Coal Highway EIS
PROJECT NO: 023-1400-003
LOCATION: Pocahontas, VA

DRILLING DATE: July/August, 1998
DRILL RIG: Geoprobe 72
ACCEPTABLE WATER

DATUM: MSL
COORDINATES: N
E

COLLAR ELEV.: NA
GROUND SURFACE: NA
ELEVATION: 40'

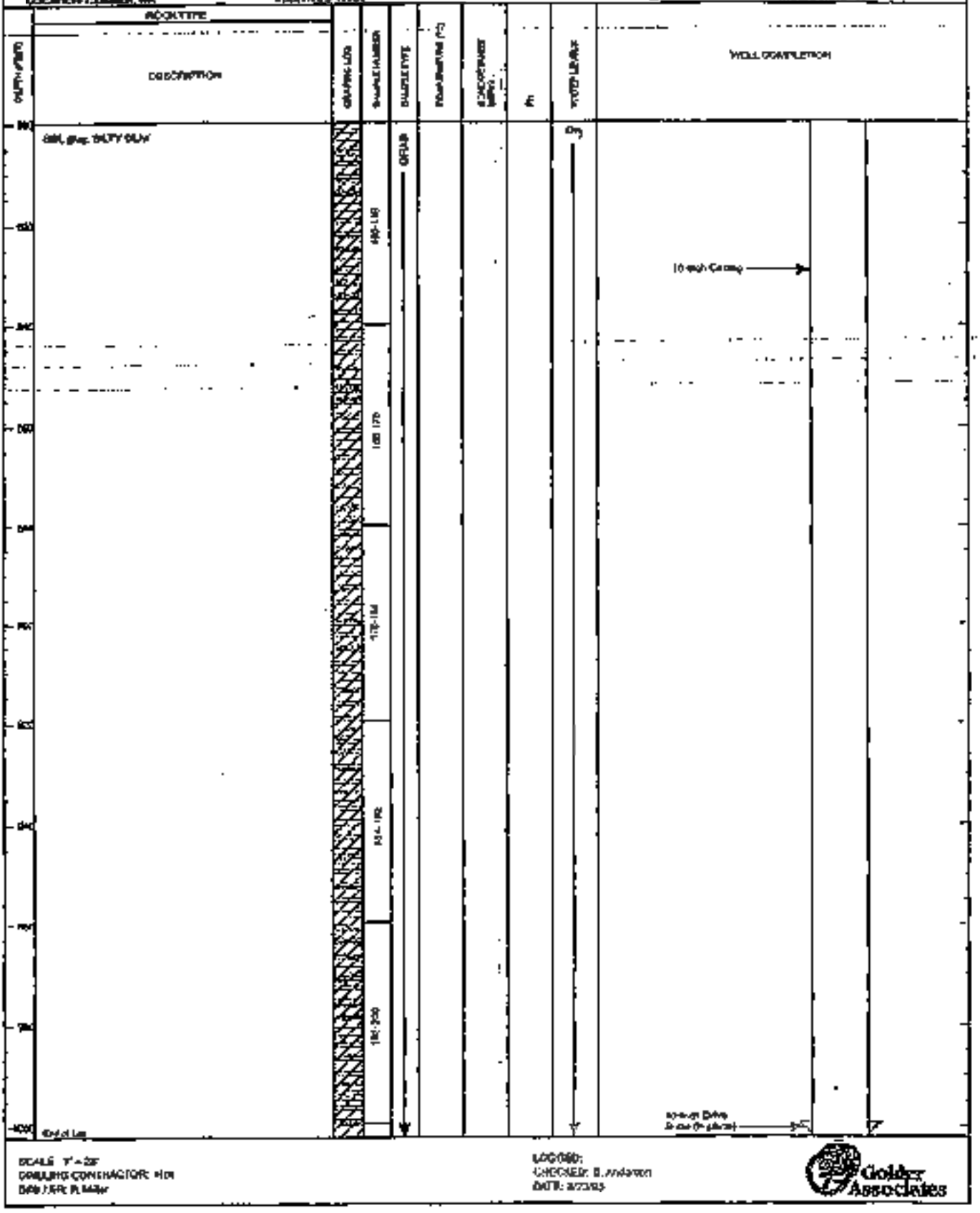
DEPTH (FEET)	DESCRIPTION	CASING TYPE	CASING DIAMETER	SCREEN TYPE	TOTAL DEPTH OF CO	CONDUCTANCE (µS/cm)	pH	WATER LEVEL	WELL COMPLETION
0	coal, gray, SILTY CLAY							Dry	
60			120-125						Grout Casing
80			125-135						
100			135-145						
120			145-155						
140			155-160						
160									

SCALE: 1" = 20'
DRILLING CONTRACTOR: NA
DRILLER: R. Miller

LOGGED:
CHECKED: B. Anderson
DATE: 8/27/98

Golder Associates

RECORD OF WELL LOG GWNR-1



SCALE: 1" = 25'
DRILLING CONTRACTOR: HDR
DRILLER: R. Miller

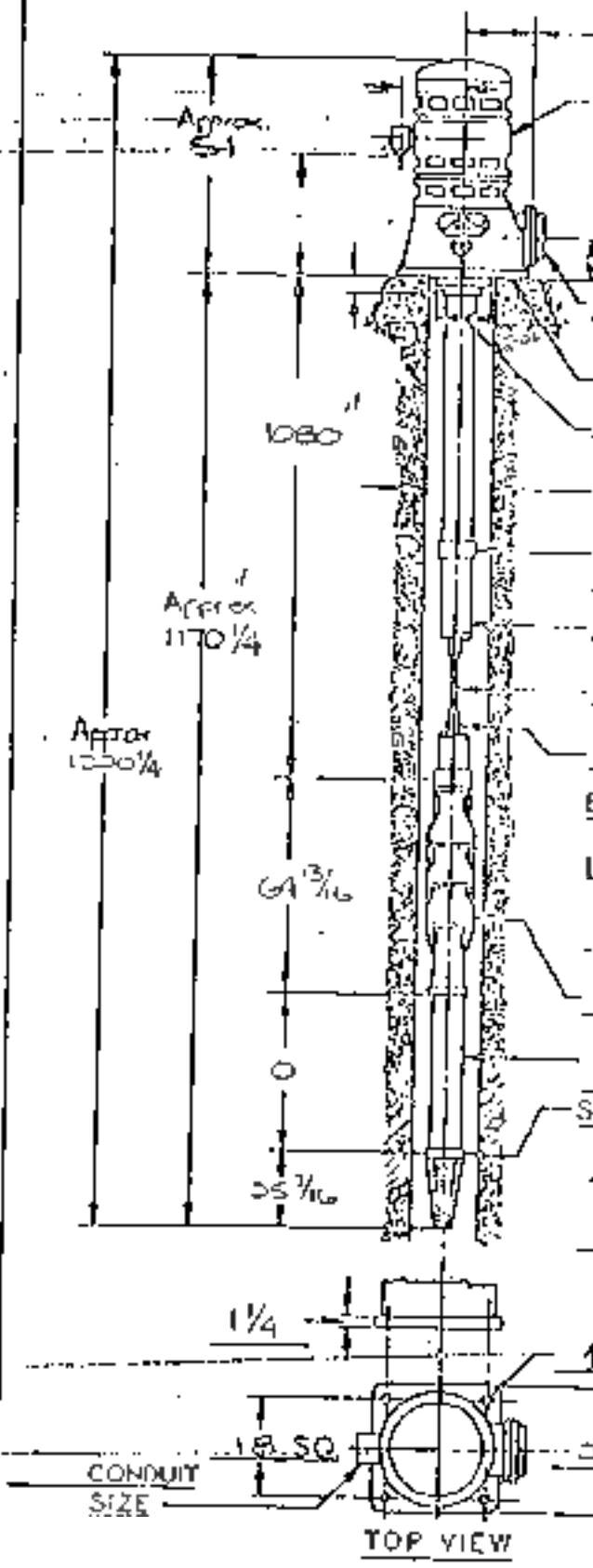
LOGGED:
CHECKED: B. Anderson
DATE: 8/23/13

Golder Associates

All dim in inches

PEERLESS PUMP

SURFACE DISCHARGE



10 1/4" ℄ TO FACE OF FLANGE

MOTOR: PEERLESS — MFR. ODP TYPE

50 H.P. 60 CY. 460 VOLTS

1760 R.P.M. 3 PH 286T FRAME

7 3/4 BASE TO ℄ OF DISCHARGE

DISCHARGE COMPANION FLANGE FOR:

6" x 8" x 1/4 DISCHARGE HEAD

O.D. TOP COL. FLANGE

10" I.D. OF WELL

9 7/16 OD OF COUPLING

8' COLUMN

1 SHAFT

NONE TUBE

BOWL UNIT:

KDMA ASSEMBLY

7 STAGE

9 3/4 O.D. OF BOWLS

NONE SUCTION PIPE

STRAINER:

10" SIZE 11 1/2 OD

CONE TYPE

1" DIA. 4 HOLES

PUMP RATING

G.P.M. 700

FT. FIELD HD. 225-230

SO NO.

SOLD TO:

ORDER NO.

USER:

ITEM NO.

PUMP IDENTIFICATION:

THIS CERTIFIED PRINT

☐ FOR APPROVAL

BY _____ DATE _____

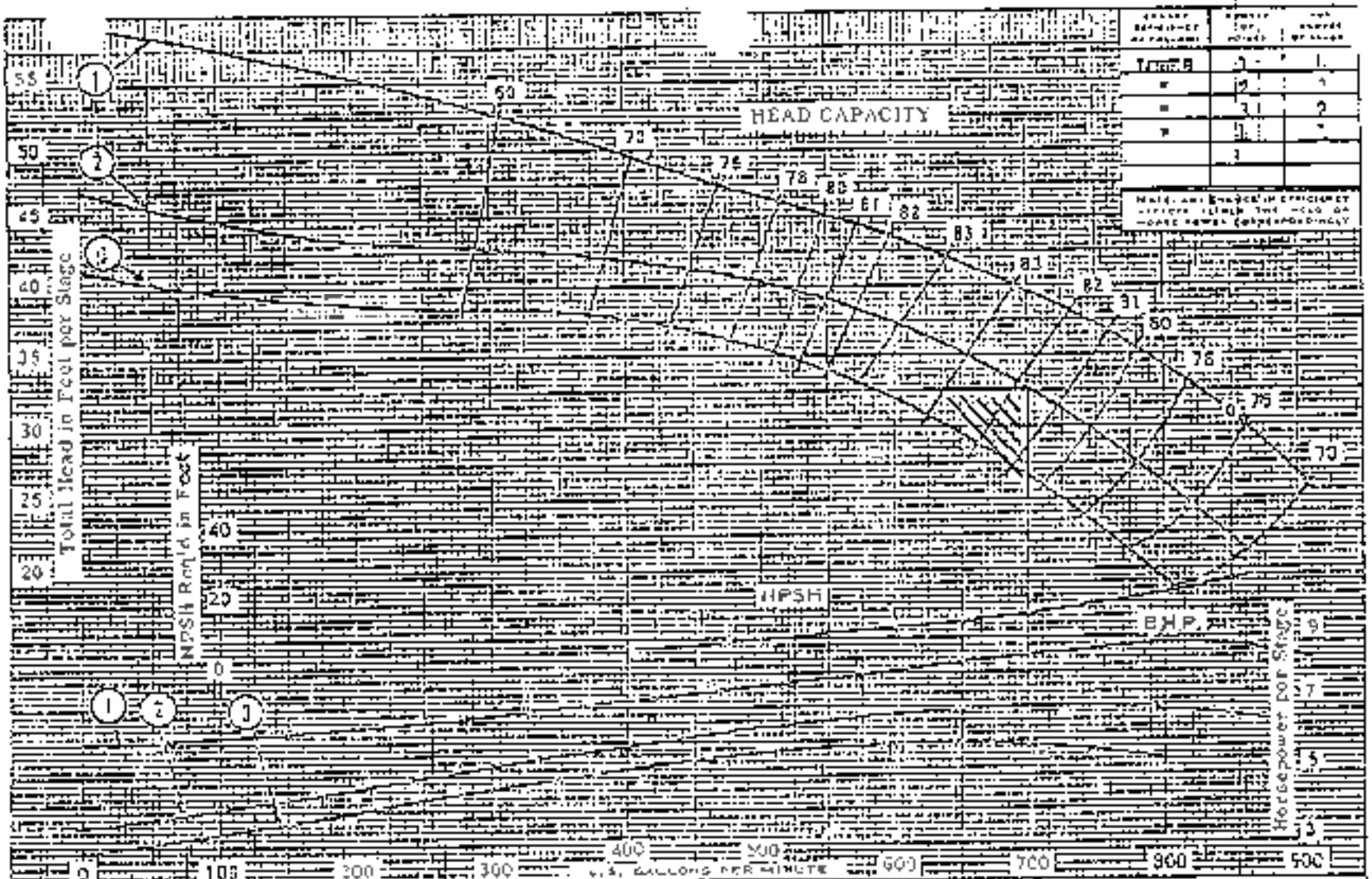
☐ FOR CONSTRUCTION

BY _____ DATE _____

HYDRODYNAMICS DIVISION

PEERLESS PUMP

Los Angeles 31, Calif. - Indianapolis 6, Ind.



HYDRAULIC PERFORMANCE WARRANTY	CURVE NO.	IMPELLER NO	IMPELLER DIA.	TAKEN FROM
Guaranteed at designated point only, and contingent on:	1	2624288	7 1/8"	40369
Proper flow to pump suction	2	2624288	6 7/8"	40390
Proper alignment	3	2624288	6 5/8"	40397
Water free of gas, air & abrasives	4			
Proper lateral setting of impeller				

Customer TOWN of CARNATION

Job

Peerless Bel. No

Laboratory Performance

SIZE 10 MA | RPM 1750 | CURVE 2840478

SERIAL T84232-E

PUMP DESCRIPTION: Driver V.H.S. MOTOR ; Head 6x8x16½ ; Column 8"

GUARANTEED PERFORMANCE: Capacity 700 gpm; Head 227.5 ft; Eff 81.8 %; BEP 80

BOWLS FIELD

VERTICAL TURBINE PUMPS

No. 140

PUMP DATA SHEET NO. 1

VERTICAL SHAFT TURBINE PUMPS

Bidder's Name STANG HYDRONICS Date [illegible], 1978

PUMP DATA

RPM	1160
Manufacturer	PEERLESS
Model Number	10MA
Number of Stages	7
Nominal Size of Bowls	9 3/4
Max. OD of Bowls	9 3/4
Overall Length Bowl Sec.	69 5/16
Pump Shaft Diameter	1 3/16
Pump Shaft Material	416 SS
No. of Pump Bearings	16
Pump Bearing Material	SAE 660 BRONZE
Description of Pump Bearings	RUBBER IN BRONZE SPIDER
Pump Bowl Catalog Number	[illegible]
Pump Bowl Material	CI SOLID
Pump Bowl Lining	ENAMEL
Impeller Type (Open, Closed)	CLOSED
Impeller Number	[illegible]
Impeller Material	CI SOLID
Type Lubrication	WATER
HP Demand at 700 gpm	48.69
HP Demand at 600 gpm	40.5
Available End Float in Bowls	.118
Test Pressure all Pump Bowls	417 PSI

COLUMN SHAFT DATA

Column Size	8"
Type Column Couplings	THREADED
Line Shaft Size	1"
Line Shaft Insert Material	316 SS
Line Shaft Coupling Material	[illegible]
No. Line Shaft Bearing Spacers	9
Line Shaft Bearing Materials	NEOPRENE
Line Shaft Bearing Description	RUBBER IN BRONZE SPIDER
Column Steel Thickness	.322"

DISCHARGE HEAD

Manufacturer	PEERLESS
Model Number	[illegible]
Guide Bearing Material	SAE 660 BRONZE
Guide Bearing Lubrication	[illegible]
Guide Bearing Type	SLEEVE
Weight	[illegible]
Test Pressure	175 W.P.

C

PUMP DATA SHEET NO. 2

Bidder's Name FLYING HYDRONICS Date APR. 29, 1978

At Guarantee Point of 700 gpm:

Total Head in Feet 207.5

Total Overall Efficiency (%)(Pump and Motor) 74%

Power Factor at 460 Volts 86%

~~Power Factor at 480 Volts~~

The following data are the actual performance characteristics of the pump proposed for installation as specified which will be reproduced in the field test:

Operating Characteristics

Quantity gpm	Total Head Feet	HP Demand by Pump	Overall Efficiency-% (Pump & Motor)
0 (shutoff)	329		
200	304.5	31.28	45
400	294	42.36	64
600	259	47.75	75
700	207.5	49.69	74
800	182	48.59	69
900			

Note: Refer to definitions of Total Head and Efficiency under DEFINITIONS.

Appendix P

Cross-Connection Control Plan

CITY OF CARNATION

CROSS-CONNECTION CONTROL PROGRAM

PURPOSE

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

GENERAL POLICY

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

RESPONSIBILITY

City

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

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

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

- Premise isolation, as defined in WAC 246-290-010, is the City's preferred method of cross-connection control to isolate the consumer's water system from the City distribution system, whereby an approved air gap or approved backflow prevention assembly is installed at the service connection.

- When the in-premises isolation method is to be used for backflow protection for residential irrigation systems, residential swimming pools, spas, decorative ponds and boilers, the backflow prevention must provide a level of protection commensurate with

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

Water Customer

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

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

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

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

Local Administrative Authority

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

PERSONNEL

Program Administrator

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

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

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

HAZARD EVALUATION

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

Schedule For Initial Hazard Assessments

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

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

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

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

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

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

New Service Connections

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

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

Existing Services

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

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

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

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

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

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

Inspection of High Hazard Sites

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

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

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

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

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

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

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

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

REGULATIONS AND REFERENCES

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

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

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

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

BACKFLOW PREVENTION REQUIREMENTS

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

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

BACKFLOW ASSEMBLY INSTALLATION

General Requirements

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

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

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

Thermal Expansion

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

Schedule for Installation of Backflow Assemblies

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

BACKFLOW ASSEMBLY TESTING

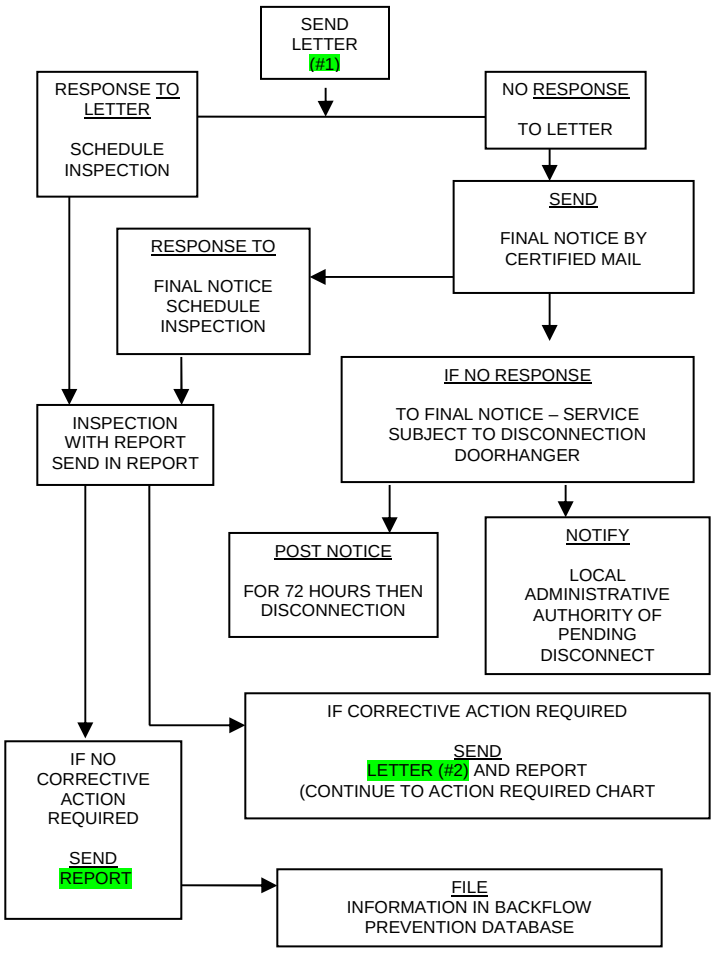
All Backflow preventers that the City relies on for protection of the water system shall be inspected and if applicable tested, including backflow preventers for in-premise protection. Inspection and testing will be conducted by a Washington State Department of Health (DOH) certified BAT for proper application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

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

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

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

BACKFLOW PREVENTION INSPECTION PROCEDURE



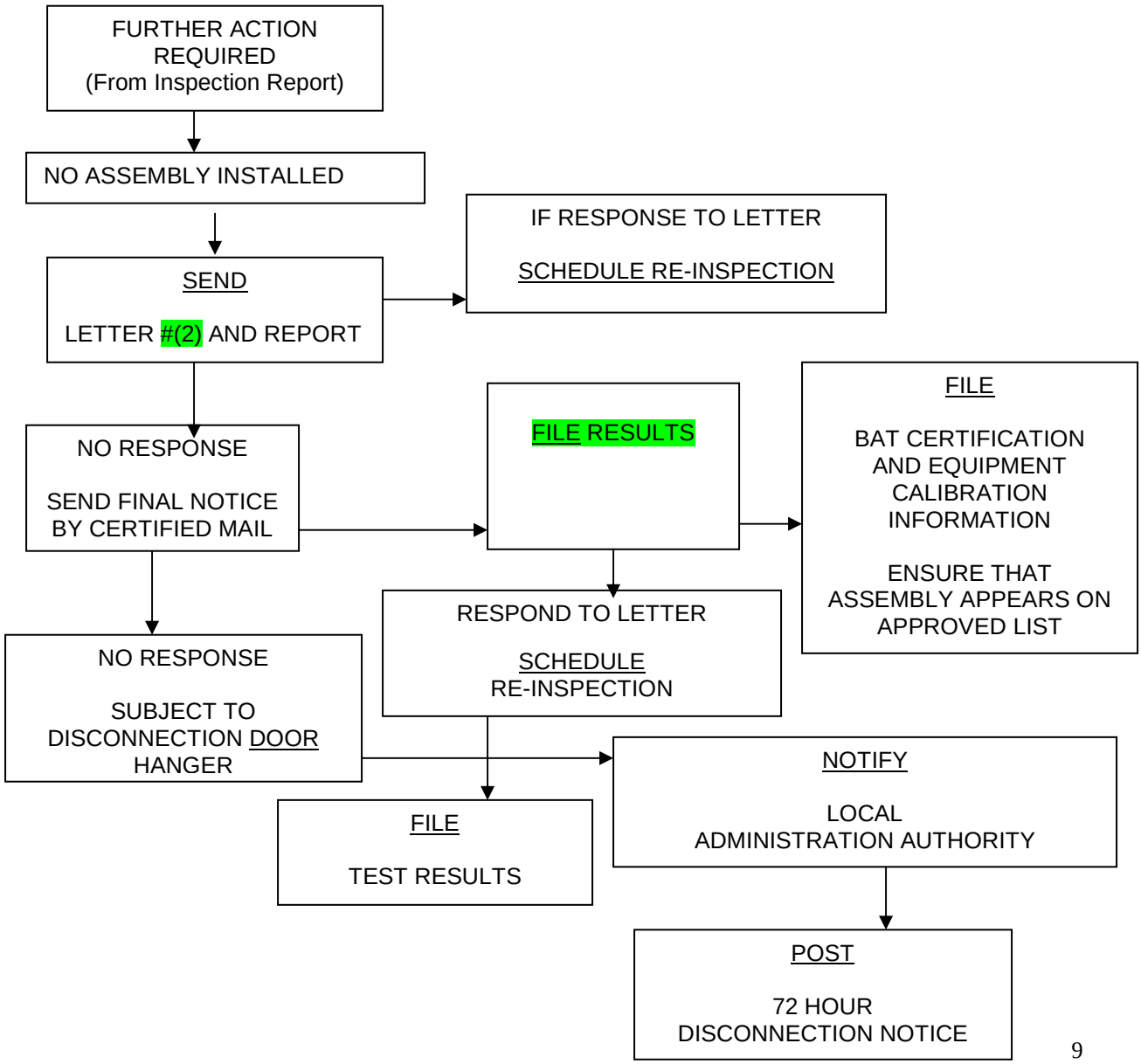
Inspection and Testing of New Installations

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

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

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

BACKFLOW PREVENTION INSPECTION
(CUSTOMERS WITH NO BACKFLOW ASSEMBLY INSTALLED)



Previously Installed Assemblies

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

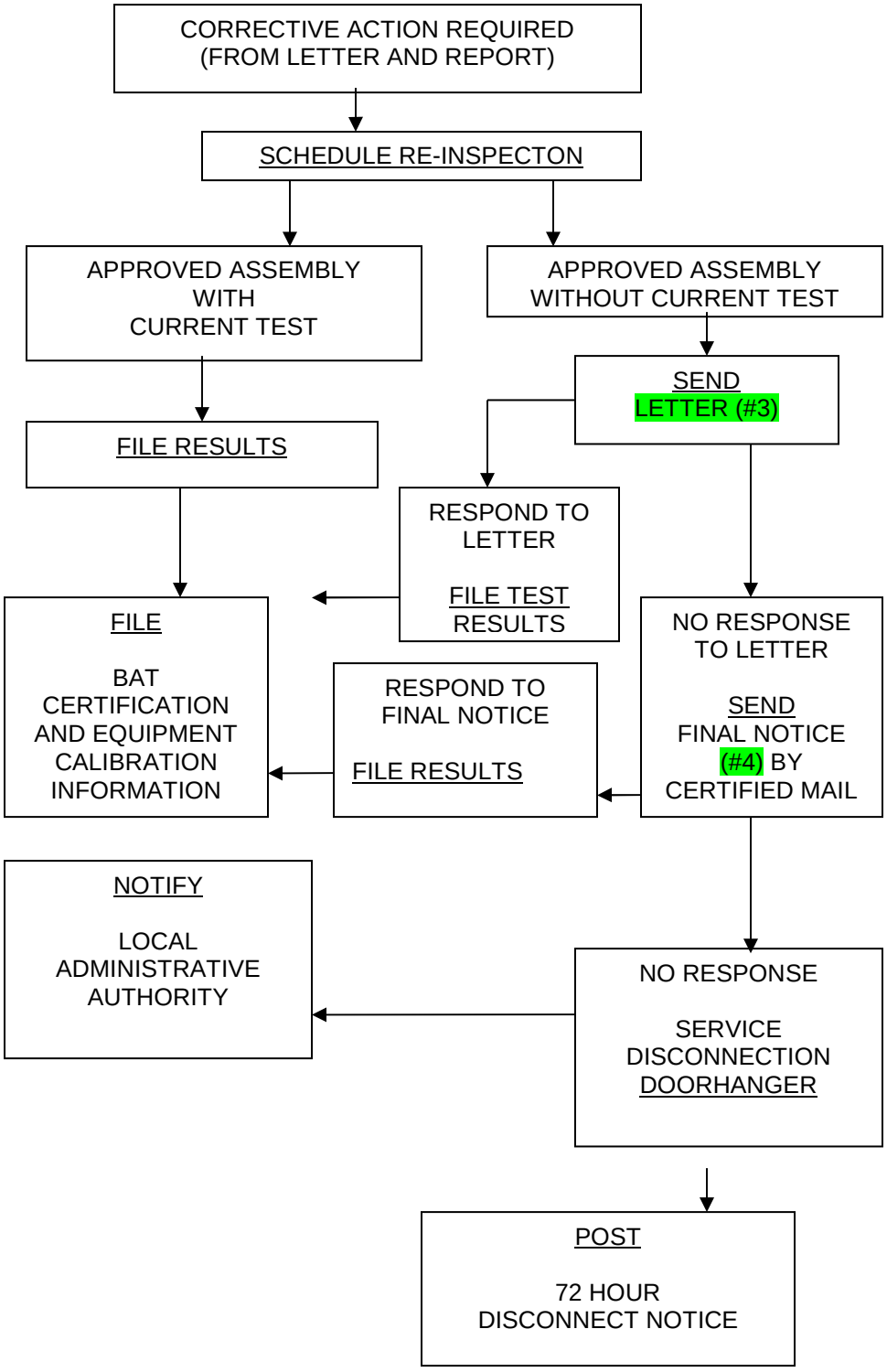
The City shall notify customers with backflow assembly devices of the requirement for testing not less than 30 days prior to the required test date. The completed satisfactory test results shall be forwarded to the City not more than 30 days after the test date.

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

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

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

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



Inspection and Testing of Repaired or Replaced Installations

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

ENFORCEMENT

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

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

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

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

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

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

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

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

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

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

City Authorized To Hire Approved Contractor

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

RECORDS AND REPORTS

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

For approved air gaps:

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

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

For approved backflow prevention assemblies:

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

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

For approved Atmospheric Vacuum Breakers:

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

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

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

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

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

CONSUMER EDUCATION

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

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

Customer Information Packet

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

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

BACKFLOW INCIDENT RESPONSE PROCEDURES

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

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

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

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

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

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

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

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

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

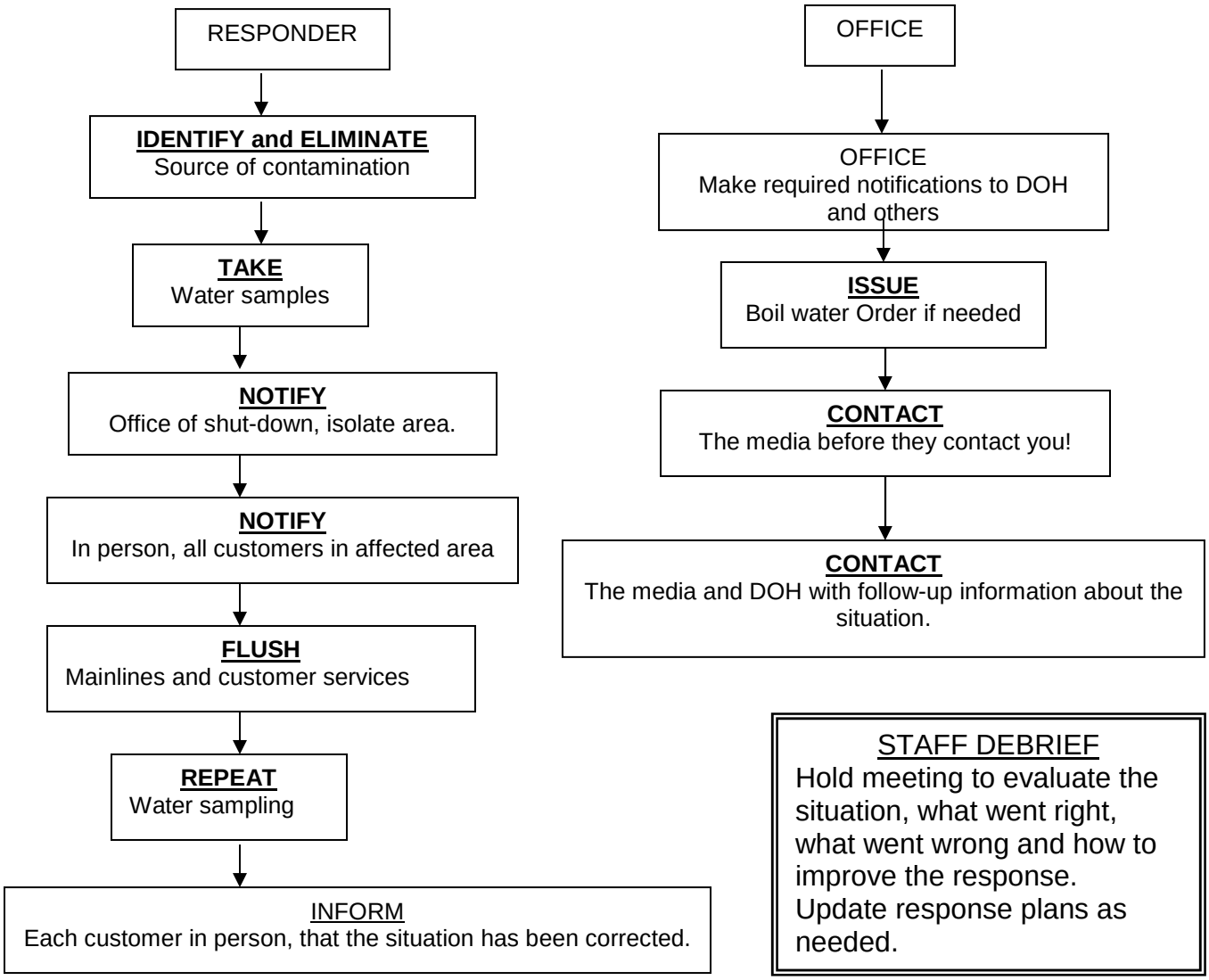
begin public notification. Contact DOH (1-877-481-4901) and follow any directions they may give. When the cross-connection responsible for the system contamination is located, discontinue water service to that customer, until the customer completes the corrective action ordered.

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

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

PROCEDURE FLOW CHART CONFIRMED BACKFLOW INCIDENT

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



PROTECTION OF STAFF

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

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

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

EMERGENCY CONTACTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CITY – The City of Carnation

Combined Fire Protection System –a fire sprinkler system that:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Flow Through Fire System – means a sprinkler system that:

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

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

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

International Plumbing Code –This code establishes Citywide minimum plumbing standards applicable within the property lines of the customer's premises.

Local Administrative Authority – the local official, board, department or agency authorized to administer and enforce the provisions of the International Plumbing Code. Low Health Hazard – a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

Maximum Contaminant Level (MCL) – the maximum amount of a contaminant allowed in a sample of water according to federal and state regulations.

Non-Potable Fluid – any water, other liquid, gas, or other substance which is not safe for human consumption, or is not part of the public potable water supply as described by the health authority.

Primary Disinfection – means a treatment process for achieving inactivation of Giarda lambliaq cysts, viruses, or other pathogenic organisms of public health concern to comply with the treatment technique requirements of Part 6 of this chapter.

Potable Water – water that is safe for human consumption and free from harmful or objectionable materials, as described by the health authority.

Premises – a piece of land to which water is provided, including all structures and improvements located on it.

Reclaimed Water – means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would otherwise occur, and it is no longer considered wastewater.

Reduced Pressure Backflow Assembly (RPBA) – a device incorporating two or more check valves and an automatically opening differential relief valve located between the two checks, two shut off valves, and equipped with the necessary appurtenances for testing.

Reduced Pressure Detector Assembly (RPDA) – an approved assembly consisting of two approved reduced pressure backflow assemblies, set in parallel, equipped with a meter on a bypass line to detect small amounts of water leakage or use.

Safe Drinking Water Act – Legislation enacted by the US Congress in1974 to ensure that the public is provided with safe drinking water.

Service Connection – the piping connection by means of which water is conveyed from the City's distribution main to a customer's property line, or to the end of the water connection.

Thermal Expansion –the pressure increase due to a rise in water temperature. The problem becomes acute in heated water piping systems when such a system becomes "closed" due to a malfunctioning backflow prevention assembly, which disallows expansion beyond that point.

Un-Approved Auxiliary Water Supply – means a supply (other than the purveyor's water supply) available to the customers premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

Used Water – means water which has left the control of the purveyor.

USC FCCCHR – The abbreviation for the UNIVERSITY OF Southern California Foundation for Cross-Connection Control and Hydraulic Research. It is the agency which tests and approves backflow prevention assemblies by approved standards.

Abbreviations and Acronyms

AG – Air Gap
AVB – Atmospheric Vacuum Breaker
BAT – Backflow Assembly Tester
CCS – Cross-Connection Control Specialist
DCDA – Double Check Detector Assembly
DCVA – Double Check Valve Assembly
IAPMO – International Association of Plumbing and Mechanical Officials
PVBA – Pressure Vacuum Breaker Assembly
RPBA – Reduced Pressure Backflow Assembly
RPDA – Reduced Pressure Detector Assembly
SVBA – Spill Resistant Vacuum Breaker Assembly
UBC – Uniform Building Code
UL – Underwriters laboratory
UPC – Uniform Plumbing Code

APPENDICES

Appendix A Application For Water Service
Appendix B Pre Approved BAT
Appendix C Cross-connection Hazard Survey
Appendix D Water-Use Survey Report
Appendix E Backflow Incident Report
Appendix F Annual Summary Report Forms
Appendix G Customer Information Packet
Appendix H Letters

APPENDIX A

Application for Water Service

CITY OF CARNATION
Application for Water Service (Service Agreement)

Owner's Name: _____**Phone:** _____

Mailing Address: _____

Location Address: _____

Legal Description: _____

The undersigned applicant hereby applies for a water connection to the above-described property.

1. The applicant is the owner of the described property or the authorized agent of the owner.

2. As a condition of City of Carnation, hereinafter referred to as the Purveyor, providing and continuing service to the above described property, the property owner, by signing this application, agrees to comply with:

   a. All provisions of the City's current Ordinance and/or Cross Connection program, Resolution of the Purveyor, or latest revision thereof; and

   b. Other such current and future rules and regulations that govern the Purveyor's water system.

3. The property owner specifically agrees:

   a. To install and maintain at all times his plumbing system in compliance with the most current edition of the **International** Plumbing Code as it pertains to the prevention of potable water system contamination and prevention of pressure surges and thermal expansion in his water piping (for thermal expansion, it shall be assumed that a check valve is installed by the Purveyor on the water service pipe);

   b. Within 30 days of the Purveyor's request (or alternate schedule acceptable to the Purveyor):

      i) To install, maintain, test and repair in accordance with the Purveyor's cross-connection control standards all premises isolation backflow prevention assemblies required by the Purveyor to be installed to protect the public water system from contamination; and
      ii) To report to the Purveyor the results of all assembly tests and/or repairs to the premises isolation backflow prevention assemblies.

   c. As a condition of the Purveyor waiving the requirement for premises isolation by a reduced pressure backflow assembly on the property owner's service pipe:

      i) To authorize the Purveyor to make periodic water use surveys of the premises;
      ii) Within 30 days of the Purveyor's request, to install, test, maintain, and repair in accordance with the Purveyor's cross-connection control standards (copy received with

this application) all in-premises backflow prevention assemblies that provide equivalent protection for the Purveyor's distribution system;

iii) To report to the Purveyor within 30 days of obtaining the results of all tests and repairs to the aforementioned backflow prevention assemblies; and

iv) To report to the Purveyor any change to the plumbing system.

d. Not to make a claim against the Purveyor or its agents or employees for damages and/or loss of production, sales or service, in case of water pressure variations, or the disruption of the water supply for water system repair, routine maintenance, power outages, and other conditions normally expected in the operation of a water system.

e. To pay his water bill within 30 days from the date of billing.

30 days after the Purveyor mails a written notice to the property owner of his breach of this agreement, the Purveyor may terminate water service.

In the event legal action is required and commenced between the parties to this agreement to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.

Applicant's Signature _____Date _____

Attachments received (have customer initial):

Water Rates/Charges _____
Service Connection Information _____
Water Service Policy _____

For Purveyor Use Only

_____/_____/____ Date connection fee received

_____/_____/____ Date Water Use Survey questionnaire received

_____/_____/____ Date risk assessment completed; by _____
Name of CCS

_____/_____/____ Date customer notified of requirement for BPA

_____/_____/____ Date BPA installation approved

_____/_____/____ Date BPA test report accepted

_____/_____/____ Date BPA information entered into database

APPENDIX B

Pre Approved BAT

Backflow Assembly Testers Pre-Approved for Submitting Test Reports to the City of Carnation

BAT testers must document that they appear on the approved BAT list of another nearby water system that has a testing QA/QC program acceptable to our system and on State certified BAT list.

WAC 246-290-490 requires a DOH-certified BAT to test all assemblies (RPBA, RPDA, DCVA, DCDA etc.) that protect the distribution system. Assemblies that protect the public water system must be tested in accordance with DOH-approved field test procedures:

- Upon installation, and annually thereafter;
- After repair, reinstallation, or relocation; and
- After a backflow incident.

Note: the DOH BAT certification is a special certification separate from other waterworks operator certification categories, plumbing licenses, contractor registration, etc. Other licenses, certifications and/or registrations may be required to install backflow prevention assemblies and/or perform maintenance work on assemblies within buildings. **However, only a currently DOH-certified BAT may test the assemblies that protect the public water system from contamination. A list of DOH approved BAT's is available upon request.**

APPENDIX C

Cross-Connection Hazard Survey

Preliminary Cross-Connection Control Hazard Assessment Form
Non-Residential Customers

Name of Customer or Business:

_____

Address:

_____

Phone Number: _____

Description of Business:

_____

Is your business or premises of a type included in the table below (check all that apply)?

Agricultural (farm or dairy)		Metal plating industry	
Beverage bottling plant		Mortuary	
Car wash		Petroleum processing or storage plant	
Chemical plant		Pier or dock	
Commercial laundry or dry-cleaners		Radioactive material processing plant or nuclear reactor	
Having both reclaimed water and potable water provided		Survey access denied or restricted	
Film processing facility		Wastewater lift station	
Food processing plant		Wastewater treatment plant	
Hospital, medical center, nursing home, veterinary, medical, or dental clinic, or blood plasma center		Having an unapproved auxiliary water supply interconnected with the potable water supply	
Having separate irrigation system using purveyor's water and adding chemicals*		*Beauty salon, Tattoo business*	
Laboratory		Other (describe) *[See above]*	

*e.g., parks, playgrounds, golf courses, cemeteries, estates, etc.

Other potential cross-connection concerns:

☐ Irrigation system

☐ Fire sprinkler system, using ☐ not using ☐ chemicals or anti-freeze

☐ Swimming pool

☐Other (describe): _____

Note to Customer: *This form is used for preliminary assessment only. The water purveyor may require a more thorough assessment at a later date.*

This form was completed by (print name): _____ **Date:** _____

Please return completed form by {insert date} and send to: {insert name/address}.

Cross-Connection Control Hazard Survey Report

Non-Residential Customers

Survey date: _____

Customer Information

Premises name: _____Telephone: _____

Address: _____ZIP: _____

Contact person: _____Title: _____

Description of premises: _____

Description of water use: _____

Water Service and Backflow Prevention Assembly (BPA) Size/Type

Service Type	Service Size	Meter Size	BPA Size	BPA Type
Domestic				
Fire				
Irrigation				
Other				

Cross-Connection Control Specialist (CCS) Information

Name: _____ Telephone: _____

Company name: _____

Address: _____ZIP: _____

DOH CCS Certification #: _____ Year certified: _____

Survey Results

Note: The CCS's survey shall include an inspection of the premises isolation assembly to verify that it is installed correctly and is a currently listed DOH-approved assembly.

Item	Location & Description of Cross-connection	Backflow Prevention Provided/Required

Attach additional sheets if needed.

Surveyor's Comments

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Surveyor's Recommendations

I certify that this cross-connection hazard survey accurately reflects the overall risk posed by the customer's plumbing system to the Purveyor's distribution system. Based on the above survey, I certify that:

1. I found the following type(s) of premises isolation backflow preventer(s):

   Air Gap ____ RPBA/RPDA ____ DCVA/DCDA _____ None ____

2. The existing backflow preventer(s) is/are properly installed.

   Yes ____ No ____ N/A ____

3. The existing backflow preventer(s) is/are commensurate with the degree of hazard:.

   Yes ____ No ____ N/A ____

4. Since no backflow preventer was installed for premises isolation, the premises owner should install a premises isolation backflow preventer of the following type:

   Air Gap ____ RPBA/RPDA ____ DCVA/DCDA ____ N/A ____

5. The premises owner should replace the existing premises isolation backflow preventer(s) with the following:

   Air Gap ____ RPBA/RPDA ____ DCVA/DCDA ____ N/A ____

The completed survey report shall be first signed by the CCS conducting the survey, and then counter-signed by the owner of the premises or the owner's authorized agent.

CCS Signature: _____Date: _____

As the Owner of the Premises (or Owner's authorized agent), I certify that I have received a copy of this completed Cross-Connection Control Hazard Survey Report.

Signature: _____**Date**: _____

Note: Customers and regulatory agencies should be aware that the Purveyor's requirement for this cross-connection hazard survey and/or for the installation of a specific backflow prevention assembly on a service pipe ***do not*** constitute an approval of the customer's plumbing system, compliance of the customer's plumbing system with the International Plumbing Code or an assurance of the absence of cross-connections in the customer's plumbing system.

APPENDIX D

Water-Use Survey Report

SAMPLE 1

Water Use Questionnaire
Residential Customers

Customer Account Number (optional)
Customer Name
Address Line 1
Address Line 2

Please indicate whether the special plumbing or activities listed below apply to your premises:

Yes	No	Plumbing or Activity Present on Customer's Premises*
		Underground sprinkler system
		Water treatment system (e.g., water softener)
		Solar heating system
		Residential fire sprinkler system
		Other water supply (whether or not connected to plumbing system)
		Sewage pumping facilities or grey water system
		Boat moorage with water supply
		Hobby farm
		Animal watering troughs
		Swimming pool or spa
		Greenhouse
		Decorative pond
		Photo lab or dark room
		Home-based business. If Yes, list type/describe (e.g., beauty salon, machine shop, etc.): _____ _____ _____

* Based on their knowledge of residential connections served, public water systems may "customize" this list by adding or deleting plumbing categories or activities

Completed by (print name): _____ Date: _____

Resident's Signature: _____

APPENDIX E

Backflow Incident Report

Backflow Incident Report Form

Reporting Agency: _____ Report Date: _____

Reported By: _____ Title: _____

Mail Address: _____ City: _____

State: _____ Zip Code: _____ Telephone: _____

Date of Incident: _____ Time of Occurrence: _____

General Location (Street, etc.): _____

Backflow Originated From:

Name of Premises: _____

Street Address: _____ City: _____

Contact Person: _____ Telephone: _____

Type of Business: _____

Description of Contaminants:
(Attach Chemical Analysis or MSDS if available)

_____

_____

Distribution of Contaminants:

Contained within customer's premises: Yes: _____ No: _____

Number of persons affected: _____

Effect of Contamination:

Illness Reported: _____

Physical irritation reported: _____

Cross-Connection Source of Contaminant (boiler, chemical pump, irrigation system, etc.):

_____

_____

Cause of Backflow (main break, fire flow, etc.):

_____

_____

Corrective Action Taken to Restore Water Quality (main flushing, disinfection, etc.):

_____

_____

Corrective Action Ordered to Eliminate or Protect from Cross Connection (type of backflow preventer, location, etc.)

_____

_____

Previous Cross-Connection Survey of Premises:

Date: _____
By_____

Types of Backflow Preventer Isolating Premises:

RPBA: _____ RPDA: _____ DCVA: _____ DCDA: _____ PVBA: _____ SVBA: _____

AVB: _____ Air Gap: _____ None: _____ Other Type: _____

Date of Latest Test of Assembly: _____

Notification of Washington State Health Department:

Date: _____ Time: _____ Person Notified: _____

Attach sheets with additional information, sketches, and/or media information, and mail to:

PNWS-AWWA CCC Committee
c/o George Bratton
1252 S. Farragut Drive
Coupeville, WA 98239

APPENDIX F

Annual Summary Report Forms

Annual Summary Report Forms

Appendix E contains sample cross-connection control (CCC) Annual Summary Report forms. Per WAC 246-290-490, purveyors are required to complete these forms to report information on the status of a public water system's CCC program and implementation activities. When the Department of Health sends out hard copies or electronic copies of the forms, they are color-coded. Purveyors often refer to the forms by color instead of name. The respective color of each form is noted below.

The three forms are:

1. **Cross-Connection Control Activities Annual Summary Report**

   Purveyors use this form to report (for a calendar year) their CCC implementation activities, such as status of high-hazard premises protection, backflow preventer inventory/testing information, and hazard evaluations. This is the "blue form."

2. **Cross-Connection Control Program Summary Report**

   This form is use to report the type, policies, and provisions of a public water system's CCC written program. This is the "cream form."

3. **Exceptions to High Health Hazard Premises Isolation Requirements**

   Purveyors use this form to document and report exceptions to mandatory premises isolation requirements allowed under WAC 246-290-490(4) (b) (iii). Only purveyors granting exceptions need to complete and submit this form. This is the "green form."

The forms provided are those used for the reporting year indicated on the forms. For copies of forms for later years, or for versions suitable for completion on screen using MS Word, contact the DOH Office of Drinking Water (see Appendix F)

Public Water System Cross-Connection Control Activities
Annual Summary Report for Year 2009

Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information

PWS ID:	PWS Name:	County:
Provide name and Certification Number of CCS who develops and implements your CCC program.		
CCS Name (Last, First & MI): ,		CCS Phone: (___) ___-____
CCS Cert. No.:	BAT Cert. No. (if applicable):	
CCS is (check one): PWS owner or employee ☐ On contract to PWS ☐ Volunteer or other ☐		

Part 2: Status of Cross-Connection Control (CCC) Program

PWS has: A written CCC program 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.)

Please provide information regarding PWS's specific CCC Program Elements. Check one box in each column.

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is Currently:	
		Included in Written Program	Being Implemented or is Completed
1	Legal Authority Established	Y ☐ 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 2009

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). **Estimate if necessary**.

Type of Service Connection	Number
Residential (as defined by PWS)	
All Other (include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers and docks)	
Total Number of Connections	

PWS

If PWS does not serve any high-hazard premises or systems, check here ☐ and go to Part 4.

- Complete all cells. Count only premises PWS serves water to. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 2009			
	Being Served Water by PWS[1]	With Premises Isolation by AG/RP[2]	With Premises Isolation AG/RP Inspected or Tested[3]	Granted Exception from Mandatory Premises Isolation
Agricultural (farms and dairies)				
Beverage bottling plants (including breweries)				
Car washes				
Chemical plants				
Commercial laundries and dry cleaners				
Both reclaimed water and potable water provided				
Film processing facilities				
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies				
Food processing plants (including canneries, slaughter houses, rendering plants)				
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers				
Separate irrigation systems using purveyor's water supply and chemical addition[4]				
Laboratories				
Metal plating industries				
Mortuaries				
Petroleum processing or storage plants				
Piers and docks				
Radioactive material processing plants or nuclear reactors				
Survey access denied or restricted				
Wastewater lift stations and pumping stations				
Wastewater treatment plants				
Unapproved auxiliary water supply interconnected with potable water supply				
Other high-hazard premises (list)[5]				
Totals				

[2] Count only those connections with AG or RP installed for premises isolation. Do not include connections with only in-premises protection, or those with DCVA/DCDAs installed for premises isolation.

[3] Count only those connections ***whose premises isolation preventers*** were tested or inspected during year 2009

[4] For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RP), such as: aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, e.g.: other manufacturing, or other commercial. ***If needed, attach additional sheet giving same information as requested by table.***

Part 4A: Backflow Preventer Inventory and Testing Data During Year 2009

- Complete all cells. Enter zero (0) if there are no backflow preventers in the category.
- **Count only the backflow preventers that the PWS relies upon for protection of the distribution system*. If your records do not distinguish between premises isolation and in-premises protection preventers, enter all data in Premises Isolation section and check the box*.**
- Count AVBs on irrigation systems only. **If you do not track AVBs, check box above the "AVB" column.**
- Count multiple tests or failures for any particular backflow preventers as one test or failure for that backflow preventer.
- Multiple Service or Parallel Connections**:** count each assembly separately.
- Assemblies on Dedicated Fire or Irrigation Lines: count as Premises Isolation Assemblies.

If PWS does not track AVBs check here ☐

Backflow Preventer Category and Testing/ Inspection Information		Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. ***If In-Premises Protection preventers are also included,***									
Rows 1 – 3 pertain ONLY to Premises Isolation preventers in service at beginning of 2009									
1Number	In service at beginning								
2Number	Inspected and/or								
3	Failed Inspection or								
Rows 4 – 6 pertain ONLY to NEW Premises Isolation preventers installed during 20099									
4Number of	New preventers								
5	Inspected and/or								
6	Failed inspection or								
Premises Isolation Total at end of									
Installed for In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.									
Rows 7 – 9 pertain ONLY to In-Premises Protection preventers in service at beginning of 2009									
7Number	In service at beginning								
8Number	Inspected and/or								
9Number	Failed Inspection or								
Rows 10 – 12 pertain ONLY to NEW In-Premises Protection preventers installed during 2009									
10Number	New preventers								
11Number	Inspected and/or								
12Number	Failed inspection or								
In-Premises Protection Total at end of									
Grand Total at end of 2009									

[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).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced preventers those in service at beginning of 2009. Replacement preventers may be of a different type than the original.

[3] Total installed at end of 2009 can't be more than preventers in service at beginning of 2008 plus those installed during 2009. May be less due to changes in preventer type and preventers taken out of service during 2008.

Part 4B: Other Implementation Activities in 2009

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New services connections evaluated for cross-connection hazards to PWS in 2009.	
New services connections requiring backflow protection to protect PWS.[1]	
Existing services connections evaluated for cross-connection hazards to PWS in 2009.	
Existing services connections requiring backflow protection to protect PWS.[1, 2]	
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b) in 2009.[3]	
CCC Corrective enforcement actions taken by PWS during 2009.[4]	

[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 Exception 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, Risk Factors and Indicators during 2009

	Backflow Incidents, Risk Factors and Indicators during 2009	***Number*** (Enter 0 if none)	Check if Data Not Available
Backflow Incidents during 2009			
1	Backflow incidents that contaminated the PWS.[5]		☐
2	Backflow incidents that contaminated the customer's drinking water system ***only***.[5]		☐
Risk Factors for Backflow during 2009			
3	Distribution main breaks per 100 miles of pipe.		☐
4	Low pressure events (<20 psi in PWS distribution system).		☐
5	Water outage events.		☐
Indicators of Possible Backflow during 2009			
6	Total health-related complaints received by PWS.[6]		☐
7	Received during BWA or PN events.[7]		☐
8	Received during low pressure or water outage events.		☐
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).		☐
10	Received during BWA or PN events.[7]		☐
11	Received during low pressure or water outage events.		☐

[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 "wordwrap" from one line to the next. Press <Enter> to continue on new line. Maximum length of each comment is 255 characters, including spaces.

Part No.	Comment

Part 7: Report Completion Information

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Administrator Name (Print):		Title:
Signature:		Date:
Phone: (___) ___-____	E-mail: _____@_____	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
General Manager Name (Print):		Title:
Signature:	Op. Cert. No.:	Date:

Cross-Connection Control Program Summary
For 2009

Part 1: Public Water System (PWS) Identification

PWS ID:	PWS Name:	County:

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 Local Administrative Authority (LAA) on Cross-Connection Issues

Indicate the status of coordination with LAAs in your service area. The LAA is the entity that enforces the International Plumbing Code. ***Check one box in each of last 3 columns for each LAA in your service area***.

LAA No.	**Name of LAA[1]** (e.g., the City or County Building Department)	**PWS currently:**		**If not coordinating, did LAA Decline to Coordinate?**
		Coordinates with LAA	**Has Written Agreement with LAA**	
1		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
2		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 LAAs, attach separate sheet giving the above information.

C. Corrective or Enforcement Actions Available to the Purveyor

Type of Corrective Action	Indicate Whether Available	Most Often Used (Check one)
Denial or discontinuance of water service.	Y ☐ 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 below):	Y ☐ N ☐	☐

D. CCC Program Typical Responsibilities

Typical responsibilities *do not* include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS.	☐	☐
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 ***LAA*** 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: _____)	N ☐ N/A ☐
PWS requires retrofits to ***low***-hazard FPS.	Y ☐ (No. of days allowed: _____)	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.	Date (mm/dd/yyyy):	N/A ☐
Current number of service connections returning used water to distribution system.		

H. Backflow Protection for Unapproved 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 only one 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 ☐

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. site 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 the District has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow protection required (whether or not that type of customer currently exists).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Protection Required
Commercial	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Industrial	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Institutional	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Other (specify): _____	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐
Other (specify): _____	Y ☐ N ☐	Not required ☐ DCVA ☐ RPBA ☐

K. Backflow Protection for Wholesale Customers

Indicate whether the District requires backflow protection at interties with wholesale customers (other PWSs).

Type of Intertie	District has (plans to have) Customers of this Type	Backflow Protection Required (If protection is required, indicate minimum level)
Existing	Y ☐ 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 ☐

Part 3: CCC Program Record-Keeping and Inventory

Indicate the type or name of computer software used by the District to track CCC records.

BMI ☐ BPMS ☐ 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 customized commercial CCC software. Indicate these on line above.

Part 4: Comments and Clarifications

Enter comments or clarifications to any of the information included in this report.

Part No.	Comment

Part 5: CCC Program Summary Completion Information

Enter dates in MM/DD/YYYY format.

I certify that the information provided in this CCC Program Summary is complete and accurate to the best of my knowledge.		
CCC Program Administrator Name (Print):		Title:
Signature:		Date:
Phone: (___) ___-____	E-mail: _____@_____	
I certify that the information provided in this report accurately represents the status and description of this water system's CCC Program.		
General Manager Name (Print):		Title:
Signature:	Op. Cert No:	Date:

Exceptions to High Health Hazard Premises Isolation Requirements
For 2009 Annual Summary Report

Exceptions forms must be completed and submitted to the Department of Health (DOH) with the Annual Summary Report per WAC 246-290-490(4)(b)(iii).

Complete one form for **each** exception that was granted:

- During 2009; or
- Prior to 2009, **if** you didn't submit an Exceptions form to DOH previously (i.e., don't duplicate previously submitted Exception forms).

If your system didn't grant any exceptions in 2009, and you have already submitted forms for exceptions granted prior to 2009, don't complete any Exception forms for 2009.

Part 1: Public Water System (PWS) Information

PWS ID:	PWS Name:	County:

Part 2: Premises Information

Name of Premises	
Service Address	
Premises Type or Category – Refer to Table 9 of WAC 246-290-490(4)(b)	
Additional Information or Description of Premises to help explain why exception is appropriate:	

Part 3: Information Regarding Exception to Premises Isolation

Enter dates in MM/DD/YYYY format.

Date of Hazard Evaluation	
Date Exception Granted	
Expiration Date of Exception (if any)	
Date of Next Hazard Evaluation	

Part 4: Justification for not Requiring Premises Isolation Using AG, RPBA or RPDA

- The reasons for not requiring mandatory premises isolation shown in the table are typical examples. *purveyors are not required to follow or apply any of these reasons.*
- purveyors may provide other reasons consistent with WAC 246-290-490(4)(b)(ii), i.e., no hazard exists for this particular service.

Reason that the Premises *Do Not* Pose a High Health Hazard to PWS	**Check if Applicable**
Medical/Health Services Facility not having laboratory or similar facilities, e.g., Psychiatric or Counseling Office.	☐
Dental Office having independent water supplies for dental work (no interconnection with purveyor's water system).	☐
"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.	☐
Other (please describe):_____	☐
	☐
	☐
	☐

Part 5: Form Completion Information

Enter dates in MM/DD/YYYY format.

I am the Cross-Connection Control Specialist (CCS) who granted this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name (Print)**:**		CCS Cert. No:
Signature:		Date:
Phone: (___) ___-____	E-mail: _____@_____	
I am the Manager* of the PWS and I concur with the granting of this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name (Print)**:**		Title:
Signature :	Op. Cert. No:	Date:

* The person that the CCS reports to or other manager having direct responsibility for and/or oversight of the CCC program. It is not required that this person be in charge of the entire water system.

APPENDIX G

Customer Information Packet

CUSTOMER INFORMATION PACKET

DEAR CUSTOMER:

Under Washington State Law, the City of Carnation has the responsibility to protect the public water supply from possible contamination due to cross-connections. A cross-connection is the connection point of two otherwise separate water systems, one of which is public containing safe drinking water and the other which is private containing water of questionable safe drinking quality, such as steam, gas or chemicals.

Cross-connection control is necessary because of physics. Water always flows towards the path of least resistance or to the point of lowest pressure. It is logical to assume that because water is under pressure, it can only flow in one direction, but this assumption is wrong. Under certain circumstances, such as loss or reduced pressure, water can and will flow backwards.

Imagine what could potentially happen if a water main broke just as your neighbor began to use a water hose to spray insecticide or flush a car radiator. Or the fire district turned on several hydrants to fight a fire just as someone was dispensing carbonated water from a soft drink machine. These contaminants could be siphoned into the public water system.

The City of Carnation cross-connection program consists of inspections to identify actual or potential cross-connections, requiring the installation of needed assemblies to mitigate the hazard, and the testing of installed backflow prevention assembles on an annual basis.

Generally the risk to the public water supply can be assessed as either High Health Hazard or as a Low Health Hazard.

A High Health Hazard is one in which a substance could impair the quality of the potable water supply and create an actual public health hazard through the poisoning or spread of disease by sewage, industrial liquids or waste.

A Low Health Hazard is one in which a substance could cause an impairment of the quality of the potable water supply to the degree that it does not create a hazard to public health, but does adversely and unreasonably affect the aesthetic qualities for domestic use.

The City has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations and for the prevention of contamination of his plumbing system from sources within his/her premises. Any action taken by the City to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation, installation of a DCVA or RPBA on the service line, is solely for the purpose of reducing the risk of contamination of the City's public water system.

Any action taken by the City shall not be construed as guidance on the safety or reliability of the customer's plumbing system. Installation of backflow prevention

assemblies shall be in accordance with the most recently published edition of the Pacific Northwest Section, American Water Works Association Cross-connection Control Manual.

The City will notify each customer at least 30 days before the due date for each required inspection and or testing of any backflow devices by a certified Department of Health Cross-Connection Control Specialist (CCS) and/or a Backflow Assembly Tester (BAT). The City has on hand a list of certified testers.

The inspection or test reports conducted by the CCS and/or BAT are to be received by the City within 15 days following the due date. After this time enforcement actions may be taken.

TYPE OF FACILITY/REQUIRED DEVICE
AUXILIARY WATER SUPPLY
Any water supply on or available to a premise in addition to the City's approved potable water supply. Backflow protection requires an Air Gap or the installation of an approved Reduced Pressure Backflow Assembly downstream of the meter on the customer's property.

WATER RE-USE SYSTEMS
Reclaimed water can be systems that use treated sewage effluent, Stormwater reuse, and Graywater systems from untreated household wastewater that has not come in contact with toilet or food processing waste. All classes of reclaimed water are considered as a high health hazard and NO Direct connections to the City system will be allowed.

FIRE PROTECTION SYSTEMS
High-Hazard
This includes all fomite systems, systems with an auxiliary water supply connected to the fire system and systems with chemical additives. Backflow protection will be by a Reduced Pressure Backflow Assembly located at the service connection.

LOW-HAZARD
Are all other fire systems and require a Double Check Valve Assembly at the service connection.

SEWAGE LIFT/PUMPING STATIONS
All sewer lift and grinder pump stations pose a sever health hazard due to the potential presence of human pathogens. Backflow protection will be with an approve Reduce Pressure Backflow Assembly located at the service connection.

ACCESS RESTRICTED OR DENIED
The City must consider the health hazard to be severe unless it has the knowledge to make an assessment otherwise. Without the health hazard evaluation, backflow prevention is with an approved air gap of a reduced pressure backflow assembly.

CAR WASHES
Most automatic car washes use re-circulating water with chemical additives in heated water. The system is considered high hazard because of these chemicals and

bacteriological contaminants in the water. Backflow protection will be with a reduced pressure backflow assembly.

HOSPITALS, MEDICAL CENTERS, VETERINARY CLINICS, DENTAL CLINICS, MEDICAL CLINICS AND NURSING HOMES
The primary health hazard is the presence of waterborne disease transmitted in the feces, urine, and blood of humans and animals. The secondary health hazard is from the numerous chemicals used in these facilities. Backflow protection will be with an approved reduced pressure backflow assembly.

LABORATORIES
Laboratories are facilities using and handling chemicals and bacteriological materials such as medical, biological, chemical, environmental, and material testing laboratories including government agencies and schools.

All laboratories should be considered a high health hazard due to storage, use and/or processing of chemicals and soils, liquid's or products containing bacteria. An approved reduced pressure backflow assembly will be utilized for backflow prevention.

LAWN IRRIGATION SYSTEMS
Irrigation systems can be either assessed as either a low or high health hazard. High health hazard systems contain pumps or injectors for addition of chemicals. An approve air gap or reduced pressure backflow assembly is needed on these systems.

A low health hazard is assessed to all other irrigation systems. An approved double check valve assembly will provide backflow protection.

RETAIL CENTERS
Due to the high probability of changes in water use by tenants, retail centers are considered a high health hazard. An approved reduced pressure backflow assembly shall be installed to protect against backflow.

RECREATIONAL VEHICLE PARKS
Recreational vehicle parks usually contain a transient population that significantly increases the probability of cross-connections due to plumbing that has not been approved. As such a high health hazard is assessed and protection will be with a reduced pressure backflow assembly.

HEAT EXCHANGERS/SOLAR HOT WATER SYSTEMS
Heat exchangers physically separate one medium from another and either heat or cool a medium by transferring energy between the two mediums across an enlarged surface. Backflow conditions exist when a leak develops in the piping or tank walls separating potable from non-potable water. Backflow protection will utilize an approved reduce pressure backflow assembly.

BUILDINGS OVER 30" IN HEIGHT
Whenever the hydraulic gradient (water pressure) falls below the elevation of a plumbing fixture, backsiphonage conditions occur. This increased probability of backflow conditions elevates the risk for structures over thirty feet in height. Backflow protection will be with an approved reduced pressure backflow assembly.

TANKER TRUCKS
Tanker trucks are assessed a high health hazard, the same as an unapproved auxiliary source. Chemical and bacteriological contaminants could be present in any tank. Backflow protection will be with an approved air gap or an approved reduced pressure backflow assembly. Additionally tankers may only connect to the District water supply after obtaining a permit and only at specific locations.

SEWER FLUSHING
When sewer or storm lines are flushed, an approved air gap separation will be maintained to protect the potable water supply. If at all possible tanker trucks should be utilized to flush lines.

OTHER
In cases where there has been a history of repeating the same or similar cross-connections or backflows, even though these conditions have been removed or disconnected, a high health hazard is assessed. Backflow prevention will be with an approved reduced pressure backflow assembly.

In cases where intricate plumbing makes it impractical to ascertain whether or not a cross-connection exists, or where any fixture is subject to being submerged, a high health hazard is assessed and protection will be with a reduced pressure backflow assembly.

INSTALLATION STANDARDS
All backflow preventers relied upon by the City to protect the public water system shall meet the definition of "approved backflow preventer" as contained in WAC 246-290-010. The City will maintain a current list of assemblies approved for installation in Washington State.

Installation standards contained in the most recently published edition of the Pacific Northwest Section, American Water Works Association Cross-Connection Manual or the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research Manual shall be followed unless the manufacturer's requirements are more stringent.

Special considerations to note for each type of assembly are:

Air Gap (AG)
- Separations are measured vertically and must be at least twice the inside diameter of the inlet pipe, but never less than one-inch.
- An obstruction around or near an AG may restrict flow of air into the outlet pipe and nullify the effectiveness in preventing backsiphonage. When affected by sidewalls the vertical separation must be at least three (3) times that of the inside pipe diameter.

Reduced Pressure Backflow Assembly (RPBA)
- The RPBA must be installed above ground or maximum flood level whichever is greater.

- Because of the inherent design of a RPBA, fluctuating water supply pressure may cause nuisance dripping and potential fouling on the assembly. If located inside a building drainage should be provided for these discharges.

Double Check Valve Assembly (DCVA)

- Unless evaluated and approved otherwise a DCVA is only to be installed in the horizontal position.
- If installed in a pipe or meter box, adequate room must be provided for testing.
- Plugs must be installed in the test cocks to reduce the risk of ground water being siphoned through a leaking test cock.
- Sufficient drainage must be provided to prevent the assembly from becoming submerged.
- The DCVA must be protected from freezing, other severe weather and physical damage.

APPENDIX H

Letters

Letter (#1) Requesting Customer to Complete Water Use Questionnaire

Date

Customer Account Number
Customer
Customer Address Line 1
Customer Address Line 2

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs help protect public health by preventing contamination of the drinking water as it is delivered to water system customers. The attached brochure explains what a cross-connection is, describes typical household cross-connections and what you can do to help protect your drinking water.

As part of our efforts to keep your drinking water safe, we are conducting a cross-connection control hazard survey of residential customers served by our system. The purpose of the survey is to help us determine if any of our residential customers have special plumbing or activities on their premises that could increase the risk of contamination to our water system.

For most residential customers, the cross-connection control hazard posed to the public water system is minimal. This is because your household plumbing was installed in compliance with the Uniform Plumbing Code. The Uniform Plumbing Code generally provides adequate protection of your potable water piping and our public water distribution system from cross-connections. However, a few customers with special plumbing or activities on their premises may pose an increased health risk to other customers served by our system. These customers may need to have a backflow preventer installed on their service lines or provide alternate protection to prevent contamination of the public water system.

Please complete the attached questionnaire by checking the applicable boxes on the table; and return the completed, signed questionnaire by {insert date} to the address shown on the letterhead.

Thanks in advance for filling out the questionnaire. We appreciate your cooperation in helping us to protect the drinking water we deliver to our customers. If you have any questions about the survey or how to fill out the questionnaire, please contact me at {**insert phone number**}. We will review your questionnaire and determine whether we need to contact your for further information.

Sincerely,

Name
CCC Program Manager

Enclosures: CCC Brochure
Water Use Questionnaire

Request to Install Backflow Prevention Assembly (Letter#2)

Date

Customer Account Number
Customer Name
Customer Address Line 1
Customer Address Line 2

Dear _____ Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs protect public health by preventing contamination of the drinking water as it is delivered to people served by the water system. **The purpose of this letter is to inform you of a requirement to install a backflow assembly.**

Our water system's policy considers each of our customer's plumbing systems, starting from the termination of the service pipe downstream of the water meter, to pose a potential cross-connection hazard to the public water system. Our policy requires a backflow prevention assembly commensurate with the degree of hazard to be installed on the service line. The purpose of this backflow prevention assembly is to isolate your plumbing system from the water distribution system. We've attached a copy of Resolution {**insert number**} describing our cross-connection control policy.

We have received the cross-connection control survey report submitted by your Cross-Connection Control Specialist (CCS). The survey assessed the overall public health hazard posed by your plumbing system (and water use) to the public water system. We agree with the assessment made by the CCS. **Based on the assessment, a Department of Health-approved {insert type of assembly} is required to be installed on your service line (at a location downstream of the water meter).**

Please make arrangements for the assembly to be installed by {**insert date**} or when your plumbing system is modified, whichever comes sooner. We realize that this expense was not anticipated, so if you are unable to comply with this deadline, please contact us to discuss an alternative date. We've enclosed a copy of our standard installation drawings for this type of assembly. Your CCS should oversee the installation of the assembly to ensure compliance with these standards.

We appreciate your cooperation in this matter. If you have any questions, please contact me at {**insert phone number**}.

Sincerely,

Name
CCC Program Manager

cc: {City/County Plumbing Inspector}

Enclosures: Standard Installation Drawings

Request To Submit Test of Backflow Prevention Assembly (Letter #3)

Date

Customer Account Number
Customer Name
Customer Address Line 1
Customer Address Line 2

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies have been installed on your water service(s) and/or within your plumbing system to protect our water distribution system. Annual testing is required to ensure that the backflow prevention assemblies properly function.

The purpose of this letter is to request that you now arrange for the annual testing of the reduced pressure principle (RPBA), double check valve (DCVA), and/or pressure vacuum breaker (PVBA or SVBA) assembly/assemblies described on the attached list. A Washington State Department of Health certified backflow assembly tester (BAT) must conduct the testing. **Testing results should be sent to the address above and submitted by {insert date}.**

For your convenience, we are enclosing a list of backflow assembly testers pre-approved to test assemblies that protect our water system. Test report forms are also enclosed. The test report forms need to be properly completed by the BAT, signed by the customer/assembly owner, and returned to us.

Note: the Uniform Plumbing Code in effect in Washington also requires annual assembly testing. In addition to the testing required for the assemblies that protect the public water system (i.e., identified on the attached list), you may wish to have all of the remaining assemblies within your premises tested at this time.

If you have any questions, please feel free to contact me at {**insert phone number**}.

Sincerely,

Name
CCC Program Manager

Enclosures: Assembly List
Pre-Approved BAT List
Assembly Test Report Forms

Second Notice to Test Backflow Prevention Assembly (Letter#4)

Date

Customer Account Number
Customer Name
Customer Address Line 1
Customer Address Line 2

Subject: Testing of Backflow Prevention Assembly - Second Notice
First Notice Date: _____ Second Notice Date: _____

Dear Water System Customer:

Washington State drinking water regulations, WAC 246-290-490, require public water systems to implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies were installed on your service or within your premises to protect our water distribution system from contamination. The WAC requires these assemblies to be tested annually to verify that they are in good working condition.

The assembly/assemblies identified in our letter of {**insert date**} (copy attached) must be tested by a Department of Health certified Backflow Assembly Tester (BAT) upon installation and annually thereafter. This requirement is a condition of our system continuing to supply potable water to your premises. **According to our records, as of today's date, you have not submitted the requested Assembly Test Report(s).** If you believe this is in error, please contact me as soon as possible at the number below.

If you have not submitted the Assembly Test Reports as requested, please:

- Immediately employ a DOH-certified BAT to test the listed assembly/assemblies; and
- Submit a signed copy of the completed Assembly Test Report(s) to me at the address above **within 15 days of the date of this letter**.

Your cooperation in this matter is essential for protecting your drinking water supply and the public water supply from contamination. Failure to comply with the annual assembly testing requirement will trigger an enforcement action by our system. Enforcement could include a shut-off of your water service.

If you have any questions, please contact me at {**insert phone number**}.

Sincerely,

Name
CCC Program Manager

Enclosure: First Test Notice Letter

Appendix Q

Water Shortage Emergency Plan

Chapter 13.120 - WATER SHORTAGE EMERGENCY PLAN

Sections:

13.120.010 - Purpose.

The city declares it to be in the public interest to promote conservation of the city's water supply in order to protect the health, welfare, and safety of water users. To accomplish this declared purpose, the city reserves the right to exercise its police powers through emergency measures as set forth in this chapter.

(Ord. 743 § 4 (Exh. A) (part), 2008)

13.120.020 - Authority.

A. The city council, when necessary for the protection of the public health, safety, and welfare, shall have the authority to declare various stages of water emergencies and to implement the water conservation measures set forth in this chapter. The city council shall also have authority to determine whether the various stages of water emergencies and water conservation measures apply to the entire city utility service area or to such portions as may be particularly affected.

B. In the event of an emergency when time is of the essence, the city manager may declare a water emergency. The city manager must seek city council approval of such a declaration at the next regularly scheduled council meeting.

(Ord. 743 § 4 (Exh. A) (part), 2008)

13.120.030 - Policies and procedures.

The following policies and procedures shall apply during the various stages of water emergencies as set forth in this section:

A. Stage I—Anticipated Water Shortage—Internal Preparations. The city may declare a Stage I water emergency when a water shortage is anticipated but not immediate. The public works department shall conduct public education efforts regarding the benefits and necessity of conservation by the public.

B. Stage II—Serious Water Shortage—Voluntary Conservation. The city may declare a Stage II water emergency when a water shortage exists such that immediate voluntary reductions in consumption are necessary. The public works department shall conduct an intensified public information campaign and shall coordinate the campaign to encourage voluntary water conservation through news releases and other methods of providing information about conservation methods.

C. Stage III—Critical Water Shortage—Limited Outdoor Restrictions. The city may declare a Stage III water emergency when a water shortage exists such that water supplies are critically impacted and water demand must be reduced. The public works director is authorized to establish certain specified days or hours for irrigating, sprinkling or watering lawns and gardens, and may prohibit or regulate other nonessential uses of water within the water system during such times as there

is an actual or impending water shortage, extreme pressure loss in the distribution system, or for any other reasonable cause. The following nonessential uses of water may be prohibited on all properties connected to the city's water system, whether inside or outside of the city:

1. Washing sidewalks, walkways, driveways, parking lots, patios, and other exterior paved areas by direct hosing and pressure washing, except as may be necessary to prevent or eliminate materials dangerous to the public health and safety.
2. Escape of water through breaks or leaks within the customer's plumbing or private distribution system for any period of time beyond which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the customer discovers a leak or break, or receives notice from the city of such leak or break, whichever occurs first, is a reasonable time in which to correct the same.
3. Noncommercial washing of privately owned motor vehicles, trailers, and boats, except from a bucket or hose using a shutoff nozzle for quick rinses.
4. Lawn sprinkling and irrigation which allows water to run off or overspray the lawn area. Every customer is deemed to have knowledge of and control over his or her lawn sprinkling and irrigation at all times.
5. Sprinkling and irrigation of lawns, ground cover, or other plants, between the hours of nine a.m. and six p.m. or on any day not authorized by the established rotation schedule.
6. Such other uses as the public works director deems necessary.

D. Stage IV—Emergency Water Shortage—Mandatory Outdoor Restrictions and Indoor Conservation. The city may declare a Stage IV water emergency when a water shortage exists such that maximum flow reduction is immediately required, water available to the city is insufficient to permit any irrigation, watering, or sprinkling, and all available water is needed solely for human consumption, sanitation, and fire protection. The city may prohibit all nonessential uses of water, including but not limited to all vehicle washing, all lawn watering, and all of the uses that may be prohibited for a Stage III water emergency. The public works department shall disseminate information using every available means to encourage customers to reduce indoor water usage to the maximum extent possible.

E. Stage V—Regional Disaster—Water Rationing. The city may declare a Stage V regional disaster water emergency when a water shortage exists such that water rationing must be implemented and emergency water distribution may be necessary for customers without water. The public works director is authorized to restrict water use by rationing the amount of water used by residential users to a certain number of gallons per day per person residing within the dwelling unit, by rationing the amount of water used by nonresidential users based on a percentage of their historical usage as calculated by the city, and by any other type of rationing as the public works director deems necessary and appropriate in the circumstances.

F. Implementation Requirements. Prior to the implementation and enforcement of any of the above stages, the city shall take reasonable efforts to have information disseminated to affected customers regarding the rationing plan, which shall include, at a minimum, publication in the official newspaper of the city at least once, information of the declaration of the applicable stage, a description of the limitations and restrictions that would apply, and identification of the effective date of the declared stage and limitations and restrictions. Notwithstanding the publication requirements set forth herein above, if it is determined by the public works director that exigent circumstances exist that necessitate immediate implementation and enforcement of

any particular stages of water emergency, notice to affected customers may be provided by personal service of the notice on said customers, or by posting notices at the customers' residences (if the customers' residences are the affected sites), or by posting notices at the locations where the customers' utility services are received (if the affected sites are not their residences).

G. Term of Stage and Scope. The city council is also authorized to determine the geographic area to which the declared stage shall apply, and to determine the duration for which the declared stage and its limitations and restrictions shall be in effect.

(Ord. 743 § 4 (Exh. A) (part), 2008)

13.120.040 - Enforcement.

The public works director and/or police chief shall have the authority to enforce the provisions of this chapter.

(Ord. 743 § 4 (Exh. A) (part), 2008)

13.120.050 - Variances.

The public works director may grant temporary variances for the prospective use of water otherwise prohibited by this chapter. Such temporary variances shall be in writing and shall be based on a determination by the director that, due to unusual circumstances, application of this chapter would cause an extraordinary hardship adversely affecting the health, sanitation, or fire protection of the applicant or the public. The director's determination shall be final.

(Ord. 743 § 4 (Exh. A) (part), 2008)

13.120.060 - Penalties.

Violations of this chapter shall be punishable as follows:

A. The first violation of any provision of this chapter shall be a fine of seventy-five dollars.

B. For any second violation of any provision of this chapter the fine shall be one hundred fifty dollars.

C. For any subsequent violation of any provision of this chapter the penalty shall be as proscribed in Chapter 13.96 CMC.

(Ord. 743 § 4 (Exh. A) (part), 2008)