City of Bellingham
Water System Plan

September 2009

This document has been prepared under the Direction of a registered professional engineer.

P.O. Box 91500
BELLEVUE, WA 98004
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<td>hydraulic gradeline</td>
</tr>
<tr>
<td>hp</td>
<td>horsepower</td>
</tr>
<tr>
<td>HVAC</td>
<td>heating, ventilation, and air conditioning</td>
</tr>
<tr>
<td>ISDC</td>
<td>Irrigation System Development Charge</td>
</tr>
<tr>
<td>IWS</td>
<td>Institute for Watershed Studies</td>
</tr>
<tr>
<td>LID</td>
<td>local improvement district</td>
</tr>
<tr>
<td>LWMC</td>
<td>Lake Whatcom Management Committee</td>
</tr>
<tr>
<td>LWMP</td>
<td>Lake Whatcom Management Program</td>
</tr>
<tr>
<td>LWW&amp;SD</td>
<td>Lake Whatcom Water and Sewer District</td>
</tr>
<tr>
<td>MDD</td>
<td>maximum day demand</td>
</tr>
<tr>
<td>MG</td>
<td>million gallons</td>
</tr>
<tr>
<td>mgd</td>
<td>gallons per day</td>
</tr>
<tr>
<td>MSDS</td>
<td>material safety data sheet</td>
</tr>
<tr>
<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
</tr>
<tr>
<td>MTU</td>
<td>master telemetry unit</td>
</tr>
<tr>
<td>OS</td>
<td>operational storage</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>operations and maintenance</td>
</tr>
<tr>
<td>PHD</td>
<td>peak hour demand</td>
</tr>
<tr>
<td>PL</td>
<td>pipeline</td>
</tr>
<tr>
<td>PLC</td>
<td>programmable logic controller</td>
</tr>
<tr>
<td>PRV</td>
<td>pressure-reducing valve</td>
</tr>
<tr>
<td>PS</td>
<td>pump station</td>
</tr>
<tr>
<td>psi</td>
<td>pounds per square inch</td>
</tr>
<tr>
<td>PWC</td>
<td>Partnership for Water Conservation</td>
</tr>
<tr>
<td>PWTF</td>
<td>Public Works Trust Fund</td>
</tr>
<tr>
<td>RCW</td>
<td><em>Revised Code of Washington</em></td>
</tr>
<tr>
<td>SB</td>
<td>standby storage</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>SCADA</td>
<td>supervisory control and data acquisition</td>
</tr>
<tr>
<td>SDC</td>
<td>system development charge</td>
</tr>
<tr>
<td>SDWA</td>
<td>Safe Drinking Water Act</td>
</tr>
<tr>
<td>SEPA</td>
<td>State Environmental Policy Act</td>
</tr>
<tr>
<td>SFR</td>
<td>single-family residential</td>
</tr>
<tr>
<td>ST</td>
<td>storage</td>
</tr>
<tr>
<td>SVCA</td>
<td>Sudden Valley Community Association</td>
</tr>
<tr>
<td>TMDL</td>
<td>total maximum daily load</td>
</tr>
<tr>
<td>TR</td>
<td>treatment</td>
</tr>
<tr>
<td>UGA</td>
<td>urban growth area</td>
</tr>
<tr>
<td>ULID</td>
<td>utility local improvement district</td>
</tr>
<tr>
<td>USGS</td>
<td>United States Geologic Survey</td>
</tr>
<tr>
<td>VMP</td>
<td>voluntary metering program</td>
</tr>
<tr>
<td>WAC</td>
<td><em>Washington Administrative Code</em></td>
</tr>
<tr>
<td>WADOH</td>
<td>Washington State Department of Health</td>
</tr>
<tr>
<td>WCC</td>
<td>Whatcom County Code</td>
</tr>
<tr>
<td>WD 2</td>
<td>Water District 2</td>
</tr>
<tr>
<td>WD 7</td>
<td>Water District 7</td>
</tr>
<tr>
<td>WFI</td>
<td>water facilities inventory</td>
</tr>
<tr>
<td>WRIA</td>
<td>water resource inventory area</td>
</tr>
<tr>
<td>WSDM</td>
<td>Water System Design Manual</td>
</tr>
<tr>
<td>WSU</td>
<td>Washington State University</td>
</tr>
<tr>
<td>WTP</td>
<td>Water Treatment Plant</td>
</tr>
<tr>
<td>WUE</td>
<td>Water Use Efficiency</td>
</tr>
</tbody>
</table>
Executive Summary

Description of Water System

The City of Bellingham (City) owns and manages its water system for municipal water supply purposes that includes a broad range of water uses including residential, commercial, industrial, and government uses. The Washington State Department of Health (WADOH) water system identification number for the City’s municipal system is 05600.

The City manages its water system through its Public Works Department. Daily maintenance and operations are executed by the Operations Division, which is comprised primarily of operators, field crew, and laboratory staff. Water system planning, design, and other non-routine management of the water system are addressed by engineering staff within the Engineering Division.

Basic Planning Data and Water Demand Forecasting

City of Bellingham historical population growth was used for developing projected growth in water use (demand). Estimated future population and demand for the 6-year (2014) and 20-year (2028) planning horizons were based on a compound annual growth rate of 1.63 percent and are shown in Table ES-1. Demand is presented in terms of annual average daily demand (ADD), maximum day demand (MDD), and peak hour demand (PHD).

The City’s current and past water use is characterized by water consumed, as measured by billing records, and water supplied to the system, as measured by the master meter locations monitored by the City. A portion of residential customers are not metered and are billed based on a flat rate. Bellingham began a voluntary metering program in 2005 to encourage and reward conservation. The City will begin mandatory metering, and will be fully metered by January 2017.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>ADD (mgd)</th>
<th>MDD (mgd)</th>
<th>PHD (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>78,821</td>
<td>11.5</td>
<td>22.0</td>
<td>33.0</td>
</tr>
<tr>
<td>2014</td>
<td>91,897</td>
<td>13.5</td>
<td>25.9</td>
<td>38.8</td>
</tr>
<tr>
<td>2028</td>
<td>122,672</td>
<td>18.3</td>
<td>35.1</td>
<td>52.7</td>
</tr>
</tbody>
</table>
System Analysis

Typically, the City of Bellingham’s source water (Lake Whatcom and the Middle Fork of the Nooksack River) is high quality yielding high quality treated water. The City’s filtration system is able to adequately treat their water as indicated by zero water quality violations between 2002 and 2007. The City provides treatment through direct filtration at the Bellingham Water Treatment Plant. The City’s system has several pump stations and 13 reservoirs. The City’s distribution system is mainly comprised of a single-main configuration where a typically-sized main of 6 to 12 inches in diameter is installed on one side of the street and service lines extend under the street to service connections on the other side of the street.

The City’s water system was evaluated with respect to requirements for distribution and source water quality, current and forthcoming treatment regulations, distribution system storage, system control, and distribution system piping for fire protection. The results of the evaluation revealed that the City will need to implement improvements to meet requirements for treatment, distribution system storage, and fire protection and minimum service pressure requirements in the distribution system piping (see Table ES-2 for recommended improvements).

Conservation Program, Water Rights Analysis, System Reliability, and Interties

In addition to updating its on-going Conservation Program, which complies with guidelines established by WADOH and the recently-enacted Municipal Water Law, the City of Bellingham’s water rights, system reliability, and interties were evaluated and documented. The results of this evaluation show that the City’s water rights are adequate to meet current and projected demand, that the City’s water system is sufficiently reliable, and that its interties are appropriately documented.

Conservation Program

The City’s conservation program objective is to maintain current City-wide per capita daily consumption and to keep the City-wide water demand equal to or below City population growth rate. All WADOH-required programs for medium-sized systems have been implemented and many recommended programs are also currently in place.

Water Rights

The City has multiple rights for its system to use water from the Middle Fork of the Nooksack River and from Lake Whatcom that support the City’s municipal drinking water supply needs. Comparing the City’s ADD and the maximum annual volume allowed per the water right demonstrates that the City has enough annual water right quantity to meet current and projected future needs.
### TABLE ES-2
Summary of Proposed City of Bellingham Water System Improvements

<table>
<thead>
<tr>
<th>System Type</th>
<th>Improvement</th>
<th>ID Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>Construct 1.35 million gallons (MG) of storage in the Upper Yew pressure zone at an hydraulic grade line (HGL) of 870 feet to provide storage for the combined Upper Yew and Governor Road pressure zones</td>
<td>ST-1</td>
</tr>
<tr>
<td></td>
<td>Construct 1.9 MG of storage in the 350 Cordata pressure zone at an HGL of 370 feet</td>
<td>ST-2</td>
</tr>
<tr>
<td></td>
<td>Construct 2.5 MG of storage in the 457 South pressure zone at the existing Padden reservoir site</td>
<td>ST-3</td>
</tr>
<tr>
<td></td>
<td>Construct 1.5 MG of storage for the 730 Alabama Hill pressure zone</td>
<td>ST-4</td>
</tr>
<tr>
<td></td>
<td>Construct 2.2 MG of storage near the existing Consolidation storage reservoir in conjunction with the Consolidation pump station upgrade</td>
<td>ST-5</td>
</tr>
<tr>
<td>Source Treatment</td>
<td>Filtration Rate Increase from 6.0 to 6.5 gallons per minute (gpm) per square foot</td>
<td>TR-1</td>
</tr>
<tr>
<td></td>
<td>Filter Addition</td>
<td>TR-2</td>
</tr>
<tr>
<td>Pump Station</td>
<td>A new 40th Street pump station with a capacity of 740 gpm is recommended to serve the new Upper Yew storage reservoir</td>
<td>PS-1</td>
</tr>
<tr>
<td></td>
<td>A new Kearney Road pump station with a capacity of 2,000 gpm is recommended to serve the proposed King Mountain reservoir</td>
<td>PS-2</td>
</tr>
<tr>
<td></td>
<td>An upgrade to 1,250 gpm is recommended to the existing Consolidation pump station</td>
<td>PS-3</td>
</tr>
<tr>
<td></td>
<td>An upgrade to 1,000 gpm is recommended to the existing Reveille pump station</td>
<td>PS-4</td>
</tr>
<tr>
<td></td>
<td>A new 950 pressure zone pump station (350 gpm) is recommended to serve customers that are located above the elevation of the planned Upper Yew 870 storage reservoir</td>
<td>PS-5</td>
</tr>
<tr>
<td></td>
<td>A replacement of the James Street pump station is recommended to meet fire flow and projected demands for the 20-year planning period (upgrade is 1,000 gpm)</td>
<td>PS-6</td>
</tr>
<tr>
<td>Pipeline</td>
<td>Construct a 12-inch pipeline from the 40th Street pump station to the new Upper Yew 870 reservoir</td>
<td>PL-1</td>
</tr>
<tr>
<td></td>
<td>Construct a 16-inch pipeline from the new Upper Yew 870 reservoir to Yew Street</td>
<td>PL-2</td>
</tr>
<tr>
<td></td>
<td>Construct a 16-inch pipeline from Kearney Road pump station to the King Mountain reservoir</td>
<td>PL-3</td>
</tr>
<tr>
<td></td>
<td>Construct a new 8-inch pipeline from the new Upper Yew 950 pump station to serve the rezoned area of the Upper Yew 950 pressure zone</td>
<td>PL-4</td>
</tr>
<tr>
<td></td>
<td>Replace the existing 8-inch pipeline in Yew Street with a new 16-inch pipeline to provide additional pipeline capacity required to meet future demands in the area and to correspond with the upgrade of the Consolidation and Reveille pump stations</td>
<td>PL-5</td>
</tr>
</tbody>
</table>

### System Reliability
The City has taken several actions to reduce the risk of water shortages and degraded water quality and to plan for activities which can be taken when emergency events occur that may...
cause such issues. System reliability with respect to quantity can be achieved by providing
long-term storage of potable water or by development of reliable sources of supply. The
City’s water sources have been able to meet required capacity throughout the City’s history.

However, the City is starting to have difficulties with taste and odor problems in the
summer related to algal growth in Lake Whatcom in part caused by stormwater runoff and
excess phosphorous. The City is instigating a rigorous source water protection plan that
includes a significant public education component for residents within the Lake Whatcom
watershed.

Supply, distribution, pumping, and storage facilities are adequate to reliably provide a
sufficient quantity of water at sufficient pressure to meet domestic, commercial, industrial,
and fire suppression water demands. To maximize water system reliability, the City is
committed to upgrading, replacing, and maintaining its facilities as necessary, within
reasonable budget constraints.

**Interties**

The City has supply interties with eight small neighboring systems and does not have
interties with water systems that supply water to the City. Furthermore, there are no known
opportunities to develop interties as a means of developing an additional supply for the
City.

**Source Water Protection**

The City of Bellingham’s watershed protection efforts have focused on the Lake Whatcom
watershed because it lies partially within the City limits and is more vulnerable than the
Middle Fork of the Nooksack River watershed. The City, in partnership with Whatcom
County and Lake Whatcom Water and Sewer District jointly administer the Lake Whatcom
Management Program. Lake Whatcom has been monitored for many years, generally
beginning with regularity in the early 1960s although limited data prior to that period can
be found in some early reports and studies.

In addition to monitoring, the City uses various techniques to control the quality of water in
the Lake Whatcom watershed including the following: the Lake Whatcom Management
Committee whose goal is to promote the long-term protection, preservation, and
enhancement of Lake Whatcom water quality; the City’s Property Acquisition Program
protects the drinking water source, which includes the conservation and management of the
acquired land; land use restrictions and alterations; regulation of Agriculture, Timber
Harvesting, and Construction Practices; source control; and, public education.

**Operation and Maintenance Program**

The City of Bellingham manages its water system and wastewater collection system in a
cooperative manner within the same management unit, the Public Works Department. Daily
maintenance and operations are executed by the Operations Division. The City’s on-going
Operation and Maintenance Program is documented in this Water System Plan. The
Program includes system management, operator certification, system control, water quality monitoring, emergency response, safety, cross-connection control, response to customer complaints, recordkeeping and reporting, and improvements. No improvements to Bellingham’s Water System operation and maintenance program are proposed.

Design and Construction Standards

Capital improvements to the water system shall be designed in accordance with WADOH and Bellingham performance, design, and construction standards. Major facility improvement plans and designs are required to be submitted to both the City and WADOH for their review and approvals in accordance with Washington Administrative Code (WAC) 246-290. Construction of improvements to Bellingham’s water system must be certified with respect to compliance with the City’s design and construction standards, WADOH requirements, and the design plans and specifications submitted to the City for review by the party undertaking the improvement. Certification of such compliance to WADOH shall be effected by completion of a Construction Report for Public Water System Projects (a WADOH form), per WAC 246-290-040.

Improvement Program

The City’s Improvement Program summarizes the improvements planned over the course of the 6- and 20-year planning horizon. As described above, the key improvements developed for the Program address treatment, distribution system storage, and distribution system piping, and are based on the analyses described in Section 3. Assuming a four percent annual escalation factor, the Capital Improvement Program (CIP) is projected to cost about $46.7 million over the course of the next 6 years.

Financial Program

The City’s financial capacity to operate, maintain, and improve its water system was evaluated over the 6-year planning horizon, as required by WADOH. This rate address improvements planned during the 6-year planning horizon but do not address the more-costly treatment improvements required beyond the 6-year horizon. The City is currently undertaking a cost of service analysis to evaluate the appropriate distribution of costs to the various customer classes. To meet future expenses for improvement projects, it has several options to raise additional funds, including the following:

♦ Increase water rates
♦ State or federal loans or grants
♦ The formation of local improvement districts
♦ Issue revenue bonds
Description of Water System

This section presents basic and background information on the City of Bellingham’s water system. This information provides the context and foundation for development of this Water System Plan.

1.1 Ownership and Management

The City of Bellingham (City) owns and manages its water system for municipal water supply purposes that includes a broad range of water uses including residential, commercial, industrial, and government uses. The Washington State Department of Health (WADOH) water system identification number for the City’s municipal system is 05600.

The City manages its water system through its Public Works Department. Daily maintenance and operations are executed by the Operations Division, which is comprised primarily of operators, field crew, and laboratory staff. Water system planning, design, and other non-routine management of the water system are addressed by engineering staff within the Engineering Division. A copy of the City’s Water Facilities Inventory (WFI), a document filed with WADOH that identifies major facilities and water rights, is presented in Appendix A. Also included in Appendix A are a copy of City of Bellingham Resolution 2009-25 adopting the Water System Plan and a copy of the letter documenting approval of the Water System Plan by WADOH.

1.2 System Background

Development of Bellingham’s current water system evolved in a pattern similar to that of the overall City; that is, through initial creation of a number of pieces that, over time, merged together and expanded. What is now Bellingham began as a series of four towns located around Bellingham Bay. These towns were (from north to south along the Bay) Whatcom (1852), Sehome (1854), Bellingham (1853), and Fairhaven (1853). In 1890, Sehome re-incorporated as the Town of New Whatcom and then almost immediately (in 1890 also) consolidated with the Town of Whatcom as the Town of New Whatcom. In that same year, the Towns of Bellingham and Fairhaven incorporated as Fairhaven. By the end of 1903 (December 28th) what had been four towns, were formally consolidated into one town – Bellingham. Thousands of people now lived on the bay where only a handful had lived 5 years before. The 1890 census recorded 8,135 residents within the present City. Rapid growth occurred from 1900 to 1910 and by 1930, the population had reached 30,823.

1.3 History of Water System

The Bellingham water system began in 1895 when the Bellingham Bay Waterworks Company was granted a franchise by the Town of Whatcom. The source of water for this system was Lake Whatcom. The water facilities were purchased by New Whatcom (formerly the Towns of Sehome and Whatcom) in 1892.
The southern portion of what is now Bellingham (formerly Fairhaven) was served by a separate, privately owned water system until 1935. The source of water for this system was Lake Padden. By 1960, a dam had been constructed on the Middle Fork Nooksack River with a diversion by tunnel and pipeline to Lake Whatcom that served the entire City of Bellingham. Bellingham’s Water Filtration Plant near Lake Whatcom began operation in November 1968 with six mixed media gravity filters.

1.4 Geography

The City of Bellingham lies in the southwestern portion of Whatcom County. Bellingham rings the shore of Bellingham Bay which is protected by Lummi Island, Portage Island, and the Lummi Peninsula, and opens into the Strait of Georgia. It lies west of Mount Baker and Lake Whatcom and north of the Chuckanut Mountains and Skagit Valley.

Whatcom Creek is the outlet of Lake Whatcom flows westerly through the middle of the City into Bellingham Bay. Two other significant streams cut across the City. In the southern part of Bellingham, Padden Creek outlets from Lake Padden and flows northwesterly through town to south Bellingham Bay. Near the City’s northern limits, Squalicum Creek flows southwesterly through town and discharges into Bellingham Bay.

Unincorporated Whatcom County bounds Bellingham on the north, east, and south. Total area within the current City limits and the outer harbor line of Bellingham Bay is 27.8 square miles. The total land surface area inside current City limits (excluding Lake Whatcom, Lake Padden, and Bellingham Bay) is about 25.5 square miles. The City’s Urban Growth Area (UGA) includes an additional area of 11.5 square miles.

Bellingham’s water service area slopes from the hills in the east to Bellingham Bay in the west; several rolling hills between require many pressure zones to provide adequate service. It includes all of the developed area along the Bay and extends north to Smith Road. Figure 1-1 illustrates Bellingham’s current retail service area consistent with the Whatcom County Coordinated Water System Plan (CWSP) adopted pursuant to Chapter 70.116 of the Revised Code of Washington (RCW). The retail service area shown on Figure 1-1 does not show Bellingham’s retail service areas that overlap with other purveyors (for example, Water District 2 [WD 2], Northwest Water Association, Chuckanut Trail Water Association, and others) as established in the CWSP. Also shown on Figure 1-1 are Bellingham’s City limits, and its UGA boundary and 5-Year-UGA-Review-Area as adopted by the Whatcom County Council on February 12, 2008.
Some portions of Bellingham’s UGA and 5-Year-Review-Area are not within the Designated Water Service Area of any purveyor established by the Whatcom County CWSP (see Appendix B). Two examples of this situation (among several) include property around Bear Creek between Northwest Drive and Aldrich Road and properties east of Guide-Meridian north of the City’s service area and south of Deer Creek Water Association’s service area. Because properties such as these are located within Bellingham’s designated or planned UGA, the city would expect them to become part of its retail service consistent with the procedures and criteria outlined in Section 1.14, below, and the provisions of the Whatcom County CWSP and Chapter 70.116 RCW. Properties such as these would be considered Bellingham’s “future water service area” for the purposes of the Municipal Water Law.

1.5 Neighboring and Adjacent Purveyors

Bellingham’s water service area abuts, overlaps, or both abuts and overlaps with a number of water systems including:

♦ Whatcom County WD 2 to the northwest
♦ Lummi Water and Sewer District to the northwest
♦ Deer Creek Association to the north
♦ Water District 7 (WD 7) to the east
♦ Glen Cove Water Co-Op to the southeast
♦ Lake Whatcom Water and Sewer District to the southeast
♦ California Street Water Association to the south
♦ Montgomery Road Water Association to the northeast

These service area boundaries for these systems are displayed on the map included in Appendix B. This map shows the service areas for Whatcom County water systems as established by the Whatcom County CWSP. The systems listed above are supplied with water by the City of Bellingham and as such represent the City’s “wholesale service area” for the purposes of the Municipal Water Law. The City does not intend to expand its “wholesale service area.” These systems supplied by the City are much smaller in terms of consumption and numbers of connections than the City’s water system. Additional details of the water demands from these systems are discussed in Section 2.

1.6 Inventory of Existing Facilities

A brief introduction to Bellingham’s existing facilities and the general configuration of the water system are presented in this section. More detailed descriptions and analysis of these water system elements are presented in Section 3. The major facility components of the City’s existing water system are displayed in Figure 1-2 as a hydraulic profile. In general, these major facility components can be categorized as follows:

♦ Supply and treatment facilities
♦ Storage facilities
♦ Distribution and transmission pipelines
♦ Pumping stations
Pressure-reducing valve (PRV) stations
Interties to adjacent systems

The City’s system is supplied from the Middle Fork of the Nooksack River and Lake Whatcom which acts a supply reservoir for the Bellingham system. Water withdrawn from Lake Whatcom is screened then treated at the inline gravity filtration water treatment plant, located west of the Whatcom Falls Park.

The current average production from the Water Treatment Plant (WTP) is about 11 million gallons per day (mgd). Treated water is pumped through nine pump stations and stored in one of 14 storage reservoirs located throughout the City. The combined capacity of the storage reservoirs is 28.43 million gallons (MG). Bellingham’s system has six pressure zones with storage and seven constant pressure neighborhood zones that do not contain water storage. The City’s pressure zones, along with locations of the treatment plant, pump stations, storage reservoirs, and adjacent system interties are shown in Figure 1-3. Bellingham’s Lake Whatcom and Nooksack watersheds and supply configurations are discussed in Section 5, Source Water Protection.

1.7 Related Plans

Plans and planning activities that may affect Bellingham’s water system are described in the following subsections. Smaller purveyors and districts such as the Deer Creek Association and Montgomery Road Water Association have not submitted water system plans to the City.

The following is a list of plans related to the City’s water treatment system.

- 1993 Comprehensive Water Plan, City of Bellingham, Washington, Public Works Department
- Whatcom County Population and Economic Forecasts, May 2002
- City of Bellingham Urban Growth Area – DRAFT Land Supply Analysis Summary, March 2003
- 2005 Comprehensive Plan, City of Bellingham
- Whatcom County Coordinated Water System Plan Update, February 2000

1.8 Whatcom County Population and Economic Forecasts

The May 2002 Whatcom County Population and Economic Forecasts report by ECONorthwest provides 5-, 10-, and 20-year forecasts for the following:

1. Low-, baseline-, and high-range population growth projections for the County, the cities and their UGAs, two County UGAs, and the Point Roberts community.
2. Economic forecast scenarios and supporting analysis of trends for major employment sectors and labor force projections.

3. Commercial land and industrial land demand (consumption) forecasts for each jurisdiction.

4. Housing growth projections and residential land demand forecasts for each jurisdiction.

The Bellingham City Council adopted the 20-year population growth forecasts based on this report for use in City and County comprehensive plan updates. These forecasts are the basis for the water system demand forecasts described in Section 2.

1.9 Comprehensive Plan

The City of Bellingham Comprehensive Plan was updated in 1995 and 2005 from an older plan published in 1980. A separate land use plan was developed for each of the City’s 22 neighborhoods during the formation of the 1980 Comprehensive Plan. These plans were updated during the 2005 update of the Comprehensive Plan. Each of the plans includes sections devoted to neighborhood character, open space, public facilities, and land use. Included in the 2005 update are the UGA plans, which have been added to address areas outside the current City limits that are slated for annexation during the 20-year planning period.

Each of the neighborhoods is divided into subareas. Each subarea has a detailed land use classification description. The classification system for each subarea begins with a brief written description of the subarea that includes a brief rationale for the recommended land use.

In addition to the neighborhood plans, the Comprehensive Plan contains five required and two optional elements which address specific issues relevant to future development in the City and also fulfill the requirements of the Growth Management Act (GMA). The seven elements of the plan are:

- Land Use – Required
- Housing – Required
- Capital Facilities – Required
- Utilities – Required
- Transportation – Required
- Parks & Recreation – Optional
- Community Design – Optional

Each of the seven elements includes a brief introduction, background information, and relevant goals and policies. The Land Use element also contains the historical references, policies, and criteria that were used to set the urban growth boundary. The urban growth boundary sets the limit of urban development and represents the anticipated City boundary during the 20-year planning period. This boundary can be changed when appropriate.
1.10 Whatcom County Coordinated Water System Plan

The Whatcom County Coordinated Water System Plan (WCCWSP) was updated in February 2000. It was developed under the provisions of the Water Supply Coordination Act (Chapter 70.116 RCW) to coordinate planning and provision of water service among the County’s water purveyors and other local government. One goal of the Plan is to establish water service areas for purveyors. These established service areas are shown in Appendix B. The CWSP also provides minimum design standards for adoption by water utilities in Whatcom County. In addition, the Plan provides guidance for fire flow requirements based on zoning categories and a County-wide conservation program.

1.11 Whatcom County Water District 2 Water System Plan

Whatcom County WD 2’s last adopted Water System Plan was completed in 1998 and revised in 2003. This plan is scheduled to be updated by September 2009. WD 2 serves customers adjacent to the northwestern part of the City both within Bellingham’s City limits and its urban growth area. WD 2’s service overlaps with Bellingham’s water service area (see Appendix B).

WD 2 currently serves about 1,400 people through 520 service connections, and is expected to grow to 3,500 people by 2023. WD 2 is served exclusively by the City through three interties. All treatment and storage for WD 2 occurs within the City’s system. The District’s Water System Plan calls for an additional intertie with the City, additional fire hydrants, and routine water main replacement. None of these activities are expected to impact Bellingham’s ability to provide water to Water District 2.

1.12 Whatcom County Water District 7 Water System Plan

Whatcom County WD 7’s last adopted Water System Plan was completed in 1999. This was supposed to be updated by the end of 2005. WD 7 serves customers northeast of the City and north of Lake Whatcom (see Appendix B). WD 7 currently serves about 508 service connections, and expects to grow to 1,000 connections by 2020. WD 7 is served exclusively by the City through one intertie. All treatment for WD 7 occurs within the City’s system, with some storage within the City’s system and some in WD 7’s. The District’s Water System Plan calls for construction of two new storage reservoirs and booster stations, an additional intertie with Bellingham’s system, and some reconfiguration of the system to alleviate high and low pressure problems. None of these activities are expected to impact the City’s ability to provide water to Water District 7, consistent with the terms of the water service agreement.
1.13 Lake Whatcom Water and Sewer District (formerly Water District 10) Water System Plan

Whatcom County Water District 10 (WD 10) has changed its name to Lake Whatcom Water and Sewer District (LWW&SD). The District last adopted Water System Plan was completed in 2001. The District’s plan was scheduled to be updated by the end of 2007. LWW&SD was originally established in 1968. At that time, the district began to provide sewer service to residences surrounding Lake Whatcom that were not covered in the City of Bellingham’s service area. LWW&SD acquired the Geneva Water Corporation and the Sudden Valley Water Company. Numerous expansions and extensions have increased the district service area and capacity including the acquisition of water wells on the North Shore and the completion of the Lake Louise Interceptor.

LWW&SD serves customers southeast of the City and south of Lake Whatcom. LWW&SD serves customers in its Geneva and North Shore/City Source Study Areas through interties with the City. LWW&SD currently serves about 1,008 connections, and expects to grow to 1,857 connections by 2020. All surface water treatment for LWW&SD occurs within the City’s system, with some storage within the City’s system and some in LWW&SD’s system. Their Water System Plan calls for construction of additional pump station capacity or new intertie and one new storage reservoir. None of these activities are expected to impact Bellingham’s ability to provide water to LWW&SD.

1.14 Bellingham’s Existing and Future Retail Service Area

The Growth Management Act (GMA) provides that it is not appropriate for urban governmental services, which include water and sewer services, to be extended to or expanded in rural areas except in very limited circumstances that are necessary to protect basic public health and safety and the environment and which do not permit urban development. In March 2006, the City adopted Ordinance 2006-03-026 which repealed all City water services zones outside the City’s UGA and provided that the City would not extend or expand urban governmental services such as water and sewer outside the UGA unless authorized by law.

Bellingham’s retail service area, including its existing and future service areas, is reflected by the boundaries shown in Figure 1-1. The City’s retail service area consists of the City and its unincorporated UGA. The City’s service to properties outside of its current UGA consists of only those lots that were developed and legally receiving water prior to March 21, 2006 or have an approved utility service contract with the City of Bellingham consistent with Ordinances 2006-03-026 and 2006-06-064. The City does not intend to terminate water service to those properties that the City currently serves outside of its retail service area; however the City will not modify, expand, or extend that service. The retail service area boundary in Figure 1-1 does not show the overlapping service areas with adjoining purveyors that were included in the CWSP (see Appendix B for the location of these
overlaps). If an inconsistency between Figure 1-1 and the City’s written policies contained in this Water System Plan is identified or occurs the written policies govern.

Bellingham’s future retail service area would include those portions of its designated UGA that are not within another purveyor’s water service area as established by the CWSP. Provision of water to any future service area would only occur consistent with the policies and guidelines discussed in Section 1.17.

1.15 Zoning

Bellingham’s most recent land use plan was adopted as part of the 2005 update to the 1980 City of Bellingham Comprehensive Plan. Land use, in addition to the 5-Year Review Areas, is shown on Figure 1-4. City zoning is divided into 11 categories covering residential, commercial, industrial, and public building/open space uses. Descriptions of the City zoning categories are described in the Bellingham Comprehensive Plan. A copy of these descriptions is presented in Appendix C.

1.16 Service Area Agreements

Bellingham has entered into water service agreements with several Water Districts and other small purveyors adjacent to the City’s system to provide regular water service to these purveyors. The flow provided to each purveyor is summarized in Table 1-1.

<table>
<thead>
<tr>
<th>Name</th>
<th>Flow Direction</th>
<th>Supply Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WD 2</td>
<td>To WD 2</td>
<td>Regular supply</td>
<td>1,100 gpm maximum at 20 psi</td>
</tr>
<tr>
<td>WD 7</td>
<td>To WD 7</td>
<td>Regular supply</td>
<td>500 gpm maximum at 20 psi</td>
</tr>
<tr>
<td>Lake Whatcom Water &amp; Sewer District</td>
<td>To Lake Whatcom Water &amp; Sewer District</td>
<td>Domestic &amp; fire supply</td>
<td>750 gpm maximum</td>
</tr>
<tr>
<td>California Street</td>
<td>To California Street</td>
<td>Regular supply – no fire flow</td>
<td>None listed</td>
</tr>
<tr>
<td>Montgomery Road²</td>
<td>To Montgomery Road</td>
<td>Regular supply</td>
<td>²See footnote below</td>
</tr>
<tr>
<td>Deer Creek Water Association</td>
<td>To Deer Creek</td>
<td>Regular supply</td>
<td></td>
</tr>
<tr>
<td>Lummi Tribal</td>
<td>To Lummi Tribal</td>
<td>Regular supply</td>
<td>1,000 gpm maximum at 30 psi</td>
</tr>
<tr>
<td>Glen Cove</td>
<td>To Glen Cove</td>
<td>Regular supply</td>
<td>None listed – 4-inch line/meter</td>
</tr>
</tbody>
</table>

¹Formerly Water District 10

²Montgomery Road Water system is a small system with 7 connections. Functionally it is served in the same manner as Bellingham would serve a retail water customer.

psi = pounds per square inch

Note: Copies of existing service agreements can be found in Appendix D.
All water service agreements are governed by the Bellingham Municipal Code (BMC) 15.36.080. Requests for new service or expanded service area are governed by BMCs 15.36.060 and 15.36.090. All such agreements require evaluation and City Council approval. Copies of these service area agreements are included in Appendix D.

1.17 Service Area Policies

Bellingham manages its water system in conformance with its water system policies. In general, these policies are categorized per the policy categories presented in the WADOH Planning Handbook and are presented below.

1.17.1 Wholesaling Water

The City provides what it defines as “resale water service” by which potable water is provided under contract to a water district or association for resale. Current wholesale water customers include WD 7, Lake Whatcom Water and Sewer District, Glen Cove Water Co-Op, WD 2, Lummi Water and Sewer District, Montgomery Road Water Association, and the California Water District; all of which are included in the City’s wholesale service area and shown in Appendix B. The City does not intend to expand its “wholesale service area.”

The City considers the following criteria in providing both wholesale water and existing service extensions:

1. The consistency of the proposed development with the following land use plans and development standards acceptable to the City.
   a. Consistency with the goals, Policies, and land use designations in Whatcom County’s adopted subarea plan for the area; the applicable goals and policies in Bellingham’s Comprehensive Plan; and the provisions of the City/County interlocal agreement related to annexation and development in Bellingham’s UGA.
   b. Consistency with all City design and development standards and environmental regulations.

2. The expected impact such development might have on City streets and arterials as currently developed.

3. For property located within the Lake Whatcom watershed, whether the proposed development might be expected to adversely impact the watershed.

4. Whether or not adequate consideration has been given to retention and discharge of stormwater so as to preclude adverse impacts upon the City.

Whether it is in the best interests of the City to authorize the requested extension, even though sufficient capacity is available within existing transmission lines.

Financial impacts to the City associated with wholesaling will be passed along to the wholesale customer through up-front service charges and reuse rates.
1.17.2 Wheeling Water

Bellingham does not currently wheel water to another water system. Any potential future requests to use the City’s transmission or distribution system infrastructure for wheeling water to benefit another utility will be addressed on a case-by-case basis to assess any detrimental impacts to the City resulting from such wheeling.

1.17.3 Service to Areas outside City Limits – Annexation

Consistent with the GMA, Bellingham will provide new or expanded water service to only properties within its UGA. Generally, the City will provide such service only upon the property being annexed into the City. The GMA requires that property to be annexed must lie within the City’s UGA. The City may initiate a cost-revenue analysis with any service area expansion request, if the City Council deems it appropriate. Based on the results of the cost-revenue analysis and other considerations enumerated in BMC 15.38.010, the City Council will determine whether to initiate annexation proceedings for the property in question.

The City Council can, however, extend water service subject to limitations described in BMC 15.36.070. All requests for enlargement of service areas must be made to the Director of Public Works consistent with BMC 15.36.060.

1.17.4 Satellite Systems

It is currently the policy of Bellingham not to promote the creation of or manage satellite water systems.

1.17.5 Design and Performance Standards

Bellingham requires that all water system improvements within its service area, whether undertaken by the City or private developers, be designed in conformance with its latest water system design and construction standards. These standards, which are updated periodically, are presented in Section 8.

Any extensions of the City’s water system must be approved by the City and conform to the requirements of WADOH, the City Fire Department, and the City’s Water System Plan. The developer proposing the extension is responsible for the planning and design that ensures adequate water for domestic and fire protection uses are attainable. The developer is also responsible for demonstrating how these uses will be adequately provided and how any adverse impacts to the existing City system will be mitigated. Design of water system extensions shall be done by an engineer registered in Washington State.

1.18 Urban Growth Area

Bellingham intends to provide “urban” levels of water service throughout its existing and future service area. The City strives to provide such levels of service within its existing service area. Levels of service in the future service area that are less than those of the
existing service area will be improved over time in coordination with other water utility
priorities. Payment for water main extensions may be paid for by the person benefitting
from the extension, the City, or a local improvement district.

1.19 **Oversizing**

When the water system is being extended by a private developer and Bellingham has
identified a future extension beyond that proposed by the private developer, the extension
shall be oversized to meet the City’s future plans for the system. The City will pay for costs
related to oversizing the facilities installed by the private developer.

1.20 **Cross-Connection Control Program**

Bellingham policy dictates cross-connection control is the responsibility of the consumer
and begins at the service connection. Consumers are responsible for the following:

1. Elimination of cross-connections when possible
2. Control of cross-connections at the service connection (premise isolation)
3. Control of cross-connections, within the consumer’s water system, by relying on in-
   premise protection when premise isolation is not required by the *Washington
   Administrative Code* (WAC) 246-290-490 and this method is approved by the Director of
   Public Works

Consumers are also responsible for the installation, testing, inspection, repair, maintenance,
and proper operation of approved backflow preventers required for the control of cross-
connections between their premise and the public water system. The Director of Public
Works has the authority to issue a final order to achieve compliance with the
WAC 246-290-490, City cross-connection control policy and procedures, or both. If the
consumer fails to comply, water service may be denied or discontinued and the consumer
may be issued a civil penalty.

When an unprotected connection between the public water system and the consumer’s
water system constitutes an imminent threat of contamination to the City’s public water
system, water service may be shut off immediately without providing the required legal
notices prior to shut off. The City’s Cross-Connection Control plan is also discussed in
Section 6, as well as presented in Appendix E.

1.21 **Level of Service**

Bellingham policies describing the level of service to be provided by the City are presented
below.

1.21.1 **Service Ownership and Responsibility**

Bellingham shall own and maintain all water mains and service lines in established City and
County streets or other utility rights-of-way. The property owner shall own and maintain
1.21.2 Service Pressure and Flow

Bellingham shall provide domestic water to its customers in sufficient quantity to meet maximum day demands and at a pressure that meets or exceeds all minimum applicable regulations, except during emergency conditions. The City’s goal is to provide system pressure of at least 30 pounds per square inch (psi), measured at the service meter.

1.22 Fire Protection

Bellingham’s fire protection policies are grouped into the specific policies presented below.

1.22.1 Fire System Responsibility

Bellingham is responsible for providing and maintaining system infrastructure to deliver adequate fire flow for fire suppression to residents and businesses within its retail service area. Water system infrastructure, including water mains, storage, hydrants, pump stations, and related facilities, shall be designed to meet all codes applicable at the time of construction.

Privately owned fire protection services (automatic sprinklers, on-site fire hydrants, or standpipes) are allowed if they include a flow meter accessible by City staff and cross-connection control in accordance with City policy. No domestic or potable water supply connections are allowed on a fire protection service.

1.22.2 Fire Flow Requirements

Bellingham is responsible for providing fire flow capability plus maximum daily demand flow conditions with a residual pressure of 20 psi throughout the system. Table 1-2 shows the City’s minimum fire flow requirements.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Design Fire Flow</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>One- and two-family unit developments</td>
<td>750 gpm</td>
<td>2 hours</td>
</tr>
<tr>
<td>Multiple-family developments</td>
<td>1,500 gpm</td>
<td>2 hours</td>
</tr>
<tr>
<td>Institutional developments</td>
<td>2,000 gpm</td>
<td>2 hours</td>
</tr>
<tr>
<td>Commercial developments</td>
<td>2,500 gpm</td>
<td>2 hours</td>
</tr>
<tr>
<td>Industrial developments</td>
<td>3,500 gpm</td>
<td>2 hours</td>
</tr>
</tbody>
</table>
1.23 Financial Policies

Bellingham’s financial policies are presented in the following subsections and include water rates and other funding issues.

1.23.1 Fiscal Stewardship

Bellingham has a water fund which is used for capital, operation, and maintenance of the water system, including water system improvements. The water fund is managed in a professional manner in accordance with applicable laws, standards, and City financial practices. Fiscal stewardship requires ongoing monitoring of revenues and expenses in order to make decisions and report to City officials, as needed, regarding the status of utility financing.

1.23.2 Self Sufficient Funding

The water fund remains a self-supporting enterprise fund. Funding is sufficient to support direct and indirect costs of the water utility, including the cost of annual depreciation of capital assets. Water utility revenue is primarily from customer charges, dependent on established rates. Funds received from connection charges are credited to a reserve cash line in the water fund. Connection charges ensure that newly connected properties bear their equitable share of the system cost. Interest accrued on connection charge revenue is credited to the water fund’s cash line.

All system development charges are credited to the cash line of the water fund as well. User rates contain fee charges for the Lake Whatcom Watershed Land acquisition and Preservation Program and are used to fund land acquisition and other land preservation measures in the Lake Whatcom Watershed.

1.23.3 Capital Improvement Program Level

Funding of the Capital Improvement Program (CIP) is maintained at a level sufficient to maintain system integrity. The CIP shall be managed, as appropriate, to evenly distribute expenses over time, thus, enabling revenue streams to be maintained or change gradually. Funding reserves shall be maintained in the CIP fund in order to manage cash flow variation caused by the nature of the cost and timing of projects.

Water utility revenue bonds, utility local improvement districts (LID’s), and State Public Works Trust Fund (PWTF) loans and Drinking Water State Revolving Fund (DWSRF) loans may also considered for funding portions of the CIP.

1.23.4 System Development Charge

Fees and charges are used to recover all utility costs related to new development. In addition, there are fixed rates for routine services such as meter installation and water shut-off and turn-on, as discussed below. The costs for services such as developer extensions, which require lengthy and variable amounts of staff time, are also collected. System
development charges are collected for new or exchanged services. There is also an Irrigation System Development Charge (ISDC) that is applied to all new Irrigation Water services. New connections to the water system must pay a connection charge and any applicable system development charges and latecomer fees.

1.23.5 Connection Fee Schedule
A connection fee is charged per BMC 2-5.04 of the City’s Development Guidelines & Improvement Standards when a customer wants to start or stop water service in their home. A new residential service connection fee is charged, if applicable, and includes the cost to tap the City’s water main and install a water meter assembly and water service line to within two feet of the property line. This fee is different than the development fee discussed in BMC 1.7.16.4, which is charged for new developments requiring extension of the City’s water system.

1.23.6 Frequency of Water Rate Adjustments
Water use rates have been set by the Bellingham City Council through December 31, 2012. Thereafter, beginning on January 1, 2013, the rates may be adjusted annually by the City Council and reflect, at a minimum, an inflationary factor tied to the Consumer Price Index, all Urban Consumers (CPI-U), and the Seattle-Tacoma-Bremerton index.

1.23.7 Water Rates
Water rates are billed as follows:

♦ Single family unmetered water services and unmetered duplex water services are charged a monthly rate for each month of service or portion thereof.

♦ Single family metered water services including metered duplexes are charged a fixed rate based on meter size and a volume rate per hundred cubic feet of water used.

♦ Contract sales of water for resale are as covered by agreement between the City and the water district or association. Rates for water that is resold are covered by the BMC unless specifically modified by the agreement in recognition of substantial differences in service provided by the City.

♦ Non-single family water services including multiple dwelling units, commercial, and institutional, are charged a fixed rate based on meter size and a volume rate per hundred cubic feet of water used.

♦ Irrigation water services are charged a fixed rate based on meter size and a volume rate per hundred cubic feet of water used.
1.23.8  Water Rate Assistance
Rate assistance programs are provided for specific low income customers. The City has adopted a rate discount or rebate program for senior citizens over 62 years of age, disabled citizens, and citizens with income below certain levels as defined in BMC 15.04.070.

1.23.9  Surcharge for Customers Outside of Bellingham City Limits
Existing City water customers located outside of the service area are served per the conditions of service originally negotiated when these services were granted. All new customers outside the service area, if approved for service, will have a 50 percent surcharge imposed on their bill.

1.23.10 Formation of Local Improvement Districts Outside of Bellingham
Bellingham considers on a case-by case basis assisting property owners located outside of the City’s service area with efforts to secure financing for construction of water facilities if the area is to be annexed.

1.23.11 Latecomer Agreements
Bellingham allows developers or others extending City water system facilities to recover a portion of the facility cost from other properties that receive a direct benefit from the facility. The pro-rata share of a facility that may be recovered from a benefited property owner is determined on a case-by-case basis. Pro-rata shares are proposed by the proponent of the latecomer agreement, and evaluated by the City to determine if they are equitable and reasonable. They can be based on linear footage of a facility across benefited property, the number of equivalent residential units (ERUs) a benefited property represents, the area of a benefited property, or a combination of factors. The City reserves the right to grant final approval of the method to be used.

1.23.12 Latecomer Provisions
Property owners who construct water mains may be partially reimbursed by benefiting owners if a contract, facilitated by the City of Bellingham, with other property owners is implemented. The project proponent must follow the procedures below to enter into a "Latecomer Contract":

1. Prior to the time the project is accepted by the City, the proponent must notify the City of the intent to seek a Latecomer Contract. Notification consists of a letter stating the intention along with a list and map of the property owners who the proponent believes will benefit from the improvement(s). Signature of the “Acknowledgement of Understanding” letter provided to developers with the deed of conveyance information can satisfy this requirement.
2. Once the City receives the request, a pre-application meeting will be scheduled and the proponent will have the opportunity to present the proposal to City staff. This meeting will consist of discussion of the proposal, comments, and suggestions from the City, and general preparation for submittal of the formal application.

3. Within 30 days of the water system improvements being deeded to the City (Deed of Conveyance), the proponent may request a Latecomer Contract by making a formal application. Application shall be made on forms prepared by the Public Works Department and shall be accompanied by the base fee portion of the City Administrative Fees as set forth in BMC 14.02.130. The application shall be prepared, approved, or prepared and approved by a professional licensed engineer and shall contain the following information:

   a. A legal description of the applicant's property.

   b. A legal description of the properties within the applicant's proposed assessment reimbursement area together with the names and addresses of the owners of each property as shown in the records of the Assessor's Office of Whatcom County.

   c. Vicinity map of applicant's property, proposed reimbursement area, and location of all improvements.

   d. Itemized cost data for cost of construction certified by a Professional Engineer.

      \[
      \text{Cost of construction} = \text{direct construction costs} + \text{developer administrative costs} + \text{construction interest} + \text{City latecomer administrative fee}
      \]

      (See BMC 14.02 for eligible costs and calculation details.)

   e. The applicant's proposed allocation of the cost of construction to the individual properties within the applicant's proposed assessment reimbursement area and the method of such allocation.

   f. Payment of the base fee portion of the City Administrative Fee, which shall be non-refundable. The fee is calculated based on the type of project, construction costs, and a fee per each parcel within each applicant’s proposed reimbursement area. Fees are adjusted annually in accordance with BMC 14.02.130(C) and should be confirmed prior to submitting a late comers application.

4. Within 30 days of the City receiving the application for a Developer Reimbursement Agreement, the City will provide the applicant written notice of whether the application is complete and, if incomplete, what must be done for the application to be considered complete. The applicant will have no more than 30 days from the date of the written notice to respond and provide the information required to complete the application or, if the applicant can not submit the required information within the 30-day period, the applicant shall provide the City with a written explanation of why they can not provide the information within the designated time period and a date that the requested
information will be submitted. In its discretion, the Public Works Department may grant the applicant an extension of not more than 60 days to submit the required information.

5. Sign and return the Application Summary (to be prepared by City Staff) for recording by Staff with the County Auditor’s Office.

6. In the event a hearing is requested by a person owning property within the proposed reimbursement area, the proponent must attend or send a representative to attend the hearing.

7. Sign and return Latecomer Contract to the City.

1.24 **Conditions of Service**

The City has established a number of policies and requirements that establish conditions of water service within the established retail service area. These policies are governed by BMC 15.08. Policies and requirements have been established for: (1) Application for Individual Water Service, (2) Water Service Connections (of note: on January 1, 2005 it was established that all new water service installations will be metered), (3) Water Service Installation Fees, and (4) Water Main Extensions. The Conditions of Service policies and requirements are included in Appendix F.

1.24.1 **Bellingham Responsibilities**

Bellingham maintains all water accounts by reference to the address or legal description of the property to which service is provided. Customers are billed according to a regular schedule determined by the Finance Director. The City maintains and reads the meter for each connection. In addition, all water connections are completed by City personnel.

1.24.2 **Customer Responsibilities**

An Application for Water is required to be completed by the prospective customer to obtain service. Bellingham requires each prospective customer requesting water service to either make a deposit or show proof of suitable and verifiable prior utility credit. Accounts are considered delinquent if payment is not received within 30 days of the date posted on the bill. Customers are responsible for cross-connection control as previously described in Section 1.20 of this Plan.

1.24.3 **Meter and Materials Specifications**

Design standards for materials associated with services and meter installations are presented in Section 7, Design and Construction Standards. These standards cover the water facilities from the main lines up to and including the meter setter. The City supplies the meters directly and will provide specifications for any large meters that need to be built into the system at the time of request. Pipe fittings must be ductile iron and conform to the referenced American Water Works Association (AWWA) specifications in the standards.
1.24.4 Disruption of Water Service

Bellingham has the right at any time, after giving reasonable notice, to shut off the water supply for repairs, extensions, violations of the BMC, and any other reason other than nonpayment of rates. The City is not responsible for any damage caused by the breaking, bursting or collapsing of any boilers, tanks, pipes or fixtures, or any damage whatever resulting directly or indirectly from shutting off of water, when timely notice is given. Cross-connection control requirements for customers are discussed in Section 1.20 of this Plan.

1.24.5 Developer Extension Requirements

In order to obtain water service from Bellingham, the property in question must abut a City-owned water main located within the right-of-way or an approved easement. The main must have adequate flow to meet both domestic and fire suppression requirements. If the required abutting main does not exist or the abutting main does not have sufficient flow to meet either domestic or fire needs, the developer must construct a water main extension prior to obtaining water service. Proposed developer extensions must be prepared by a licensed civil engineer and be submitted to the City Engineer for approval. If approved the developer must enter into a contract with the City for the construction of the water system extension. Upon completion of the contract requirements, the developer must also apply for a water service and pay the applicable connection fees to receive service.

1.25 Complaints

With the exception of red water complaints, the Bellingham Laboratory staff is charged with responding to customer complaints on water quality. Red water complaints are usually first referred to the water distribution system crew supervisor. The lab handles all other complaints.

Laboratory staff receive annual training on customer service and response. This training includes information on City procedures for complaint investigation, typical complaints and causes (that is, water heater maintenance, Serratia, organic precursors causing taste and odor complaints, and garden hose backflow) as well as information on waterborne disease, permeability of plastic service pipe, backflow and back siphonage, and numerous other topics to aid in customer complaint investigations.

In roughly half of the complaint investigations a Technician will be dispatched to the customer’s home to investigate the problem. At the customer’s home, the Technician will take samples to ensure water potability at that time. In the other half of complaint investigations, the customer is given information to help resolve the water quality issue. Typical information given to customers under these circumstances include information on flushing water heaters, information on organic precursors causing heightened chlorine smells, information on Serratia, or the customer is advised to turn garden hoses off at the valve.
Customer water quality inquiries or complaints are recorded and logged into the City’s maintenance management software program, Hansen. There are five categories of complaints related to potable water that are tracked via Hansen:

1. General water plant and water quality information
2. Taste or odor problems with water
3. Drinking water quality concerns
4. Nontreated Lake Whatcom water concern
5. Plant miscellaneous including all inquiries specific to water treatment at the water or wastewater treatment plant

Table 1-3 shows the number of complaints recorded for each category from 2003 through the first half of 2008. A summary of water quality complaints is provided to the WADOH as part of the City’s Monthly Surface Water Report.

<table>
<thead>
<tr>
<th>Category</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>General plant and water quality information</td>
<td>21</td>
<td>14</td>
<td>17</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Taste or odor problem</td>
<td>10</td>
<td>22</td>
<td>14</td>
<td>19</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Nontreated Lake Whatcom water concern</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plant miscellaneous</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>General plant and water quality information</td>
<td>21</td>
<td>14</td>
<td>17</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

¹Number of 2008 complaints through June 1, 2008.
Source: City of Bellingham (2009) and Whatcom County (2006).
existing hydraulic profile

city of bellingham
2008 water system plan

reservoir
pump station
intertie
prv

a raymond pump station serves 1 home.

b bonanza pump station serves 4 homes.
Figure 1-3
Major Facilities and Pressure Zones
City of Bellingham
2009 Water System Plan

Source: City of Bellingham (2007) and Whatcom County (2006).
Bellingham’s Water Use

This section summarizes current and past water use and demand characteristics for the Bellingham water system. These characteristics facilitate forecasting water supply needs for Bellingham’s current and future customers. Characteristics include land uses, population, service connections, water use, and identified trends in these or other conditions that affect estimates of future water supply needs.

2.1 Current and Past Conditions

Data readily available and relevant to the task of estimating future water supply needs are from the Bellingham and Whatcom County. These data were obtained from City staff, the current City Comprehensive Land Use Plan, the Office of Financial Management, and the City’s previous Comprehensive Water Plan.

2.2 Bellingham Population and Service Connections

According to the 2000 census Bellingham’s population was 67,171 people. The city’s population in 2007 was estimated to be 75,220 people. This increase in population indicates an annual growth rate for this period of 1.63 percent.

Bellingham provides water service to residents of the city as well as an increasing number of residents in the Urban Growth Area. Chart 2-1 illustrates recent trends in the population served by the City’s water system inside the city and in its Urban Growth Area. Chart 2-2 shows a similar recent trend for employment served by the Bellingham Water System.
A summary of current and past population and the total number of service connections for the City is also presented in Table 2-1. The current number of service connections within the City is summarized by account type (customer class) in Table 2-2.

**TABLE 2-1**  
City of Bellingham Past Population and Service Connections

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Employment Population</th>
<th>Service Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>29,314</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1950</td>
<td>34,112</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1960</td>
<td>34,668</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1970</td>
<td>39,375</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1980</td>
<td>45,794</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1990</td>
<td>52,179</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2000</td>
<td>67,171</td>
<td>---</td>
<td>23,278</td>
</tr>
<tr>
<td>2001</td>
<td>68,890</td>
<td>32,350</td>
<td>22,076</td>
</tr>
<tr>
<td>2002</td>
<td>69,260</td>
<td>---</td>
<td>22,191</td>
</tr>
<tr>
<td>2003</td>
<td>69,850</td>
<td>---</td>
<td>22,615</td>
</tr>
<tr>
<td>2004</td>
<td>71,080</td>
<td>37,317</td>
<td>23,341</td>
</tr>
<tr>
<td>2005</td>
<td>72,320</td>
<td>38,973</td>
<td>23,723</td>
</tr>
<tr>
<td>2006</td>
<td>75,150</td>
<td>40,814</td>
<td>24,072</td>
</tr>
<tr>
<td>2007</td>
<td>75,220</td>
<td>42,666</td>
<td>24,374</td>
</tr>
</tbody>
</table>

1Historical Census Data.  
2Office of Financial Management Data.  
3City of Bellingham Data as of April 1, 2007.  
5Projected from ECONorthwest Report, 2002.  
--- Data unavailable for these years.

### 2.3 Bellingham’s Water Use

Bellingham’s water use is comprised of water consumed, as measured by billing records, and water supplied to the system, as measured by the master meter locations. Water usage as measured by billing records is referred to as “consumption,” and water supplied to the system is referred to as “demand.” Water use is typically presented in million gallon per day (mgd).

#### 2.3.1 Demand

Bellingham’s historical demands are summarized in Table 2-3. The data presented in Table 2-3 show the average day demand (ADD) and the maximum day demand (MDD)
produced by the WTP. The peak hour demand (PHD) is calculated based on the determination of the PHD peaking factor as explained below.

**TABLE 2-2**
City of Bellingham Number of Service Connections by Customer Class

<table>
<thead>
<tr>
<th>Customer Class</th>
<th>Number of Service Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Treatment Plant Usage</td>
<td>1</td>
</tr>
<tr>
<td>Accessory Dwelling Units</td>
<td>35</td>
</tr>
<tr>
<td>Colleges &amp; Universities</td>
<td>49</td>
</tr>
<tr>
<td>Commercial General</td>
<td>1,912</td>
</tr>
<tr>
<td>Commercial Lodging</td>
<td>40</td>
</tr>
<tr>
<td>Duplex - 1 Service Single Lot</td>
<td>835</td>
</tr>
<tr>
<td>Duplex - 2 Services Single Lot</td>
<td>25</td>
</tr>
<tr>
<td>Industrial General</td>
<td>49</td>
</tr>
<tr>
<td>Institution - City</td>
<td>71</td>
</tr>
<tr>
<td>Institution - General</td>
<td>89</td>
</tr>
<tr>
<td>Institution - Public Schools</td>
<td>35</td>
</tr>
<tr>
<td>Institution - Whatcom</td>
<td>14</td>
</tr>
<tr>
<td>Irrigation</td>
<td>419</td>
</tr>
<tr>
<td>MBCS - 1 Service Duplex</td>
<td>108</td>
</tr>
<tr>
<td>MBCS - 1 Service SFR</td>
<td>112</td>
</tr>
<tr>
<td>MBCS - 2 Service Duplex</td>
<td>100</td>
</tr>
<tr>
<td>Multi-Family Apartment</td>
<td>1,265</td>
</tr>
<tr>
<td>Single Family Residence</td>
<td>2,982</td>
</tr>
<tr>
<td>Water Districts and Associations</td>
<td>11</td>
</tr>
<tr>
<td>Unmetered/Flat Rate Consumption:</td>
<td>16,222</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24,374</strong></td>
</tr>
</tbody>
</table>

The characterization of the water system demand by ADD, MDD, and PHD is typically used for various aspects of water system planning and system evaluation. ADD represents average water production, including unaccounted uses, throughout the year, and is used to estimate the total annual amount of supply needed. ADD was developed from actual master meter data.

MDD represents the day of the year on which maximum water usage occurs. Actual MDD data was provided by the City from daily recorded values of water production at the WTP.
Transmission, distribution, pumping, and treatment facilities are typically designed with a capacity equal to the projected future MDD.

**TABLE 2-3**

<table>
<thead>
<tr>
<th>Year</th>
<th>ADD (mgd)</th>
<th>MDD (mgd)</th>
<th>PHD (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>9.48</td>
<td>15.84</td>
<td>23.76</td>
</tr>
<tr>
<td>2001</td>
<td>9.46</td>
<td>15.33</td>
<td>23.00</td>
</tr>
<tr>
<td>2002</td>
<td>10.38</td>
<td>17.91</td>
<td>26.87</td>
</tr>
<tr>
<td>2003</td>
<td>10.63</td>
<td>19.52</td>
<td>29.28</td>
</tr>
<tr>
<td>2004</td>
<td>10.81</td>
<td>20.69</td>
<td>31.04</td>
</tr>
<tr>
<td>2005</td>
<td>10.60</td>
<td>17.77</td>
<td>26.66</td>
</tr>
<tr>
<td>2006</td>
<td>10.85</td>
<td>19.38</td>
<td>29.07</td>
</tr>
<tr>
<td>2007</td>
<td>10.32</td>
<td>18.34</td>
<td>27.51</td>
</tr>
</tbody>
</table>

PHD represents the maximum usage that occurs in a 1-hour period during the MDD. PHD is used for sizing the distribution system and system storage. Reservoir storage capacity is developed based on a combination of ADD, MDD, and PHD, and their relative differences.

The ratios of MDD:ADD and PHD:MDD are often referred to as “demand ratios” or “peaking factors” and are computed for the purpose of characterizing demand in a given water system. Chart 2-3 shows ADD, MDD and PHD, as well as Peaking Factors for the years 2000 through 2007. MDD:ADD peaking factors over this time period ranged from 1.62 to 1.92.

MDD:ADD peaking factor calculations are also presented in Table 2-4. Based on a review of the historical data, the MDD/ADD peaking factor has been as high as 1.92 for the time period evaluated. Thus, this factor will be used to generate the forecast MDD.

The City has developed diurnal demand curves for extended period modeling of their water distribution system based on records from the Bellingham Supervisory Control and Data Acquisition (SCADA) system. The diurnal curve represents the variation in water system demand throughout the day. Based on the data evaluated for the diurnal curve, the PHD/MDD peaking factor was determined to be 1.5. The PHD/MDD peaking factor of 1.5, as developed from the diurnal curve, will also be applied to generate the forecast PHD.
### TABLE 2-4
City of Bellingham Demand Peaking Factors

<table>
<thead>
<tr>
<th>Year</th>
<th>MDD/ADD Peaking Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1.67</td>
</tr>
<tr>
<td>2001</td>
<td>1.62</td>
</tr>
<tr>
<td>2002</td>
<td>1.73</td>
</tr>
<tr>
<td>2003</td>
<td>1.84</td>
</tr>
<tr>
<td>2004</td>
<td>1.92</td>
</tr>
<tr>
<td>2005</td>
<td>1.68</td>
</tr>
<tr>
<td>2006</td>
<td>1.79</td>
</tr>
<tr>
<td>2007</td>
<td>1.78</td>
</tr>
</tbody>
</table>

#### 2.3.2 Consumption

Consumption for customers within the City limits is measured at individual service meters where meters are installed. A summary of the consumption by City customer class is presented in Table 2-5 for the years 2000 through 2007.

### TABLE 2-5
City of Bellingham Historical Consumption Summary by Customer Class

<table>
<thead>
<tr>
<th>Customer Class</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTP Usage</td>
<td>0.17</td>
<td>0.17</td>
<td>0.18</td>
<td>0.17</td>
<td>0.16</td>
<td>0.13</td>
<td>0.14</td>
<td>0.12</td>
<td>0.15</td>
</tr>
<tr>
<td>Flat-rate and Metered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Family Residential</td>
<td>3.23</td>
<td>3.06</td>
<td>3.72</td>
<td>3.95</td>
<td>3.80</td>
<td>3.55</td>
<td>3.90</td>
<td>3.83</td>
<td>3.63</td>
</tr>
<tr>
<td>Multi-Unit Residential</td>
<td>1.51</td>
<td>1.51</td>
<td>1.67</td>
<td>1.64</td>
<td>1.72</td>
<td>1.70</td>
<td>1.77</td>
<td>1.75</td>
<td>1.66</td>
</tr>
<tr>
<td>Institutional</td>
<td>0.47</td>
<td>0.47</td>
<td>0.40</td>
<td>0.43</td>
<td>0.45</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
<td>0.43</td>
</tr>
<tr>
<td>Commercial</td>
<td>1.80</td>
<td>1.76</td>
<td>1.83</td>
<td>1.84</td>
<td>1.87</td>
<td>1.83</td>
<td>1.85</td>
<td>1.74</td>
<td>1.81</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.31</td>
<td>0.24</td>
<td>0.30</td>
<td>0.32</td>
<td>0.31</td>
<td>0.32</td>
<td>0.33</td>
<td>0.29</td>
<td>0.30</td>
</tr>
<tr>
<td>Irrigation</td>
<td>0.25</td>
<td>0.29</td>
<td>0.47</td>
<td>0.45</td>
<td>0.48</td>
<td>0.44</td>
<td>0.46</td>
<td>0.44</td>
<td>0.41</td>
</tr>
<tr>
<td>Water District(^1)</td>
<td>0.52</td>
<td>0.50</td>
<td>0.50</td>
<td>0.52</td>
<td>0.39</td>
<td>0.33</td>
<td>0.33</td>
<td>0.30</td>
<td>0.42</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8.26</td>
<td>8.01</td>
<td>9.07</td>
<td>9.32</td>
<td>9.17</td>
<td>8.73</td>
<td>9.20</td>
<td>8.89</td>
<td>8.83</td>
</tr>
</tbody>
</table>

\(^1\)The Water District customer class refers to the purveyors served by the City.

A portion of residential customers are not metered and are billed based on a flat rate. Bellingham began a voluntary metering program in 2005 to encourage and reward
conservation. The City will begin mandatory metering, and will be fully metered by January 2017. A discussion of Bellingham’s customer metering program is included in Section 4. Customers are billed for water service every month.

2.3.3 Non-Revenue Water

Non-Revenue, or unaccounted, water is the difference between the volume of water entering the distribution system, as measured at the water treatment plant (demand), and the volume actually measured and billed to the customers (consumption). Non-Revenue water is typically a positive volume; the quantity by the master is typically larger than the sum of all metered consumption. This positive difference is typically attributed to the following:

♦ Leakage from pipelines, reservoirs, valves, and hydrants
♦ Unmetered water used during construction
♦ Unmetered water used for street cleaning, firefighting, sewer and water main flushing, reservoir cleaning, and other unmetered public uses
♦ Master or service meter inaccuracies

For an average water utility, the volume of non-revenue water ranges between 10 and 15 percent of the total demand (or production). The WADOH guidance document, Conservation Planning Requirements, requires utilities to estimate the sub-volumes of water that comprise the total non-revenue water to assist in efforts to reduce total non-revenue water. The City allocates water usage to several categories to evaluate the total non-revenue water as shown in Table 2-5. The City’s non-revenue water for the period from 2000 to 2007 is presented in Table 2-6. The total water produced from the WTP is shown for each year, and the total metered portion of the consumption is shown next.

As stated previously, a portion of Bellingham’s single-family residences are not metered. Consumption allocated non-metered service connections is based on the Water Meter Pilot Study conducted by the City. That compared the consumption of the flat rate single family customers (non-metered) to the metered single family customers. The results of the study showed that the difference in usage between the metered single family customers and the flat rate single family customers is not statistically significant. The study also showed an average of 6.5 flat-rate-single-family customers for each metered single-family customer. This fact
allowed a simple multiplication of 6.5 times metered single family consumption to determine flat rate single family water consumption.

The City also inputs data for the Real Losses category from known system leakage from their annual leak detection program which surveys and tests about 10 to 15 miles of water main annually. The Unbilled Authorized consumption totals are generated from data from main flushing, fire training, blow-offs, and water main replacement records.

The City’s annual non-revenue water is then calculated by subtracting the above categories from the Total Water Produced. As seen in Table 2-6, the City’s non-revenue water percentage ranges between 11.8 percent in 2002 to a peak of 17.3 percent in 2005. The average is 13.9 percent which is within the typical range of 10 to 15 percent. Further information on water use and conservation is discussed in Section 4.

### Table 2-6
City of Bellingham Non-Revenue Water Summary

<table>
<thead>
<tr>
<th>Water Production and Consumption (mgd)</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Water Produced</td>
<td>9.48</td>
<td>9.46</td>
<td>10.38</td>
<td>10.63</td>
<td>10.81</td>
<td>10.60</td>
<td>10.85</td>
<td>10.32</td>
<td>10.32</td>
</tr>
<tr>
<td>Total Metered Consumption</td>
<td>5.46</td>
<td>5.36</td>
<td>5.84</td>
<td>5.89</td>
<td>5.88</td>
<td>5.65</td>
<td>5.82</td>
<td>5.57</td>
<td>5.68</td>
</tr>
<tr>
<td>Total Flat Rate Consumption</td>
<td>2.80</td>
<td>2.65</td>
<td>3.22</td>
<td>3.43</td>
<td>3.29</td>
<td>3.08</td>
<td>3.38</td>
<td>3.32</td>
<td>3.15</td>
</tr>
<tr>
<td>Real Losses</td>
<td>0.02</td>
<td>0.04</td>
<td>0.06</td>
<td>0.03</td>
<td>0.03</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Unbilled Authorized Consumption</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Non-Revenue Water</td>
<td>1.18</td>
<td>1.39</td>
<td>1.23</td>
<td>1.26</td>
<td>1.58</td>
<td>1.83</td>
<td>1.61</td>
<td>1.38</td>
<td>1.43</td>
</tr>
<tr>
<td>Non-Revenue Water Percentage</td>
<td>12.4%</td>
<td>14.7%</td>
<td>11.8%</td>
<td>11.9%</td>
<td>14.6%</td>
<td>17.3%</td>
<td>14.8%</td>
<td>13.4%</td>
<td>13.9%</td>
</tr>
</tbody>
</table>

#### 2.3.4 City of Bellingham Per Capita Usage

Using the population totals in Table 2-1, and the water consumption data shown in Table 2-5 and Table 2-6, per capita consumption was also calculated. To account for non-residential water uses, the per capita consumption was calculated both for residential customer classes and for non-residential customer classes. The non-revenue water, including total was added to the residential customer class to account for non-revenue water in the per capita factors which will be used to project future water needs based on population growth projections. The population number used for the non-residential customer classes is employment population totals. The per capita consumption is summarized in Table 2-7.
### TABLE 2-7

City of Bellingham Non-Revenue Water Breakdown by Residential and Non-Residential Categories

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Consumption (mgd)</td>
<td>5.50</td>
<td>5.32</td>
<td>6.16</td>
<td>6.34</td>
<td>6.15</td>
<td>5.81</td>
<td>6.22</td>
<td>6.10</td>
<td>5.95</td>
</tr>
<tr>
<td>Total Non-Revenue Water (mgd)</td>
<td>1.22</td>
<td>1.45</td>
<td>1.31</td>
<td>1.31</td>
<td>1.63</td>
<td>1.87</td>
<td>1.65</td>
<td>1.42</td>
<td>1.48</td>
</tr>
<tr>
<td>Total Residential Consumption (mgd)</td>
<td>6.72</td>
<td>6.77</td>
<td>7.47</td>
<td>7.65</td>
<td>7.78</td>
<td>7.87</td>
<td>7.52</td>
<td>7.43</td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>67,171</td>
<td>68,890</td>
<td>69,260</td>
<td>69,850</td>
<td>71,080</td>
<td>72,320</td>
<td>75,150</td>
<td>75,220</td>
<td></td>
</tr>
<tr>
<td>Residential Per Capita Use (gpcd)</td>
<td>100</td>
<td>98</td>
<td>108</td>
<td>110</td>
<td>109</td>
<td>106</td>
<td>105</td>
<td></td>
<td>105</td>
</tr>
<tr>
<td>Non-residential Consumption (mgd)</td>
<td>2.59</td>
<td>2.51</td>
<td>2.73</td>
<td>2.81</td>
<td>2.87</td>
<td>2.78</td>
<td>2.84</td>
<td>2.67</td>
<td>3.1</td>
</tr>
<tr>
<td>Employment Population</td>
<td>---</td>
<td>32,350</td>
<td>---</td>
<td>---</td>
<td>37,317</td>
<td>38,973</td>
<td>40,814</td>
<td>42,666</td>
<td></td>
</tr>
<tr>
<td>Non-residential Per Capita Use (gpcd)</td>
<td>---</td>
<td>77</td>
<td>---</td>
<td>---</td>
<td>77</td>
<td>71</td>
<td>70</td>
<td>63</td>
<td>72</td>
</tr>
</tbody>
</table>

**gpcd = gallons per capita per day**

--- Data unavailable or not calculated for these years.

The residential per capita factors range from 97 to 109 gallons per capita per day (gpcd), with an average of 105 gpcd. The non-residential per capita factors range from 63 to 77 gpcd, with an average of 72 gpcd. For the non residential per capita factors, there has been a downward trend over the last 5 years of data. This may be due to changing patterns in water usage from the City’s conservation program. The residential per capita factors have also slightly decreased over the last 5 years, but the data from 2000 to 2001 was in a similar range of the 2007 data. Based on an evaluation of the data, the average value of 105 gpcd for the residential per capita usage and the maximum value of 77 gpcd will be applied for non-residential per capita use will used for water demand projections.

### 2.3.5 Equivalent Residential Units

An Equivalent Residential Unit (ERU) is a unit of measure used to equate non-residential or multi-family residential water use to a specific number of single family residences. For example, if a system has a capacity to serve 100 ERUs, it has a capacity to serve 100 full-time single family residences. Similarly, it would be able to serve any combination of commercial, industrial, and residential customers provided the quantity of water used is equivalent to the projected needs of 100 full-time single family homes (or 100 ERUs).

The number of ERUs are computed by dividing consumption, whether on a total or on a per-customer-category basis, by the consumption per ERU. Average day consumption data was used to develop the ERU data. The current (based on an average of 1996 through 2000...
data) numbers of ERUs served by the City’s water system are presented in Table 2-8. Non-revenue water was also converted to ERUs so that adding the number of ERUs for each customer classification to the number of ERUs for unaccounted water equals the amount of ERUs supplied from the WTP.

**TABLE 2-8**
City of Bellingham Equivalent Residential Units Conversion by Customer Class

<table>
<thead>
<tr>
<th>Connections</th>
<th>ADD (mgd)</th>
<th>Average gpd per Connection</th>
<th>ERUs per Connection</th>
<th>Total ERUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>19,351</td>
<td>3.85</td>
<td>199</td>
<td>1</td>
</tr>
<tr>
<td>Apartments</td>
<td>1,265</td>
<td>1.47</td>
<td>1,165</td>
<td>6</td>
</tr>
<tr>
<td>Duplexes</td>
<td>1,068</td>
<td>0.26</td>
<td>242</td>
<td>1</td>
</tr>
<tr>
<td>Commercial - General</td>
<td>1,912</td>
<td>1.57</td>
<td>824</td>
<td>4</td>
</tr>
<tr>
<td>Commercial - Lodging</td>
<td>40</td>
<td>0.17</td>
<td>4,158</td>
<td>21</td>
</tr>
<tr>
<td>Industrial - General</td>
<td>49</td>
<td>0.29</td>
<td>5,980</td>
<td>30</td>
</tr>
<tr>
<td>City Facilities</td>
<td>209</td>
<td>0.20</td>
<td>939</td>
<td>5</td>
</tr>
<tr>
<td>College and Universities</td>
<td>49</td>
<td>0.22</td>
<td>4,488</td>
<td>23</td>
</tr>
<tr>
<td>Irrigation</td>
<td>419</td>
<td>0.44</td>
<td>1,047</td>
<td>5</td>
</tr>
<tr>
<td>Water Districts and Associations</td>
<td>11</td>
<td>0.30</td>
<td>27,070</td>
<td>136</td>
</tr>
<tr>
<td>WTP Usage</td>
<td>1</td>
<td>0.12</td>
<td>121,758</td>
<td>612</td>
</tr>
<tr>
<td>Leak Adjustment</td>
<td>---</td>
<td>0.02</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Real Losses</td>
<td>---</td>
<td>0.02</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Unbilled Authorized</td>
<td>---</td>
<td>0.02</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Non-Revenue Water</td>
<td>---</td>
<td>1.36</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24,374</strong></td>
<td><strong>10.32</strong></td>
<td></td>
<td><strong>51,845</strong></td>
</tr>
</tbody>
</table>

### 2.4 Estimated Future Conditions

Estimates of future demand are presented in this section. Conditions that affect future demand such as land use issues and population growth are also discussed.

### 2.5 Land Use

The Bellingham Comprehensive Plan set the stage to reduce sprawl and encourage infill; therefore, no significant changes to the City and County zoning presented in Section 1 are anticipated.
2.6 Population and Demand

As stated in the Bellingham Comprehensive Plan, the City had been historically characterized by slow, but steady population growth. Starting in the 1990s, the trend changed and the population growth has increased substantially. The main source of growth in urban areas has been due to in-migration. The growth in the City has followed County, State, and National growth trends. With in-migration, both the residential population and employment population increase.

In the last several years, the City has been featured in several national publications as one of the best places for outdoor recreation, retirement living, college education, and small businesses with clean air and healthy living. Regionally, the location of the City on a major north-south transportation connection (Interstate 5) and the proximity to areas such as Vancouver, British Columbia, Skagit Valley, the Seattle-Tacoma metropolitan area, the North Cascades, and the San Juan Islands make the City a popular place to live. At the county and local level, education influences, such as Western Washington University and an excellent public school district, excellent health care, and the numerous public greenways and year-round recreation make the City attractive. A combination of the national, regional, and local factors has promoted the in-migration and growth of the City.

2.6.1 Population Growth

Future water demands for the Bellingham water system service area were developed using population projections adopted by the Whatcom County Council in February 2004 and employment projections in the Whatcom County Population and Economic Forecasts Report. The adopted population projections as well as the employment projections were based on work done by ECONorthwest in 2002 and were generated in 5-year increments. Both population and employment projections were used to generate future water demand to account for both residential and non-residential water usage.

The UGA population projections include both population within the City and population in the unincorporated portion of the UGA. Using the City population of 69,260, as estimated by the Office of Financial Management in 2002 (see Table 2-1), results in a remaining population in the unincorporated portion of the UGA of 12,194 in 2002. ECONorthwest also projected that in 2022, 82.5 percent of the Bellingham UGA population would be within the 2002 City limits (ECONorthwest, Table 3-5).

It is assumed that the rate of expansion of water service into the UGA will occur at a uniform rate from 2008 to 2028. Using those assumptions and the data from the ECONorthwest report, population projections were generated to determine the total number of people served by the City for the planning horizon. Projections for the 2014 planning year were generated from linear interpolation and projections for 2028 were generated by linear extrapolation. The population summary is presented in Table 2-9.

As mentioned above, both population and employment projections were used to generate future water usage. Table 2-10 summarizes the employment projection data from the
Whatcom County Population and Economic Forecasts Report. Table 2-10 also shows the projection data for the planning years of 2014 and 2028. The 2014 data was generated from linear interpolation of the data and the 2028 data was generated from linear extrapolation of the ECONorthwest data.

**TABLE 2-9**
City of Bellingham Population Projections

<table>
<thead>
<tr>
<th>Year</th>
<th>Total UGA Population</th>
<th>Population within City Limits</th>
<th>UGA Population Outside City Limits</th>
<th>UGA Population Served</th>
<th>Total Population Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>81,454</td>
<td>69,260</td>
<td>12,194</td>
<td>0</td>
<td>69,260</td>
</tr>
<tr>
<td>2003</td>
<td>83,039</td>
<td>69,850</td>
<td>13,189</td>
<td>0</td>
<td>69,850</td>
</tr>
<tr>
<td>2004</td>
<td>84,623</td>
<td>71,080</td>
<td>12,880</td>
<td>0</td>
<td>71,080</td>
</tr>
<tr>
<td>2005</td>
<td>86,208</td>
<td>72,320</td>
<td>13,230</td>
<td>0</td>
<td>72,320</td>
</tr>
<tr>
<td>2006</td>
<td>87,792</td>
<td>74,210</td>
<td>13,582</td>
<td>679</td>
<td>74,889</td>
</tr>
<tr>
<td>2007</td>
<td>89,377</td>
<td>75,437</td>
<td>13,940</td>
<td>1,394</td>
<td>76,831</td>
</tr>
<tr>
<td>2008</td>
<td>90,979</td>
<td>76,676</td>
<td>14,303</td>
<td>2,145</td>
<td>78,821</td>
</tr>
<tr>
<td>2009</td>
<td>92,581</td>
<td>77,910</td>
<td>14,671</td>
<td>2,934</td>
<td>80,844</td>
</tr>
<tr>
<td>2010</td>
<td>94,184</td>
<td>79,141</td>
<td>15,043</td>
<td>3,761</td>
<td>82,902</td>
</tr>
<tr>
<td>2011</td>
<td>95,786</td>
<td>80,367</td>
<td>15,419</td>
<td>4,626</td>
<td>84,993</td>
</tr>
<tr>
<td>2012</td>
<td>97,388</td>
<td>81,590</td>
<td>15,798</td>
<td>5,529</td>
<td>87,119</td>
</tr>
<tr>
<td>2014</td>
<td>100,488</td>
<td>83,847</td>
<td>16,622</td>
<td>8,050</td>
<td>91,897</td>
</tr>
<tr>
<td>2017</td>
<td>105,310</td>
<td>87,567</td>
<td>17,743</td>
<td>10,646</td>
<td>98,213</td>
</tr>
<tr>
<td>2022</td>
<td>113,055</td>
<td>93,270</td>
<td>19,785</td>
<td>16,793</td>
<td>110,092</td>
</tr>
<tr>
<td>2028</td>
<td>122,672</td>
<td>101,089</td>
<td>21,583</td>
<td>21,583</td>
<td>122,672</td>
</tr>
</tbody>
</table>

**TABLE 2-10**
City of Bellingham Employment Projections

<table>
<thead>
<tr>
<th>Year</th>
<th>Bellingham Employment</th>
<th>Bellingham UGA Employment</th>
<th>UGA Employment Served</th>
<th>Total Employment Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>32,350</td>
<td>3,127</td>
<td>0</td>
<td>32,350</td>
</tr>
<tr>
<td>2004</td>
<td>37,317</td>
<td>3,474</td>
<td>0</td>
<td>37,317</td>
</tr>
<tr>
<td>2005</td>
<td>38,973</td>
<td>3,590</td>
<td>0</td>
<td>38,973</td>
</tr>
<tr>
<td>2006</td>
<td>40,628</td>
<td>3,705</td>
<td>185</td>
<td>40,814</td>
</tr>
<tr>
<td>2007</td>
<td>42,284</td>
<td>3,821</td>
<td>382</td>
<td>42,666</td>
</tr>
<tr>
<td>2008</td>
<td>43,504</td>
<td>3,910</td>
<td>587</td>
<td>44,090</td>
</tr>
<tr>
<td>2009</td>
<td>44,724</td>
<td>4,000</td>
<td>800</td>
<td>45,524</td>
</tr>
<tr>
<td>2010</td>
<td>45,943</td>
<td>4,089</td>
<td>1,022</td>
<td>46,966</td>
</tr>
</tbody>
</table>
2.6.2 Water Demand Projections

Using the population and employment projections presented in Tables 2-8 and 2-9 and applying the per capita unit demand factors summarized in Table 2-6, future water demand requirements for the City’s water distribution system were determined. To project the future water demands, it was also assumed that the unit demand factors and the peaking factors would remain constant through the planning period. The projected water system demands for the required 6-year and 20-year planning periods are summarized in Table 2-11 and in Figure 2-1. The calculated number of ERUs for the planning periods are also summarized in Table 2-11. The projections shown in this table do not include water for backwash water and WTP usage since the water distribution system does not need to be sized to convey those demands.

The amount of water used for backwash usage and plant usage will be dependent on the quantity of water produced at the WTP. Based on historical data, the backwash water has accounted for an average of 3.7 percent of the water system demand and the plant usage has accounted for an average of 1.7 percent of the water system demand. By applying these percentages, total ADD and MDD water demands including backwash and plant usage are summarized in Table 2-12. A comparison of the total MDD is compared to the existing production capacity in Figure 2-2.
### TABLE 2-11
City of Bellingham Summary of Projected Water Demands

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Residential Demand (mgd)</th>
<th>Employment Population</th>
<th>Non-Residential Demand (mgd)</th>
<th>ADD (mgd)</th>
<th>MDD (mgd)</th>
<th>PHD (mgd)</th>
<th>ERUs $^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>87,119</td>
<td>9.1</td>
<td>49,877</td>
<td>3.6</td>
<td>12.7</td>
<td>24.5</td>
<td>36.7</td>
<td>64,013</td>
</tr>
<tr>
<td>2013</td>
<td>89,813</td>
<td>9.4</td>
<td>51,578</td>
<td>3.7</td>
<td>13.1</td>
<td>25.2</td>
<td>37.9</td>
<td>66,050</td>
</tr>
<tr>
<td>2014</td>
<td>91,912</td>
<td>9.7</td>
<td>53,142</td>
<td>3.8</td>
<td>13.5</td>
<td>25.9</td>
<td>38.8</td>
<td>67,723</td>
</tr>
<tr>
<td>2028</td>
<td>122,672</td>
<td>12.9</td>
<td>75,034</td>
<td>5.4</td>
<td>18.3</td>
<td>35.1</td>
<td>52.7</td>
<td>91,874</td>
</tr>
</tbody>
</table>

$^1$Calculated based on 199 gpd/ERU as shown in Table 2-8.

### FIGURE 2-5
City of Bellingham Water Demand Projections
TABLE 2-12
City of Bellingham Total Projected Water Demands

<table>
<thead>
<tr>
<th>Year</th>
<th>Water System ADD (mgd)</th>
<th>Water System MDD (mgd)</th>
<th>ADD Backwash and Plant Usage (mgd)</th>
<th>MDD Backwash and Plant Usage (mgd)</th>
<th>Total ADD (mgd)</th>
<th>Total MDD (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>11.5</td>
<td>22.0</td>
<td>0.6</td>
<td>1.2</td>
<td>12.1</td>
<td>23.2</td>
</tr>
<tr>
<td>2009</td>
<td>11.8</td>
<td>22.6</td>
<td>0.6</td>
<td>1.2</td>
<td>12.4</td>
<td>23.8</td>
</tr>
<tr>
<td>2010</td>
<td>12.1</td>
<td>23.2</td>
<td>0.7</td>
<td>1.3</td>
<td>12.7</td>
<td>24.5</td>
</tr>
<tr>
<td>2011</td>
<td>12.4</td>
<td>23.8</td>
<td>0.7</td>
<td>1.3</td>
<td>13.1</td>
<td>25.1</td>
</tr>
<tr>
<td>2012</td>
<td>12.7</td>
<td>24.5</td>
<td>0.7</td>
<td>1.3</td>
<td>13.4</td>
<td>25.8</td>
</tr>
<tr>
<td>2013</td>
<td>13.1</td>
<td>25.2</td>
<td>0.7</td>
<td>1.4</td>
<td>13.9</td>
<td>26.6</td>
</tr>
<tr>
<td>2014</td>
<td>13.5</td>
<td>25.9</td>
<td>0.7</td>
<td>1.4</td>
<td>14.2</td>
<td>27.3</td>
</tr>
<tr>
<td>2028</td>
<td>18.3</td>
<td>35.1</td>
<td>1.0</td>
<td>1.9</td>
<td>19.3</td>
<td>37.0</td>
</tr>
</tbody>
</table>

FIGURE 2-6
City of Bellingham Water Demand Projections Compared to Existing WTP Capacity
System Analysis

The purpose of this section is to analyze Bellingham’s water system with respect to the following system elements: water quality, supply, treatment, storage, distribution, and other related aspects. System deficiencies revealed by the analyses are summarized and mitigation improvements are described.

3.1 System Design Standards

The analyses presented in this section were undertaken with respect to applicable system design standards. In general, the City’s system and its component elements are designed and operated in conformance with WADOH requirements, as established in WAC 246-290, as well as applicable sections of the *Water System Design Manual* (WSDM) 2001. Key water system design standards adhered to by Bellingham, which provided the bases for the analyses presented in this section, are summarized in the following list. The evaluation of pump stations and conveyance and subsequent improvement and sizing recommendations was completed consistent with standards contained in WAC 246-290 for peak demands and minimum pressure. Closed zone pump stations were evaluated and sized to meet simultaneous peak hour, maximum day, and fire flow requirements. Other more-detailed construction standards required by Bellingham are presented in Section 7.

- **Water Quality**: WADOH water quality standards as established in WAC 246-290-300 through -320.
- **Average and Maximum Daily Demands**: ADDs were generated from evaluating historical billing records and water production data. MDDs were generated from water production data.
- **Peak Hour Demand**: PHDs were generated by applying a peaking factor from the City’s diurnal curve to the MDDs.
- **Storage Requirements**: The storage requirements equal to operating storage plus equalizing storage plus the largest of (WAC 246-290-235, WSDM Chapter 9) standby storage or fire suppression storage.
- **Standby storage volumes (WSDM Chapter 9)**
- **Fire flow volume for rate and duration of largest fire flow used to analyze the City’s storage capacity were those presented in the WADOH Design Manual.**
- **Capacity of pumping facilities, transmission and distribution pipelines, and storage reservoirs must provide refilling of reservoir equalizing volume at the end of the maximum day.**
- **Fire volume withdrawn from storage should be replenished within 72 hours (WSDM Chapter 5).**
Minimum System Pressure: Per City Policy (WSDM Chapter 8) Distribution facilities are sized to provide a minimum system pressure of 30 psi during peak hour demands and 20 psi during maximum daily demand plus fire flows.

Maximum System Pressure: Per WAC 246-290-230 and the City’s WSDM pressures shall not exceed 100 psi.

Minimum Pipe Size: Per WSDM, the City requires the following:
- All new residential mains must be 6 inches in diameter or greater. A grid spacing of 600 feet must be maintained. If 600-foot grid spacing is not possible, an 8-inch main is allowed. The maximum ungridded length may not exceed 1,500 feet. With City approval, 4-inch mains may be allowed where future development is not anticipated provided the main does not serve a fire hydrant.
- All new commercial, industrial, and institutional zones require 8-inch water mains with a grid spacing not to exceed 600 feet. 10-inch mains shall be used where the water system is not gridded. The maximum ungridded length and size of main may be determined by site conditions and fire flow requirements.
- Transmission mains shall not be smaller than 12 inches and shall be spaced on 3,000-foot centers. The actual size of the transmission main shall be determined by peak daily demand plus fire flow requirements.
- Maximum Pipeline Velocity: Water main non-fire condition maximum velocity is limited to 8 feet per second according to the WSDM, Chapter 8.
- Pump Stations: WAC 246-290-235 and the WSDM state that pump stations are sized to provide peak daily flows with the largest unit out of service.
- Telemetry System: Bellingham utilizes both fiber optic and radio-transdyne SCADA to monitor and control the water system.
- Backup Power Requirements: All pump stations constructed since 1996 have backup power systems. All pump stations serving closed zones are equipped with backup power generation equipment. All future pump stations will include backup power in their design. Bellingham also maintains multiple portable generators for use in case of power failure at stations not equipped with on-site backup power generation.

3.2 Water Quality Analysis and Compliance

The City is required to comply with the provisions of the Safe Drinking Water Act (SDWA) and the State’s provisions (WAC 246-290) which generally incorporate SDWA requirements.

3.2.1 Source Water

Typically, Bellingham’s source water (Lake Whatcom and the Middle Fork of the Nooksack River) is high quality. There have been increasing problems with taste and odor complaints
in the summer months related to algal blooms on Lake Whatcom. The City is attempting to mitigate these problems with a rigorous watershed protection plan for the Lake Whatcom watershed, see Section 5 for more discussion of Source Water Protection efforts.

### 3.2.2 Treated Water

Bellingham’s high quality source water yields high quality treated water. Water quality data, provided by the City, can be found in Appendix G. Table 3-1 summarizes the City’s status with respect to current state water quality regulations.

The City’s filtration system is able to adequately treat their water. There were no water quality violations between 2002 and 2007. The water is able to maintain the chlorine residual throughout the distribution system. A corrosion control program is not required because lead and copper levels are below action levels throughout the distribution system.

### 3.3 System Description and Analysis

Lake Whatcom and the Middle Fork of the Nooksack River are the City’s source of water. Further detail regarding these sources, treatment, pressure zone demands, pump stations, PRVs, storage, and distribution systems are described hereafter.

#### 3.3.1 Lake Whatcom and the Middle Fork of the Nooksack River

Lake Whatcom is the historic water source for Bellingham. In 1961, a diversion on the Middle Fork of the Nooksack River was constructed to provide supplemental water to the City’s system. The water flows through a 40-inch tunnel and hydroelectric facility. The transmission system between the Middle Fork of the Nooksack River and the City ends in Mirror Lake. Water is then conveyed to Lake Whatcom by the 2.4-mile-long Anderson Creek. Anderson Creek was re-channeled in 1960 to accommodate the City’s flow from Mirror Lake. Bellingham’s intake in Lake Whatcom was constructed in 1940. It consists of an intake tower that pulls water from below the water surface. Water is conveyed through a tunnel to a Screenhouse and then a 66-inch pipeline to the WTP.

The tunnel between the Middle Fork of the Nooksack and Mirror Lake is a limiting component of the system capacity due to the smaller size of the Nooksack diversion tunnel compared to the pipeline.
between the intake and the treatment plant.

**TABLE 3-1**

City of Bellingham Status with Respect to State Water Quality Regulations

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Sample Location</th>
<th>Sample Frequency</th>
<th>Follow-up Monitoring if Standard Exceeded</th>
<th>Next Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriological Distribution System</td>
<td>Distribution system</td>
<td>80/month</td>
<td>Follow-up sampling, notify WADOH, notify public if exceedance persists</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Inorganics &amp; Physical (less Nitrate and Asbestos)</td>
<td>Entry point to distribution system</td>
<td>Annually</td>
<td>Quarterly Monitoring</td>
<td>Yes</td>
</tr>
<tr>
<td>Asbestos</td>
<td>Distribution system with AS pipe</td>
<td>Every 7 years</td>
<td>Quarterly Monitoring</td>
<td>2008</td>
</tr>
<tr>
<td>Nitrate</td>
<td>Entry point to distribution system</td>
<td>Annually</td>
<td>Quarterly Monitoring</td>
<td>2008</td>
</tr>
<tr>
<td>Lead and Copper</td>
<td>Minimum of 30 distribution sites</td>
<td>Every 36 months</td>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>Organic Chemicals</td>
<td>Entry point to distribution system</td>
<td>Annually</td>
<td>Quarterly Monitoring</td>
<td>2008</td>
</tr>
<tr>
<td>Radionuclides</td>
<td>Source</td>
<td>Every 3 years</td>
<td>Corrective action as required by WADOH</td>
<td>2008</td>
</tr>
<tr>
<td>Unregulated Chemicals (Contaminant Candidate List)</td>
<td>Entry point to distribution system</td>
<td>As required by Congress (generally every 5 years) on quarterly basis</td>
<td>N/A</td>
<td>2008</td>
</tr>
<tr>
<td>Stage 1(^1) Disinfection Byproducts</td>
<td>Four sites in distribution system</td>
<td>Four times annually</td>
<td>Treatment Technique Changes</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Total Organic Carbon/Alkalinity</td>
<td>Untreated and treated water</td>
<td>Monthly</td>
<td>Additional treatment per Surface Water Treatment Rule</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Treatment Plant effluent</td>
<td>Continually</td>
<td>N/A</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Free Chlorine Residual</td>
<td>Treatment Plant and locations within distribution system</td>
<td>Continually at plant, daily in distribution system</td>
<td>N/A</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>

\(^1\)All regulations are in compliance and no corrective actions are needed.  
\(^2\)Used System Specific Study (SSS) approach for Stage 2 Disinfection Byproducts (DBP) Rule; do not start sampling until 2012. 
N/A = not applicable. 
AS = Asbestos
3.3.2 Treatment

The City provides treatment through direct filtration at the Bellingham WTP, constructed in 1968. The water travels through the screenhouse near Lake Whatcom, where traveling screens remove debris from the water. Chlorine and polymer can also be added at this point. Water then flows to the WTP where alum and additional polymer are added prior to rapid mixing, coagulation, and flocculation.

After solids are prepared for removal, the water flows through one of six multi media granular filters. The filters contain 16.5 inches of anthracite coal, 9 inches of silica sand, 4.5 inches of garnet, and 9 inches of graded gravel. The filter media is supported by Leopold clay block underdrains, which are being replaced with stainless steel. Each filter surface area is 560 square feet, with a WADOH-approved filtration rate of 6 gallons per minute per square foot (gpm/ft²). The theoretical filtration capacity of the plant is 29.0 mgd, but because one filter is typically being backwashed, the effective filtration capacity of the plant includes only five of the six filters and is 24.2 mgd. The hydraulic design capacity of the plant is 36.0 mgd.

After filtration, the water is chlorinated as it flows into the 15.6-MG Whatcom Falls II Reservoir, or the “CT Reservoir.” At this point additional chlorine is added and the pH is adjusted with soda ash as the water leaves the reservoir for the 276 North zone.

The plant capacity must not only provide for consumptive demands but also for filter backwash and plant uses and replenishment of fire volume after a fire. The demands in Table 2-11 include allowance for filter backwash and plant uses. Table 1-2 shows the largest fire flow to be 3,500-gpm for 2 hours. The resulting volume is 420,000 gallons. Assuming that replenishment of the fire volume of 420,000 gallons is provided over a 24-hour period, the associated plant capacity required to replenish the fire volume is 0.42 mgd.

The 2014 and 2028 MDD from Table 2-12 plus the fire volume replenishment rate of 0.42 mgd results in 26.3 and 35.5 mgd, respectively. Therefore, there will be a shortfall of 2.1 mgd maximum day supply (26.3 mgd - 24.2 mgd) at 2014. This 2.1 mgd shortfall can be supplied if the filtration rate is increased from 6.0 to 6.5 gpm/ft². Therefore, it will be necessary to seek an increase in approved filtration rate from 6.0 to 6.5 gpm/ft², or alternatively, it will be necessary to add one filter to eliminate the production deficiency of 2.1 mgd by 2014.

Depending on the filtration rate, an addition of two or three filters to the existing plant will be required by 2025. The projected MDD of 35.5 mgd for 2028 is within the hydraulic design capacity of the treatment plan.
3.3.2.1 Treatment Plant Improvements

The treatment plant improvements recommended evaluating and seeking approval for increasing the filtration rate from 6.0 gpm/ft\(^2\) to 6.5 gpm/ft\(^2\) in the 6-year planning period. Depending on the approved filtration rate, two or three filters will be required in the 20-year planning horizon.

3.3.3 Pressure Zone Demands

The system-wide existing and projected water usage was summarized in Section 2, but individual pressure zone demands must be used for analysis for pumping, storage, and the distribution system. A summary of the current pressure zone ADD (as developed from existing customer billing records and meter locations as well as the projected ADD pressure zone demands developed from growth information provided by the City) is shown in Table 3-2. These demands were used in the following sections for the pump station, storage, and distribution analysis.

**TABLE 3-2**
Summary of Bellingham Pressure Zone Average Day Demands

<table>
<thead>
<tr>
<th>Pressure Zone</th>
<th>Planning Year 2008 ADD (gpm)</th>
<th>Planning Year 2014 ADD (gpm)</th>
<th>Planning Year 2028 ADD (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>276 North(^1)</td>
<td>3,192</td>
<td>4,189</td>
<td>5,157</td>
</tr>
<tr>
<td>350 Cordata(^2)</td>
<td>880</td>
<td>1,155</td>
<td>2,122</td>
</tr>
<tr>
<td>457 South(^3)</td>
<td>1,461</td>
<td>1,917</td>
<td>2,332</td>
</tr>
<tr>
<td>460 King Mountain</td>
<td>10</td>
<td>13</td>
<td>110</td>
</tr>
<tr>
<td>519 Dakin &amp; Yew(^4)</td>
<td>915</td>
<td>1,226</td>
<td>1,406</td>
</tr>
<tr>
<td>541 College Way</td>
<td>57</td>
<td>75</td>
<td>78</td>
</tr>
<tr>
<td>696 Padden Yew</td>
<td>309</td>
<td>406</td>
<td>585</td>
</tr>
<tr>
<td>730 Alabama Hill</td>
<td>242</td>
<td>318</td>
<td>497</td>
</tr>
<tr>
<td>830 Reveille(^5)</td>
<td>19</td>
<td>25</td>
<td>163</td>
</tr>
<tr>
<td>873 Governor Road(^5)</td>
<td>47</td>
<td>62</td>
<td>200</td>
</tr>
<tr>
<td>Total Pressure Zone (future)</td>
<td>11</td>
<td>14</td>
<td>70</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,143</strong></td>
<td><strong>9,399</strong></td>
<td><strong>12,694</strong></td>
</tr>
<tr>
<td><strong>Total (mgd)</strong></td>
<td><strong>10.3</strong></td>
<td><strong>13.5</strong></td>
<td><strong>18.3</strong></td>
</tr>
</tbody>
</table>

\(^1\)Includes demands for Montgomery Road Water Association, Water District #2, and LWW&SD.

\(^2\)Includes demands for Deer Creek Association.

\(^3\)Includes demands for California Street Water Association.

\(^4\)Includes demands for LWW&SD, Water District #7, and Glen Cove Cooperative.

\(^5\)Pressure zones 830 Reveille and 873 Governor Road will be combined to 870 Upper Yew pressure zone by 2028.
3.3.4 Pump Stations

The City’s system has several pump stations. These pump stations include the pumps at Otis Street, Dakin & Yew, Reveille, Governor, Birch Street, Woburn Street, College Way, Short Street, Consolidation, 38th Street, and Balsam Lane. The location of Bellingham’s pump stations are shown in Figure 1-3. A schematic presentation of the City’s hydraulic profile is presented in Figure 1-2. These pump stations are summarized in Table 3-3 and described in the following subsections.

Information on the projected demands for each pressure zone are shown in Table 3-2. The demand information included in Table 3-2 was applied in the pumping analysis conducted by pump station shown in Tables 3-4 through 3-11 and the storage analysis conducted by pressure zone shown in Tables 3-14 through 3-18.

The pump station capacity evaluation accounts for the capacity that a lower zone pump station must have in order to deliver water demand to all higher zones that are served by that pump station. This is specifically shown in each of the individual pump station evaluation tables in Section 3.3.4. Each of the higher zones that a lower pump station serves are listed with their demand in the individual pump station tables (Tables 3-4 through 3-11). For those zones that are served by two pump stations, the pump station supply capacity is evaluated based on the total combined firm pumping capacity of the two pump stations. This is also shown in the series of pump station capacity evaluation tables included in Section 3.3.4.

The pump station capacity evaluation also identifies pump stations that serve closed end zones where the pump station must have capacity to not only supply PHD (since no equalization storage is provided in the closed zone) but also must have the capacity to supply MDD plus fire flow. The fire flow storage must be provided in the pressure zone that the closed end pump station pumps from (suction zone). The storage portion of this analysis is included in the storage analysis tables summarized by pressure zone in Section 3.3.6.4.

All pump stations constructed since 1996 have backup power systems. All pump stations serving closed zones are equipped with backup power generation equipment. All future pump stations will include backup power in their design. Bellingham also maintains multiple portable generators for use in case of power failure at stations not equipped with on-site backup power generation.

Until future storage projects are constructed, the City will have to supply PHD as well as MDD plus fire flow to closed-end zones. The pumping evaluation as shown in Tables 3-4 through 3-11 includes specific lines for PHD and for fire flow where required. As shown in these tables, the James Street Pump Station shows a deficiency for providing fire flow through the 6-year planning period. Improvements are recommended for the James Street Pump Station.
### TABLE 3-3
City of Bellingham Pump Stations

<table>
<thead>
<tr>
<th>Pump Station Name</th>
<th>Pump Station</th>
<th>Year Pump Installed</th>
<th>Pump Manufacturer</th>
<th>Pump Motor (hp)</th>
<th>Capacity (gpm)</th>
<th>Pump Head (ft)</th>
<th>Zone Supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otis Street</td>
<td>Pump 1</td>
<td>1967</td>
<td>DeLaval</td>
<td>150</td>
<td>3,500</td>
<td>215</td>
<td>457 South</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>1967</td>
<td>DeLaval</td>
<td>250</td>
<td>3,500</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>1967</td>
<td>DeLaval</td>
<td>250</td>
<td>1,000</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 4</td>
<td>1967</td>
<td>Paco</td>
<td>100</td>
<td>1,000</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td>Dakin &amp; Yew</td>
<td>Pump 1</td>
<td>1995</td>
<td>Layne &amp; Bowler</td>
<td>150</td>
<td>1,500</td>
<td>285</td>
<td>519 Dakin &amp; Yew</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>1995</td>
<td>Layne &amp; Bowler</td>
<td>150</td>
<td>1,500</td>
<td>285</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>1995</td>
<td>Layne &amp; Bowler</td>
<td>150</td>
<td>1,500</td>
<td>285</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 4</td>
<td>1995</td>
<td>Layne &amp; Bowler</td>
<td>150</td>
<td>1,500</td>
<td>285</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 5</td>
<td>1995</td>
<td>Layne &amp; Bowler</td>
<td>150</td>
<td>1,500</td>
<td>285</td>
<td></td>
</tr>
<tr>
<td>James Street</td>
<td>Pump 1</td>
<td>2001</td>
<td>PACO</td>
<td>10</td>
<td>120</td>
<td>260</td>
<td>460 King Mountain</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>2001</td>
<td>PACO</td>
<td>10</td>
<td>120</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>Woburn Street</td>
<td>Pump 1</td>
<td>1985</td>
<td>Allis-Chalmers</td>
<td>100</td>
<td>2,000</td>
<td>282</td>
<td>519 Dakin &amp; Yew</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>1985</td>
<td>Allis-Chalmers</td>
<td>100</td>
<td>2,000</td>
<td>282</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>1999</td>
<td>PACO</td>
<td>75</td>
<td>700</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 4</td>
<td>1999</td>
<td>PACO</td>
<td>75</td>
<td>700</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>College Way</td>
<td>Pump 1</td>
<td>2006</td>
<td>American Marsh</td>
<td>150</td>
<td>600</td>
<td>145</td>
<td>541 College Way</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>2006</td>
<td>American Marsh</td>
<td>150</td>
<td>600</td>
<td>145</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>2006</td>
<td>American Marsh</td>
<td>400</td>
<td>1,000</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 4</td>
<td>2006</td>
<td>American Marsh</td>
<td>400</td>
<td>1,000</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 5</td>
<td>2006</td>
<td>American Marsh</td>
<td>7.5</td>
<td>100</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 6</td>
<td>2006</td>
<td>American Marsh</td>
<td>7.5</td>
<td>100</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>Short Street</td>
<td>Pump 1</td>
<td>1987</td>
<td>Fairbanks Morse</td>
<td>200</td>
<td>2,500</td>
<td>350</td>
<td>350 Cordata</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>1987</td>
<td>Fairbanks Morse</td>
<td>200</td>
<td>2,500</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>1987</td>
<td>PACO</td>
<td>40</td>
<td>750</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 4</td>
<td>1987</td>
<td>PACO</td>
<td>40</td>
<td>750</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 5</td>
<td>1987</td>
<td>PACO</td>
<td>40</td>
<td>750</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 6</td>
<td>1987</td>
<td>PACO</td>
<td>40</td>
<td>750</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 7</td>
<td>1987</td>
<td>PACO</td>
<td>40</td>
<td>750</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>Consolidation</td>
<td>Pump 1</td>
<td>1959</td>
<td>PACO</td>
<td>40</td>
<td>550</td>
<td>200</td>
<td>696 Padden Yew</td>
</tr>
</tbody>
</table>
### TABLE 3-3
City of Bellingham Pump Stations

<table>
<thead>
<tr>
<th>Pump Station Name</th>
<th>Pump Station</th>
<th>Year Pump Installed</th>
<th>Pump Manufacturer</th>
<th>Pump Motor (hp)</th>
<th>Capacity (gpm)</th>
<th>Pump Head (ft)</th>
<th>Zone Supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>38th Street</td>
<td>Pump 1</td>
<td>1984</td>
<td>PACO</td>
<td>75</td>
<td>500</td>
<td>338</td>
<td>696 Padden Yew</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>1984</td>
<td>PACO</td>
<td>75</td>
<td>500</td>
<td>338</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>1984</td>
<td>PACO</td>
<td>75</td>
<td>500</td>
<td>338</td>
<td></td>
</tr>
<tr>
<td>Birch Street</td>
<td>Pump 1</td>
<td>2005</td>
<td>PACO</td>
<td>60</td>
<td>90</td>
<td>181</td>
<td>780 Birch Street</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>2005</td>
<td>PACO</td>
<td>60</td>
<td>575</td>
<td>330</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>2005</td>
<td>PACO</td>
<td>100</td>
<td>575</td>
<td>330</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 4</td>
<td>2005</td>
<td>Sulzer</td>
<td>15</td>
<td>1100</td>
<td>279</td>
<td></td>
</tr>
<tr>
<td>Balsam Lane</td>
<td>Pump 1</td>
<td>1994</td>
<td></td>
<td>60</td>
<td>600</td>
<td>196</td>
<td>730 Alabama Hill</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>1994</td>
<td></td>
<td>60</td>
<td>600</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>1994</td>
<td></td>
<td>60</td>
<td>500</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 4</td>
<td>1994</td>
<td></td>
<td>60</td>
<td>500</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td>Governor Road</td>
<td>Pump 1</td>
<td>1999</td>
<td>Grundfos</td>
<td>10</td>
<td>180</td>
<td>215</td>
<td>873 Governor Road</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td>1998</td>
<td>Grundfos</td>
<td>10</td>
<td>180</td>
<td>215</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pump 3</td>
<td>1998</td>
<td>Peerless</td>
<td>40</td>
<td>1100</td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>Reveille</td>
<td>Pump 1</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>217</td>
<td>830 Reveille</td>
</tr>
<tr>
<td></td>
<td>Pump 2</td>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>217</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3.4.1 Otis Street

The Otis Street pump station supplies water to the 457 South zone from the 276 North zone. It is the only means of boosting water to this zone, thus it serves as an essential link in the City’s water system. The pump station’s four pumps are housed in a brick building located near the intersection of Otis Street and East Maple Street, and was constructed in 1967.

Water pumped by the Otis Street Pump station to the 457 South zone is the sole source of supply for the College Way 541 zone through the College Way pump station. In addition, water pumped by the Otis Street Pump station becomes one of two sources of supply for the 696 Padden Yew zone via the 38th Street Pump Station (see Figure 1-2, Existing Hydraulic Profile).
As shown in Table 3-4, the Otis Street pump station has sufficient capacity through the 6-year and 20-year planning period to meet the demands of the 457 South zone. No improvements to the Otis Street pump station are recommended.

### 3.3.4.2 Dakin & Yew

The Dakin & Yew pump station supplies water to the 519 Dakin & Yew zone from the CT Reservoir (Whatcom Falls II) in the 276 North zone. It is one of two pump stations supplying this zone, the other one being the Woburn Street pump station. The Dakin & Yew pump station is located at the Bellingham WTP. The pump station was constructed in 1995. The station includes an emergency backup generator as part of the water treatment plant.

Together with water supplied by the Woburn Street Pump Station, water pumped to the 519 Dakin & Yew is pumped again to three additional pressure zones; 696 Padden Yew, 730 Alabama Hill, and 780 Birch Street. No improvements are recommended as documented in Table 3-5 below.
3.3.4.3 Woburn Street

The Woburn Street pump station supplies water to the 519 Dakin & Yew zone from the 276 North zone. Woburn Street pump station is located on Woburn Street and East Illinois Street and is housed in an above-ground brick building. The two Allis-Chalmers pumps are used for fire flow, while the two PACO pumps supply normal demands. The pump station was primarily used for fire flow until the Olympic Pipe Line explosion, after which the pumps were upgraded to the current configuration in 1999. The Woburn Street pump station has sufficient capacity through the 6- and 20-year planning horizon to supply water to the 519 Dakin & Yew pressure zone as well as the pressure zones that are served through the 519 Dakin & Yew pressure zone. No improvements are recommended as documented in Table 3-5 below.

<table>
<thead>
<tr>
<th>Zones Served</th>
<th>Existing MDD</th>
<th>2014 MDD</th>
<th>2028 MDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>519 Dakin &amp; Yew</td>
<td>1,757</td>
<td>2,306</td>
<td>2,597</td>
</tr>
<tr>
<td>696 Padden Yew</td>
<td>593</td>
<td>779</td>
<td>1,124</td>
</tr>
<tr>
<td>730 Alabama Hill¹</td>
<td>465</td>
<td>610</td>
<td>955</td>
</tr>
<tr>
<td>780 Birch Street¹</td>
<td>0</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td><strong>Total MDD</strong></td>
<td><strong>2,815</strong></td>
<td><strong>3,742</strong></td>
<td><strong>4,729</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Existing MDD Capacity</th>
<th>9,400</th>
<th>9,400</th>
<th>9,400</th>
</tr>
</thead>
</table>

| Excess (Deficient) MDD Pumping Capacity | 6,585 | 5,658 | 4,671 |

¹ Closed Zone

3.3.4.4 James Street

The James Street pump station supplies water from the 276 North zone to the 460 King Mountain closed zone. It was constructed in 2001. The James Street pump station is deficient in providing fire flow and is recommended to be upgraded to provide fire flow and to provide for the projected growth in demand for the King Mountain area. The pumping analysis showing the deficiency for the James Street Pump Station is shown below in Table 3-6.
TABLE 3-6
Summary of James Street Pump Station Capacity Evaluation¹

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Flow Required</td>
<td>750</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td>Peak Hour Demand</td>
<td>29</td>
<td>38</td>
<td>316</td>
</tr>
<tr>
<td>FF + PHD Required</td>
<td>769</td>
<td>775</td>
<td>961</td>
</tr>
<tr>
<td>Existing Maximum</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td>Capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excess (Deficient)</td>
<td>(529)</td>
<td>(535)</td>
<td>(721)</td>
</tr>
<tr>
<td>MDD Pumping Capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Closed Zone

3.3.4.5 Short Street
The Short Street pump station supplies water to the 350 Cordata zone from the 276 North zone, and is the only means of boosting water to this zone. The pump station is located in an above ground brick building located on Short Street in north Bellingham, near the Whatcom Community College. The pump station was constructed in 1987. The station includes separate electrical service for the fire pumps and the rest of the station operation as well as an emergency generator. The station contains two 200-horsepower (hp) fire pumps and four 40-hp normal supply pumps. Based on the current configuration of supplying Peak Hour Demands and Fire Flow, supply to the existing 350 Cordata pressure zone is deficient to meet water demands in the future, so a new storage tank (King Street Reservoir) is planned for this zone at a hydraulic grade line (HGL) of 370 feet. Raising the HGL of the Cordata zone by 20 feet will change the output of the existing Short Street Pump Station since the pumps will need to operate at a different point on their curve. Therefore an additional pump station near the existing James Street pump station is recommended to also provide supply to the reconfigured Cordata zone. Construction of the proposed King Street reservoir will increase operating hydraulic grade line (HGL) of the Cordata zone from 350 to 370 feet and reduce pumping requirements to the new zone from meeting Peak Hour Demands to meeting Maximum Day Demands. The evaluation of the Short Street pump station is shown below in Table 3-7.
### TABLE 3-7
Summary of Short Street Pump Stations Capacity Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Flow Required(^1)</td>
<td>3,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Hour Demand</td>
<td>2,534</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Day Demand(^2)</td>
<td></td>
<td>2,217</td>
<td>4,075</td>
</tr>
<tr>
<td>FF + PHD/MDD Required</td>
<td>6,034</td>
<td>2,217</td>
<td>4,075</td>
</tr>
<tr>
<td>Existing Maximum Capacity</td>
<td>8,750</td>
<td>8,750</td>
<td>8,750</td>
</tr>
<tr>
<td>Excess (Deficient) MDD Pumping Capacity</td>
<td>2,716</td>
<td>6,533</td>
<td>4,675</td>
</tr>
</tbody>
</table>

\(^1\) After construction of the King Street Reservoir fire flow is provided from storage;

\(^2\) Construction of the 1.9 MG King Street Reservoir converts the pumping capacity analysis calculations from PHD to MDD.

---

#### 3.3.4.6 College Way

The College Way pump station supplies water to the 541 College Way zone from the 457 South zone. It is the only pump station supplying this zone. The pump station, constructed in 2006 to replace an older constant pressure pump system, is housed in a partially buried concrete building. It is located near the intersection of Highland Drive and West College Way, to the west of the Western Washington University campus. The 541 College Way pump station has sufficient capacity through the 6- and 20-year planning periods, and no improvements are recommended as shown in the pump station analysis in Table 3-8.
### TABLE 3-8

Summary of College Way Pump Station Capacity Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Flow Required</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Peak Hour Demand</td>
<td>164</td>
<td>215</td>
<td>223</td>
</tr>
<tr>
<td>FF + PHD Required</td>
<td>2,164</td>
<td>2,215</td>
<td>2,223</td>
</tr>
<tr>
<td>Existing Maximum</td>
<td>3,400</td>
<td>3,400</td>
<td>3,400</td>
</tr>
<tr>
<td>Capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excess (Deficient)</td>
<td>1,236</td>
<td>1,185</td>
<td>1,177</td>
</tr>
<tr>
<td>MDD Pumping Capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Closed Zone

#### 3.3.4.7 Consolidation

The Consolidation pump station supplies water to the 696 Padden Yew zone from the 519 Dakin & Yew zone. It is one of two pump stations supplying this zone. The Consolidation pump station constructed in 1959 and is housed in an underground building at the intersection of Yew Street and San Juan Boulevard. The 38th Street pump station described below also supplies water to the 696 Padden Yew zone. The combined supply capacity of the two pump stations is sufficient in the 6-year planning period to meet projected demands, but the supply capacity is deficient in the 20-year planning period. It is recommended that the Consolidation pump station be upgraded to meet the future supply needs. The analysis of the Consolidation pump station and the 38th Street pump station is shown below in Table 3-9.

#### 3.3.4.8 38th Street

The 38th Street pump station supplies water to the 696 Padden Yew zone. It is the second pump station supplying this zone. The 38th Street pump station is located along the border between 457 South zone and 696 Padden Yew zone, just west of Lake Padden and was constructed in 1984. The analysis of the supply to the 696 Padden Yew zone from the Consolidation pump station and the 38th Street pump station is shown below in Table 3-9, and to meet future water demands, it is recommended that the Consolidation pump station be upgraded.
**TABLE 3-9**
Summary of Consolidation and 38th Street Pump Stations Capacity Evaluation

<table>
<thead>
<tr>
<th>Zones Served</th>
<th>Existing MDD</th>
<th>2014 MDD</th>
<th>2028 MDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>696 Padden Yew</td>
<td>593</td>
<td>779</td>
<td>1,124</td>
</tr>
<tr>
<td>873 Governor Road</td>
<td>90</td>
<td>118</td>
<td>384</td>
</tr>
<tr>
<td>830 Reveille¹</td>
<td>36</td>
<td>48</td>
<td>313</td>
</tr>
<tr>
<td><strong>Total MDD</strong></td>
<td><strong>720</strong></td>
<td><strong>945</strong></td>
<td><strong>1,821</strong></td>
</tr>
<tr>
<td><strong>Existing MDD Capacity¹</strong></td>
<td><strong>1,400</strong></td>
<td><strong>1,400</strong></td>
<td><strong>1,400</strong></td>
</tr>
<tr>
<td><strong>Excess (Deficient) MDD Pumping Capacity</strong></td>
<td>680</td>
<td>455</td>
<td>(421)</td>
</tr>
</tbody>
</table>

¹ Closed Zone

### 3.3.4.9 Birch Street

The Birch Street pump station supplies water to the Birch Street closed zone. The pump station is located near the intersection of Birch Street and Riley Street, just west of Lake Whatcom. It was constructed in 2005. The Birch Street pump station has sufficient capacity to meet projected water demands for the 6- and 20-year planning periods, so no improvements are recommended. The Birch Street pump station analysis is shown in Table 3-10.

**TABLE 3-10**
Summary of Birch Street Pump Station Capacity Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fire Flow Required</strong></td>
<td>750</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Peak Hour Demand</strong></td>
<td>0</td>
<td>72</td>
<td>79</td>
</tr>
<tr>
<td><strong>FF + PHD/MDD Required</strong></td>
<td>750</td>
<td>798</td>
<td>803</td>
</tr>
<tr>
<td><strong>Existing Maximum Capacity</strong></td>
<td>1,765</td>
<td>1,765</td>
<td>1,765</td>
</tr>
<tr>
<td><strong>Excess (Deficient) MDD Pumping Capacity</strong></td>
<td>1,015</td>
<td>967</td>
<td>962</td>
</tr>
</tbody>
</table>
3.3.4.10 Balsam Lane

The Balsam Lane pump station supplies water to the 730 Alabama Hill zone. It is the only means of boosting water to this zone. The pump station is located in an above ground brick building located at the end of Balsam Lane to the north of the northwest tip of Lake Whatcom. The pump station was constructed in 1994. The Balsam Lane pump station has insufficient capacity to provide PHD plus fire flow to the 730 Alabama Hill zone in the 6-year and 20-year planning period. However, for the 6- and 20-year planning periods, the MDD plus fire flow conditions are met with the current pumps. To improve zone operation, it is recommended that a 1.5 million gallon storage reservoir be constructed (see Section 3.3.6) in lieu of providing additional pumping capacity to the zone. If storage is provided, the current pump station is sufficient through the 20-year planning period as shown in the pump station analysis in Table 3-11.

<table>
<thead>
<tr>
<th>TABLE 3-11</th>
<th>Summary of Balsam Lane Pump Station Capacity Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
</tr>
<tr>
<td>Fire Flow Required(^1)</td>
<td>1,500</td>
</tr>
<tr>
<td>Peak Hour Demand</td>
<td>697</td>
</tr>
<tr>
<td>Maximum Day Demand(^2)</td>
<td></td>
</tr>
<tr>
<td>FF + PHD/MDD Required</td>
<td>2,190</td>
</tr>
<tr>
<td>Existing Maximum Capacity</td>
<td>2,050</td>
</tr>
<tr>
<td>Excess (Deficient) MDD Pumping Capacity</td>
<td>85</td>
</tr>
</tbody>
</table>

\(^1\) After construction of the 1.5 MG Alabama Hill Reservoir fire flow is provided from storage;

\(^2\) Construction of the 1.5 MG Alabama Hill Reservoir converts the pumping capacity analysis calculations from PHD to MDD.
3.3.4.11 Governor Road

The Governor Road pump station supplies water to the 873 Governor Road zone. The pump station is located in an above ground brick building along Governor Road to the north of Lake Padden. The pump station was constructed in 1998 and 1999. The pump station building is old with minimal security. It is planned that the 873 Governor Road pressure zone and the 830 Reveille pressure zone be combined and converted to operate at an HGL of 870 feet. With the joining of the pressure zones, a new pump station (40th Street pump station) is currently planned to be constructed at the site of the 40th Street reservoir. This pump station will replace the existing Governor Road pump station and allow the HGL to be increased to 870 feet for this zone. This improvement is planned to occur in the 20-year planning horizon and will alleviate the pumping deficiency as shown in Table 3-12 by 2028.

<table>
<thead>
<tr>
<th>Zones Served</th>
<th>Existing MDD</th>
<th>2014 MDD</th>
<th>2028 MDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>830 Reveille</td>
<td></td>
<td></td>
<td>313</td>
</tr>
<tr>
<td>873 Governor Road</td>
<td>90</td>
<td>118</td>
<td>384</td>
</tr>
<tr>
<td>950 Pressure Zone¹</td>
<td></td>
<td></td>
<td>134</td>
</tr>
<tr>
<td>Total Required</td>
<td>90</td>
<td>118</td>
<td>831</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Existing MDD Capacity¹</th>
<th>180</th>
<th>180</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess (Deficient)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDD Pumping Capacity</td>
<td>90</td>
<td>62</td>
<td>(651)</td>
</tr>
</tbody>
</table>

¹ Closed Zone

3.3.4.12 Reveille

The Reveille pump station supplies water to the 830 Reveille zone. The pump station is located at the site of the Reveille reservoir along Yew Street. As mentioned above, it is planned that the 873 Governor Road and 830 Reveille pressure zones be combined and that the HGL is increased to 870 feet. It is recommended that the Reveille pump station be upgraded to meet the 6-year and 20-year planning period demands effectively and conform to the newly created 870 Upper Yew HGL. The pump station has the capacity to meet PHD but cannot meet fire flow in the 830 Reveille pressure zone. Once the 873 Governor Road and 830 Reveille pressure zones are combined, the fire flow deficiency is alleviated with the new storage tank for the pressure zone. The Reveille pump station analysis is shown in Table 3-13 below.
### TABLE 3-13
Summary of Reveille Pump Stations Capacity Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Flow Required</td>
<td></td>
<td>750</td>
<td></td>
</tr>
<tr>
<td>Peak Hour Demand</td>
<td></td>
<td>55</td>
<td>72</td>
</tr>
<tr>
<td>FF + PHD/MDD Required</td>
<td></td>
<td>805</td>
<td>822</td>
</tr>
<tr>
<td>Existing Maximum Capacity</td>
<td></td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Excess (Deficient) MDD Pumping Capacity</td>
<td>(505)</td>
<td>(522)</td>
<td>(920)</td>
</tr>
</tbody>
</table>

#### 3.3.4.13 Recommended Pump Station Improvements

A summary of the pump station improvements as discussed above is presented below:

- **PS-1**: A new 40th Street pump station with a capacity of 740 gpm is recommended to serve the new Upper Yew storage reservoir. In the future, the 830 Reveille and 873 Governor Road pressure zones will be connected and will be served by the new 40th Street pump station and the new 870 Upper Yew reservoir. The addition of the new 40th Street pump station and the improvement of the Reveille pump station will meet the projected demands for the combined 870 Upper Yew and the 950 pressure zones served through the 870 Upper Yew pressure zone through the planning period.

- **PS-2**: A new Kearney Road pump station with a capacity of 2,000 gpm is recommended to serve the proposed King Mountain reservoir. The Kearney Road pump station will provide redundancy for the existing Short Street pump station that serves the 350 Cordata pressure zone. With the construction of the new King Mountain reservoir, the 350 Cordata pressure zone will be converted to a 370 Cordata pressure zone and will operate at the higher HGL.

- **PS-3**: An upgrade is recommended to the existing Consolidation pump station. The upgrade will increase the capacity of the pump station to 1,250 gpm so that demands of the 696 Padden Yew pressure zone can be met for the 20-year planning horizon.

- **PS-4**: An upgrade is recommended to the existing Reveille pump station. The upgrade will increase the capacity of the pump station to 1,000 gpm. The upgrade to the Reveille pump station and the addition of the new 40th Street pump station will meet projected demands for the future planned combined 870 Upper Yew and the future planned 950...
pressure zone that will be supplied through the future 870 Upper Yew pressure zone during the 20-year planning period.

♦ PS-5: A new 950 pressure zone pump station is recommended to serve customers that are located above the elevation of the planned 870 Upper Yew storage reservoir. The proposed new 950 pressure zone will be a closed end zone, and the capacity of the pump station to meet PHD through the planning period will be 350 gpm.

♦ PS-6: A replacement of the James Street pump station is recommended to meet fire flow and projected demands for the 20-year planning period. The pump station has capacity to meet the projected 6-year PHD but cannot meet existing fire flow requirements. The recommended capacity for the pump station upgrade is 1,000 gpm.

3.3.5 Pressure-Reducing Valve Stations

The PRVs in the City’s system are primarily used to control pressures in low elevations. They are not used to supply a lower pressure zone from a higher pressure zone. The Pacific Highway PRV is shown on Figure 1-2, Existing Hydraulic Profile.

3.3.6 Storage

The distribution system storage within Bellingham’s system is comprised of 13 reservoirs constructed between 1930 and 2006. The location of the storage is split between localized storage at the WTP and distributed storage through the City’s pressure zones. While the overall system storage meets current storage requirements and excess pumping capacity is available to transfer stored water, existing storage deficiencies have been identified in three zones. The deficient storage facilities all provide storage for multiple zones. More detailed discussion of the City’s reservoirs is provided in the following subsections. Hydraulic modeling of the system was used to evaluate system-wide and individual pressure zone storage. This modeling also provided the basis for the location and sizing of recommended storage improvements.

Information on the projected demands for each pressure zone are shown in Table 3-2. The demand information included in Table 3-2 was applied in the pumping analysis conducted by pump station shown in Tables 3-4 through 3-11 and the storage analysis conducted by pressure zone shown in Tables 3-14 through 3-18.

The future storage evaluation conducted for this plan includes the five components of storage (Operational Storage (OS), Equalizing Storage (ES), Standby Storage (SB), Fire Suppression Storage (FSS), Dead Storage (DS)) as described in Section 3.3.6.2. The volume for each component of storage (Operational, Equalization, Standby, Fire Suppression) as well as total required storage volume, the existing storage, and surplus or deficit volume are presented in Tables 3-13 through 3-18. Section 3.3.6.4, Table 3-13 shows the system-wide storage evaluation, and Tables 3-14 through 3-18 show the individual pressure zone evaluation.
Storage evaluation distinguishes between Total Storage, and the Total Storage Available and not required for CT. Refer to table 3-14 for the total system storage (29.37 MG, including CT volume; 25.27 MG, not including CT volume of 4.1 MG). With this distinction between required storage volumes for the reservoirs shown in Table 3-14, the volume available in the 276 North Pressure Zone is 18.6 MG. See Table 3-15. The total storage in the 696 Padden Yew Zone is 1.5 MG, as shown in Table 3-19.

### 3.3.6.1 Description

The City has thirteen distribution system storage reservoirs as summarized in Table 3-14. Each of the reservoirs is in relatively good condition, and all of these reservoirs (except the Parkhurst reservoir) are expected to remain serviceable for at least the 20-year planning horizon. Several of Bellingham’s existing storage facilities have common inlets and outlets. As improvements are planned and implemented at these reservoirs the issue of common inlets and outlets will be addressed. Descriptions of each of these reservoirs are presented in the subsections below.

**Dakin I** The Dakin I reservoir was constructed in 1987. This reservoir has an overflow elevation of 519 feet and serves the 519 Dakin & Yew zone. Dakin I reservoir is a pre-stressed concrete cylinder constructed in an embankment. The reservoir has a capacity of 0.5 MG and is 22.3 feet deep.

**Dakin II** The Dakin II reservoir was constructed in 1990. Like Dakin I, it has an overflow elevation of 519 feet and serves the 519 Dakin & Yew zone. Dakin II reservoir is a pre-stressed concrete cylinder constructed partially above ground. The reservoir is 18.5 feet deep with a total capacity of 0.5 MG.

**Marietta** The Marietta reservoir was constructed in 1969 and has an overflow elevation of 276 feet and serves the 276 North zone. Marietta reservoir is a steel tank cylinder constructed completely above ground. The reservoir is 51 feet deep with a total capacity of 3 MG. Marietta reservoir is in mostly good condition and was painted in the summer of 2008.
### TABLE 3-14
City of Bellingham Reservoirs

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Year Built</th>
<th>Capacity (MG)</th>
<th>Common Inlet/Outlet</th>
<th>Zone Served</th>
<th>Max Water Level (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakin I</td>
<td>Balsam Lane and Sylvan Street</td>
<td>1987</td>
<td>0.5</td>
<td>Yes</td>
<td>519 Dakin &amp; Yew</td>
<td>519</td>
</tr>
<tr>
<td>Dakin II</td>
<td>Balsam Lane and Sylvan Street</td>
<td>1990</td>
<td>0.5</td>
<td>Yes</td>
<td>519 Dakin &amp; Yew</td>
<td>519</td>
</tr>
<tr>
<td>Marietta</td>
<td>Marietta Avenue and Wynn Road</td>
<td>1969</td>
<td>3.0</td>
<td>Yes</td>
<td>276 North</td>
<td>276</td>
</tr>
<tr>
<td>Whatcom Falls I</td>
<td>Whatcom Falls Park</td>
<td>1984</td>
<td>4.1</td>
<td>Yes</td>
<td>276 North</td>
<td>276</td>
</tr>
<tr>
<td>Whatcom Falls II</td>
<td>Whatcom Falls Park</td>
<td>1993</td>
<td>15.6&lt;sup&gt;1&lt;/sup&gt;</td>
<td>No</td>
<td>276 North</td>
<td>276</td>
</tr>
<tr>
<td>Kearney</td>
<td>James Street Road and Gooding Avenue</td>
<td>2006</td>
<td>2.49</td>
<td>No</td>
<td>276 North</td>
<td>276</td>
</tr>
<tr>
<td>Consolidation</td>
<td>San Juan Boulevard and Yew Street Road</td>
<td>1959</td>
<td>0.5</td>
<td>Yes</td>
<td>519 Dakin &amp; Yew</td>
<td>519</td>
</tr>
<tr>
<td>Padden</td>
<td>38th Street and Broad Street</td>
<td>1958</td>
<td>0.5</td>
<td>Yes</td>
<td>457 South</td>
<td>457</td>
</tr>
<tr>
<td>College Way</td>
<td>Highland Drive and W College Way</td>
<td>1968</td>
<td>0.5</td>
<td>Yes</td>
<td>541 College Way</td>
<td>541</td>
</tr>
<tr>
<td>Sehome&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Sehome Hill near Oak Street and Indian Terrace</td>
<td>1920</td>
<td>0.7</td>
<td>Yes</td>
<td>457 South</td>
<td>457</td>
</tr>
<tr>
<td>Reveille</td>
<td>Reveille Street and Yew Street Road</td>
<td>1958</td>
<td>0.3</td>
<td>Yes</td>
<td>696 Padden Yew</td>
<td>696</td>
</tr>
<tr>
<td>40&lt;sup&gt;th&lt;/sup&gt; Street</td>
<td>40th Street and Mill Avenue</td>
<td>1958</td>
<td>0.5</td>
<td>Yes</td>
<td>696 Padden Yew</td>
<td>696</td>
</tr>
<tr>
<td>Parkhurst</td>
<td>Parkhurst Drive and Samish Crest Way</td>
<td>1997</td>
<td>0.18</td>
<td>Yes</td>
<td>873 Governor Road</td>
<td>873</td>
</tr>
</tbody>
</table>

<sup>1</sup>Total volume of Whatcom Falls II is 15.6 MG, lower 7.1 feet (4.1 MG) is required for CT; Total volume available as system storage is 10.5 MG

<sup>2</sup>Estimated year of construction.

**Whatcom Falls I** The Whatcom Falls I reservoir was constructed in 1984. This reservoir has an overflow elevation of 276 feet and serves the 276 North zone. Whatcom Falls I reservoir is a steel tank cylinder constructed completely above ground. The reservoir has a total capacity of 4.1 MG and is 16.7 feet deep. It serves as the primary storage reservoir at the WTP.

**Whatcom Falls II** The Whatcom Falls II reservoir was constructed in 1993. Like Whatcom Falls I, it has an overflow elevation of 276 feet and serves the 276 North zone. Whatcom Falls II reservoir is a pre-stressed concrete cylinder, built entirely above ground. The reservoir is
17.2 feet deep with a total capacity of 15.6 MG. It serves as the contact time basin for chlorine addition at the WTP. Whatcom Falls reservoir II has 10.56 MG of operational storage capacity plus 4.1 MG reserved for contact time (CT) for a total of 15.56 MG. The Whatcom Falls II reservoir has a separate inlet/outlet.

**Kearney** The Kearney reservoir was constructed in 2006. This reservoir replaced the former James Street stand pipe and has an overflow elevation of 276 feet. Kearney reservoir serves the 276 North zone. The Kearney reservoir is an above ground pre-stressed concrete cylindrical tank. It has a total capacity of 2.49 MG.

**Consolidation** The Consolidation reservoir has an overflow elevation of 519 feet and serves the 519 Dakin & Yew zone. It was constructed in 1959. The Consolidation reservoir is a partially buried cylindrical steel tank. It is 22.2 feet deep with a total capacity of 0.5 MG.

**Padden** The Padden reservoir has an overflow elevation of 457 feet and serves the 457 South zone. It is a prestressed concrete cylinder constructed in 1958. This reservoir is 25 feet deep with a total capacity of 0.5 MG.

**College Way** The College Way reservoir was constructed in 1968. This reservoir has an overflow elevation of 541 feet and serves the 541 College Way zone. The College Way reservoir is a partially buried cylindrical steel tank. It has a total capacity of 0.5 MG.

**Sehome** The Sehome reservoir was constructed in the 1920’s. This reservoir has an overflow elevation of 457 feet and serves the 457 South zone. The Sehome reservoir is a primarily rectangular partially buried concrete in an
embankment. It is 11 feet deep with a total capacity of 0.7 MG.

**Reveille** The Reveille reservoir was constructed in 1958. This reservoir has an overflow elevation of 696 feet and serves the 696 Padden Yew zone. The Reveille reservoir is a partially buried prestressed concrete cylindrical tank. It is 23.8 feet deep with total a capacity of 0.5 MG.

**40th Street** The 40th Street reservoir was constructed in 1958. This reservoir has an overflow elevation of 696 feet and serves the 696 Padden Yew zone. The 40th Street reservoir is an above ground prestressed concrete cylindrical tank. It is 26.8 feet deep with a total capacity of 0.5 MG. It is planned to be relined and painted after construction of the Yew Street Upper Reservoir pump station and reservoir. The 40th Street reservoir requires a pipe to be inserted through the wall.

**Parkhurst** The Parkhurst reservoir was constructed in 1997. This reservoir has an overflow elevation of 873 feet and serves the 873 Governor Road zone. The Parkhurst reservoir is an above ground steel cylindrical tank. It has a total capacity of 0.18 MG and is 34.5 feet deep.

### 3.3.6.2 Storage Capacity Analysis

As noted above, the storage in the Bellingham’s system is a combination of localized storage at the WTP and distributed storage throughout the City’s pressure zones. There are five components of storage that must be evaluated and include the following components:

- Operational Storage (OS)
- Equalizing Storage (ES)
- Standby Storage (SB)
- Fire Suppression Storage (FSS)
- Dead Storage (DS)

Operational storage is the volume of the reservoir devoted to supplying the water system while the source(s) of supply are in “off” status and is dependent upon the level control applied to control excessive cycling of the pump motor(s). The OS volume is additive to the other components of storage (ES, SB, and FSS). Operational storage does not apply to systems under a continuous pumping mode.

Equalizing storage is the volume of storage that is provided to meet PHD placed on a system when the source pumping capacity cannot meet the PHD alone. The ES must be provided at an elevation so that 30 psi is available at all service connections. Diurnal demand curves have been developed for the City’s distribution system, and have been input into an extended period simulation (EPS) model of City’s distribution system. The extent and duration of the PHD event as shown with the diurnal curve was used to generate the volume of ES that must be provided to meet PHD.

Standby storage is the volume of storage that provides reliability for the system in the event that a water supply source may fail or when unusually high demands are experienced. The SB component is dependent upon the number of sources that the system has. The City has
one source of supply, so the recommended SB is equal to two days of ADD. SB may also be nested with FSS.

The fire suppression storage component is the product of the required fire flow rate multiplied by the duration that the flow is required. The FSS must be provided at an elevation so that 20 psi will be maintained throughout the distribution system. The FSS requirement may vary by pressure zone depending upon the type of structures and service connections within the pressure zone.

Dead storage is the volume of stored water that is not available in a storage reservoir since it is at an elevation that cannot provide the minimum design pressure to customers. DS is not included in the available volume calculations. The available storage in the overall system and individual pressure zones was evaluated and compared to the required volumes for the planning horizons. A summary of the storage evaluation is presented in the following sections.

3.3.6.3 Overall System Storage Evaluation

A summary of the required storage for the overall system is shown in Table 3-15. As shown in Table 3-15, there will be a system-wide deficit in storage within the 6-year planning horizon that is also carried through to the 20-year planning horizon. Recommendations for storage improvements will be made based on the evaluation of the storage provided in the individual pressure zones in the next section.

For the existing system, there is a higher proportion of storage in the 276 North pressure zone. However, this zone also contains approximately 45 percent of the system-wide demand (see Table 3-2), so a larger portion of the storage is expected in this zone. For the existing system condition, much of the standby storage is in 276 North zone and there is sufficient pumping capacity (and backup power) to move this volume of water through the system as needed. Improvement recommendations include locations additional storage in the higher pressure zones as development is projected to occur in those zones at a higher rate than in the 276 North pressure zone.

Dead storage for each reservoir was evaluated as part of the storage analysis in Section 3.3.6. Only the Marietta Reservoir in the 276 Zone was found to contain dead storage of about 1.18 million gallons. This dead storage is accounted for in both Tables 3-15 (System Wide Storage Evaluation Summary) and 3-16 (276 Zone Storage Evaluation).

3.3.6.4 Individual Pressure Zone Storage Evaluation

There are currently five pressure zones in the City’s system that have storage within them. The remaining six pressure zones that do not contain storage rely on these storage tanks to meet the storage requirements described in Subsection 3.3.6.2. This means that sufficient pumping capacity must be available so that the storage provided in a lower zone can be pumped to a higher zone. The City also maintains a large volume of storage in the 276 North zone with the Whatcom Falls I and II reservoirs. To access this storage for any other zone, it must be transferred through the system via pumping.
Until future storage projects are constructed, the City will have to supply PHD as well as MDD plus fire flow to closed-end zones. The pumping evaluation shown in Tables 3-4 through 3-11 includes lines for PHD and for fire flow where required. As shown in these tables, the James Street Pump Station shows a deficiency for providing fire flow through the 6-year planning period. Improvements are recommended for the James Street Pump Station.

Table 3-15 summarizes the storage evaluation for the 276 North pressure zone. Two additional zones are served by the 276 North pressure zone via closed end pump stations. These include the 460 King Mountain pressure zone and the 350 Cordata pressure zone.

<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD (gpm)</td>
<td>7,143</td>
<td>9,399</td>
<td>12,694</td>
</tr>
<tr>
<td>MDD (gpm)</td>
<td>13,715</td>
<td>18,047</td>
<td>24,372</td>
</tr>
<tr>
<td>PHD (gpm)</td>
<td>20,572</td>
<td>27,070</td>
<td>36,559</td>
</tr>
<tr>
<td>Total ADD (mgd)</td>
<td>10.29</td>
<td>13.53</td>
<td>18.28</td>
</tr>
<tr>
<td>Total MDD (mgd)</td>
<td>19.75</td>
<td>25.99</td>
<td>35.09</td>
</tr>
<tr>
<td>Total PHD (mgd)</td>
<td>29.62</td>
<td>38.98</td>
<td>52.64</td>
</tr>
<tr>
<td>Operational (MG)</td>
<td>1.65</td>
<td>1.65</td>
<td>1.65</td>
</tr>
<tr>
<td>Equalization (MG)</td>
<td>1.65</td>
<td>2.17</td>
<td>2.92</td>
</tr>
<tr>
<td>Standby (MG)</td>
<td>20.57</td>
<td>27.07</td>
<td>36.56</td>
</tr>
<tr>
<td>Fire Suppression (MG)¹</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
</tr>
<tr>
<td>Total Required (MG)</td>
<td>23.87</td>
<td>30.89</td>
<td>41.13</td>
</tr>
<tr>
<td>Existing Storage (MG)²</td>
<td>25.27</td>
<td>25.27</td>
<td>25.27</td>
</tr>
<tr>
<td>Dead Storage</td>
<td>1.18</td>
<td>1.18</td>
<td>1.18</td>
</tr>
<tr>
<td>Surplus (Deficit) (MG)</td>
<td>0.23</td>
<td>(6.79)</td>
<td>(17.04)</td>
</tr>
<tr>
<td>Planned Storage (MG)</td>
<td>-</td>
<td>1.9¹</td>
<td>7.55²</td>
</tr>
</tbody>
</table>

¹ Fire Suppression storage is nested in the Standby Storage and therefore not included in the Total Required.

² Available storage from Whatcom Falls II is water above 7.1 feet. The volume below 7.1 feet (about 4.1 MG) is required to meet CT requirements. Total volume of Whatcom Falls II is 15.6 MG Whatcom Falls II is the CT reservoir. Total volume available for storage = 15.6 - 4.1 = 11.5 MG

³ King Mountain 1.9 MG

⁴ Padden 2.5 MG; Upper Yew 1.35 MG Alabama Hill 1.5 MG; and Dakin & Yew 2.2 MG

Table 3-16 summarizes the storage evaluation for the 276 North pressure zone. Two additional zones are served by the 276 North pressure zone via closed end pump stations. These include the King Mountain 460 pressure zone and the 350 Cordata pressure zone.
### TABLE 3-16
City of Bellingham’s 276 North Pressure Zone Storage Evaluation

<table>
<thead>
<tr>
<th>Zones Served by 276 North Storage</th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>276 North ADD</td>
<td>3,192</td>
<td>4,189</td>
<td>5,157</td>
</tr>
<tr>
<td>350 Cordata ADD(^1)</td>
<td>880</td>
<td></td>
<td></td>
</tr>
<tr>
<td>460 King Mountain ADD</td>
<td>10</td>
<td>13</td>
<td>110</td>
</tr>
<tr>
<td>Total ADD (gpm)</td>
<td>4,082</td>
<td>4,202</td>
<td>5,266</td>
</tr>
<tr>
<td>Total MDD (gpm)</td>
<td>7837</td>
<td>8068</td>
<td>10111</td>
</tr>
<tr>
<td>Total PHD (gpm)</td>
<td>11756</td>
<td>12103</td>
<td>15167</td>
</tr>
<tr>
<td>Total ADD (mgd)</td>
<td>5.88</td>
<td>6.05</td>
<td>7.58</td>
</tr>
<tr>
<td>Total MDD (mgd)</td>
<td>11.29</td>
<td>11.62</td>
<td>14.56</td>
</tr>
<tr>
<td>Total PHD (mgd)</td>
<td>16.93</td>
<td>17.43</td>
<td>21.84</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage Component</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational (MG)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Equalization (MG)</td>
<td>0.94</td>
<td>0.97</td>
<td>1.21</td>
</tr>
<tr>
<td>Standby (MG)</td>
<td>11.76</td>
<td>12.10</td>
<td>15.17</td>
</tr>
<tr>
<td>Fire Suppression (MG)(^1)</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
</tr>
<tr>
<td>Total Required (MG)</td>
<td>12.70</td>
<td>13.07</td>
<td>16.38</td>
</tr>
<tr>
<td>Existing Storage (MG)</td>
<td>18.60</td>
<td>18.60</td>
<td>18.60</td>
</tr>
<tr>
<td>Dead Storage</td>
<td>1.18</td>
<td>1.18</td>
<td>1.18</td>
</tr>
<tr>
<td>Surplus (Deficit)</td>
<td>4.73</td>
<td>4.35</td>
<td>1.04</td>
</tr>
<tr>
<td>Planned Storage (MG)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)After 2014, storage for the 350 Cordata zone is provided in the 350 Cordata zone with the King Mountain Reservoir.

\(^2\)Fire Suppression Storage is nested in the Standby Storage and not included in the Total Required.

The 276 North pressure zone currently has a surplus of storage, but becomes deficient within the 20-year planning period. The current surplus in storage is available for upper zones to access to meet storage requirements. In the near term, it is recommended that a 1.9 MG reservoir be constructed in the Cordata zone and for the future, additional storage be evaluated for the 276 North Zone.
Table 3-17 summarizes the storage evaluation of the 457 South pressure zone. The 457 South pressure zone also provides storage for the 541 College Way pressure zone which is a closed zone.

The 457 South zone is currently deficient in storage with this deficiency increasing throughout the 20-year planning horizon. A portion of the 276 North Zone storage is available for the 457 South Zone, but the excess capacity is not sufficient to meet all of the 457 South needs within the 6-year planning horizon.

### TABLE 3-17
City of Bellingham’s 457 South Pressure Zone Storage Evaluation

<table>
<thead>
<tr>
<th>Zones Served by 457 South Storage</th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>457 South ADD</td>
<td>1,461</td>
<td>1,917</td>
<td>2,332</td>
</tr>
<tr>
<td>541 College Way ADD</td>
<td>57</td>
<td>75</td>
<td>78</td>
</tr>
<tr>
<td>ADD (gpm)</td>
<td>1,518</td>
<td>1,992</td>
<td>2,410</td>
</tr>
<tr>
<td>MDD (gpm)</td>
<td>2,915</td>
<td>3,825</td>
<td>4,626</td>
</tr>
<tr>
<td>PHD (gpm)</td>
<td>4,372</td>
<td>5,738</td>
<td>6,940</td>
</tr>
<tr>
<td>ADD (mgd)</td>
<td>2.19</td>
<td>2.87</td>
<td>3.47</td>
</tr>
<tr>
<td>MDD (mgd)</td>
<td>4.20</td>
<td>5.51</td>
<td>6.66</td>
</tr>
<tr>
<td>PHD (mgd)</td>
<td>6.30</td>
<td>8.26</td>
<td>9.99</td>
</tr>
<tr>
<td><strong>Storage Component</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational (MG)</td>
<td>0.75</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>Equalization (MG)</td>
<td>0.35</td>
<td>0.46</td>
<td>0.56</td>
</tr>
<tr>
<td>Standby (MG)</td>
<td>4.37</td>
<td>5.74</td>
<td>6.94</td>
</tr>
<tr>
<td>Fire Suppression (MG)¹</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
</tr>
<tr>
<td><strong>Total Required (MG)</strong></td>
<td>5.47</td>
<td>6.94</td>
<td>8.24</td>
</tr>
<tr>
<td><strong>Existing Storage (MG)</strong></td>
<td>1.70</td>
<td>1.70</td>
<td>1.70</td>
</tr>
<tr>
<td><strong>Surplus (Deficit)</strong></td>
<td>(3.77)</td>
<td>(5.24)</td>
<td>(6.54)</td>
</tr>
<tr>
<td><strong>Planned Storage (MG)</strong></td>
<td></td>
<td></td>
<td>2.5 MG²</td>
</tr>
</tbody>
</table>

¹Fire Suppression Storage is nested in the Standby Storage and not included in the Total Required.

² Padden 2.5 MG

A summary of the 519 Dakin & Yew pressure zone storage evaluation is summarized in Table 3-18. The 519 Dakin & Yew pressure zone serves three closed-end zones that include the 730 Alabama Hill pressure zone, and the 780 Birch Street pressure zone. The Dakin &Yew pressure zone is currently deficient in storage, with the deficiency increasing in the 6- and 20-year planning horizons. An additional storage reservoir is recommended in the 519
Dakin & Yew zone. The City may also consider providing storage in the 730 Alabama Hill zone.

Table 3-19 presents the summary of the storage evaluation for the 696 Padden Yew storage pressure zone. The 696 Padden Yew pressure zone serves the 830 Reveille closed-end pressure zone. In the future, the 830 Reveille pressure zone will be combined with the 873 Governor Road pressure zone. The Padden Yew Zone has sufficient storage through the 6-year planning horizon, but becomes deficient within the 20-year planning horizon. An additional storage reservoir is recommended for the Padden Yew Zone.

**TABLE 3-18**  
City of Bellingham's 519 Dakin & Yew Pressure Zone Storage Evaluation

<table>
<thead>
<tr>
<th>Zones Served by 519 Dakin &amp; Yew Storage¹</th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>519 Dakin &amp;Yew ADD</td>
<td>915</td>
<td>1,201</td>
<td>1,353</td>
</tr>
<tr>
<td>730 Alabama Hill ADD</td>
<td>242</td>
<td>318</td>
<td>497</td>
</tr>
<tr>
<td>780 Birch Street ADD</td>
<td>0</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>ADD (gpm)</td>
<td>1,157</td>
<td>1,543</td>
<td>1,878</td>
</tr>
<tr>
<td>MDD (gpm)</td>
<td>2,221</td>
<td>2,963</td>
<td>3,606</td>
</tr>
<tr>
<td>PHD (gpm)</td>
<td>3,332</td>
<td>4,445</td>
<td>5,408</td>
</tr>
<tr>
<td>ADD (mgd)</td>
<td>1.67</td>
<td>2.22</td>
<td>2.70</td>
</tr>
<tr>
<td>MDD (mgd)</td>
<td>3.20</td>
<td>4.27</td>
<td>5.19</td>
</tr>
<tr>
<td>PHD (mgd)</td>
<td>4.80</td>
<td>6.40</td>
<td>7.79</td>
</tr>
<tr>
<td>Operational (MG)</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
</tr>
<tr>
<td>Equalization (MG)</td>
<td>0.27</td>
<td>0.36</td>
<td>0.43</td>
</tr>
<tr>
<td>Standby (MG)</td>
<td>3.33</td>
<td>4.45</td>
<td>5.41</td>
</tr>
<tr>
<td>Fire Suppression (MG)²</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Total Required (MG)</td>
<td>3.99</td>
<td>5.20</td>
<td>6.24</td>
</tr>
<tr>
<td>Existing Storage (MG)</td>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>Surplus (Deficit)</td>
<td>(2.49)</td>
<td>(3.70)</td>
<td>(4.74)</td>
</tr>
<tr>
<td>Planned Storage (MG)</td>
<td>-</td>
<td></td>
<td>3.7³</td>
</tr>
</tbody>
</table>

¹ Dakin-Yew also serves four homes at the 575 HGL referred to as the Bonanza Pressure zone.

² Fire Suppression Storage is nested in the Standby Storage and not included in the Total Required.

³ Dakin & Yew 2.2 MG and Alabama Hill 1.5 MG
### TABLE 3-19
City of Bellingham’s 696 Padden Yew Pressure Zone Storage Evaluation

<table>
<thead>
<tr>
<th>Zones Served by 696 Padden Yew Storage</th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>696 Padden Yew ADD</td>
<td>309</td>
<td>406</td>
<td>585</td>
</tr>
<tr>
<td>830 Reveille ADD</td>
<td>19</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>ADD (gpm)</td>
<td>328</td>
<td>430</td>
<td>585</td>
</tr>
<tr>
<td>MDD (gpm)</td>
<td>630</td>
<td>826</td>
<td>1,124</td>
</tr>
<tr>
<td>PHD (gpm)</td>
<td>945</td>
<td>1240</td>
<td>1,685</td>
</tr>
<tr>
<td>ADD (mgd)</td>
<td>0.47</td>
<td>0.62</td>
<td>0.84</td>
</tr>
<tr>
<td>MDD (mgd)</td>
<td>0.91</td>
<td>1.19</td>
<td>1.62</td>
</tr>
<tr>
<td>PHD (mgd)</td>
<td>1.36</td>
<td>1.79</td>
<td>2.43</td>
</tr>
<tr>
<td>Operational (MG)</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Equalization (MG)</td>
<td>0.08</td>
<td>0.10</td>
<td>0.13</td>
</tr>
<tr>
<td>Standby (MG)</td>
<td>0.94</td>
<td>1.24</td>
<td>1.69</td>
</tr>
<tr>
<td>Fire Suppression (MG)</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Total Required (MG)</td>
<td>1.09</td>
<td>1.41</td>
<td>1.89</td>
</tr>
<tr>
<td>Existing Storage (MG)</td>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>Surplus (Deficit)</td>
<td>0.41</td>
<td>0.09</td>
<td>(0.39)</td>
</tr>
</tbody>
</table>

Planned Storage (MG)

1 830 Reveille is assumed to be connected to 873 Governor Road by 2028.
2 Fire Suppression Storage is nested in the Standby Storage and not included in the Total Required.

A summary of the storage evaluation for the 873 Governor Road pressure zone is shown in Table 3-20. As noted in Table 3-19, it is expected that the 873 Governor Road and the 830 Reveille pressure zones will be connected by 2028 and will be served by a new reservoir at a hydraulic grade of 870 for that combined zone. In addition, a new pressure zone, 950 Pressure Zone, will be connected to the 870 Upper Yew pressure zone by 2028.

### TABLE 3-20
City of Bellingham’s 873 Governor Road Pressure Zone Storage Evaluation

<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>830 Reveille ADD</td>
<td>-1</td>
<td>25</td>
<td>163</td>
</tr>
<tr>
<td>873 Governor Road ADD</td>
<td>47</td>
<td>62</td>
<td>200</td>
</tr>
<tr>
<td>950 Pressure Zone ADD (future)</td>
<td>-1</td>
<td>14</td>
<td>70</td>
</tr>
<tr>
<td>ADD (gpm)</td>
<td>47</td>
<td>101</td>
<td>433</td>
</tr>
</tbody>
</table>
TABLE 3-20
City of Bellingham’s 873 Governor Road Pressure Zone Storage Evaluation

<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Existing</th>
<th>2014</th>
<th>2028</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDD (gpm)</td>
<td>90</td>
<td>194</td>
<td>831</td>
</tr>
<tr>
<td>PHD (gpm)</td>
<td>135</td>
<td>291</td>
<td>1,246</td>
</tr>
<tr>
<td>ADD (mgd)</td>
<td>0.07</td>
<td>0.15</td>
<td>0.62</td>
</tr>
<tr>
<td>MDD (mgd)</td>
<td>0.13</td>
<td>0.28</td>
<td>1.20</td>
</tr>
<tr>
<td>PHD (mgd)</td>
<td>0.19</td>
<td>0.42</td>
<td>1.79</td>
</tr>
<tr>
<td>Operational (MG)</td>
<td>0.06</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Equalization (MG)</td>
<td>0.01</td>
<td>0.02</td>
<td>0.10</td>
</tr>
<tr>
<td>Standby (MG)</td>
<td>0.14</td>
<td>0.29</td>
<td>1.25</td>
</tr>
<tr>
<td>Fire Suppression (MG)</td>
<td>0.09</td>
<td>0.09</td>
<td>0.09</td>
</tr>
<tr>
<td>Total Required (MG)</td>
<td>0.21</td>
<td>0.39</td>
<td>1.42</td>
</tr>
<tr>
<td>Existing Storage (MG)</td>
<td>0.18</td>
<td>0.18</td>
<td>0.003</td>
</tr>
<tr>
<td>Surplus (Deficit)</td>
<td>(0.03)</td>
<td>(0.09)</td>
<td>(1.42)</td>
</tr>
<tr>
<td>Planned Storage (MG)</td>
<td></td>
<td></td>
<td>1.35</td>
</tr>
</tbody>
</table>

1830 Reveille and 950 pressure zone are assumed to be connected to 873 Governor Road by 2014. Demands for 830 Reveille and 950 pressure zone are included in the 2014 and 2028 projections.

2Fire Suppression Storage is nested in the Standby Storage and not included in the Total Required.

3Existing Parkhurst Reservoir will be removed from service when 1.35 MG 870 Reservoir is constructed.

Currently, the 873 Governor Road pressure zone is deficient in storage. The planned 1.35-MG 870 Upper Yew reservoir will alleviate the existing storage deficit and meet the storage requirement throughout the planning period.

3.3.6.5 Storage Improvements

A summary of the storage improvements recommended to meet the storage deficiencies as noted in the above tables is summarized below:

♦ ST-1: Construct 1.35 MG of storage in the Upper Yew pressure zone at an HGL of 870 feet to provide storage for the combined Upper Yew and Governor Road pressure zones. This improvement project will alleviate the storage deficit in the Upper Yew and Governor Road pressure zones through the 20-year planning horizon.

♦ ST-2: Construct 1.9 MG of storage in the Cordata pressure zone at an HGL of 370 feet. This will provide storage for the Cordata pressure zone through the 20-year planning horizon and will decrease the amount of storage required in the 276 North pressure zone since the Cordata zone is currently a closed end zone served from the 276 North pressure zone.
♦ ST-3: Construct 2.5 MG of storage in the 457 South pressure zone at the existing Padden reservoir site. The combination of the 2.5 MG of storage at the Padden site and excess storage that is available in the 276 North pressure zone will meet the storage requirements for the 6-year planning horizon.

♦ ST-4: Construct 1.5 MG of storage for the 730 Alabama Hill pressure zone. The 730 Alabama Hill zone is currently a closed end zone, and based on projected growth, it is recommended that storage be provided for this zone in the future. A 1.5-MG storage reservoir will meet the storage requirements for the zone through the 20-year planning horizon. Providing storage in the 730 Alabama Hill pressure zone will also reduce the requirements for storage in the 519 Dakin & Yew pressure zone that currently serves the 730 Alabama Hill pressure zone.

♦ ST-5: Construct 2.2 MG storage near the existing Consolidation storage reservoir in conjunction with the Consolidation pump station upgrade. An additional 2.2 MG of storage is required in the 519 Dakin & Yew pressure zone in the 6-year planning horizon.

3.3.7 Distribution System

Bellingham’s distribution system is comprised of pump stations, storage reservoirs, pipelines and other minor appurtenances. The City’s pump stations, and storage reservoirs are presented in earlier sections. This section focuses primarily on the City’s distribution system pipelines.

3.3.7.1 General Description and Conditions

The City’s distribution system is mainly comprised of a single–main configuration where a typically-sized main of 6 to 12 inches in diameter is installed on one side of the street and service lines extend under the street to service connections on the other side of the street. An inventory of the City’s distribution system piping, not including service connections or hydrant laterals, is presented in Table 3-21. Bellingham’s distribution system pipelines are presented in Figure 3-1.

3.3.7.2 Hydraulic Capacity Analysis

Bellingham’s distribution system was analyzed to assess its capacity to convey current and projected normal operating flows as well as high-intensity flows typical of fire-flow conditions. To accomplish these analyses, the City’s existing hydraulic model was recalibrated for steady state conditions. Details of the model calibration can be found in Appendix H. The City’s current water demand was applied to the model by determining the total demand by customer class and by pressure zone, and then allocating that demand across each pressure zone. The modeling software used was H2OMap V7 developed by MWHSof, Inc. H2OMap uses the U.S. Environmental Protection Agency’s (EPA’s) EPANet Version 2.0 as the hydraulic engine for the model.
3.3.7.3 Modeling Results

Modeling scenarios were developed for the following conditions:

- 2008 MDD
- 2008 PHD
- 2014 MDD
- 2014 PHD
- 2028 MDD
- 2028 PHD
- Fire flow

### TABLE 3-21
Bellingham Water System Distribution System Pipe Inventory

<table>
<thead>
<tr>
<th>Material</th>
<th>Asbestos Cement</th>
<th>Cast Iron</th>
<th>Concrete</th>
<th>Copper</th>
<th>CPP</th>
<th>Ductile Iron</th>
<th>Galvanized</th>
<th>PVC</th>
<th>Steel</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Dia. (in)</td>
<td>1/2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1/2</td>
<td>N/A</td>
<td>220</td>
<td>N/A</td>
<td>283</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>476</td>
<td>N/A</td>
<td>979</td>
</tr>
<tr>
<td>1/2</td>
<td>N/A</td>
<td>699</td>
<td>N/A</td>
<td>106</td>
<td>N/A</td>
<td>36</td>
<td>15</td>
<td>797</td>
<td>N/A</td>
<td>1,653</td>
</tr>
<tr>
<td>1/2</td>
<td>7,217</td>
<td>61,673</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>42,432</td>
<td>N/A</td>
<td>1,663</td>
<td>N/A</td>
<td>112,986</td>
</tr>
<tr>
<td>1/2</td>
<td>6,683</td>
<td>304,711</td>
<td>N/A</td>
<td>71</td>
<td>N/A</td>
<td>223,143</td>
<td>995</td>
<td>2,362</td>
<td>N/A</td>
<td>537,966</td>
</tr>
<tr>
<td>1/2</td>
<td>747</td>
<td>120,780</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>606,634</td>
<td>N/A</td>
<td>828</td>
<td>N/A</td>
<td>728,988</td>
</tr>
<tr>
<td>1/2</td>
<td>47,880</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>117,086</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>164,967</td>
</tr>
<tr>
<td>1/2</td>
<td>4,079</td>
<td>58,035</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>217,850</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>279,965</td>
</tr>
<tr>
<td>1/2</td>
<td>N/A</td>
<td>332</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>3,379</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>3,711</td>
</tr>
<tr>
<td>1/2</td>
<td>N/A</td>
<td>39,997</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>79,763</td>
<td>N/A</td>
<td>N/A</td>
<td>3,425</td>
<td>123,185</td>
</tr>
<tr>
<td>1/2</td>
<td>17,381</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>44,328</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>61,709</td>
</tr>
<tr>
<td>1/2</td>
<td>30,794</td>
<td>N/A</td>
<td>N/A</td>
<td>1,848</td>
<td>N/A</td>
<td>10,642</td>
<td>N/A</td>
<td>N/A</td>
<td>4,821</td>
<td>48,105</td>
</tr>
<tr>
<td>1/2</td>
<td>N/A</td>
<td>1,268</td>
<td>N/A</td>
<td>3,254</td>
<td>1,853</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>6,374</td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>51</td>
<td>N/A</td>
<td>N/A</td>
<td>9,494</td>
<td>405</td>
<td>N/A</td>
<td>N/A</td>
<td>410</td>
<td>10,360</td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>9</td>
<td>N/A</td>
<td>N/A</td>
<td>16,884</td>
<td>723</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>17,616</td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>780</td>
<td>780</td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1,599</td>
<td>1,599</td>
<td></td>
</tr>
</tbody>
</table>

Total: 18,726, 682,563, 1,268, 460, 31,480, 1,348,273, 1,010, 6,127, 11,036, 2,100,942

N/A = Not applicable.
PVC = Polyvinyl chloride.
The criteria applied to the system evaluation were used to verify that pressures were maintained between 30 and 100 psi, and that velocities were less than 8 feet per second (ft/sec). For fire flow conditions, pressures throughout the system must be maintained above 20 psi while meeting MDD demands and the fire flow requirement.

Under existing conditions, no velocity was above 8 ft/sec for ADD, MDD, or PHD conditions. A few locations of pressures below 30 psi were noted. The pressures below 30 psi were near water storage reservoirs at high elevations or near the supply from the Whatcom Falls reservoirs. Pressures above 100 psi were evident in several pressure zones. The high pressures are due to the topography of the area and the elevation of existing storage facilities. In these locations, it is typical that individual PRVs are installed. The system-wide pressures for the 2008 PHD analysis are shown in Figure 3-2.

Modeling of the 2014 scenarios was performed by incorporating the recommended storage and pumping improvements to meet the 6-year planning horizon demands. The results of the 2014 analyses showed similar results as compared to the 2008 scenarios. Velocity was maintained below 8 ft/sec, and no low pressures were identified in areas other than high elevations near storage reservoirs. The model predicted 2014 PHD pressures are shown in Figure 3-3.

Modeling of the 2028 scenarios and incorporating the recommended storage and pumping improvements showed that additional transmission capacity was needed to supply the recommended reservoirs and to also reduce velocity below 8 ft/sec throughout the system. The model predicted 2028 PHD pressures are shown in Figure 3-4. Fire flow evaluations were conducted at 20 simulation locations throughout the system and included residential and non-residential development. Table 3-22 shows the fire flow modeling result at each location. The model showed fire flow requirements were not met in the 519 Dakin & Yew, 873 Governor Road, and 830 Reveille pressure zones. For Dakin & Yew, residual pressure above 20 psi could not be maintained at the extreme northeast corner of the zone during one evaluation. Pressures elsewhere in the Dakin & Yew zone met the fire flow requirements for all analyses in the Dakin & Yew zone. For the 873 Governor Road and 830 Reveille zones, it is planned that future connection of the Governor Road and Upper Yew Zones and previously recommended improvements for pumping, storage, and distribution will allow fire flow requirements to be met in those areas. Figure 3-5 shows required fire flows.

### 3.3.7.4 Distribution System Improvements

The recommended distribution system improvements that were included in the modeling consisted of the following projects:

- **PL-1:** Construct a 12-inch pipeline from the 40th Street pump station to the new 870 Upper Yew reservoir.
- **PL-2:** Construct a 16-inch pipeline from the new 870 Upper Yew reservoir to Yew Street.
- **PL-3:** Construct a 16-inch pipeline from Kearny Road pump station to the King Mountain reservoir which then continues along Van Wyck to existing 12-inch pipeline in...
Meridian in the Cordata zone. This assumes the Cordata zone is converted from an operating HGL of 350 ft to 370 feet.

♦ PL-4: Construct a new 12-inch pipeline from the new 870 Upper Yew pump station to serve the rezoned area of the 950 pressure zone to serve customers at an elevation higher than the 870 Upper Yew storage reservoir.

♦ PL-5: Replace the existing 8-inch pipeline in Yew Street with a new 16-inch pipeline to provide additional pipeline capacity required to meet future demands in the area and to correspond with the upgrade of the Consolidation and Reveille pump stations. The pipeline extends from south of the existing Consolidation reservoir to the new 870 Upper Yew pressure zone.

---

**TABLE 3-22**
Bellingham Water System Fire Flow Modeling Locations

<table>
<thead>
<tr>
<th>Location ID</th>
<th>Zone</th>
<th>Land Use Classification</th>
<th>Fire Flow Required (gpm)</th>
<th>Meets Fire Flow Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>350 Cordata</td>
<td>Commercial</td>
<td>2,500</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>350 Cordata</td>
<td>Industrial</td>
<td>3,500</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>519 Dakin &amp; Yew</td>
<td>Industrial</td>
<td>3,500</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>276 North</td>
<td>Industrial</td>
<td>3,500</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>276 North</td>
<td>Institutional</td>
<td>2,000</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>276 North</td>
<td>Institutional</td>
<td>2,000</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>730 Alabama Hill</td>
<td>Multi Family Residential</td>
<td>1,500</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>276 North</td>
<td>Multi Family Residential</td>
<td>1,500</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>519 Dakin &amp; Yew</td>
<td>Single Family Residential</td>
<td>750</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>276 North</td>
<td>Commercial</td>
<td>2,500</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>276 North</td>
<td>Multi Family Residential</td>
<td>1,500</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>519 Dakin &amp; Yew</td>
<td>Institutional</td>
<td>2,000</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>696 Padden Yew</td>
<td>Single Family Residential</td>
<td>750</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>457 South</td>
<td>Commercial</td>
<td>2,500</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>541 College Way</td>
<td>Single Family Residential</td>
<td>750</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td>830 Reveille</td>
<td>Single Family Residential</td>
<td>750</td>
<td>No</td>
</tr>
<tr>
<td>17</td>
<td>457 South</td>
<td>Single Family Residential</td>
<td>750</td>
<td>Yes</td>
</tr>
<tr>
<td>18</td>
<td>873 Governor Road</td>
<td>Single Family Residential</td>
<td>750</td>
<td>No</td>
</tr>
<tr>
<td>19</td>
<td>696 Padden Yew</td>
<td>Single Family Residential</td>
<td>750</td>
<td>Yes</td>
</tr>
<tr>
<td>20</td>
<td>457 South</td>
<td>Single Family Residential</td>
<td>750</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3.4 Selection and Justification of Proposed Improvement Projects

The proposed improvement projects described in previous subsections of Section 3 are summarized in Table 3-23, and the future hydraulic profile is shown in Figure 3-6.

TABLE 3-23
Summary of City of Bellingham System Improvements

<table>
<thead>
<tr>
<th>Type</th>
<th>Improvement</th>
<th>ID Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>Upper Yew: 1.35 MG</td>
<td>ST-1</td>
</tr>
<tr>
<td></td>
<td>King Mountain: 1.9 MG</td>
<td>ST-2</td>
</tr>
<tr>
<td></td>
<td>Padden, 457 South: 2.5 MG</td>
<td>ST-3</td>
</tr>
<tr>
<td></td>
<td>730 Alabama Hill: 1.5 MG</td>
<td>ST-4</td>
</tr>
<tr>
<td></td>
<td>519 Dakin &amp; Yew: 2.2 MG</td>
<td>ST-5</td>
</tr>
<tr>
<td>Source Treatment</td>
<td>Filtration Rate Increase from 6.0 to 6.5 gpm/ft²</td>
<td>TR-1</td>
</tr>
<tr>
<td></td>
<td>Filter Addition</td>
<td>TR-2</td>
</tr>
<tr>
<td>Pump Station</td>
<td>New 40th Street Pump Station</td>
<td>PS-1</td>
</tr>
<tr>
<td></td>
<td>New Kearney Road Pump Station</td>
<td>PS-2</td>
</tr>
<tr>
<td></td>
<td>Upgrade of Consolidation Pump Station</td>
<td>PS-3</td>
</tr>
<tr>
<td></td>
<td>Upgrade of Reveille Pump Station</td>
<td>PS-4</td>
</tr>
<tr>
<td></td>
<td>New 950 Pressure Zone Pump Station</td>
<td>PS-5</td>
</tr>
<tr>
<td></td>
<td>New James Street Pump Station</td>
<td>PS-6</td>
</tr>
<tr>
<td>Pipeline</td>
<td>New Upper Yew Street 870 Reservoir West Connection</td>
<td>PL-1</td>
</tr>
<tr>
<td></td>
<td>New Upper Yew Street 870 Reservoir East Connection/40th Street Pump Station Discharge</td>
<td>PL-2</td>
</tr>
<tr>
<td></td>
<td>New King Mountain Reservoir-West Connection</td>
<td>PL-3</td>
</tr>
<tr>
<td></td>
<td>New 950 Pressure Zone Pipeline</td>
<td>PL-4</td>
</tr>
<tr>
<td></td>
<td>Yew Street Transmission Main Expansion</td>
<td>PL-5</td>
</tr>
</tbody>
</table>
Figure 3-2: Service Pressure at 2008 PHD

City of Bellingham 2009 Water System Plan

Source: City of Bellingham (2007) and Whatcom County (2006).

File Path: \simba\proj\BellinghamWaCityOf\371934WaterSystemPlan\GIS\MapFiles\Modeling\Results\ServicePressure2008PHD.mxd, Date: June 23, 2009
Figure 3-3
Service Pressure
at 2014 PHD
City of Bellingham
2009 Water System Plan

Source: City of Bellingham (2007) and Whatcom County (2006).

File Path: \simba\proj\BellinghamWaCityOf\371934WaterSystemPlan\GIS\MapFiles\Modeling\Results\ServicePressure2014PHD.mxd, Date: June 23, 2009
Figure 3-5
Fire Flow Locations
City of Bellingham
2009 Water System Plan

Source: City of Bellingham (2007) and Whatcom County (2006).

Source: City of Bellingham (2007) and Whatcom County (2006).
Figure 3-7
Major Facilities and Future Pressure Zones
City of Bellingham
Water System Plan

Source: City of Bellingham (2007) and Whatcom County (2006).
Water Use Efficiency, Water Rights, System Reliability, and Interties

Like other municipalities across Washington State, the City of Bellingham is challenged to use its supply in an effective and efficient manner to meet the supply needs of its current and future customers. However, Bellingham is also committed to help ensure there is enough water to meet other important needs, such as those of Native American tribes, fish and other wildlife, agriculture, hydroelectric power, and recreation. The City’s conservation program was updated in 2008 and is presented in this section in conformance with WADOH’s 1994 Conservation Planning Requirements, 2007 Water Use Efficiency Rule, and in general format presented in the Planning Handbook.

4.1 Water Use Efficiency and Conservation Program

The City’s conservation program began in the 1990s in recognition of Bellingham’s specific needs as they relate to ensuring adequate water supply. In general, the City’s conservation program objective is to maintain current City-wide per capita daily consumption and to keep the City-wide water demand equal to or below City population growth rate. In order to do this, Bellingham has implemented the following measures:

- Toilet retrofit program for single family residence water utility customers
- Toilet retrofit program for multi-family residence water utility customers
- Toilet retrofit program for commercial water utility customers
- Develop and implement 6th-grade water conservation education program
- Door hanger campaign for lawn watering
- Evaluate and develop high-efficiency fixture program
- Develop future water rate structures with an emphasis on water conservation
- Upgrade City parks to high-efficiency irrigation systems
- Continue existing public outreach measures

In addition to these specific measures, the city has abundant information on indoor and outdoor water conservation on their Web site as well as access to free water conservation kits. The City has completed its Water Use Efficiency Program. It can be found in Appendix I.

4.2 Bellingham’s Metering and Leak Detection Programs

Bellingham has specific plans for metering its entire system. In addition it has a robust leak detection program.
4.2.1 Source Meters
Diversion flows from the Nooksack are metered in the pipe downstream from the diversion structure. Flows at the City’s WTP are also metered, including the volume of water required for filter backwashing. Finally, Bellingham meters flows from the CT reservoirs into the distribution system.

4.2.2 Service Meters
Bellingham is one of the last cities of its size in Washington State where flat-rate water accounts still exist for single-family residences. The City presently has over 15,000 flat-rate accounts. Beginning January 1, 2005, the City Council adopted the Voluntary Metering Program (VMP) to help promote water conservation and offer City residents the opportunity to potentially save money on their water utility bill. The VMP is available through the Public Works Department to any single-family residential flat-rate water customer inside the City limits. Cost to participate in the program is a one-time fee of $150 that pays for the water meter. The City financially supports the remaining costs associated with the installation of the meter and any upgrades to the water service for the meter.

Bellingham will begin mandatory metering in compliance with the Water Efficiency Rule. The system will be fully metered by January 2017.

4.2.2.1 Bellingham Metering Program
The WADOH’s Water Use Efficiency Rule requires municipal water suppliers to meter all of its water customers by January 22, 2017. As the mandate is unfunded, the City of Bellingham is currently deciding how to fund the estimated $8 million cost to retrofit approximately 15,883 single-family residential homes with a water meter.

The City has implemented various policies over the past couple of decades to prepare for metering its flat-rate customers. Meter-ready assemblies have been installed since the mid-1990s on all water service repair projects performed by the Public Works Department and on new main replacement projects since 2004. In 2005, the City adopted an ordinance that requires all new single-family residential (SFR) construction and remodels to purchase and install a water meter.

![FIGURE 4-1](Image)

Water Production Breakdown (2000 to 2007)
Source: City of Bellingham, 2008.
Approximately 55 percent of Bellingham customers are metered (see Figure 4-1). To aid in the retro-fit of existing SFR homes, a VMP is available that subsidizes a portion of the cost to install a meter on existing homes.

As a result of these various programs, residences throughout the City vary in what needs to be done on their property to receive a water meter. Some have no meter-ready assembly or a water meter installed and would need the full retro-fit; some have a meter-ready assembly, but no water meter; and some are fully metered. These scenarios present issues in how to fairly allocate the cost of metering within the City in an efficient and cost-effective manner.

There are several impacts associated with the mandate to consider when determining how to meter the City of Bellingham and include labor, financial, Customer Service Impacts, and Water Customer Impact. To better understand the dynamics of Bellingham’s water use, the follow sections outline the consumption patterns and usage by customer class.

4.2.2.2 Residential Water Consumption

SFR flat rate water customers alone are estimated to consume about 30 percent of the total water produced. Residential water customers are the largest water consumer of the municipal water system. When water consumption is broken down by customer class, both SFR flat rate and SFR metered water customers combined make up an estimated 36 percent of the total water consumption (see Figure 4-2).

After reviewing Bellingham City Council comments and conducting more research into funding options, the most equitable and common method for a utility to implement full metering is to bond for the capital improvement over time. This method spreads the cost of metering mandate over the entire customer base which will follow the cost-of-service rate model that Council approved in 2004.

As the City begins to meter its entire utility, staff will continue to explore new technologies and new methodologies to metering. A recent trend in the industry of meter installations has been to install the residential water meter and MXU radio antennas near the shut-off
valve within the home. The benefit of this process is that there could be a substantial savings in the cost of installation, which could then potentially reduce the amount of debt the City would have to undertake for full metering. Additionally, staff will also be researching water conservation block rate structures and their applicability with other similar sized utilities in the region so that the cost-of-service model adopted by Council reflects business model changes. This approach could potentially be more responsive to customer usage patterns while maintaining good stewardship of the water resources.

4.2.3 Leak Detection Program

Bellingham has been operating a leak detection program on its water system since 1994. As part of routine protocol, all distribution system valves are exercised and tested on a regular schedule, and repairs done as needed. The City has a meter maintenance crew and meter testing facilities to facilitate this process. Meters 3 inches and larger are tested annually, and meters 1.5 to 2 inches are tested every 5 years. An average of 10 miles of water main in the distribution system has been tested for leaks annually since 1994.

Bellingham established leak detection zones to prioritize areas of the system that contain water mains that are older and more prone to leaks to conform to state water accountability measures. In 2005 and 2006, the City took a more efficient and aggressive approach to the traditional leak detection process, and hired a consultant to increase the mileage in leak detection and survey 16 miles in 2005 and 25 miles in 2006. Leak detection figures for 2002 to 2003 are significantly higher than 2005 to 2006 due to the zone area surveyed, which were water mains constructed in the early 1900s.

When the origin of a leak is determined to be on a City water main, Bellingham repairs the leak at its own cost in a timely manner. If the leak is determined to be on the property owner’s water service line, it is the responsibility of the property owner to repair the leak. Water savings from the leak detection program has been approximately 260,000 gallons per day (gpd) over the past 5 years.

4.3 Target Water Savings Projections for Bellingham

From 1990 to 2006, the City has seen a 41 percent increase in water services and population. Despite these increases, average daily water production has remained steady, fluctuating by approximately 2 percent on average, which is equal to the annual average growth rate of 1.8 percent as well (see Table 4-3). If this trend continues, and the City is able to meet its goal of maintaining its current per capita water use throughout the planning period, the ADD and MDD for the system will be reduced 12 percent in 2028 from projections without conservation measures.
Table 4-3

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>% Change in Population</th>
<th>No. of Services</th>
<th>% Change in Services</th>
<th>Rainfall</th>
<th>ADD (mgd)</th>
<th>% Change in Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>69,260</td>
<td>0.54%</td>
<td>22,352</td>
<td>1.25%</td>
<td>24</td>
<td>10.38</td>
<td>9.73%</td>
</tr>
<tr>
<td>2003</td>
<td>69,850</td>
<td>0.85%</td>
<td>23,240</td>
<td>3.97%</td>
<td>34</td>
<td>10.63</td>
<td>2.41%</td>
</tr>
<tr>
<td>2004</td>
<td>71,080</td>
<td>1.76%</td>
<td>23,464</td>
<td>0.96%</td>
<td>36</td>
<td>10.80</td>
<td>1.60%</td>
</tr>
<tr>
<td>2005</td>
<td>72,320</td>
<td>1.74%</td>
<td>23,905</td>
<td>1.88%</td>
<td>31</td>
<td>10.59</td>
<td>-1.94%</td>
</tr>
<tr>
<td>2006</td>
<td>73,460</td>
<td>1.58%</td>
<td>24,210</td>
<td>1.28%</td>
<td>35</td>
<td>10.85</td>
<td>2.46%</td>
</tr>
</tbody>
</table>


Table 4-4 presents the City’s water demand projects in ADD and MDD with and without conservation measures in place. Conservation is forecast to reduce ADD and MDD by more than 11 percent by 2014. Continued conservation is forecast to reduce 2028 ADD and MDD by nearly 12 percent.

Table 4-4

<table>
<thead>
<tr>
<th>Year</th>
<th>Without Conservation</th>
<th>With Conservation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADD</td>
<td>MDD</td>
</tr>
<tr>
<td>Current Year</td>
<td>10.32</td>
<td>19.81</td>
</tr>
<tr>
<td>2014</td>
<td>14.20</td>
<td>27.26</td>
</tr>
<tr>
<td>2028</td>
<td>19.27</td>
<td>37.00</td>
</tr>
</tbody>
</table>

Note: Demands in mgd.

### 4.4 Program Monitoring

In an effort to monitor the effects of its Conservation Program, the City reviews demand and consumption data compiled annually as part of the Water Use Efficiency (WUE) rule as well as the 6-year WADOH-required water system plan update cycle. As part of the WUE rule, the City must show progress towards increasing conservation, and reduced distribution system leakage each year.

### 4.5 Regional Conservation Programs

Bellingham participates in regional and local partnerships and is a member of the following organizations that address water conservation issues:

- AWWA
- Partnership for Water Conservation (PWC)
- Lake Whatcom Management Team
- Sustainable Connections
4.6 Water Rights

The following pages discuss the City of Bellingham’s permits, claims, applications, water rights, current water usage, and projected needs. Bellingham has rights for use of water from the Middle Fork Nooksack River, Lake Padden and Lake Whatcom. The City’s Nooksack and Lake Whatcom municipal water rights are currently the sole source of supply for the City’s municipal drinking water system. These water rights support the City’s municipal drinking water supply needs as well as industrial and hydro-electric power generation. The source locations (Middle Fork Nooksack River and Lake Whatcom intake) for the City’s water rights are shown in Figures 5-1 and 5-2. Bellingham’s municipal water supply place of use was described and illustrated in Section 1.

Reflecting the evolution of its water system Bellingham has multiple water rights for its system. Bellingham uses these water rights for a multitude of beneficial purposes in support of the City’s municipal drinking water supply needs. A summary of the City’s water rights and a comparison of those rights with current and future demand are presented in Table 4-5. Copies of the City’s water right certificates and claims are located in Appendix J.

The city’s supply is provided by a conjunctive operation of sources; Lake Whatcom and the Middle Fork Nooksack River. The Lake Whatcom Reservoir is a primary source of supply for Bellingham. However, extensive hydrologic simulation conducted by the city has documented that natural inflow into Lake Whatcom is not always sufficient to support extant demands and withdrawals. To assure sufficient supply and adequate water quality Bellingham supplements Lake Whatcom natural inflows via a diversion from the Middle Fork Nooksack River.

4.6.1 Lake Whatcom Reservoir

Lake Whatcom Reservoir provides drinking water to about 95,000 residents of Whatcom County. Both the City of Bellingham and Lake Whatcom Water and Sewer District withdraw water for municipal purposes from Lake Whatcom. In addition the lake is the source of Whatcom Creek and provides water to the Whatcom Falls Fish Hatchery. In recent years water quality in the lake has declined and is now listed on Ecology’s 303(d) for exceeding several water standards including total phosphorus and low dissolved oxygen levels. Bellingham has partnered with Whatcom County and Lake Whatcom Water and Sewer District to implement the Lake Whatcom Management Program; a joint effort to protect Lake Whatcom Reservoir.

The Lake Whatcom Management Program is multi-faceted and includes stormwater management efforts, public education, phosphorous source control limits, and property acquisition within the basin. The dissolved oxygen and concomitant excess phosphorus loading problems in Lake Whatcom also require that attention be given management of reservoir inputs, withdrawals and outflow into Whatcom Creek.
Water supply withdrawals from Lake Whatcom Reservoir are operationally constrained. The city’s outlet structure sill is at elevation 308.6 MSL. A June 8, 1953 Superior Court Order enjoins the city from raising or holding the lake’s elevation above elevation 314.94. These physical and legal restrictions provide a maximum storage capacity of the Reservoir of about 29,700 acre-feet. However, all of that volume is not available to Bellingham as other users (e.g. Lake Whatcom Water and Sewer District, riparian water right users, exempt and surface right holders) also take water from the lake. In addition, for over 40 years, Bellingham has operated the Reservoir outlet so that water elevations remain on average above elevation 310 feet MSL. These factors reduce available storage in Lake Whatcom to well below 25,000 acre-feet; necessitating supplementation from Nooksack diversions.

Bellingham has two water right certificates and a claim for water from Lake Whatcom. On June 12, 1974 Bellingham filed a claim with the Department of Ecology for 82 mgd (25 mgd domestic and 57 mgd industrial). Included in this claim was an annual quantity of 92,000 acre-feet from Lake Whatcom. The priority dates for this claim flow from Bellingham’s predecessor towns of Whatcom and New Whatcom (see section 1.3 for an explanation of these towns’ roles in the history of Bellingham). The claims priority dates are 1883 (from the Town of Whatcom) and 1894 (from the Town of New Whatcom).

The City also utilizes Certificate 2020 with a priority date of March 9, 1937 for storage rights of 20,000 acre-feet from Lake Whatcom. In addition, Bellingham utilizes Certificate 4631 with a priority date of April 6, 1937 for 10 cfs continuously from Lake Whatcom for the purposes of maintaining flow and water quality in Whatcom Creek. The Lake Whatcom water rights are perfected for municipal use. These municipal purpose water rights are exempt from relinquishment for nonuse pursuant to RCW 90.14.140(2)(d), the “municipal water supply” exemption.

Lake Whatcom Reservoir is the City’s primary source of supply. Water from it is used for municipal purposes throughout Bellingham’s direct retail and wholesale service areas. These service areas are described in this Water System Plan and illustrated in Figure 1-1. Water has also continuously been diverted from the Lake Whatcom Reservoir by Bellingham and delivered untreated for industrial purposes in quantities up to 53 MGD.

4.6.2 Middle Fork of the Nooksack

Water diverted from the Nooksack is a critical part of Bellingham’s water supply. Water from the Middle Fork is conveyed through a tunnel/pipeline to Lake Whatcom. This water is used for hydro-power on its way to Lake Whatcom and then withdrawn from Lake Whatcom for municipal purposes within the City’s service area as shown in Figure 1-1.

For more than a decade Bellingham has engaged in multiple efforts and programs to improve stewardship of water resources in the Nooksack Basin. In 1998 an Interim Agreement on Middle Fork Nooksack In-Stream Flow Requirements was established for water year 1998 to 1999. (See Appendix K.) Under the terms of the agreement the City has voluntarily limited the times it diverts water from the river based on in-stream flows but has
not committed to comply with Ecology’s minimum in-stream flows. Ecology’s minimum in-stream flow requirements are listed in Table 4-5.

<table>
<thead>
<tr>
<th>Period</th>
<th>Minimum In-Stream Flow (cfs/mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 1 to January 31</td>
<td>275 / 178</td>
</tr>
<tr>
<td>February 1 to May 14</td>
<td>380 / 246</td>
</tr>
<tr>
<td>May 15 to May 31</td>
<td>450 / 291</td>
</tr>
<tr>
<td>June 1 to July 14</td>
<td>575 / 372</td>
</tr>
<tr>
<td>July 14 to July 31</td>
<td>400 / 372</td>
</tr>
</tbody>
</table>

U.S. Geological Survey (USGS) stream flow records indicate that up to the mid 1900s, the minimum in-stream flow in the vicinity of the diversion dam was 164 cfs (106 mgd). During more recent years, the City has been collecting stream flow data. The lowest flow recorded by the City is 94 cfs (61 mgd) during August 1996. This flow would indicate that there are times in the year when in-stream flows are less than Ecology’s’ instream flow requirements. Hydraulic model simulations of natural flows conducted for the City of Bellingham document that natural flows in the Middle Fork cannot meet the Ecology’s adopted instream flows.

Shortly after the 1998 interim agreement was executed, Bellingham was one of five initiating governments that began the 2514 Watershed Planning Process for the Nooksack Basin (WRIA 1). The City was an active participant and sponsor of this effort throughout the process until the Watershed Plan’s adoption by Whatcom County in 2005.

Currently, the City of Bellingham is developing a Habitat Conservation Plan for endangered fish species that may be affected by the operation of the water supply diversion in the Middle Fork. The City is also developing programs and projects to protect and restore fish habitat in the streams inside city limits.

Bellingham owns two water right certificates for diversions from the Middle Fork Nooksack. Both of these certificates have the same priority date of October 6, 1954. Certificate S-00547C grants rights for 125 cubic feet per second (cfs) (81 mgd) from the Middle Fork of the Nooksack River at the City’s diversion dam. This certificate includes the restriction that limits withdrawals based on a minimum instream flow of “…between 10 and 15 cfs. (The exact figure to be determined by study.)” Certificate 1508515 grants a change in the purpose of use for Certificate S-00547C by adding power generation. The city’s power generation authority is limited by the new certificate to “only when water is being transported for the purposes of municipal supply, industrial and domestic supply.”

In addition to the voluntary operational constraints related to the 1998 Interim Agreement, diversion from the Middle Fork are structurally limited in two ways. First, the hydraulic
capacity of the transmission facilities from the diversion is 116 cfs. Second, when power is being generated from the diverted flows, maximum actual diversions are about 67 cfs.

### 4.6.3 Lake Padden

Bellingham owns three water right certificates associated with Lake Padden. Lake Padden is a legacy source of supply for the city. Two of these certificates are surface diversions and one is a storage right. Certificate 2008 is for a diversion from Silver Creek to Lake Padden of up to 2.0 cfs. It has a priority date of January 14, 1930. The Silver Creek 2.0 cfs diversion is limited to the period from October 1 through July 1. For the remaining months, diversion is limited to 0.2 cfs. Certificate 2009 duplicates certificate 2008 with regard to terms and quantities (e.g. The 2.0 and 0.2 cfs limits) except that it is for a diversion from Ruby Creek into Lake Padden. Bellingham’s storage rights from Lake Padden equal 780 acre-feet per year as granted by certificate 2118. Certificate 2118 has priority date of October 14, 1933.

### 4.6.4 Assessment of Existing and Forecast Water Rights

This section provides explanatory details for the numbers presented in Table 4-5a (Existing Status), Table 4-5b (6-Year Forecast), and Table 4-5c (20-Year Forecast) Water Right Self Assessment consistent with WDOH requirements. For each of these tables the characteristics of the individual certificates and claims are listed with brief clarifications as necessary to address ambiguities. Copies of the actual certificates and claim are included in Appendix J.

A summary of these certificates and claims is outlined here:

1. Lake Claim 175592 (S1-146016) and Middle Fork Certificate S-00547C are additive.
2. Lake Claim 175592 and Lake Storage Cert. 2020 are not additive.
3. Middle Fork Certificate S-00547C and Middle Fork Certificate 1508515 are not additive.
4. Cert. 4631 does not appear to be an extension of or granted by any other Certificate or Claim
5. Certificate 2020 is not an extension, grant or outcome of Middle Fork Certificate S-00547C

Therefore the total water available for municipal withdrawal by the City of Bellingham is:

- a) 182,465 annual acre feet
- b) 59.1 annual billion gallons
- c) 162.7 million gallons a day

As shown on Table 4-5a, the city currently has water rights and claims with an excess capacity of about 154.71 cfs (Qi) and 160,747 acre-feet per year (Qa).

The two drivers of change between Table 4-5a and 4-5b are increasing demands within Bellingham’s retail service area and declining demands from industrial users. This results in a net reduction in both Qi and Qa values shown in Table 4-5b.
Long-term (20) demand forecasts show increases in both Bellingham’s retail service demand and re-establishment of industrial/commercial uses that will take advantage of the availability of non-potable sources. While industrial demand is forecast to rebound long-term it is not expected to return to historical maximum consumption volumes from the system. These factors result in increases in both Qi and Qa demands shown in Table 4-5c.
**Table 4-5a**

**WATER RIGHTS SELF ASSESSMENT – EXISTING STATUS**

<table>
<thead>
<tr>
<th>PERMIT / CERTIFICATE</th>
<th>NAME ON DOCUMENT</th>
<th>PRIORITY DATE (List oldest first)</th>
<th>SOURCE NAME / NUMBER</th>
<th>ANY PORTION SUPPLEMENTAL? (Y/N, explain in footnotes)</th>
<th>EXISTING WATER RIGHTS</th>
<th>EXISTING CONSUMPTION</th>
<th>CURRENT WATER RIGHT STATUS (Excess / Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (Q)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. 2008</td>
<td>City of Bellingham</td>
<td>1-14-1920</td>
<td>Silver Creek</td>
<td>No</td>
<td>20 cfs</td>
<td>Not Specified</td>
<td>0</td>
</tr>
<tr>
<td>2. 2009</td>
<td>City of Bellingham</td>
<td>1-14-1930</td>
<td>Ruby Creek</td>
<td>No</td>
<td>20 cfs</td>
<td>Not Specified</td>
<td>0</td>
</tr>
<tr>
<td>3. 2118</td>
<td>City of Bellingham</td>
<td>10-14-1933</td>
<td>Lake Padden</td>
<td>No</td>
<td>Not Specified&lt;sup&gt;4&lt;/sup&gt;</td>
<td>780 aqy&lt;sup&gt;5&lt;/sup&gt;</td>
<td>0</td>
</tr>
<tr>
<td>4. 2020</td>
<td>City of Bellingham</td>
<td>3-5-1937</td>
<td>Lake Whatcom</td>
<td>No</td>
<td>Not Specified&lt;sup&gt;6&lt;/sup&gt;</td>
<td>20,000 aqy&lt;sup&gt;5&lt;/sup&gt;</td>
<td>65 cfs</td>
</tr>
<tr>
<td>5. 4331</td>
<td>City of Bellingham</td>
<td>4-6-1937</td>
<td>Lake Whatcom</td>
<td>No</td>
<td>100 cfs</td>
<td>Not Specified&lt;sup&gt;6&lt;/sup&gt;</td>
<td>10 cfs</td>
</tr>
<tr>
<td>6. S-00547C</td>
<td>City of Bellingham</td>
<td>10-6-1954</td>
<td>MF Nooksack</td>
<td>No</td>
<td>125 cfs</td>
<td>Not Specified&lt;sup&gt;6&lt;/sup&gt;</td>
<td>116 cfs</td>
</tr>
<tr>
<td>7. 19806741</td>
<td>City of Bellingham</td>
<td>10-6-1954</td>
<td>MF Nooksack</td>
<td>No</td>
<td>125 cfs</td>
<td>Not Specified&lt;sup&gt;6&lt;/sup&gt;</td>
<td>116 cfs</td>
</tr>
</tbody>
</table>

**Claims**

<table>
<thead>
<tr>
<th>INTERTIE NAME / IDENTIFIER</th>
<th>NAME OF PURVEYOR PROVIDING WATER</th>
<th>EXISTING LIMITS ON INTERTIE USE</th>
<th>EXISTING CONSUMPTION THROUGH INTERTIE</th>
<th>CURRENT INTERTIE SUPPLY STATUS (Excess / Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (Q)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. T/5592</td>
<td>City of Bellingham</td>
<td>1835/1854</td>
<td>No</td>
<td>82 mgd&lt;sup&gt;7&lt;/sup&gt; (127 cfs)</td>
</tr>
</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th>PENDING WATER RIGHT APPLICATION (New / Change)</th>
<th>NAME ON APPLICATION</th>
<th>DATE SUBMITTED</th>
<th>ANY PORTION SUPPLEMENTAL? (Y/N, explain in footnotes)</th>
<th>PENDING WATER RIGHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

<sup>1</sup> Certificate limits diversion to 20 cfs from October 1 to July 1 and 0 cfs from July 1 to October 1. Imputed annual acre-feet would be 1,120 acre-feet.

<sup>2</sup> Peak withdrawals from Lake Padden were 471 cfs.

<sup>3</sup> Peak withdrawals from Lake Whatcom are for municipal, non-potable industrial uses and Whatcom Creek for any purposes have been 106 cfs.

<sup>4</sup> Notice of water right application for this certificate indicates the diversion would be continuous. Continuous annual diversion of 10 cfs would impound to 7,227 acre-feet.

<sup>5</sup> Water right certificate limits withdrawals based on a minimum stream flow of 15.0 cfs during April - June and 12 cfs during July - January. The exact figure to be determined by study.

<sup>6</sup> This certificate is for changes in purpose to add hydropower.

<sup>7</sup> See discussion in this section for explanations of these calculations.

DOH Form #331-371 (09/07)
### Table 4-5b
**WATER SYSTEM PLAN**

**WATER RIGHTS SELF ASSESSMENT – 6 YEAR FORECAST**

<table>
<thead>
<tr>
<th>PERMIT CERTIFICATE OR CLAIM</th>
<th>NAME ON DOCUMENT</th>
<th>PRIORITY DATE (First oldest first)</th>
<th>SOURCE NAME / NUMBER</th>
<th>ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)</th>
<th>EXISTING WATER RIGHTS</th>
<th>FORECASTED WATER USE FROM SOURCES (6-year Demand)</th>
<th>FORECASTED WATER RIGHT STATUS (Excess / Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (aft)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. 2008 City of Bellingham</td>
<td>1-11-1930</td>
<td>Silver Creek</td>
<td>No</td>
<td>2.9 cfs</td>
<td>0</td>
<td>0</td>
<td>2.9 cfs</td>
</tr>
<tr>
<td>2. 2009 City of Bellingham</td>
<td>1-14-1930</td>
<td>Ruby Creek</td>
<td>No</td>
<td>2.9 cfs</td>
<td>0</td>
<td>0</td>
<td>2.9 cfs</td>
</tr>
<tr>
<td>3. 2118 City of Bellingham</td>
<td>10-14-1933</td>
<td>Lake Padron</td>
<td>No</td>
<td>Not Specified</td>
<td>780 a/fy</td>
<td>0</td>
<td>780 a/fy</td>
</tr>
<tr>
<td>4. 2120 City of Bellingham</td>
<td>3-6-1937</td>
<td>Lake Whatcom</td>
<td>No</td>
<td>Not Specified</td>
<td>20,000 a/fy</td>
<td>57 cfs</td>
<td>21,720 a/fy</td>
</tr>
<tr>
<td>5. 4831 City of Bellingham</td>
<td>6-6-1937</td>
<td>Lake Whatcom</td>
<td>No</td>
<td>70 cfs</td>
<td>10 cfs</td>
<td>7,200 a/fy</td>
<td>0</td>
</tr>
<tr>
<td>6. S-00547C City of Bellingham</td>
<td>10-6-1954</td>
<td>Middle Fork of the Nooksac</td>
<td>No</td>
<td>125 cfs</td>
<td>Not Specified</td>
<td>116 cfs</td>
<td>27,520 a/fy</td>
</tr>
<tr>
<td>7. 150855+ City of Bellingham</td>
<td>10-6-1954</td>
<td>Middle Fork of the Nooksac</td>
<td>No</td>
<td>125 cfs</td>
<td>Not Specified</td>
<td>116 cfs</td>
<td>27,520 a/fy</td>
</tr>
</tbody>
</table>

**Claims**

<table>
<thead>
<tr>
<th>PERMIT CERTIFICATE OR CLAIM</th>
<th>NAME ON DOCUMENT</th>
<th>PRIORITY DATE (First oldest first)</th>
<th>SOURCE NAME / NUMBER</th>
<th>ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)</th>
<th>EXISTING WATER RIGHTS</th>
<th>FORECASTED WATER USE FROM SOURCES (6-year Demand)</th>
<th>FORECASTED WATER RIGHT STATUS (Excess / Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (aft)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. 176592 City of Bellingham</td>
<td>18837184</td>
<td>Lake Whatcom</td>
<td>No</td>
<td>82 mgd (27 cfs)</td>
<td>52,000 a/fy</td>
<td>57 cfs</td>
<td>27,320 a/fy</td>
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</table>

**TOTAL**

<table>
<thead>
<tr>
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<th>NAME ON DOCUMENT</th>
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<th>SOURCE NAME / NUMBER</th>
<th>ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)</th>
<th>EXISTING WATER RIGHTS</th>
<th>FORECASTED WATER USE FROM SOURCES (6-year Demand)</th>
<th>FORECASTED WATER RIGHT STATUS (Excess / Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (aft)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>253,75 cfs</td>
<td>183,465 a/fy</td>
<td>118 cfs</td>
</tr>
</tbody>
</table>

**INTERIE NAME / IDENTIFIER**

<table>
<thead>
<tr>
<th>PERMIT CERTIFICATE OR CLAIM</th>
<th>NAME ON DOCUMENT</th>
<th>PRIORITY DATE (First oldest first)</th>
<th>SOURCE NAME / NUMBER</th>
<th>ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)</th>
<th>EXISTING WATER RIGHTS</th>
<th>FORECASTED WATER USE FROM SOURCES (6-year Demand)</th>
<th>FORECASTED WATER RIGHT STATUS (Excess / Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (aft)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>253,75 cfs</td>
<td>183,465 a/fy</td>
<td>118 cfs</td>
</tr>
</tbody>
</table>

**PENDING WATER RIGHT APPLICATION (New/Change)**

<table>
<thead>
<tr>
<th>PERMIT CERTIFICATE OR CLAIM</th>
<th>NAME ON DOCUMENT</th>
<th>PRIORITY DATE (First oldest first)</th>
<th>SOURCE NAME / NUMBER</th>
<th>ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)</th>
<th>EXISTING WATER RIGHTS</th>
<th>FORECASTED WATER USE FROM SOURCES (6-year Demand)</th>
<th>FORECASTED WATER RIGHT STATUS (Excess / Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (aft)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>253,75 cfs</td>
<td>183,465 a/fy</td>
<td>118 cfs</td>
</tr>
</tbody>
</table>

*Certificate limits diversion to 2.0 cfs from October 1 to July 1 and 0.2 cfs from July 1 to October 1. Imputed annual acre-feet would be 1,120 acre-feet.

*Peak withdrawals from Lake Padron were 4.71 cfs.

*Peak withdrawals from Lake Whatcom for municipal potable, non-potable industrial uses and Whatcom Creek sanitary purposes have been 106 cfs.

*Notice of water right application for this certificate indicated the diversion would be continuous. Continuous (annual) diversion of 10 cfs would impute to 7,227 acre-feet.

*Water right certificate limits withdrawals based on a minimum instantaneous flow of 0.007 between 10 and 15 cfs. (The exact figure to be determined by study.)

*This certificate is for change in purpose to add hydropower.

*See discussion in this section for explanations of these calculations.

*afy = acre-feet per year

*cf = cubic feet per second

*mgd = million gallons per day

DOH Form #331-371 (09/07)
### Table 4-5c
WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 20 YEAR FORECAST

<table>
<thead>
<tr>
<th>PERMIT CERTIFICATE OR CLAIM NUMBER</th>
<th>NAME ON DOCUMENT</th>
<th>PRIORITY DATE (List oldest first)</th>
<th>SOURCE NAME / NUMBER</th>
<th>ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)</th>
<th>EXISTING WATER RIGHTS</th>
<th>FORECASTED WATER USE FROM SOURCES (20-year Demand)</th>
<th>FORECASTED WATER RIGHT STATUS (Excess/Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (Qa)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1 2008</td>
<td>City of Bellingham</td>
<td>1-14-1990</td>
<td>Silver Creek</td>
<td>No</td>
<td>2.0 cfs</td>
<td>Not Specified</td>
<td>0</td>
</tr>
<tr>
<td>2 2009</td>
<td>City of Bellingham</td>
<td>1-14-1990</td>
<td>Ruby Creek</td>
<td>No</td>
<td>2.0 cfs</td>
<td>Not Specified</td>
<td>0</td>
</tr>
<tr>
<td>3 2118</td>
<td>City of Bellingham</td>
<td>10-14-1993</td>
<td>Lake Padden</td>
<td>No</td>
<td>Not Specified</td>
<td>780 afy r</td>
<td>0</td>
</tr>
<tr>
<td>4 2020</td>
<td>City of Bellingham</td>
<td>3-9-1917</td>
<td>Lake Whatcom</td>
<td>No</td>
<td>Not Specified</td>
<td>20,000 afy r</td>
<td>125 cfs</td>
</tr>
<tr>
<td>5 4721</td>
<td>City of Bellingham</td>
<td>4-8-1997</td>
<td>Lake Whatcom</td>
<td>No</td>
<td>10 cfs</td>
<td>Not Specified</td>
<td>10 cfs</td>
</tr>
<tr>
<td>6 543647</td>
<td>City of Bellingham</td>
<td>10-6-1994</td>
<td>Middle Fork of the Nooksack</td>
<td>No</td>
<td>125 cfs</td>
<td>Not Specified</td>
<td>116 cfs</td>
</tr>
<tr>
<td>7 15087/54</td>
<td>City of Bellingham</td>
<td>10-4-1994</td>
<td>Middle Fork of the Nooksack</td>
<td>No</td>
<td>125 cfs</td>
<td>Not Specified</td>
<td>116 cfs</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>261.75 cfs</td>
<td>182,405 afy r</td>
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</tbody>
</table>

**CLAIMS**

<table>
<thead>
<tr>
<th>INTERIE NAME/IDENTIFIER</th>
<th>NAME OF PURVEYOR PROVIDING WATER</th>
<th>EXISTING LIMITS ON INTERIE USE</th>
<th>FORECASTED CONSUMPTION THROUGH INTERIE</th>
<th>FORECASTED INTERIE SUPPLY STATUS (Excess/Deficiency)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
<td>Maximum Annual Volume (Qa)</td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>261.75 cfs</td>
<td>182,405 afy r</td>
<td>135 cfs</td>
</tr>
</tbody>
</table>

1. None

**PENDING WATER RIGHT APPLICATION (New/Change)**

<table>
<thead>
<tr>
<th>NAME ON APPLICATION</th>
<th>DATE SUBMITTED</th>
<th>ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)</th>
<th>PENDING WATER RIGHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
<tr>
<td>1. None</td>
<td></td>
<td></td>
<td>Maximum Instantaneous Flow Rate (Q)</td>
</tr>
</tbody>
</table>

*Certificate limits diversion to 2.0 cfs from October 1 to July 1 and 0.2 cfs from July 1 to October 1. Imputed annual acre-feet would be 1,120 acre-feet.

*Peak withdrawals from Lake Padden were 4.71 cfs.

*Peak withdrawals from Lake Whatcom for municipal potable, non-potable industrial uses and Whatcom Creek sanitary purposes have been 106 cfs.

*Notice of water right application for this certificate indicated the diversion would be continuous. Continuous (annual) diversion of 10 cfs would implicate 7,227 acre-feet.

*Water right certificate limits withdrawals based on a minimum instream flow of 10 cfs. The daily figures to be determined by study.

*This certificate is for change in purpose to add hydropower.

*See discussion in this section for explanations of these calculations.

afy r = acre-feet per year

cfs = cubic feet per second

mgd = million gallons per day

DOH Form #331-373372 (09/07)
4.7 **Bellingham System Reliability**

This section summarizes Bellingham’s effort to ensure an adequate supply of high quality water is provided at all times. Public health may be threatened when water shortages or interruptions in service occur and when the quality of water may be degraded. The City has taken several actions to reduce the risk of water shortages and degraded water quality and to plan for activities which can be taken when emergency events occur that may cause such issues.

System reliability with respect to quantity can be achieved by providing long term storage of potable water or by development of reliable sources of supply. Long term storage of potable water is not a viable alternative for several reasons. Even a few weeks supply would be enormous and the financing of such facilities to store several weeks supply would be very burdensome. In addition, storage of large quantities of potable water result in water quality issues and treatment would likely be required prior to use by the customers. For these reasons, the City has focused on development of reliable sources of supply as well as the supply facilities themselves (water treatment, pump stations and storage facilities).

The City has developed two documents that define processes and/or responses to address a lack of water supply such as a drought as well as during various emergencies that may occur. They are the Water Shortage Response Plan (2001) and the City of Bellingham Water System Emergency Response Plan for Public Works Operations (2005). Plan table of contents are included in Appendix L and M, respectively. An Emergency Response Plan Flowchart and Checklist Index are also included in Appendix M.

4.8 **Source Reliability**

Bellingham’s municipal supply provides excellent reliability both in terms of supply capacity and water quality.

4.8.1 **Capacity**

The City’s water sources have been able to meet required capacity throughout the City’s history. The storage provided in Lake Whatcom and the ability to supplement supply with the Middle Fork of the Nooksack River provides a robust system for the City. The water rights and hydraulic capacity of the system appear to be adequate to meet needs for current and future demands through 2028.

The supply system from Lake Whatcom is vulnerable in two ways. First, there is a single tunnel and pipeline from Lake Whatcom to the WTP. Second, there a single pipeline from the WTP to the distribution system. As previously discussed, the Nooksack source is vulnerable due to in-stream flow restrictions. These restrictions diminish or cut-off the amount of water the City can divert during peak demand periods.
4.8.2 Quality

The quality of the City’s water is discussed in Section 3. The supply has been reliable since its inception. All applicable water quality requirements have been met. However, the City is starting to have difficulties with taste and odor problems in the summer related to algal growth in Lake Whatcom in part caused by stormwater runoff and excess phosphorous. The City is instigating a rigorous source water protection plan that includes a significant public education component for residents within the Lake Whatcom watershed. Additionally, phosphorous-laden fertilizers and dishwasher detergents are already outlawed in the county.

4.9 Facility Reliability

An analysis of Bellingham’s water system facilities is presented in Section 3. Supply, distribution, pumping, and storage facilities are adequate to reliably provide a sufficient quantity of water at sufficient pressure to meet domestic, commercial, industrial, and fire suppression water demands. To maximize water system reliability, the City is committed to upgrading, replacing, and maintaining its facilities as necessary, within reasonable budget constraints. The facility improvements summarized in Section 3 are included in the Bellingham’s improvement program, presented in Section 9.

On-site or trailer-mounted emergency power facilities are available for all the existing major pump stations and are included in any new stations. In addition, most of the pressure zones are supplied by two pump stations and are served by two or more reservoirs. The City has identified alternative supply routes to provide at least a minimal supply of water to the major pressure zones. This system was put to the test during the 1999 Olympic Gas Pipeline Explosion. This explosion took the Dakin & Yew Pump Station out of service and the City was able to reconfigure flow routes to provide a supply of water to the affected pressure zone.

4.10 Water Shortage Response Plan


4.11 Water System Emergency Response Planning

The City of Bellingham developed a Water System Emergency Response Plan for Public Works Operations in 2005. This plan provides the following:

- Potential hazards and how to address them
- Concepts of operations as they relate to emergencies
4.12 Water Source Protection

The City of Bellingham prepared a Water Source Protection Plan for the Lake Whatcom Watershed in 2000. The City is cooperating with numerous agencies to gather additional data and analyze water quality concerns and issues on a continuing basis. Further information about this plan is presented in Section 5.

4.13 Interties

The City of Bellingham has supply interties with eight small neighboring systems as described in Sections 1 and 3. The City does not have interties with any other water systems that supply water to the City. Furthermore, there are no known opportunities to develop interties as a means of developing an additional supply for the City.

4.14 Wastewater Reuse

The City of Bellingham recognizes the importance of reuse of treated wastewater in reducing the demand for potable water and coordinating the Water System Plan and the Sewer Comprehensive Plan (see Appendix N). The City of Bellingham’s wastewater treatment facility would serve as the source of reclaimed wastewater. However, creating reclaimed water would require significant and costly improvements to existing treatment processes to generate the Class-A standard effluent required for reuse.

<table>
<thead>
<tr>
<th>Last Name</th>
<th>Total Consumption (ccf)</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Washington University</td>
<td>113,063</td>
<td>4.31%</td>
</tr>
<tr>
<td>Whatcom County WD 2</td>
<td>71,783</td>
<td>2.74%</td>
</tr>
<tr>
<td>Whatcom County WD 7</td>
<td>54,280</td>
<td>2.07%</td>
</tr>
<tr>
<td>Port of Bellingham</td>
<td>52,115</td>
<td>1.99%</td>
</tr>
<tr>
<td>City of Bellingham</td>
<td>43,675</td>
<td>1.66%</td>
</tr>
<tr>
<td>Bellingham Cold Storage</td>
<td>43,096</td>
<td>1.64%</td>
</tr>
<tr>
<td>Bellingham School District</td>
<td>33,524</td>
<td>1.28%</td>
</tr>
<tr>
<td>Bellingham Golf and Country</td>
<td>32,415</td>
<td>1.24%</td>
</tr>
<tr>
<td>Saint Joseph’s Hospital</td>
<td>30,798</td>
<td>1.17%</td>
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</table>
TABLE 4-6
Top 20 Users of Reclaimed Water Consumption

<table>
<thead>
<tr>
<th>Last Name</th>
<th>Total Consumption (ccf)</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haggens</td>
<td>27,995</td>
<td>1.07%</td>
</tr>
<tr>
<td>Bellingham Housing Authority</td>
<td>27,464</td>
<td>1.05%</td>
</tr>
<tr>
<td>Bellis Fair</td>
<td>27,340</td>
<td>1.04%</td>
</tr>
<tr>
<td>Trans-Ocean Products, Inc.</td>
<td>23,470</td>
<td>0.89%</td>
</tr>
<tr>
<td>Habitat Properties, LP</td>
<td>21,916</td>
<td>0.84%</td>
</tr>
<tr>
<td>Britax Heath Tecna, Inc.</td>
<td>21,903</td>
<td>0.83%</td>
</tr>
<tr>
<td>Northwest Health Care Linen</td>
<td>21,131</td>
<td>0.81%</td>
</tr>
<tr>
<td>Kimco Realty Corporation</td>
<td>18,932</td>
<td>0.72%</td>
</tr>
<tr>
<td>Icicle Seafoods</td>
<td>18,882</td>
<td>0.72%</td>
</tr>
<tr>
<td>Whatcom County Administrative Services</td>
<td>17,055</td>
<td>0.65%</td>
</tr>
<tr>
<td>Bornstein Seafoods, Inc.</td>
<td>16,312</td>
<td>0.62%</td>
</tr>
</tbody>
</table>

1Total Consumption measured from 01/01/2007 to 12/31/2007.

CCF = hundred cubic feet

The City has considered potential customers for reuse water from two perspectives. One is to identify current large water customers of the City. The other is to map known potential reuse customers.

Table 4-6 provides a listing of the top 20 water customers of the City. A review of Table 4-6 reveals the following facts. First, many of the largest customers actually represent many smaller points of consumption. For example, Bellingham Housing Authority, Bellingham School District, City of Bellingham, Haggens, and Western Washington University. Other large water users are food processors such as Bornstein Seafoods and Icicle Seafoods where reclaimed water use would not be permitted. Two of the largest City water customers are wholesale customers of the City (Whatcom County WDs 2 and 7). The City could not substitute reclaimed water to these wholesale customers.

This assessment still leaves several potential reuse customers from the list of large water users. The City looked at these potential customers and assessed the feasibility of extended reclaimed water service from the wastewater treatment plant to these potential customers. The location of six potential reclaimed water users and their locations in relationship to the WWTP are shown on Figure 4-3. An assessment of these potential reclaimed customers revealed the following facts:

♦ Fairhaven Park is located about 5,000 feet away from the WWTP at about elevation 170 feet.
Lake Padden golf course is located about 20,000 feet away from the WWTP at about elevation 470 feet. It could potentially use reclaimed water for 3 to 4 months. In addition, the golf course’s proximity to the lake could limit reuse potential.

Boulevard Park and the new waterfront area is located about 15,000 feet away from the WWTP at about elevation 170 feet. It could potentially use reclaimed water for 3 to 4 months.

Fairhaven Middle School is located about 3,000 feet away from the WWTP at about elevation 150 feet. It could potentially use reclaimed water for 3 to 4 months.

Bellingham Golf & Country Club is located about 35,000 feet away from the WWTP at about elevation 170 feet. It could potentially use reclaimed water for 3 to 4 months.

PSE and the Cogeneration Plant is a peaking power plant that has unpredictable water demands. When operating it uses up to about 200,000 gallons per day.

The combination of the costs of adding Class Treatment to the WWTP and of pumping and piping of reclaimed water to potential customers make reuse of treated wastewater economically unfeasible. The cost of the additional treatment would be great. Even greater would be the cost of constructing miles of transmission and distribution pipes to convey the treated wastewater to the points of application. The total amount of water that would be offset from the City’s supply would be relatively small considering the large cost of additional treatment and conveyance. As a result, reuse of treated wastewater is not reasonable for the City of Bellingham at this time and is not something the City will pursue in the during the life of this Water System Plan.

However, the City understands the importance of reuse of treated wastewater in potentially reducing demand for potable water. Bellingham will continue to evaluate the use of reclaimed water and will pursue any viable opportunities that are identified.
Figure 4-3
Potential Reclaimed Water Users
City of Bellingham
2009 Water System Plan

Source: City of Bellingham (2007) and Whatcom County (2006).

File Path: \simba\proj\BellinghamWaCityOf\371934WaterSystemPlan\GIS\MapFiles\Basemap\PotentialReclaimedWaterUsers.mxd, Date: June 23, 2009

1. Fairhaven Park
2. Lake Padden Golf Course
3. Boulevard Park / Waterfront
4. Fairhaven Middle School
5. Bellingham Golf and Country Club
6. PSE / Co-generation Plant

City Limits
Potential Reclaimed Water Users
Source Water Protection

This section highlights aspects of the City of Bellingham’s existing watershed protection plan, *Water Source Protection Plan for the Lake Whatcom Watershed, December 2007*, that relate to water system planning. Water provided by the City comes from Lake Whatcom or a diversion on the Middle Fork of the Nooksack River. The City’s watershed protection efforts have focused on the Lake Whatcom watershed because it is within the City limits and more vulnerable than the Middle Fork of the Nooksack River watershed. The discussion of the Lake Whatcom watershed is more detailed because Bellingham has completed a source water protection plan for Lake Whatcom.

The City, in partnership with Whatcom County and LWW&SD jointly administer the Lake Whatcom Management Program. These three entities adopted a multi-pronged work plan in 2006 that includes the following activities:

- Investigate inflow and infiltration sources within the LWW&SD
- Install radio meters in appropriate areas and conduct meter rebuilds within the District
- Continue on-site septic surveys, water quality monitoring, and education through WADOH
- Adopt the new Washington State on-site septic system code requiring more stringent maintenance and inspections
- Review applicable policies and provide recommendations on prohibiting on-site septic systems in the City’s portion of watershed
- Consider options for requiring on-site septic system inspections during all real estate transactions
- Placeholder to explore the Lake Louise interceptor hook-up issues

5.1 Watershed Descriptions and Characteristics

Water provided by the City of Bellingham to its customers originates at a diversion on the Middle Fork of the Nooksack River (Middle Fork). Water diverted from the Middle Fork conveyed to Lake Whatcom, in the southeast portion of the City. Lake Whatcom provides about 250 billion gallons of storage for the City. Water is conveyed from an intake tower on the north end of Lake Whatcom to the City’s Screenhouse and Water Treatment Plant.

5.1.1 Geographical Location

Bellingham’s water depends on two watersheds: the Middle Fork of the Nooksack River and the Lake Whatcom watersheds. Both watersheds are contained in the Watershed Inventory Resource Inventory Area (WRIA) 1. WRIA 1 extends from the north end of Skagit County
north into British Columbia. Figures 5-1 and 5-2 illustrate Bellingham’s two primary water supply watersheds.

The Middle Fork watershed is northeast of the City. The river originates between the south slopes of Mt. Baker and the north slopes of the South Twin. It is fed primarily by runoff from the Deming Glacier on Mt. Baker. The upper portions of the Middle Fork watershed are remote and not influenced by human activity. The City diverts water from the Middle Fork near Mosquito Lake Road, where it is conveyed by tunnel and a 40-inch transmission main into Mirror Lake where some sediment settles before flowing via Anderson creek to the south end of Lake Whatcom.

The Lake Whatcom watershed is located in the eastern portion of the City and contains Lake Whatcom, which is the source of the City’s water during much of the year. Lake Whatcom is experiencing increased algal growth and contamination from stormwater runoff, so it is the focus of the City’s Watershed Protection Plan. The Lake Whatcom watershed covers an area of about 36,000 acres, of which Lake Whatcom’s surface covers 4,994 acres.

The Lake Whatcom watershed boundaries are defined by five major surrounding peaks: Squalicum Mountain (1,585 feet) to the north of Lake Whatcom, Stewart Mountain (3,080 feet) to the northeast, Anderson Mountain (3,364 feet) to the southeast, Lookout Mountain (2,677 feet) south of Sudden Valley, and Galbraith Mountain (1,745 feet) southwest of the lake. In all, 23 subdrainages comprise the Lake Whatcom watershed. There are about 36 creeks and tributaries that flow into Lake Whatcom. The primary perennial flows into the Lake are from Austin, Smith, and Anderson Creeks. Perennial creeks are those that have flowing water year-round. Additional creeks in the watershed include Fir, Brannian, Silver Beach, Carpenter, Olsen, and numerous unnamed creeks and drainages.
These creeks and drainages are smaller and can be seasonal, drying up during the warm summer months, depending on the year.

5.1.2 Lake Whatcom Hydrological Information

Lake Whatcom hydrological attributes such as climate, terrain and geology, vegetation, and soil type assist in the formation of the watershed and properties of the lake. These attributes are discussed further below.

5.1.2.1 Climate

The mean annual temperature at Lake Whatcom is 50 degrees Fahrenheit (°F) with 150 to 190 frost-free days each year. Precipitation varies considerably depending on the location in the Lake Whatcom watershed. The north end of the watershed receives about 45 inches per year with the south end receiving 60 inches annually. Most of this rain falls between October and May. Each summer month (June to August) averages about one inch of rain.

5.1.2.2 Terrain and Geology

The geology of the Lake Whatcom watershed consists of sedimentary rocks of the Chuckanut Formation with a metamorphic rock called phyllite and glacially derived sand and gravel being exposed at the far south end of Lake Whatcom. The Chuckanut Formation, often referred to as Chuckanut Sandstone, extends from the Cascade Range to Lummi Island and is a group of rocks that includes layers of sandstone, conglomerate, shale, and coal.

The same tectonic forces that shaped the Cascade Range also tightly folded the layers of the Chuckanut Formation to create the Chuckanut Mountains including the hills around present-day Lake Whatcom. More resistant layers, typically sandstone, tend to form ridges or high points while weaker rocks, such as shale, will form low points.

Lake Whatcom was formed during the last Ice Age, as glacial ice covered western Whatcom County to depths greater than 5,500 feet. This tremendous volume of ice scoured the underlying rock. The current Lake bathymetry, or underwater topography, was created as the glacier advanced and retreated multiple times. It scoured the less resistant rock, while leaving the two sills of resistant material that now divide the Lake into its three distinct basins. The tremendous weight of the ice also depressed the land beneath it, much like a finger pushed into a balloon. As the ice retreated about 10,000 years ago, the weight was relieved and the land began to rebound.

After the glaciers had melted and as the sea levels rose, but before the land had fully rebounded, it is likely that Lake Whatcom formed a fjord that was directly connected to marine waters. Two findings, fossils and fish, support this conclusion:

♦ Marine fossils have been found in deposits near the northern portion of Lake Whatcom.

♦ Kokanee, the land-locked form of sockeye salmon, are found in Lake Whatcom. These fish probably became isolated from their ocean-going counterparts as the land rebounded and the Lake became higher than Bellingham Bay. Natural barriers then
formed between the marine and Lake system, such as the multiple waterfalls in Whatcom Falls Park.

### 5.1.2.3 Vegetation

Today, much of the Lake Whatcom watershed is comprised of forested areas dominated by stands of western hemlock (*Tsuga heterophylla*) and Douglas-fir (*Pseudotsuga menziesii*) interspersed with areas of western red cedar (*Thuja plicata*). Stands of hardwood trees are dispersed throughout the riparian areas and lower elevations of the watershed. Common hardwoods include red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*), and big-leaf maple (*Acer macrophyllum*). The dominant species found in the understory are sword fern (*Polystichum munitum*) and huckleberries (*Vaccinium spp.*). The riparian zones contain salmonberry (*Rubus spectabilis*), and drier areas find dwarf Oregon grape (*Berberis nervosa*).

In addition to these native species, many invasive and non-indigenous species such as the Himalayan blackberry, horsehair, and morning glory are also present. Proper maintenance of vegetation on shoreline property is needed to prevent the spread of these and other invasive species. Aquatic invasive plants such as Eurasian milfoil and riparian plants such as Japanese knotweed can take over an area and create homogenous systems that lack the genetic diversity needed for a healthy, balanced ecosystem.

While there are limited wetland areas in the watershed, riparian areas are abundant and are associated with the streams as well as the areas of land that border the Lake. Riparian vegetation provides critical habitat features for the resident wildlife, such as lowering water...
temperatures through shading, providing cover, and recruitment of logs into the creeks; the vegetation also helps with ecosystem processes such as slope stability and filtration of runoff.

### 5.1.2.4 Soil Type

The soils that are derived from the Chuckanut Formation and the steep topography of some portions of the watershed leave the area naturally prone to landslides. Land uses such as timber harvest, forest road building and usage, residential development, and utility installation and maintenance can increase the natural rates and timing of sediment delivery, with associated effects on stream and lake water quality, fish and fish habitat, and ultimately human health and safety.

### 5.1.3 Identification of Critical Areas and Intake

Lake Whatcom is a critical component of the City’s water system; it serves as storage and a water source, via the Lake’s watershed. Figure 1-4 shows the land use, divided by zoning, of the City’s portion of the watershed. The City’s raw water intake is on Lake Whatcom and is discussed in detail in Section 3. The area within the City’s portion of the watershed is designated as the main Critical Area of the watershed due to the potential impacts of stormwater and septic systems on the lake water quality.

### 5.1.4 Water Quality and Continuous Monitoring

Lake Whatcom has been monitored for many years, generally beginning with regularity in the early 1960’s although limited data prior to that period can be found in some early reports and studies. Currently the Lake is sampled at five locations, with 12 tributaries monitored throughout the year. In 2004 and 2005, additional sites were added to the Austin/Beaver Creek system. Samples are analyzed for a number of water quality parameters including temperature, dissolved oxygen, clarity (of the Lake), nutrients, pH, conductivity, and fecal coliform. Flow information is also collected for a number of tributaries in the watershed. Appendix O shows the location of sampling sites in Lake Whatcom and streams tributary to the lake.

The majority of the current monitoring is being conducted by the Institute for Watershed Studies (IWS) at Western Washington University under a contract with the City. IWS provides annual reports summarizing details of the monitoring programs and results. The City also conducts monitoring for untreated and treated water.

Additional monitoring work has been conducted in recent years to support the Washington Department of Ecology’s Total Maximum Daily Load (TMDL) project and the WRIA 1 Watershed Management Project models. The results of these modeling efforts will be used to help develop and refine management actions necessary to address water quality issues in the Lake and its tributaries.
5.2 Identification of Activities or Land Uses Detrimental to Water Quality

Various natural and human influenced activities can impact water quality. Table 5-1 summarizes these impacts and states if they are present in the watershed or not.

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>Physical (turbidity)</th>
<th>Microbiological (Giardia Cryptosporidium)</th>
<th>Chemical</th>
<th>Present?</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geological</td>
<td>X</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Steep slopes</td>
</tr>
<tr>
<td>Climate</td>
<td>X</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Storm events</td>
</tr>
<tr>
<td>Residential</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td></td>
<td>On-site wastewater</td>
</tr>
<tr>
<td>Agricultural</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td></td>
<td>Hobby farms</td>
</tr>
<tr>
<td>Concentrated Animal Operations</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Grazing Operations</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Timber Management</td>
<td>X</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Road construction/repair and fire prevention</td>
</tr>
<tr>
<td>Municipal Wastewater Utilities</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Industrial Land Use</td>
<td>X</td>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Recreation</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td></td>
<td>Outdoor; hiking/camping and boating on Lake Whatcom</td>
</tr>
<tr>
<td>Fish and Wildlife Populations</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Transportation Routes</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Hydroelectric Power Generation</td>
<td>X</td>
<td></td>
<td></td>
<td>Yes</td>
<td>On transmission line from Middle Fork</td>
</tr>
<tr>
<td>Flood Control</td>
<td>X</td>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td>X</td>
<td>X</td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Research and Education</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td></td>
<td>Elementary, middle, and high schools</td>
</tr>
</tbody>
</table>
Both current and potential future impacts are summarized. Those that are present and pose a risk to the watershed are detailed after the table. Figure 1-4 depicts the City’s zoning of the Lake Whatcom watershed.

### 5.2.1 Geology and Steep Slopes

Steep slopes within the watersheds can cause landslides which deliver a large amount of sediment to the watersheds in a short amount of time. The Middle Fork watershed has many steep slopes, while steep slopes are common in the areas around Lake Whatcom. Watershed slopes are dissected by hundreds of small unnamed streams and drainages that feed into the rivers and their major tributaries. Steep slopes are occasionally susceptible to failure which can release large sediment loads into the streams and rivers of the watershed influencing downstream water quality.

### 5.2.2 Climate and Precipitation

Stormwater runoff is the most common cause of water pollution in the Lake Whatcom Watershed. In Whatcom County, most storm drains lead straight to streams, lakes, or marine waters. Heavy storms can cause significant runoff which carries solids into Lake Whatcom. In urban areas, as stormwater flows over impervious surfaces, it collects pollutants such as pesticides, fertilizers, bacteria and other microscopic organisms, sediment, oil, and many other pollutants. Unless it's filtered or treated, stormwater carries those pollutants into Lake Whatcom via sheetflow or tributary streams.

### 5.2.3 Residential and Agricultural

Residential land use is prominent in the northern end of the Lake Whatcom watershed, with decreasing residential density to the south end of the Lake. Potentially detrimental activities associated with residential development include the immediate impacts of lot clearing, land grading, soil compaction, and home construction, as well as the long-term impacts associated with the loss of native vegetation, increases in roads and vehicular traffic, yard and household chemical use (such as automotive, lawn and garden chemicals, home exterior products, and the storage of fuel in underground tanks), smoke from burning wood, and infrastructure demands from increased sanitary sewer volumes, which might precipitate overflows. Residential development also increases impervious surfaces which increases stormwater runoff volume, produces sedimentation products that can be more harmful than natural mineral sediment, and increases deposition of atmospheric particles and surface particulates.

Agricultural use is limited to small hobby farms rather than large-scale farming operations. Only 100 acres of the entire watershed are used for farming. Agriculture uses have the potential for introducing excessive sediment, nutrients, and pesticides into drainage ways and Lake Whatcom. However, the small amount of agriculture use in the watershed has a relatively minimal impact on Lake Whatcom water quality.

Lake Whatcom has been found to be phosphorous limited, so increases in phosphorous concentrations in the Lake spur algae and microbial growth. Like phosphorus, it occurs
naturally in small amounts, contributes to plant and animal growth, yet excessive nitrogen can decrease water quality. Although phosphorus and nitrogen are naturally occurring, other sources include exposed soil from construction and landscaping, lawn and garden fertilizers, animal waste, failing septic tanks, automobile exhaust and car washing, and phosphorus-based soaps, detergents, and chemicals.

5.2.4 Timber Management

Much of the Lake Whatcom watershed is forested and managed by the State or private timber management companies. Logging removes trees which naturally act to support soils on hillsides. Without trees, more precipitation reaches the ground, which causes increased runoff and sediment and nutrient transport into Lake Whatcom. Additionally, pesticide application and firefighting measures occur more frequently in timber management areas which may introduce these chemicals into the municipal watershed.

5.2.5 Recreation

Recreation is popular in the Lake Whatcom watershed in the form of both motorized and non-motorized water sports including boating, canoeing, fishing, sailing, kayaking, and the like. Lake Whatcom has a rich boating history which begins before settlers arrived in the mid-1800s. Local Indians used the Lake and its surroundings for transportation, fishing, hunting, and gathering. Its use increased in the late 1800s and early 1900s as settlers began to use the Lake for transport of raw materials such as wood and coal and moved into the era of steam and, eventually, gasoline-powered engines. Currently, the Lake Whatcom watershed is used for boating, swimming, a seaplane airstrip, hiking, biking, all-terrain vehicle use, and golfing.

These uses can lead to deterioration of water quality. Of primary concern for water quality is the risk of fuel spills and contamination from engine use, erosion from hiking, biking, all-terrain vehicle use around the lake, and fecal contamination from people and animals in the Lake. These concerns have lead to the adoption of restrictions on carbureted engines by both the City of Bellingham and Whatcom County. Bellingham adopted a ban on two stroke carbureted engines in January 2007. Whatcom County has established a similar restriction that will be phased beginning in January 2009.

5.2.6 Fish and Wildlife Populations

Lake Whatcom supports a native kokanee salmon population as well as many other warm and cold water introduced and native fish species. There is also a year-round resident population of Canada Geese, along with other bird and wildlife species. The Canada geese are problematic along the shores of Lake Whatcom because concentrated populations of geese contribute to higher levels of nutrients and bacteria entering the Lake.

5.2.7 Transportation Routes

The transportation routes in the Lake Whatcom watershed are experiencing increased use due to increasing housing density in the area. Water quality impacts directly related to
transportation include increases in impervious surfaces with additional stormwater runoff, slope failures, and the possibility of a hazardous spill due to vehicular accidents or commercial hauling of hazardous materials.

5.3 Watershed Management and Control Measures

Bellingham uses various techniques to control the quality of water in the Lake Whatcom watershed. They are outlined in the following sections.

5.3.1 Lake Whatcom Management Program

The Lake Whatcom Management Committee (LWMC) was founded in 1992. It is comprised of stakeholders from Whatcom County, the City of Bellingham, and the LWW&SD. The goal of the LWMC is to promote the long-term protection, preservation, and enhancement of Lake Whatcom water quality. The LWMC is responsible for the development and maintenance of the Lake Whatcom Management Program (LWMP). The LWMP is updated every 5 years and issues annual reports detailing current goals and progress towards their accomplishment.

To further develop the Lake Whatcom Reservoir Management Program 2008 Work Plan, the City of Bellingham, Whatcom County and LWW&SD provided recommendations in fall 2007 to the Joint Councils and Commissioners for consideration. These recommendations include the following:

5.3.1.1 Program Area 1: Land Preservation

To reduce development potential in the watershed:

- Pursue options other than tax foreclosure for restricting development in the watershed
- Change zoning to reduce development potential
- Provide inter-jurisdictional funding and staffing for the property acquisition program so as to acquire all remaining buildable lots in the watershed

5.3.1.2 Program Area 2: Stormwater Management

To prevent stormwater impacts:

- Require all new construction in watershed to install on-lot infiltration systems for stormwater run-off
- Implement a stormwater retrofit program to install on-lot infiltration for stormwater run-off on existing development throughout the watershed
- Explore potential options for combining the City’s and County’s obligations under the National Pollutant Discharge Elimination System (NPDES) permits and the future TMDL requirements in the Lake Whatcom watershed
5.3.1.3 **Program Area 3: Urbanization and Land Development**

To reduce new residential development impacts to lake water quality:

- Change current zoning and other policies to limit new sources of pollutants
- Reduce impact of urban level services in the watershed

5.3.1.4 **Program Area 4: Community Outreach**

Enhance stewardship actions in the watershed:

- Fund stewardship coordinator position with support from education and enforcement staff

5.3.1.5 **Program Area 5: Data Management and Information**

Enhance usability of watershed:

- Establish a peer review process for all data collected in the watershed that is used for management program development

5.3.1.6 **Program Area 8: Transportation**

To reduce traffic impacts to Lake water quality:

- Reduce traffic on roads adjacent to the lake including through traffic on Lake Whatcom Boulevard and along the North Shore Drive
- Analyze water quality impacts associated with road standards
- Implement mandatory yearly inspection for all vehicles based in the watershed or that are frequent visitors to the watershed; stickers provided for compliant vehicles, citations provided for vehicles without stickers

5.3.1.7 **Program Area 9: Recreation**

To reduce impacts from recreation use of the Lake:

- Close Bloedel-Donovan boat launch to motorized watercraft
- Restrict Park improvements that increase traffic potential
- Implement mandatory yearly inspections of all boats and motors using the Lake

5.3.1.8 **Program Area 10: Utilities and Waste Management**

To improve monitoring and maintenance of utilities:

- Develop interjurisdictional capability for emergency repairs of watershed sewer systems
- Establish a single Lake Whatcom watershed water and sewer provider

To reduce impacts from new residential construction:
5.3.1.9 Program Area 12 (New): Enforcement

Improve City and County enforcement of regulations aimed at protecting lake water quality:

- Create an enforcement team, cross-trained in all watershed-specific regulations
- Create a commissioned staff position
- Provide for joint funding of education and enforcement activities

5.3.2 Land Ownership and Written Agreements

The watershed is composed of thousands of parcels under diverse ownership with land use dominated by residential and forestry uses. Bellingham began a Program in 2001 to purchase available land in the Lake Whatcom Watershed. The City’s Property Acquisition Program is financed by water usage fees, for the purpose of protecting the drinking water source, which includes the conservation and management of the acquired land. To date (as of June 2008), the City has purchased 1,351 acres of land and protected an additional 116 acres through conservation easements and restrictive covenants. Additionally, there are many formal written agreements between land owners and jurisdictional entities that include the following:

- The LWMP, which is active and developing goals for the 2010-2014 plan.
- Several agreements pertaining to the provision of water and sewer services between the City and LWW&SD, which are still active.
- An interlocal agreement and the “On-Site Septic System Survey and Maintenance Education Program” between the City and Whatcom County. This program is slated to continue through 2008 and will likely continue past that time.
- An agreement between the City and the Washington State Department of Natural Resources (DNR) to encourage state purchase of forest land; exchange information on DNR’s forestry management practices and the City’s water quality concerns; and discuss timber sales, road construction, vegetation management, and Forest Practices Act administration.
- An agreement between the City and WD 7 for the City to sell WD 7 water, which allows the City to stipulate source water protection measures to be taken by WD 7.
Agreements between the City and sewer and new water service recipients outside the City limits allowing the City to collect stormwater fees and mandate that BMC 15.42 be followed.

Architectural Control Guidelines 14.8.2, 14.18, 14.23, 14.25, 14.35, and 14.36, developed by and for the Sudden Valley Community Association (SVCA), which is located within the LWW&SD.

A settlement agreement between LWW&SD and Cedar Hills West and Summit View Subdivisions to ensure these subdivisions maintain temporary sewage holding tanks to ensure LWW&SD does not violate its sewage contract with the City.

5.3.3 Land Use Restrictions
Land use restrictions are in place within the Lake Whatcom watershed as part of the City’s property acquisition program. There are 116 acres within the Lake Whatcom with conservation easements or restrictive covenants in place. The watershed is zoned primarily as residential with some areas of commercial forest. These zoning categories will limit the nature of future development. In the areas that can be developed, land use is restricted by various sections of the BMC and WCC.

5.3.4 Land Use Alterations
DNR is coordinating with Whatcom County to transfer or ‘re-convey’ up to 8,000 acres of state forest trust lands in the Lake Whatcom watershed. According to the DNR Lake Whatcom Landscape Plan Web site:

“As specified in state law, the County will use any re-conveyed lands for a park. Part of the concept is to trade some of the state forest trust lands in the Whatcom watershed for some of the other state trust lands that are dispersed throughout the Whatcom watershed. The exchange would ‘block up’ the state forest trusts lands so that the parcels to be re-conveyed would be together, and the federally granted state trust lands would be together for more effective management into the future. If the proposed land exchange and reconveyance project moves forward, there will be a public hearing to receive ideas and concerns about the proposal. Public comments will be presented to the decision makers. Final decisions will be made by the Whatcom County Council and the state Board of Natural Resources—which makes policy decision regarding state trust lands.” (Accessed July 17, 2008.)

The DNR Web site provides additional information regarding this reconveyance, including DNR-planned activities land use within the watershed for 2008, pilot project reports, environmental reviews, and news releases.

5.3.5 Regulation of Agriculture, Timber Harvest, and Construction Practices
Regulations of agriculture, timber harvest, and construction practices help maintain water quality and the overall health of the City’s watershed.
5.3.5.1 Agriculture

Bellingham has few regulations on agriculture and they extend only to hobby farms as there is no large-scale farming operations in the Lake Whatcom watershed. WCC 16.28 dictates that it is illegal to spread manure within 50 feet of drainage ditches leading to rivers and streams unless included in a management plan developed in conjunction with the Whatcom Conservation District. The Lake Whatcom Management Program provides information to farmers about maintaining water quality while meeting farming goals.

5.3.5.2 Timber Harvest

The City and Whatcom County have worked together to develop the following goals for timber management:

♦ Promote low impact forest practices in the watershed over residential development while working to ensure that forest management practices are conducted in harmony with the principles of a drinking water reservoir.

♦ Pursue zoning and development incentives to retain lands in long-term forestry

♦ Develop and maintain a comprehensive watershed forest management plan which minimizes cumulative impacts on the drinking water reservoir.

The City is working with Whatcom County as well as DNR and timber harvest companies to develop regulations that maintain water quality while allowing for selected timber harvest.

In addition, any burning associated with timber harvest is required to be in compliance with DNR’s Smoke Management Plan, and state and federal clean air regulations (CH2M HILL, 2003).

5.3.5.3 Construction

Both the City and Whatcom County have various regulations regarding construction in the Lake Whatcom watershed that are more stringent that regulations imposed by the Ecology. Many regulations involve the use of best management practices (BMPs) to limit the amount of stormwater runoff created at a construction site as well as to improve the quality of generated stormwater. Additionally, Whatcom County restricts land clearing activities greater than 500 square feet from September 1 to April 30. The City restricts land clearing activities from October 1 to April 30.

Allowable residential development densities vary, with minimum lot size and maximum density for new construction dependent on the availability of public sewer and water service; the densities range from a maximum of 12 units to the acre in areas with urban services down to one dwelling unit per 40-acre parcel in the rural forestry zone (CH2M HILL, 2003).
5.3.6 Inspection, Surveillance, and Monitoring Programs

Bellingham has an extensive monitoring program of the Lake Whatcom watershed. The Lake Whatcom watershed is monitored by IWS at Western Washington University under contract with the City. Currently, Lake Whatcom is sampled at five locations, with 12 tributaries monitored throughout the year. IWS provides annual reports summarizing details of the monitoring programs and results. The City does additional monitoring of Lake Whatcom in accordance with the Safe Drinking Water Act as administered by WADOH.

5.3.7 Lake Whatcom Contamination Source Controls

Natural characteristics of the watershed such as geology and steep slopes, climate and precipitation, and fish and wildlife can adversely affect water quality. Programs to mitigate impacts from naturally occurring sources are discussed below. In addition, anthropomorphic activities such as residential development and agricultural activities, timber management, and recreation can become contamination sources. The City also has taken steps to mitigate these potential sources.

5.3.7.1 Geology and Steep Slopes

The best way to prevent water quality impacts from steep slopes is to keep the natural vegetative cover. To this end, Bellingham is developing timber harvest standards for the Lake Whatcom watershed. Additionally, Erosion Control Standards exist for the City and Whatcom County to prevent sediments from entering into Lake Whatcom and its tributary streams at construction sites. The City provides a Lake-Friendly Gardening Kit with tips and alternatives to reduce fertilizer and pesticide use, as well as erosion control tips.

5.3.7.2 Climate and Precipitation

Preventing pollutants and debris from making their way into ditches, streets, and storm drains is the first step towards dealing with stormwater runoff issues. The City and County both regularly run street sweepers throughout the watershed to prevent polluted and nutrient-rich stormwater from entering into streams and lakes. Additionally, both the City’s and County’s Comprehensive Plans have adopted goals and policies to reduce the volume and increase the quality of stormwater.

Additionally, the City has completed several stormwater retrofit projects in the watershed. The retrofits include rain gardens that use native vegetation that naturally filter pollutants from stormwater and various media filter cartridge systems.

5.3.7.3 Residential and Agricultural

The City has few regulations on agriculture and they extend only to hobby farms, as there are no large-scale farming operations in the Lake Whatcom watershed. WCC 16.28 dictates that it is illegal to spread manure within 50 feet of drainage ditches leading to rivers and streams unless included in a management plan developed in conjunction with the Whatcom Conservation District. The Lake Whatcom Management Program provides information to farmers about maintaining water quality while meeting farming goals.
5.3.7.4 **Timber Management**
The City is working to develop goals and regulations to allow forest product harvest while protecting the Lake Whatcom watershed. The current goals of this process are the following:

♦ Promote low impact forest practices in the watershed over residential development while working to ensure that forest management practices are conducted in harmony with the principles of a drinking water reservoir

♦ Pursue zoning and development incentives to retain lands in long-term forestry

♦ Develop and maintain a comprehensive watershed forest management plan which minimizes cumulative impacts on the drinking water reservoir

5.3.7.5 **Recreation**
The Lake Whatcom Management Program has resources online regarding ways that boaters can minimize their impacts on the water quality in Lake Whatcom. These suggestions include the following:

♦ Use an electric motor

♦ Choose a cleaner, more efficient engine when purchasing a new engine

♦ Limit engine operation at full throttle

♦ Eliminate unnecessary idling

♦ Tune and maintain engines so they are more efficient and leak less

♦ Mix oil and gas in the correct ratio for two stroke engines and do so away from the dock and shoreline.

♦ Consider making your next boat one that does not use a gasoline engine for its main source of power, such as a sailboat, kayak, or rowboat

5.3.7.6 **Fish and Wildlife**
The Lake Whatcom Management Program provides information to lakeside homeowners about how to make their waterfront property less attractive to geese. The suggestions range from habitat modification to scare tape and hazing.

5.3.8 **Public Education**
Bellingham provides significant information to residents about the state of the Lake Whatcom watershed. They use the Lake Whatcom Management Program’s Web site as well as information in mailers, signs around Lake Whatcom, and other informational opportunities.
5.4 System Operations

Bellingham’s operation and maintenance manual, discussed in detail in Section 6, Operations and Maintenance Program, outlines procedures for operating the water treatment plant. The operational flexibility of the WTP is outlined in Section 3, System Analysis. Additionally the City has an emergency response plan, part of which is included in Appendix M, which outlines the chain of command and appropriate actions for dealing with various water system emergencies.
Operations and Maintenance Program

Bellingham proactively operates and maintains its water system as an effective means of system management. The City began developing an operations and maintenance manual in the mid-1990s and makes periodic updates and adds material. Appendix P is the table of contents for this document. This section is formatted consistent with the format presented in Chapter 6 of the WADOH Planning Handbook.

6.1 Water System Management and Personnel

Bellingham manages its water system and wastewater collection system in a cooperative manner within the same management unit, the Public Works Department. Daily maintenance and operations are executed by the Operations Division, which is comprised primarily of operators, field crew, and laboratory staff. Water system planning, design, and other non-routine management of the water system are addressed by engineering staff within the Engineering Division. The Operations Division organizational structure is presented in Figure 6-1. The structure reflects the utility’s internal organization and how the different branches of the operations division are broken out. Included in this section is a brief discussion of the responsibilities of positions in the Operations Division. Detailed job descriptions of positions in the Water and Wastewater Collection Division, and of other related positions in the Department of Public Works and Utilities, are presented in Appendix Q.

6.1.1 Superintendent of Operations

The Public Works Superintendent of Operations is responsible for management of the operation and maintenance of Bellingham’s watershed, water supply, water treatment, water distribution, and wastewater treatment systems. This includes responsibility for water and wastewater treatment management, budgets, process control systems, quality standards, laboratory services, distribution activities and for overall supervision of supervisors and personnel in both the plants and distribution groups. The Superintendent ensures that all federal, state, and local regulations are met and that departmental policies and procedures are followed to provide a safe, dependable, and cost-effective operation of the municipal water and wastewater facilities. The Superintendent is responsible for the City’s water and sewer utility which includes establishing business practices, rates, and long-range plans.

6.1.2 Utility Operations Engineer

The Utility Operations Engineer performs a variety of civil engineering duties for Bellingham’s water and sewer systems. They identify, analyze, and resolve system needs. The also provide guidance and technical information to the Department of Public Works and the public about water and sewer system management.
6.1.3 Water Conservation Specialist

The City’s Water Conservation Specialist performs a variety of work and field duties associated with Bellingham’s water conservation program in accordance with the State Municipal Water Supply-Efficiency Requirements. Examples of responsibilities include the following:

- Coordinating and developing methods, standards, and practices for water management planning
- Performing a variety of tasks associated with conservation education
- Researching, evaluating, and designing innovative technologies for water use
- Providing technical assistance with the implementation of conservation measures
- Assisting with the City’s water shortage contingency plan
- Facilitating partnerships with fellow water purveyors through participation in coalition and committee workshops
- Coordinating financial assistance for joint projects and partnerships with other agencies, water conservation projects, or awareness
- Reporting water conservation performance

6.1.4 Technical Supervisor—Water Quality

The Water Quality Technical Supervisor is responsible for the supervision and management of the monitoring and testing programs for Bellingham’s potable water, drainage, and wastewater systems. They also prepare reports per local, state, and federal requirements. Additionally, the Water Quality Technical Supervisor conducts personnel functions and handles citizen inquiries and complaints regarding water issues.

6.1.5 Water Quality Specialist

The Water Quality Specialist evaluates water quality and plant process data, develops and implements laboratory and field projects, evaluates laboratory methodology and recommends changes, and prepares scientific and technical reports (including reports for local, state, and federal compliance). They also utilize computer software to perform research and data management and respond to citizen inquiries and complaints regarding water and wastewater issues. Their work requires a high degree of accuracy since error or negligence may compromise Bellingham’s water and wastewater treatment systems, as well as have an impact on its water, wastewater, and stormwater capital improvement programs.

6.1.6 Laboratory Technician

The Laboratory Technician has the primary responsibility of collecting and testing surface water, drinking water, and wastewater samples for regulatory compliance, plant process
control, and the monitoring of environmental programs as they apply to water and wastewater compliance. The Laboratory Technicians are responsible for quality control procedures in the laboratory including analyzing performance evaluation samples to ensure state certification of both laboratories. Additional duties include assisting with information gathering and initial preparation of compliance reports, implementation of new laboratory procedures, and special project assignments. Further duties include working with laboratory and process control instrumentation. The Laboratory Technicians are responsible for monitoring, calibrating, maintaining, troubleshooting, and repairing process instruments and laboratory-related instruments. They maintain an inventory of supplies and procure equipment and supplies, as needed.

6.1.7 Maintenance Supervisor—Water Distribution

The Water Distribution Maintenance Supervisor combines supervisory and customer service responsibilities in the installation, maintenance, improvement, operation, monitoring, testing, inspection, and repair of water distribution system facilities and equipment. Error or negligence in the performance of the maintenance unit could have serious consequences for the viability of the Bellingham’s water supply, public safety, the successful operation of the water distribution system, and/or potential legal liability or financial impacts due to non-compliance with federal and state requirements.

6.1.8 Water Distribution Specialists

Below is a list of the various Water Distribution Specialists in order of decreasing responsibility.

6.1.8.1 Water Distribution Specialist V—Cross-Connection Control Specialist

The Cross-Connection Control Specialist performs inspections of construction projects and existing facilities to ensure compliance with specification and standards for cross-connection control. They perform recordkeeping to ensure that state regulations are met and results are complied according to standards. As a secondary focus, as time permits, the Specialist performs construction, maintenance, and repair of Bellingham’s water distribution system, applying special expertise and in-depth knowledge to a variety of more complex, difficult, or specialized assignments. The Specialist functions as a lead to crews of other City staff and performs independently on specialized assignments requiring well-developed skills, abilities, and knowledge. They are also capable of performing the work of the other water distribution specialists.
6.1.8.2 Water Distribution Specialist IV
The Water Distribution Specialist IV is the highest level of skilled manual labor and equipment operation in the self-advancing Water Distribution Series. The Specialist IV performs all phases of construction, maintenance, and repair of the City’s water distribution system. They regularly apply special expertise and in-depth knowledge to a variety of more complex, difficult, or specialized assignments. The Specialist IV functions as lead worker to crews of other Bellingham staff and performs independently on specialized assignments requiring well-developed skills. They are also capable of performing the work of water distribution specialists below this class.

6.1.8.3 Water Distribution Specialist III
The Water Distribution Specialist III combines manual labor and the operation of various types of specialized mechanical equipment in order to install, maintain, and service Bellingham’s water distribution system; they primarily work as part of an assigned crew, assisting higher classified staff with more complex and skilled tasks. The Specialist III occasionally works independently and may organize the work of a particular assignment involving others; they may also receive assignments focused on one or two areas of a particular skill, ability, or work need. They receive training in all functions of water distribution system maintenance and operation and have a well-rounded working knowledge of the City’s water distribution system, policies, and procedures, in addition to the purpose of assigned maintenance tasks. The Specialist III assists in the development of knowledge and skills in less experienced co-workers through on-the-job training, maintaining attention to safety and protection of personnel and equipment is integral to the work. They are also capable of performing the work of all other water distribution specialists below this class.

6.1.8.4 Water Distribution Specialist II
The Water Distribution Specialist II combines manual labor and the operation of various types of specialized mechanical equipment in order to install, maintain, and service Bellingham’s water distribution system. They primarily work as part of an assigned crew, assisting higher classified workers and receive training in all functions of water distribution system maintenance and operation. The Specialist II in the process of developing a working knowledge of the City’s water distribution system, policies, and procedures, and the purpose of assigned maintenance tasks. They maintain attention to safety and protection of personnel and equipment as an integral part of their work. They are capable of performing the work of Utility Workers.
6.1.8.5 Utility Workers 1 and 2
Utility Workers 1 and 2 perform a variety of manual labor in the construction, maintenance, and service work of all public works facilities. They operate hand and power tools and motorized equipment and usually work as part of an assigned crew. Utility Workers perform work in an assigned section but may have an individual or specialized assignment. They work indoors and outdoors in all weather conditions and sometimes under hazardous conditions; they may also be called out for emergency work.

6.1.9 Maintenance Supervisor—Plants
The position of Maintenance Supervisor of the Plants combines supervisory responsibilities, the application of technical knowledge, and occasional skilled labor to maintain the equipment and facilities for the water and wastewater treatment plants, water distribution and wastewater collection systems, and associated facilities. The Maintenance Supervisor of the Plants ensures 24-hour operation of equipment and facilities. Error or negligence in performance of the maintenance unit could have serious consequences for Bellingham’s water supply or public safety, the water and wastewater systems and treatment plant operation, or result in potential legal liability or financial impacts due to non-compliance with federal and state requirements.

6.1.10 Maintenance Specialists
Maintenance Specialists include Maintenance Planning staff, Electrical and Electronic staff, and Mechanical staff.

6.1.10.1 Maintenance Planning
Maintenance Planning staff implement and maintain the computerized maintenance management system for corrective and preventative maintenance of the treatment plants, pumping stations, water distribution, and wastewater collection systems. They prepare and distribute work assignments for the section; they also perform complex technical and troubleshooting tasks on mechanical, electrical, and electronic equipment associated with the systems. Error or negligence in performance could have serious consequences for Bellingham’s water and wastewater systems.

6.1.10.2 Electrical and Electronic
Electrical and Electronic staff coordinate, direct, assist, and perform preventative and corrective maintenance on all electrical, electronic, and instrumentation equipment associated with the water and wastewater systems. Error or negligence in performance could have serious consequences for Bellingham’s water and wastewater systems.

6.1.10.3 Mechanical
Mechanical staff coordinate, direct, assist, and perform preventative and corrective maintenance on all mechanical, pneumatic, and hydraulic equipment associated with the...
water and wastewater systems. Error or negligence in performance could have serious consequences for Bellingham’s water and wastewater systems.

6.1.11 Maintenance Technician
The Maintenance Technician performs multi-discipline preventative, corrective, rebuild, upgrade, and special project maintenance for complex plant process systems, equipment, and facilities at the water and wastewater treatment plants, pumping stations, lift stations, reservoirs, and other facilities. Examples of duties include performing troubleshooting, preventative, corrective, and special project maintenance on industrial electric, electronic, electrical generating, and distribution, electronic process control instrumentation, distributed control systems, programmable logic controllers (PLC), remote telemetry units, heating, ventilation, and air conditioning (HVAC) systems, mechanical pumping equipment, high horsepower motors, compressors, heavy industrial process machinery, piping, and pneumatic and hydraulic systems.

6.1.12 Skilled Worker
The Skilled Worker represents experienced employees who perform manual and semi-skilled labor of all kinds, indoors and outdoors, in all types of weather and under sometimes hazardous conditions. Employees in this classification may be assigned to streets, stormwater, plants maintenance or operations, traffic, clean green, or wastewater collection. They operate a variety of hand and power tools, motorized mobile equipment, and electronic test equipment, depending on assigned unit. The Skilled Worker usually works as part of an assigned crew but may be given an individual or special assignment; they perform all duties of Utility Workers. Attention to safety and protection of personnel and equipment is integral to their work.

6.1.13 Chief Operator—Water Treatment
The Chief Operator of Water Treatment is responsible for supervision and direction of watershed, water supply, water treatment, and water distribution operations; serves as the system administration for water and wastewater computerized automated control and data acquisition systems; and recommends budgets, standards, and operations. Error or negligence in supervision or performance could jeopardize municipal water supplies, facilities, and water and wastewater computerized process controls; put public health at risk; result in loss of life, property, financial resources, and equipment; and violate water quality, air, and other standards. The Chief Operator works under Washington State regulations and procedures for water supply and water treatment in addition to Bellingham and departmental policies and procedures.

6.1.14 Plant Operators
Plant Operators-In-Training and Plant Operators I and II together promote proper operation of the water treatment, water distribution, wastewater collection, primary wastewater treatment, and advanced secondary wastewater treatment plant systems.
6.1.14.1 Plant Operator II
The Plant Operator II acts as a lead worker and performs water and wastewater treatment operations, work scheduling, plant computer functions, training, and technical resource services to assist in supervisory activities and ensure proper operation of direct filtration water treatment, water distribution, wastewater collection, primary wastewater treatment, and advanced secondary wastewater treatment plant systems. The Plant Operator II may perform relief duties for the Plant Operator I and serve as a shift operator-in-charge. Error or negligence in performance could have serious consequences for Bellingham’s water supply, wastewater treatment system, or both.

6.1.14.2 Plant Operator I
The Plant Operator I acts as shift operator-in-charge and performs water and wastewater computer console operations, process control, and trouble shooting functions to ensure proper operation of direct filtration water treatment, water distribution, wastewater collection, primary wastewater treatment, and advanced secondary wastewater treatment plant systems. Duties are performed on a rotating shift basis and include swing sift, graveyard, weekend, and after hours public works dispatch and responsibilities. Error or negligence in performance could have serious consequences for Bellingham’s water supply and/or wastewater treatment system.

6.1.14.3 Plant Operator-In-Training
The Plant Operator-In-Training completes and performs progressively responsible water and wastewater duties, computer console operations, process control, and trouble shooting functions to ensure proper operation of direct filtration water treatment, water distribution, wastewater collection, primary wastewater treatment, and advanced secondary wastewater treatment plant systems. Duties are performed on a rotating shift basis and include swing sift, graveyard, weekend, and after hours public works dispatch and responsibilities. Error or negligence in performance could have serious consequences for the Bellingham’s water supply, wastewater treatment system, or both.

6.1.15 Billing and Meter Reading
Water system customers are billed bi-monthly consistent with the City’s adopted rate schedule. Customer rates vary by type (single-family, industrial, and so forth); by purpose (consumption, irrigation); and by location (inside the City limits or outside the City limits).

Metered connections are read on a bi-monthly schedule to accommodate the applicable billing cycle. All water bills include a Lake Whatcom Watershed Land Acquisition and Preservation Charge that varies depending on whether the service is metered. Metered connections currently pay $0.27 per hundred cubic feet (ccf) inside the City and $0.405 if outside the City limits. Un-metered single family connections pay a watershed fee of $10.00.

Current and adopted future water rates are presented in Section 9, Financial Analysis.
6.2 Operator Certification

Water utility personnel have a variety of certifications indicating experience and competency levels for operation of the water system. Members of the water utility staff are mandated by job classification and duties to retain a designated certification level. Bellingham pays for renewal fees, the employee’s time spent during training, and training cost for the utility. Current certifications held by Water Operations staff are summarized in Appendix R.

6.3 System Operation and Control

The City is served by a water system distribution network that includes storage reservoirs, control valves, and pump stations. The distribution system is divided into six main pressure zones with storage and seven constant pressure neighborhood zones. Each of the pressure zones is operated at different hydraulic elevations, or HGLs, to maintain relatively consistent water system pressures throughout the service area. The pressure zones are presented in Figure 1-3 and schematically in Figure 1-2.

6.4 Major System Components and Normal Operation

The major components of Bellingham’s water system, including pump stations, reservoirs, interties, and major transmission pipelines are shown in Figure 1-3. A description of the components of the City’s water system and discussion on how each normally operates within the system is presented in Section 3.3, System Description and Analysis.

6.5 Preventative Maintenance Program

A summary of preventive maintenance activities regularly scheduled by Operations Division staff is presented in Table 6-1. Operation and Maintenance Manuals are stored on Bellingham’s secure computer network and are accessible by appropriate water staff. Hard copies of the Operations and Maintenance Manual are also kept at the WTP and at the water quality laboratory. Detailed tasks in the preventative maintenance program are shown in Appendix S. Table 6-1 summarizes the preventative maintenance activities performed for each facility type.

6.6 List of Equipment and Service Representatives

The Operations Division maintains and updates lists of equipments, supplies and chemical needed to operate and maintain the water system. Information on suppliers, service representatives, technical specifications, and Materials Safety Data Sheets (MSDS) are also
maintained and regularly updated by Bellingham Operation Division staff. A stock of supplies, chemicals, pipe, parts, and fittings are kept at the Corp Yard.

TABLE 6-1
City of Bellingham Water Department Preventative Maintenance Plan Summary

<table>
<thead>
<tr>
<th>Location</th>
<th>Preventative Maintenance Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Stations</td>
<td>Bi-weekly water pump run</td>
</tr>
<tr>
<td></td>
<td>Monthly pump station check</td>
</tr>
<tr>
<td></td>
<td>Annual fire extinguisher inspection</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>Monthly reservoir check</td>
</tr>
<tr>
<td></td>
<td>Semi-annual reservoir valve exercise</td>
</tr>
<tr>
<td></td>
<td>Annual reservoir check</td>
</tr>
<tr>
<td></td>
<td>Annual fire extinguisher inspection</td>
</tr>
<tr>
<td></td>
<td>Monthly level check</td>
</tr>
<tr>
<td>Gate House</td>
<td>Monthly gate house check</td>
</tr>
<tr>
<td>Pipeline</td>
<td>Monthly line cathodic protection check</td>
</tr>
<tr>
<td>Lake Whatcom Control Dam</td>
<td>Quarterly lube and inspection</td>
</tr>
<tr>
<td></td>
<td>Annual oil change and lube and inspection</td>
</tr>
<tr>
<td>Screenhouse</td>
<td>Annual fire extinguisher inspection</td>
</tr>
<tr>
<td></td>
<td>Annual screenhouse check</td>
</tr>
<tr>
<td></td>
<td>Semi annual screen inspection</td>
</tr>
<tr>
<td></td>
<td>Semi-annual screenhouse inspection</td>
</tr>
<tr>
<td>Water Treatment Plant</td>
<td>Quarterly backwash pump greasing</td>
</tr>
<tr>
<td></td>
<td>Annual backwash pump inspection</td>
</tr>
<tr>
<td></td>
<td>Annual backwash level calibration</td>
</tr>
<tr>
<td></td>
<td>Annual filter flow loop calibration (all 6 filters)</td>
</tr>
<tr>
<td></td>
<td>Annual filter headloss loop calibration</td>
</tr>
<tr>
<td></td>
<td>Annual filter valve oil check</td>
</tr>
<tr>
<td></td>
<td>Annual Dakin &amp; Yew pump oil change</td>
</tr>
<tr>
<td></td>
<td>Annual Dakin &amp; Yew flow meter check</td>
</tr>
<tr>
<td></td>
<td>Annual alum pressure transmitter calibrate</td>
</tr>
<tr>
<td></td>
<td>Annual low vacuum switch industrial chlorinator calibration</td>
</tr>
<tr>
<td></td>
<td>2-year industrial chlorinator rebuild</td>
</tr>
<tr>
<td></td>
<td>Annual low vacuum switch trim chlorinator calibration</td>
</tr>
</tbody>
</table>
### TABLE 6-1
City of Bellingham Water Department Preventative Maintenance Plan Summary

<table>
<thead>
<tr>
<th>Location</th>
<th>Preventative Maintenance Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Treatment Plant (continued)</td>
<td>2-year #1 chlorinator rebuild</td>
</tr>
<tr>
<td></td>
<td>Annual low vacuum switch #2 trim chlorinator calibration</td>
</tr>
<tr>
<td></td>
<td>2-year #2 chlorinator rebuild</td>
</tr>
<tr>
<td></td>
<td>Annual low vacuum switch calibration, screenhouse</td>
</tr>
<tr>
<td></td>
<td>2-year screenhouse chlorinator rebuild</td>
</tr>
<tr>
<td></td>
<td>Annual low vacuum switch trim chlorinator calibration</td>
</tr>
<tr>
<td></td>
<td>2-year vacuum regulator rebuild bank #1</td>
</tr>
<tr>
<td></td>
<td>2-year vacuum regulator rebuild bank #2</td>
</tr>
<tr>
<td></td>
<td>Annual vacuum switch/inspection/report</td>
</tr>
<tr>
<td></td>
<td>Bi-weekly water pump run</td>
</tr>
<tr>
<td></td>
<td>Monthly emergency generator run</td>
</tr>
<tr>
<td></td>
<td>Annual raw water flow loop calibration</td>
</tr>
<tr>
<td></td>
<td>Annual Dakin &amp; Yew flow calibration</td>
</tr>
<tr>
<td></td>
<td>Annual clearwell level calibration</td>
</tr>
</tbody>
</table>

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### 6.7 Comprehensive Monitoring Plan

The Bellingham’s Comprehensive Monitoring Plan follows the monitoring requirements that are summarized in Section 3.2, Water Quality and Compliance. The Plan is used by Water Quality personnel to ensure that all testing is completed in the time frame required. Monitoring locations, sampling schedules, and frequency are summarized in Table 3-1.

WADOH-certified laboratories are used to provide analytical services. Laboratories utilized by the City are summarized in Table 6-2.

### 6.8 Emergency Response Plan

The City has Emergency Response Plan, know as the City of Bellingham Water System Emergency Response Plan for Public Works Operations. A copy of the table of contents for this Plan can be found in Appendix M.
TABLE 6-2
List of Certified Laboratories Used by the City of Bellingham

<table>
<thead>
<tr>
<th>WADOH ID</th>
<th>Name and Address</th>
<th>Analyte(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>023</td>
<td>WADOH Public Health Lab</td>
<td>Radionuclides</td>
</tr>
<tr>
<td></td>
<td>1610 NE 150th Street</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shoreline, WA 98155</td>
<td></td>
</tr>
<tr>
<td>046</td>
<td>Edge Analytical Incorporated</td>
<td>Inorganic compounds, volatile organic compounds, synthetic organic</td>
</tr>
<tr>
<td></td>
<td>11525 Knudsen Road</td>
<td>compounds, trihalomethanes, haloacetic acids, Unregulated</td>
</tr>
<tr>
<td></td>
<td>Burlington, WA 98233</td>
<td>Contaminants Rule analytes, lead, and copper</td>
</tr>
<tr>
<td>060</td>
<td>City of Bellingham Water Filtration Plant Laboratory</td>
<td>All microbiologic work and conventional chemistry</td>
</tr>
<tr>
<td></td>
<td>2221 Pacific Street</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bellingham, WA 98229</td>
<td></td>
</tr>
<tr>
<td>064</td>
<td>MWH Laboratories – Division of MWH Americas, Inc.</td>
<td>Trihalomethanes, haloacetic acids, and total organic carbon</td>
</tr>
<tr>
<td></td>
<td>750 Royal Oaks Drive, Suite 100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monrovia, CA 91016</td>
<td></td>
</tr>
<tr>
<td>119</td>
<td>Lab/Cor</td>
<td>Asbestos</td>
</tr>
<tr>
<td></td>
<td>7619 6th Ave NW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seattle, WA 98117</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>Analytical Services Inc</td>
<td>Giardia and Cryptosporidium analyses</td>
</tr>
<tr>
<td></td>
<td>130 Allen Brook Lane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Williston, VT 05495</td>
<td></td>
</tr>
</tbody>
</table>

6.9 Safety Procedures

The Water and Engineering Divisions maintain and continually update a set of both (1) the Washington State General Occupational Health Standards, Chapter 296-62 WAC, and (2) the Safety Standards for Construction Work, Chapter 296-155 WAC. These Standards are referred to on a regular basis. In addition, the Water Division consults with a Washington State Department of Labor and Industries Safety Consultant in preparation for work that it is not typically familiar with or does not consider routine operation and maintenance.

6.10 Cross-Connection Control Program

Bellingham has an ongoing cross-connection control program as incorporated into the BMC. A copy of the program is included in Appendix E. The purpose of the cross-connection control and backflow prevention program is to protect water quality and thereby public health through:

- The Water Utility’s program conforms to WAC 246-290-490 and generally follows the guidance as outlined in Accepted Procedure and Practice in Cross-Connection Control published by the Pacific Northwest Section of the AWWA.
The Water Utility is currently the responsible organization for implementation of the program, though customers are responsible for installation, testing, inspection, repair, maintenance, and operation of backflow preventers.

### 6.11 Record Keeping and Reporting

Bellingham maintains a variety of records on the performance of the water system. Such record keeping covers the issues of water quality, flow, reservoir level, and chemical use. These records provide historical reference for future operation of the water system, provide information to plan for future maintenance and replacement, and ensure that the system provides high quality water for its customers. Each water utility keeps the following records:

- Date
- Influent volume
- Effluent volume
- Backwash water volume
- Plant usage volume
- Dakin & Yew pump station volume
- Raw water turbidity
- Raw water pH
- Raw water hardness (twice a month)
- Raw water alkalinity (twice a month)
- Raw water temperature
- Treated water turbidity reduction (percent)
- Treated water pH
- Treated water hardness (twice a month)
- Treated water alkalinity (twice a month)
- Treated water chlorine residual concentration
- Treated water minimum chlorine residual concentration
- Filter run times
- Ultimate filter run volumes
- Filter turbidities
- Filter headloss
- Filter rates
- Chemicals used
- Watershed data
- Peak hourly flow to system
- Contact time
- Contact Time (CT) calculated
- CT required
- CT ratio

Treatment plant staff prepare a monthly flow report, which is sent to WADOH as documentation of the treatment plant operation. These reports are archived in the City’s record system. In addition, Bellingham’s SCADA system also creates daily reports showing reservoir levels, flow rates at the plant, and pump station flow rates hourly throughout the day. These reports are also archived in the City's record system.
6.12 Customer Complaint Response Program

The City’s customer complaint response program is described in Section 1.25, Complaints.

6.13 Operations and Maintenance Improvements

No improvements to Bellingham’s Water System operation and maintenance program are proposed.
FIGURE 6-1
Operations Division Organizational Structure
Bellingham Water System Plan

June 2008
Design and Construction Standards

Bellingham’s design and construction standards are presented in this section along with procedures for design review by the City’s water system improvement and policies and requirements for potential customers outside of the City limits requesting City water service.

7.1 Project Review Procedures

Capital improvements to the water system shall be designed in accordance with WADOH and Bellingham performance, design, and construction standards. Major facility improvement plans and designs are required to be submitted to both the City and WADOH for their review and approvals in accordance with WAC 246-290-110 and -120. Distribution system improvement projects designed and constructed in compliance with the performance, design, and construction standards presented in this Plan do not need to be submitted to WADOH, but do need to be submitted for review and approval by the City. The required procedures for review of design plans and specifications as well as related project descriptions are presented in Section 3, System Analysis.

7.2 Policies and Requirements for Outside Parties

Requirements for outside parties requesting service from Bellingham’s water system are presented in Section 1.17 and 1.24. All parties requesting service are required to comply with all applicable codes, including the BMC, the Public Works Development Guidelines, and Improvement Standards and all policies presented in Section 1, Description of Water System.

7.3 Design Standards

Improvements to Bellingham’s water system are required to be designed to minimum performance standards and sizing criteria, as presented in Section 3.1, System Design Standards.

7.4 Construction Standards

The City’s construction standards related to materials and methods are presented in Chapter 4 of Bellingham’s Public Works Development Guidelines and Improvement Standards. These standards are presented as written specifications and detailed drawings for improvements in the water, wastewater, and street divisions. A copy of the
specifications and detailed drawings related to water system infrastructure are presented in Appendix T¹.

### 7.5 Construction Certification and Follow-Up Procedures

Construction of improvements to Bellingham’s water system must be certified with respect to compliance with the City’s design and construction standards, WADOH requirements, and the design plans and specifications submitted to the City for review by the party undertaking the improvement. Certification of such compliance to WADOH shall be effected by completion of a Construction Report for Public Water System Projects (a WADOH form), per WAC 246-290-040. Certification of such compliance to the City shall be confirmed by City inspection and release of the financial security provided at the start of the project one year after completion.

¹ Fees and charges are subject to periodic review and update by the City.
Improvement Program

Improvements to the City of Bellingham’s water system are required to meet future demands and to alleviate deficiencies identified in the system analysis. The improvements presented in previous sections of this Plan are summarized in this Section and scheduled over the planning horizon in accordance with their relative priority.

8.1 Improvement Category

Each major improvement project is designated with an improvement project number related to the type of improvement to facilitate referencing between the text and figures in previous sections, Figure 8-1, and Table 8-1. The categories of improvements fall into the following categories and are classified by the following codes:

♦ Treatment (TR)
♦ Storage (ST)
♦ Pumping (PS)
♦ Pipeline (PL)
♦ Metering (M)
♦ Diversion (DV)
♦ Planning (PN)

The treatment projects are related to increasing the treatment capacity of the existing water treatment plant. The storage improvements are required to meet the total volume of storage required in the planning horizon. The pump station projects are required to upgrade and construct new pump stations to serve future demands in upper pressure zones. The pipeline improvements are required both to provide service to new areas and new facilities as well as to replace existing piping.

8.2 Improvement Cost

The project costs presented in Table 8-1 are planning-level or “order-of-magnitude” estimates assuming a four percent annual escalation factor. Order-of-magnitude is defined as an estimate based on typical industry experience for similar work but made without detailed design-level data. Accuracy can be expected to vary from 30 percent under to 50 percent over the estimated costs. In general, costs for land or right-of-way acquisition are not included in project costs unless specifically noted. Details of the cost estimates are provided in Appendix T.

These order-of-magnitude costs were prepared to provide budgetary guidance. Final project costs will depend on actual labor and materials costs, site conditions, productivity, competitive market conditions, final project scope and schedule, and other variable factors. As a result, final project costs will vary somewhat from the estimates presented herein. The
estimated costs presented in Table 8-1 are considered to be total project costs, which include design, construction, project contingency, legal, and administrative expenses. Project descriptions are presented in other sections of this Plan, which are referenced in Table 8-1.

### 8.2.1 Treatment Cost

For the treatment projects recommended in the 6-year planning horizon, the estimated cost for obtaining approval for increasing the filtration rate was based on conducting a study of increasing the filtration rate and preparation of a letter to WADOH for approval.

### 8.2.2 Storage Cost

The estimated cost for storage facilities was based on construction of pre-stressed concrete reservoirs. Minimal cut and fill is assumed to be required, and no rock excavation or special foundations were included in the estimated cost.

### 8.2.3 Pumping Cost

The estimated cost for pump stations were developed based on projects of similar size and requirements.

### 8.2.4 Pipeline Cost

Estimated project costs developed for pipeline improvements were based on unit costs per lineal foot of pipeline. A single set of criteria was used for the entire estimated pipeline costs presented. Site-specific cost estimates were not developed because of the uncertainty of the precise location of most of the pipeline improvements.

The estimated costs for pipeline improvements are useful for long-term budgeting purposes and for comparing alternatives. More detailed cost estimates should be made prior to installation of each improvement. The actual cost of these pipeline improvements will depend significantly on the actual route selected for the pipeline improvements.

### 8.2.5 Metering Cost

The estimated cost of implementing the metering program for the City was based on the City’s experience with installation of new customer meters in the water distribution system and the number of meters that needed to be installed.

### 8.2.6 Diversion Cost

The estimated costs for improvements related to the Nooksack Diversion were developed from a previous study that included a conceptual level approach for the Diversion and the associated costs.
8.2.7 Planning Cost
The estimated costs for the Hydraulic Model Update is based on the City’s past experience with maintenance of their hydraulic model and the associated level of effort that is required to update and maintain the City’s hydraulic model.

8.3 Implementation Schedule
The schedule for implementation of each improvement, presented in Figure 8-1, generally reflects the relative priority of each improvement in consideration of the need to undertake certain improvements in a sequential manner to comply with regulatory requirements as well as to enhance public health protection and improve reliability.
### TABLE 8-1
Bellingham’s Improvement Program¹

<table>
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<td>$3,210,000</td>
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<td>Filtration Rate Increase²</td>
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<tr>
<td>Filter Addition²</td>
<td>TR-2</td>
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<td>WTP: Air Scour System</td>
<td>TR-3</td>
<td>$950,000</td>
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<tr>
<td>Hydraulic Model, 3-yr Updates</td>
<td>PN-1</td>
<td>$100,000</td>
<td>$100,000</td>
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<tr>
<td>Metering Program</td>
<td>M-1</td>
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<td>$2,000,000</td>
<td>$2,000,000</td>
<td>$3,000,000</td>
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<tr>
<td>Nooksack Diversion Passage</td>
<td>DV-1</td>
<td>$10,000,000</td>
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<td>$10,000,000</td>
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<td><strong>TOTALS</strong></td>
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<td><strong>$3,980,000</strong></td>
<td><strong>$8,650,000</strong></td>
<td><strong>$4,450,000</strong></td>
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<td><strong>$14,600,000</strong></td>
<td><strong>$41,641,000</strong></td>
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</tr>
</tbody>
</table>

¹The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation and shown in 2008 dollars. The final costs of the project (described further in Section 3.3) will depend on actual labor and material costs, site conditions, productivity, competitive market conditions, final project scope, final project schedule, and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

²Filtration Rate Increase from 6.0 to 6.5 gpm/ft², or adding additional filter; total project cost to be determined.
Figure 8-1
Improvement Program
City of Bellingham
2009 Water System Plan

Source: City of Bellingham (2007) and Whatcom County (2006).
Financial Analysis

This section discusses the recent financial performance of Bellingham’s water utility and presents a future projection of its revenues and expenses. The ability of the City to absorb costs associated with proposed capital improvements in the next few years along with a discussion of potential funding sources is also included. The utility’s current rate structure is also outlined in this section.

9.1 Historic Financial Performance

Bellingham funds the water utility as an enterprise fund within the Public Works Department. As an enterprise fund, the Water Utility (Fund 410) is operated in a similar manner as a private business and is responsible for generating sufficient revenues to cover its operating expenses. Revenues for the fund are primarily generated from charges to customers for water service.

Table 9-1 presents a financial summary of the system’s utility fund operating revenues and expenditures from 2005 through 2007. The system’s operating budget for 2008 is also presented. The City’s water system revenues have not always covered the utility’s expenses. However, the fund balance has been sufficient enough in each year to cover the shortfall when expenses have exceeded revenues. Beginning reserves are adjusted each year in March and are based on actual cash liquidity; thus, the ending reserve balance may not equal the beginning year balance for the following year. Reserves are the sum of undesignated reserves, designated (Operations and Maintenance [O&M] contingency) reserves, and debt reserves.

Utility fund expenses (which include operations and maintenance and debt service) have ranged from a low of $8.7 million in 2005 to a high of $12.7 million in 2008. Capital expenditures have ranged from $2.2 in 2007 to $4.6 million in 2005. The expenses in 2006 included costs associated with increased capital expenditures for improvements to the water utility and to acquire property to preserve the Lake Whatcom watershed. The utility also issued revenue bonds in 2006 resulting in increased debt service payments Proceeds from this bond sale are noted in Table 9-1.

The City currently has to repay debt service on two Public Works Trust Fund (PWTF) loans as well as debt issues through a revenue bond. The annual debt service appears as an expense under “Debt Service Costs.” In 2008, the city will retire one of the PWTF loans, which will reduce the debt service payments by about $31,000 per year. The annual debt service payments for the revenue bond are about $834,000.

Based on the adopted budget, 2008 is expected to end with an estimated cash balance in the Water fund of about $12.6 million. The ending fund balance could be higher or lower than the budget based on the actual financial performance of the utility. The City will continue to
act to generate sufficient revenue to retire existing debt, to finance planned improvements and system operation expenses, and to ensure reserves for unexpected expenses.

**TABLE 9-1**
Historic Financial Performance for Bellingham's Water Utility Fund (410)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Water Fund 410</strong></td>
<td></td>
<td></td>
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<tr>
<td>Beginning Reserves¹</td>
<td>$11,290,194</td>
<td>$9,199,826</td>
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<td>$14,515,044</td>
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<tr>
<td><strong>Revenues</strong></td>
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<tr>
<td>Charges for Services</td>
<td>$8,272,898</td>
<td>$9,176,439</td>
<td>$9,852,778</td>
<td>$10,506,832</td>
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<td>Miscellaneous</td>
<td>$1,101,896</td>
<td>$491,295</td>
<td>$1,448,933</td>
<td>$1,810,298</td>
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<tr>
<td><strong>Total Revenue</strong></td>
<td>$9,374,794</td>
<td>$9,667,734</td>
<td>$11,301,711</td>
<td>$12,317,130</td>
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<td><strong>Expenditures</strong></td>
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<td></td>
</tr>
<tr>
<td>Treatment Plant</td>
<td>$2,197,108</td>
<td>$2,491,200</td>
<td>$2,719,857</td>
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<tr>
<td>Water Utility</td>
<td>$5,921,591</td>
<td>$6,894,744</td>
<td>$7,135,139</td>
<td>$7,867,301</td>
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<tr>
<td>Environmental Resources</td>
<td>$112,715</td>
<td>$171,686</td>
<td>$139,609</td>
<td>$336,644</td>
</tr>
<tr>
<td>Debt Service Costs</td>
<td>$419,863</td>
<td>$701,419</td>
<td>$921,111</td>
<td>$983,416</td>
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<td><strong>Total Expenditure</strong></td>
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<td>$10,259,049</td>
<td>$10,915,716</td>
<td>$12,658,388</td>
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<tr>
<td><strong>Net Income</strong></td>
<td>$723,517</td>
<td>($591,315)</td>
<td>$385,995</td>
<td>($341,258)</td>
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<tr>
<td><strong>Capital</strong></td>
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<tr>
<td>Loans, Grants, Interest, Misc.</td>
<td>$514,153</td>
<td>$1,162,250</td>
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<td>$339,617</td>
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<td>Bond Proceeds</td>
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<td>$6,285,000</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>System Development Charges</td>
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<td>$1,252,299</td>
<td>$1,507,785</td>
<td>$1,625,000</td>
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<td>Expenditures</td>
<td>($4,635,540)</td>
<td>($4,243,237)</td>
<td>($2,157,155)</td>
<td>($3,552,800)</td>
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<td><strong>Total Capital</strong></td>
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<td>$4,456,312</td>
<td>($94,338)</td>
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<td><strong>Adjusted Net Income</strong></td>
<td>($1,906,015)</td>
<td>$3,864,997</td>
<td>$291,657</td>
<td>($1,929,441)</td>
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<td><strong>Ending Reserves</strong></td>
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<td>$13,064,823</td>
<td>$14,625,069</td>
<td>$12,585,603</td>
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</table>

¹ Fund balance at beginning of the year

### 9.2 Water Rates

Bellingham’s water rate structure is based on a "cost of service" approach to provide the required revenue to operate and maintain the utility. In 2007, the City conducted a study to update its water rates and fees. The study recommended adjustments in the City’s rate
The City implemented a series of rate increases based on the results of the study. The rate structure and schedule rate increases presented in Table 9-2 were effective January 1, 2008. The water utility’s customer base is comprised of unmetered users and metered users. The unmetered customers pay a flat monthly rate of $21.18 for single family customers and $42.36 for duplexes, regardless of the amount of water used.

### Table 9-2

Bellingham’s Current and Adopted Future Water Rates

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<thead>
<tr>
<th>Water Rates</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tr>
<td><strong>Unmetered ($/month)</strong></td>
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<tr>
<td>Single Family</td>
<td>$21.18</td>
<td>$23.33</td>
<td>$25.47</td>
<td>$27.72</td>
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<tr>
<td>Duplex</td>
<td>$42.36</td>
<td>$42.36</td>
<td>$50.95</td>
<td>$55.43</td>
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<td><strong>Metered - Volume Charge (dollars/cubic foot)</strong></td>
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<td>Single Family/Non-Single Family</td>
<td>$1.12</td>
<td>$1.22</td>
<td>$1.32</td>
<td>$1.43</td>
<td>$1.53</td>
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<td>Irrigation</td>
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<td>$2.01</td>
<td>$2.11</td>
<td>$2.20</td>
<td>$2.30</td>
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<td><strong>Metered – Single Family - Total Fixed Rate (dollars/month)</strong></td>
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<td>Service Meter Size (inches)</td>
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<td></td>
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<tr>
<td>5/8 x 3/4</td>
<td>$9.23</td>
<td>$10.11</td>
<td>$10.61</td>
<td>$11.11</td>
<td>$11.61</td>
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<td>$20.68</td>
<td>$22.68</td>
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<td>2</td>
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<td>$192.50</td>
<td>$211.17</td>
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<td>$383.41</td>
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<td><strong>Metered - Non Single Family - Total Fixed Rate (dollars/month)</strong></td>
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<tr>
<td>Service Meter Size</td>
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<tr>
<td>5/8 x 3/4</td>
<td>$12.10</td>
<td>$13.27</td>
<td>$15.35</td>
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<td>3/4 x 3/4</td>
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<td>4</td>
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<td>$289.86</td>
<td>$332.75</td>
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<td>$577.98</td>
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<tr>
<td>8</td>
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<tr>
<td>10</td>
<td>$1,314.81</td>
<td>$1,442.35</td>
<td>$1,655.30</td>
<td>$1,868.25</td>
<td>$2,081.20</td>
</tr>
</tbody>
</table>

The metered customer’s rate structure is composed of a monthly base charge plus a usage charge. The base rate charge has an account charge, which is the same for all metered...
customers, and a meter charge, which varies depending on the size of the meter. Non-single family and irrigation customers pay a slightly higher meter charge than single family customers. Irrigation customers pay a higher volume rate than those in the city.

The City Council has adopted a VMP to help promote water conservation and offer city residents the opportunity to potentially save money on their utility bill. The VMP began in 2005 and is available through the Public Works Department to any single family residence inside the City limits. The City encourages those households with three people or less, seasonal residents, frequent travelers, and those households with a strong water conservation ethic to participate. The cost to purchase and install a residential meter is $150. According to the City’s 2008 Adopted Budget, the number of customers participating in the program increased 67 percent from 2006 to 2007.

The City has also adopted a policy to provide assistance to qualifying low income seniors and disabled citizens who cannot afford their water bill. The customer’s must provide documentation of a qualifying income in order to receive a discount between 25 percent and 75 percent.

The City also levies system development charges (SDC) upon new connections to the water system. The SDC is designed so that the new connection pays its equitable share of existing water system infrastructure expected to be utilized to serve the new connection as well as pay for new infrastructure needed to serve the new connection. Table 9-3 presents the adopted SDC schedule for 2008 to 2010. Included in the SDC is a charge to protect and preserve the watershed.

<table>
<thead>
<tr>
<th>TABLE 9-3</th>
<th>System Development Charges</th>
</tr>
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<tr>
<td>System Development Charge</td>
<td>2008</td>
</tr>
<tr>
<td>Service Meter Size (inches)</td>
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<tr>
<td>5/8 x 3/4</td>
<td>$2,911</td>
</tr>
<tr>
<td>3/4 x 3/4</td>
<td>$4,367</td>
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<td>1</td>
<td>$7,278</td>
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<tr>
<td>1.5</td>
<td>$14,557</td>
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<td>2</td>
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<td>3</td>
<td>$46,582</td>
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<tr>
<td>4</td>
<td>$72,784</td>
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<tr>
<td>6</td>
<td>$145,568</td>
</tr>
<tr>
<td>8</td>
<td>$232,908</td>
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<tr>
<td>10</td>
<td>$363,919</td>
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</table>
9.3 Capital Improvement Program

Capital outlay expenditures are based on improvements resulting from this water system plan. Table 9-4 presents the inflation adjusted 6-year capital improvement plan for the water utility. Assuming a four percent annual escalation factor, the CIP is projected to cost about $46.7 million over the analysis period.

<table>
<thead>
<tr>
<th>TABLE 9-4</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>TOTAL</th>
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<td>$400,000</td>
<td>$400,000</td>
<td>$2,150,000</td>
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<td>$300,000</td>
<td>$3,950,000</td>
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</tr>
<tr>
<td>New Kearney Road Pump Station</td>
<td>$230,000</td>
<td>$2,980,000</td>
<td></td>
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<td></td>
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<tr>
<td>New James Street Pump Station</td>
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<td>Annual Main Replacement</td>
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<td>$600,000</td>
<td>$2,600,000</td>
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<td>Mt Baker Highway Replacement II</td>
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<td>WTP: Air Scour System</td>
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<tr>
<td>Hydraulic Model, 3-yr Updates</td>
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<td></td>
<td></td>
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<td>Metering Program</td>
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<td>$2,000,000</td>
<td>$2,000,000</td>
<td>$3,000,000</td>
<td></td>
<td></td>
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<tr>
<td>Nooksack Diversion Passage</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>$10,000,000</td>
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<tr>
<td>Total</td>
<td>$4,230,000</td>
<td>$3,980,000</td>
<td>$8,750,000</td>
<td>$4,850,000</td>
<td>$10,290,000</td>
<td>$14,600,000</td>
<td>$46,700,000</td>
</tr>
</tbody>
</table>

9.4 Additional Sources of Funds

If Bellingham needs additional sources of funds, other than existing rates and connection charges, to meet future expenses for improvement projects, it has several options to raise additional funds, including the following:

♦ **Increase Water Rates.** The City has planned rate increases through 2012 to ensure rate revenues are adequate to meet long-term financial requirements of the water system.

♦ **State or Federal Loans or Grants.** Loan funding is available through the PWTF loan program. Loan rates can be as low 0.5 percent if a certain percentage of local matching funds are provided. The Drinking Water State Revolving Fund (DWSRF) program has an attractive loan program design specifically for municipal water systems. Rates are as
low as 0.0 percent for qualifying municipalities. Grant funding may be possible, if the City meets the requirements, through the Community Development Block Grant program, which is a federal program administered through the Washington State Department of Community, Trade, and Economic Development. Grants are extremely competitive and are typically being replaced by low-interest loan programs.

♦ **Local Improvement Districts (LIDs).** The formation of an LID is a tool that can be used to effect improvements that are either system-wide in nature or relative only to a specific group of customers.

♦ **Issue Revenue Bonds.** Another more-costly option for the County would be to issue revenue bonds. Revenue bonds are secured by the revenues of the water system. Typically, bonds have a 20-year term and an interest rate of around 5.0 to 6.0 percent. The water system would also have to establish a reserve fund equal to one annual debt service payment and pay a 2.0 percent bond issuance fee.

### 9.5 Fiscal Impacts of Improvement Program

A Six-year financial plan was developed to analyze the impact on water rates of implementing the Improvement Program presented in Section 8.

The building blocks of the financial plan are the projections of costs or revenue requirements (both operations and maintenance, and capital) that the City will incur during the Six-year planning period (2009 through 2014) and the revenues, under existing rates, which the City expects to generate during the same period. The financial plan is based on a set of overall assumptions related to customer growth, inflation, and other factors, as well as scheduling of the CIP.

The following assumptions were used in developing the plan:

♦ Customer growth will occur at an average rate of 1.4 percent annually.

♦ Operation and maintenance costs will escalate at annual rates of 4 percent.

♦ Capital costs will increase at an annual rate of 4 percent to account for inflation.

♦ Water rates would increase by an average of 8 percent per year per rate increases adopted by the City Council for 2008 to 2012. The currently adopted rate increase schedule did not include an increase for 2013 or 2014.

♦ For this analysis, debt service payments assume a 20-year term, 5.5 percent interest, 2 percent issuance costs, and a 10 percent reserve requirement. The financing plan presented in this analysis is intended to provide the City with a conservative estimate of the rate impacts associated with the CIP.

♦ System development charge revenue for the water utility will grow at 1.4 percent per year.
Annual requirements include operating reserves (that is, designated reserves) equal to 5 percent of water utility fund operating expenses. It was assumed that 100 percent of designated reserves would be unspent and roll forward to subsequent year beginning balances.

Debt service reserves for existing water utility debt is $1.47 million per year. Debt service reserves for estimated future bond issuances were included in the analysis. Debt reserves were assumed to equal one year of debt service payments.

The projected beginning balance for 2009 was based on the ending balance for budget year 2008.

With limited federal and state assistance available, the City must rely predominantly on locally generated revenues, in the form of water rates and SDCs, to fund the projected system costs over the planning period. Debt funding is used to level large capital expenditures over the period that the facilities will provide service. Rates and SDCs are then used to pay annual debt service costs.

For this analysis, debt service payments assume a 20-year term, 5.5 percent interest, 2 percent issuance costs, and a 10 percent reserve requirement. The financing plan presented in this memo is intended to provide the City with a general estimate of the rate impacts associated with the CIP. Ultimately, there are a number of capital financing alternatives the City may want to explore due to the significant capital investment anticipated. These include use of multiple debt instruments (for example, general obligation bonds and revenue bonds) and alternative debt structuring (for example, longer repayment terms). Also, the City may be eligible for a combination of lower-interest loans and grants from state and federal agencies. However, because funds are limited, and to provide the City with an upper end estimate of rate impacts, we have assumed that the City would have to issue debt through the conventional bond market.

The financial plan for the water utility, in the form of projected sources and uses of funds for the water operating, capital project, and SDC funds, is presented in Table 9-5. In order to meet revenue requirements and to continue to meet debt service coverage, the City will be required to raise rates by an additional 5.5 percent in 2009. It was assumed this rate increase would be in effect for only six months of the year. A 5 percent increase would also be required in 2013 and 2014. This analysis also assumed the City would issue revenue bonds in 2011 and 2013 to help pay for metering of unmetered customers, the Nooksack Diversion Passage project, and other capital improvements. The total bond amount over the analysis period, including issuance costs and reserve requirements, would be about $22 million. The annual debt service for the new bond issues would be about $1.86 million in 2014.

Table 9-6 presents the projected operating results for the water utility for 2009 to 2014. Total annual rate revenue based on the preliminary rate increase forecasts and projected revenue under existing rates is estimated. These rate increases have been established to allow the City to generate adequate fund balances and meet potential debt service coverage requirements. Debt service coverage is the amount of revenue that a utility must generate annually in excess of its operation, maintenance, and debt service requirements. This
additional revenue is required by bond buyers as a condition of issuing revenue bonds; it provides the bond buyers a measure of security regarding debt repayment by the utility. Failure to generate the required revenues puts the utility in default on the bonds, which adversely affects current and future bond ratings and interest costs.

Debt service coverage requirements generally require net revenues (system income and revenue less operation and maintenance expenses) be at least 1.25 times the average annual principal and interest requirements of all outstanding bonds. Table 9-6 shows the projected debt service coverage based on the projected operating revenues and O&M expenses over the study period. In each year, debt service coverage meets the assumed minimum coverage target.
## TABLE 9-5
City of Bellingham Projected Sources and Uses of Funds

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sources of Funds</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beginning Reserves</td>
<td>$14,515,044</td>
<td>$12,585,603</td>
<td>$10,246,897</td>
<td>$9,104,812</td>
<td>$13,224,594</td>
<td>$12,088,826</td>
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<tr>
<td>Charges for Services</td>
<td>$10,506,832</td>
<td>$11,810,572</td>
<td>$13,266,577</td>
<td>$14,513,636</td>
<td>$15,877,917</td>
<td>$16,905,219</td>
</tr>
<tr>
<td>Interest Earnings</td>
<td>$503,067</td>
<td>$251,712</td>
<td>$204,938</td>
<td>$182,096</td>
<td>$264,492</td>
<td>$241,777</td>
</tr>
<tr>
<td>Rents</td>
<td>$62,000</td>
<td>$62,000</td>
<td>$62,000</td>
<td>$62,000</td>
<td>$62,000</td>
<td>$62,000</td>
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<tr>
<td>Other Misc.</td>
<td>$1,245,231</td>
<td>$1,245,231</td>
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<td><strong>Total Sources of Funds</strong></td>
<td>$28,796,791</td>
<td>$27,602,868</td>
<td>$26,696,462</td>
<td>$36,496,985</td>
<td>$32,392,163</td>
<td>$44,770,032</td>
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<td><strong>Uses of Funds</strong></td>
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<td>$984,000</td>
<td>$984,000</td>
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<td>$0</td>
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<td>$1,333,639</td>
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<td>Ending Fund Balance</td>
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<td><strong>Total Uses of Funds</strong></td>
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<td>$27,602,868</td>
<td>$26,696,462</td>
<td>$36,496,985</td>
<td>$32,392,163</td>
<td>$44,770,032</td>
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CITY OF BELLINGHAM 2009 WATER SYSTEM PLAN

CH2M HILL
REPRODUCTION PROHIBITED
### Table 9-6: City of Bellingham Operating Results

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<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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</thead>
<tbody>
<tr>
<td><strong>Beginning Balance</strong></td>
<td>$14,515,044</td>
<td>$12,585,603</td>
<td>$10,246,897</td>
<td>$9,104,812</td>
<td>$13,224,594</td>
<td>$12,088,826</td>
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<td><strong>Sales Revenue (existing rates)</strong></td>
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#### Additional Revenue from Rate Increase

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<th>Year</th>
<th>Percent</th>
<th>% of Initial FY Effective</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<td>2009</td>
<td>5.50%</td>
<td>50%</td>
<td>$316,098</td>
<td>$691,623</td>
<td>$756,635</td>
<td>$827,759</td>
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<td>$0</td>
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<tr>
<td>2011</td>
<td>0.00%</td>
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<td>$0</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>2012</td>
<td>0.00%</td>
<td>100%</td>
<td>$0</td>
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<td>$0</td>
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<td>$0</td>
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<tr>
<td>2013</td>
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<td>100%</td>
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<tr>
<td>2014</td>
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<td>$857,095</td>
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<table>
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<th>2009</th>
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<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tr>
<td><strong>Subtotal Additional Revenue</strong></td>
<td>$0</td>
<td>$316,098</td>
<td>$691,623</td>
<td>$756,635</td>
<td>$827,759</td>
<td>$1,644,358</td>
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<td><strong>Total Sales Revenue</strong></td>
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<td>$11,810,572</td>
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<td><strong>Other Revenue</strong></td>
<td>12.4%</td>
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<td>9.4%</td>
<td>9.4%</td>
<td>6.5%</td>
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<tr>
<td><strong>Interest Earnings</strong></td>
<td>$503,067</td>
<td>$251,712</td>
<td>$204,938</td>
<td>$182,096</td>
<td>$264,492</td>
<td>$241,777</td>
<td>$359,160</td>
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<tr>
<td><strong>Rents</strong></td>
<td>$62,000</td>
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<td>$62,000</td>
<td>$62,000</td>
<td>$62,000</td>
<td>$62,000</td>
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<td><strong>Other Misc.</strong></td>
<td>$1,245,231</td>
<td>$1,245,231</td>
<td>$1,245,231</td>
<td>$1,245,231</td>
<td>$1,245,231</td>
<td>$1,245,231</td>
<td>$1,245,231</td>
</tr>
<tr>
<td><strong>Total Resources</strong></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue Requirements</strong></td>
<td>$11,674,972</td>
<td>$12,141,971</td>
<td>$12,627,650</td>
<td>$13,132,756</td>
<td>$13,658,066</td>
<td>$14,204,389</td>
<td>$14,772,564</td>
</tr>
<tr>
<td><strong>Operation &amp; Maintenance</strong></td>
<td>$11,674,972</td>
<td>$12,141,971</td>
<td>$12,627,650</td>
<td>$13,132,756</td>
<td>$13,658,066</td>
<td>$14,204,389</td>
<td>$14,772,564</td>
</tr>
<tr>
<td><strong>Net Revenue Available for Debt Service</strong></td>
<td>$642,158</td>
<td>$1,227,544</td>
<td>$2,151,097</td>
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<tr>
<td><strong>Debt Service</strong></td>
<td>$983,416</td>
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<td>$984,000</td>
<td>$984,000</td>
<td>$984,000</td>
<td>$984,000</td>
<td>$984,000</td>
</tr>
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</table>
### TABLE 9-6
City of Bellingham Operating Results

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subordinate</strong></td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$405,636</td>
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<td>$1,333,639</td>
<td>$1,856,008</td>
</tr>
<tr>
<td><strong>Debt Service</strong></td>
<td>$983,416</td>
<td>$984,000</td>
<td>$984,000</td>
<td>$1,389,636</td>
<td>$1,795,271</td>
<td>$2,317,639</td>
<td>$2,840,008</td>
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<tr>
<td><strong>Debt Service Coverage</strong></td>
<td>0.65</td>
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<td>2.19</td>
<td>2.07</td>
<td>2.11</td>
<td>1.83</td>
<td>1.72</td>
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<td><strong>Other Sources of Funds</strong></td>
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<td>$1,670,819</td>
<td>$1,694,210</td>
<td>$1,717,929</td>
<td>$1,741,980</td>
<td>$1,766,368</td>
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<td>$0</td>
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<td>$4,230,000</td>
<td>$3,980,000</td>
<td>$8,750,000</td>
<td>$4,850,000</td>
<td>$10,290,000</td>
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<td>$3,980,000</td>
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State Environmental Policy Act Environmental Checklist

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

10.1 Checklist

The following sections contain the completed checklist. Checklist questions are in normal font and responses are in italic font.

10.1.1 Background

1. Name of proposed project, if applicable: City of Bellingham 2009 Comprehensive Water System Plan

2. Name of applicant: Martin Kjelstad, Utilities Project Engineer, City of Bellingham

3. Address and phone number of applicant and contact person:
   
   210 Lottie Street
   Bellingham, WA 98225
   Phone: (360) 778-8000

4. Date checklist prepared: 06/24/2009

5. Agency requesting checklist: City of Bellingham

6. Proposed timing or schedule (including phasing, if applicable):

   The Plan will take effect after adoption by the City Council, and approval by WADOH, which is expected in 2009.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

   The plan documents the City's strategy for providing safe and reliable potable water service to existing customers and increased service capacity. The proposal anticipates that growth based on the adopted population projections will result in increased demand for municipal water service. This demand will in turn create a need for extension of water distribution lines, storage, and treatment facilities. The plan is an element of the City Comprehensive Plan, and serves as a guide...
for the maintenance and expansion of the utility within the service area, in accordance with local, county, and state requirements.

This plan is a guidance document for planning and design of future water system facilities and to help the City use its water resources in the most efficient manner possible. The City’s water system provides water for about 27,380 household and businesses. The plan addresses all aspects of the City’s water system in compliance with state requirements. The plan documents the existing water resources available to the City and evaluates supply enhancement options, provides a water conservation strategy, as well as operations and maintenance recommendations. The plan provides a capital improvement program tied to the City’s CIP that assures financial capability for phased implementation of the planning recommendations.

Projects listed in the capital improvement program are subject to review under WAC 197-11-704 and 197-11-800. While some projects might be categorically exempt, others will require preparation of a separate detailed checklist and SEPA threshold determination.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Under the authority of Chapter 197-11-635 WAC, the SEPA documents prepared for Bellingham’s Comprehensive Plan are incorporated by reference as part of this Checklist. Additional documents directly related to the proposed Water System Plan include:

   a. The Bellingham Comprehensive Plan, 2005
   b. Whatcom County Comprehensive Plan, 2008
   c. Whatcom County Coordinated Water System Plan Update, 2000
   d. City of Bellingham Urban Growth Area – DRAFT Land Supply Analysis Summary, March 2003
   e. Whatcom County Population and Economic Forecasts, May 2002

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No other applications are known.

10. List any government approvals or permits that will be needed for your proposal, if known.

The Water System Plan needs the approval of the City Council and WADOH. Individual elements of the capital improvement plan and extension of water lines greater than 8-inch-diameter will be subject to project SEPA review, and Whatcom County, or Bellingham Critical Area Review.

Some projects that involve work in surface waters likely would require Hydraulic Project Approval from the Washington State department of Fish and Wildlife. Separate SEPA checklists must be prepared for projects that are not categorically exempt under Chapter 197-11-800 WAC.
11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

The City proposes to update its Water System Plan. The Plan is prepared to comply with the requirements of the WADOH as set forth in WAC 246-290-100. Adoption of this document is a non-project action designed to improve and update the existing Plan that was adopted by ordinance effective in 1993. The plan will apply throughout the incorporated limits of the City, areas of unincorporated Whatcom County specified as the out-of-city service area and where applicable, to users of contractual water service or supply.

This checklist covers the potential significant environmental impacts resulting from the adoption of the plan described above. Following adoption of this plan, other detailed regulations which implement the plan may be developed. Future SEPA reviews may be required for project actions undertaken to implement the adopted Plan (that is, construction of capital facilities).

The City retains the authority to impose site-specific mitigation measures to address probable significant adverse environmental impacts within the City limits or on water system projects where the City assumes lead agency. Under the authority of Chapter 197-11-635 WAC, the SEPA documents prepared for Bellingham’s Comprehensive Plan are incorporated by reference as part of this Checklist; these documents include the Bellingham Comprehensive Plan.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

SEPA review for this plan will apply to the entirety of the Bellingham Service Area. The service area is outlined in Figure 1-1 of the Water System Plan. The Water System Comprehensive Plan (the plan) applies to the water service utility of the City of Bellingham. In addition to serving commercial, residential and industrial connections within the city limits, the system provides water to the Whatcom County WD 2, Whatcom County WD 7, Lummi Water and Sewer District, Deer Creek Association, Glen Cove Water Co-Op, Lake Whatcom Water & Sewer District, California Street Water Association, and the Montgomery Road Water Association. The plan included under this SEPA review will apply to all areas within Bellingham’s retail water service area and wholesale water service area.

10.1.2 Environmental Elements

1. Earth
   a. General description of the site: Flat, rolling, hilly, steep slopes, and mountainous.
Bellingham rings the shore of Bellingham Bay to the west. It lies east of Mount Baker and Lake Whatcom. The water system planning area can be characterized as rolling with a series of east to west trending valleys formed by streams and rivers traveling through the area of the City.

b. What is the steepest slope on the site (approximate percent slope)?

Steep slopes greater than 30 percent represent a relatively small percentage of the City's total acreage. A majority of Bellingham's existing development has taken place in areas with slopes of less than 15 percent. Areas of steep slopes are concentrated on the City's perimeter, adjacent to the saltwater bodies that surround the area as well as along the creeks and rivers that flow through the City.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

The soils within Bellingham reflect the region's glacial geologic history. Sedimentary rocks of the Chuckanut Formation with a metamorphic rock called phyllite and glacially derived sand and gravel are exposed at the far south end of Lake Whatcom. The Chuckanut Formation, often referred to as Chuckanut Sandstone, extends from the Cascade Range to Lummi Island and is a group of rocks that includes layers of sandstone, conglomerate, shale, and coal.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Areas with a history of unstable soils exist in a number of locations throughout the City, including the vertical bluffs along the creeks and rivers that flow through the City. These areas are relatively stable under ordinary conditions. However, seismic events of moderate to high magnitude could cause slope failures, or exacerbate erosion and landslide hazards in areas where the bluff is fractured, or where talus slopes are low.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

As a non-project action, the proposal does not involve site alterations of any kind. Future project actions that are not categorically exempt pursuant to Chapter 197-11-800 WAC, and which require issuance of a City license or permit will be subject to review under the City and Whatcom County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Because the proposal is a non-project action, it will not result in clearing or construction-related erosion. Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20
BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City of Bellingham or Whatcom County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

The proposal is a non-project action that does not involve construction of impervious surfaces.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City of Bellingham or Whatcom County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

2. Air

a. What types of emissions to the air would result from the proposal (that is, dust, automobile, odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Because the proposal is a non-project action, it does not involve construction, and will not result in emissions to the air. It is acknowledged, however, that regardless of the proposed action addressed by this Checklist, continued development activity will increase the amount of air pollution in the Bellingham Area (for example, through the location of new sources or through increases in automobile traffic).

Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No. As a non-project action, the proposal will neither result in any emissions or odors, nor will it be affected by such emissions.

b. Proposed measures to reduce or control emissions or other impacts to air, if any:

Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.
3. Water
   a. Surface:
      i. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

      Numerous named and unnamed streams flow through the water system’s planning area into Bellingham Bay. Named streams include Whatcom Creek, Squalicum Creek, Chucukanut Creek, and Padden Creek.

      ii. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

      No. Because the action is a non-project proposal, it will not involve any work over, in, or adjacent to the waters described above. The City and County will continue to require either a shoreline substantial development permit or a shoreline permit exemption for any project-related work occurring within 200 feet of the jurisdictional waters described above. Operation of the municipal diversions and transmission pipeline will continue to require operation in, over and adjacent to various water bodies including the Middle Fork of the Nooksack River, Whatcom Creek, Anderson Creek, and Lake Whatcom.

      iii. Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

      Because the proposal is a non-project action, it does not involve fill and dredge material. Future project applications that involve the removal or placement of dredge or fill materials would be subject to review and mitigation under the City’s Shoreline Management Master Program.

      Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

      iv. Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

      Bellingham water source is a diversion from the Middle Fork of the Nooksack River under the Safe Drinking Water Act.

      v. Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

      Portions of the water system plan’s planning area lie within 100-year floodplains.
vi. Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

None. Because the proposal is a non-project action, it does not involve any discharges of waste materials.

b. Ground

i. Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

No

ii. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals…; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

No

c. Water runoff (including stormwater)

Because the proposal is a non-project action, it will not result in additional sources of runoff. Development that is fostered by the availability of public water service could increase the City’s cumulative total of impervious surfaces, leading to increases of stormwater flow. The potential increase of runoff in the City and County has not been assessed.

i. Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

As a non-project action, the proposal does not include any measures designed specifically to reduce or control surface, ground, and runoff water impacts. Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

ii. Could waste materials enter ground or surface waters? If so, generally describe.

As a non-project action the proposal does not involve the discharge of waste materials. Discharge of treated wastewater to Bellingham Bay will increase in proportion to population growth. Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions,
the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

As a non-project action, the proposal does not include any measures designed specifically to reduce or control surface, ground, and runoff water impacts. However, future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

4. Plants

a. Check or circle types of vegetation found on the site:

- [X] deciduous tree: alder, maple, aspen, other
- [X] evergreen tree: fir, cedar, pine, other
- [X] shrubs
- [X] grass
- [X] pasture
- [X] crop or grain
- [X] wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- [X] water plants: water lily, eelgrass, milfoil, other
- [X] other types of vegetation

Bellingham and the out-of-city service areas support a diversity of native and nonnative plants, including all of the species listed above. Native shrubs, herbs, grasses, and wetland plants also exist within the Planning Area. The shorelines support a variety of estuarine and marine aquatic vegetation.

b. What kind and amount of vegetation will be removed or altered?

Because the proposal is a non-project, programmatic action, it would not involve the removal or alteration of vegetation. Continued development activity will result in increased native vegetation removal.
c. List threatened or endangered species known to be on or near the site.

Documented habitats for endangered, threatened, and priority species are known to exist within Bellingham and the out-of-city service area. These areas have been designated on Whatcom County Critical Area maps.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Because the proposal is a non-project, programmatic action, it does not directly involve landscaping or vegetation enhancement. Vegetation removal in Critical Areas is reviewed and conditioned under City and County ordinances.

Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

5. Animals

a. List any birds and animals which have been observed on or near the site or are known to be on or near the site:

   **birds:** hawk, heron, eagle, songbirds, other

   **mammals:** deer, bear, elk, beaver, other

   **fish:** bass, salmon, trout, herring, shellfish, other

The water service area and the source watershed contains a variety of habitat types that provide shelter, feeding and breeding sites for a number of migrating and indigenous bird species. Rare and endangered species sighted in Whatcom County include the northern bald eagle and the peregrine falcon. Important bird species known to exist within the area include: great blue herons; common loon; brandt geese; harlequin ducks; pigeon guillemots; coots; ruddy ducks; hooded mergansers; red winged black birds; belted king fishers; and mallard ducks.

Large and medium sized mammals such as deer, coyotes, skunks, and otters are found within the City limits. Bear, cougar, fox, beaver, and elk occur in the out-of-town service area and related watersheds. For further information, refer to the Comprehensive Plan.

Puget Sound bull trout, chinook salmon and Hood Canal summer chum have been listed as threatened under Endangered Species Act. Additional fish in the vicinity of the service area include coho and pink salmon, steelhead and cutthroat trout and variety of saltwater species. Shorelines and creeks provide habitat for various life stages of these fish.
b. List any threatened or endangered species known to be on or near the site.

As noted above, rare and endangered species sighted in the service area and watersheds include bull trout, chinook and Hood Canal summer chum salmon, northern spotted owl, marbled murrelet, and the northern bald eagle. The Southern Resident orca whale, listed as an endangered species, range includes water in the vicinity of Bellingham.

c. Is the site part of a migration route? If so, explain.

The water service area and municipal watershed lie within the Pacific Flyway. Consequently, numerous waterfowl use the wetlands, ponds, and surrounding marine waters as a migratory rest stop, or as a permanent wintering area.

d. Proposed measures to preserve or enhance wildlife, if any:

Because the proposal is a non-project, programmatic action, it does not directly involve impacts to wildlife.

Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

6. Energy and natural resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The principal energy sources associated with the planning area are electricity, propane, natural gas, and petroleum. Electrical power, propane, natural gas, and petroleum have historically all been provided for heating, lighting, operation of electrical appliances and manufacturing. Population growth is likely to occur regardless of this non-project proposal. As this growth and associated development occurs, the demand for sources of energy will increase. As a non-project action, the proposal would not create any additional needs for energy. Future water treatment requirements may require technologies such as ultraviolet light disinfection, which would increase the water system electric energy usage.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

As a non-project action, the proposal would not affect solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Because the proposal is a non-project action, no specific energy conservation measures are proposed.
Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? If so, describe.

Because the proposal is a non-project action, no environmental health hazards are posed.

i. Describe special emergency services that might be required.

Because the proposal is a non-project action, no emergency services will be required.

Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

ii. Proposed measures to reduce or control environmental health hazards, if any:

Because the proposal is a non-project action, no specific measures are proposed to reduce or control environmental health hazards.

b. Noise

i. What types of noise exist in the area which may affect your project (for example, traffic, equipment, operation, other)?

Because the proposal is a non-project action, it will not be affected by noise.

ii. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Because the proposal is a non-project action, it will not generate noise on either a short or a long-term basis. However, noise levels will inevitably increase along with the overall increases in the City’s population and employment base. Growth will increase the number of residential and business noise sources.

iii. Proposed measures to reduce or control noise impacts, if any:

None are proposed.
8. Land and shoreline use
   
a. What is the current use of the site and adjacent properties?
   
The proposal is to adopt a water system plan that includes strategies for providing future water service to land within the City of Bellingham and areas of unincorporated Whatcom County. The Water System Comprehensive Plan is a functional element of the City Comprehensive Plan that provides a more detailed report on existing conditions within the City. The plan implements the goals and policies of the City of Bellingham Comprehensive Plan and is consistent with land use regulations adopted in accordance with the Comprehensive Plan.
   
b. Has the site been used for agriculture? If so, describe.
   
Citywide, Bellingham does not have any land exclusively zoned for agricultural uses. There are areas in the UGA zoned for commercial forest and rural use that allow for a wide range of agricultural uses.
   
c. Describe any structures on the site.
   
Bellingham possesses a diverse range of residential, commercial, manufacturing, and public/institutional structures, including many Victorian era homes and downtown commercial and public buildings.
   
d. Will any structures be demolished? If so, what?
   
No. Because the proposal is a non-project action, it will not involve the demolition of any structures.
   
e. What is the current zoning classification of the site?
   
Zoning varies within City Limits as described in Title 20 of the BMC and within the UGA and other service areas according to WCC Title 20.
   
f. What is the current comprehensive plan designation of the site?
   
Bellingham Comprehensive Plan, was adopted in June, 1980 and last updated in 2005 designates the city’s retail service area as Urban. The Whatcom County Comprehensive Plan was adopted in 1996 and last revised in 2008 established the Urban Growth Area that the City serves with potable water.
   
g. If applicable, what is the current shoreline master program designation of the site?
   
None of the proposed policy changes directly relate to shorelines.
   
h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
   
Yes. The City keeps a map of environmentally sensitive areas on file. An assessment of the Critical Areas in the out-of-city service area in Whatcom County is on file with Whatcom County.
i. Approximately how many people would reside or work in the completed project?
   Because the proposal is a non-project action this question is inapplicable. The 2000 census estimated the population within Bellingham was 67,171.

j. Approximately how many people would the completed project displace?
   Because the proposal is a non-project action no displacement impacts are anticipated.

k. Proposed measures to avoid or reduce displacement impacts, if any:
   Because the proposal is a non-project action, no displacement impact mitigation is proposed.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
   The proposal is a non-project action; however, it is a component of and consistent with the Bellingham Comprehensive Plan.
   Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
   No housing will be provided as part of this project.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
   No housing will be eliminated as part of this project.

   Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

c. Proposed measures to reduce or control housing impacts, if any:
   None needed.
10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

As a non-project programmatic action, the proposal does not involve the construction of any structures.

b. What views in the immediate vicinity would be altered or obstructed?

As a non-project programmatic action, the proposal does not involve the alteration or obstruction of views.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Because the proposal is a non-project programmatic action, it would not produce any light or glare. Levels of artificial lighting and glare will increase with population and business growth in the Planning Area.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Because the proposal is a non-project action, it would not create light or glare safety hazards or view obstructions. Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

c. What existing off-site sources of light or glare may affect your proposal?

None. As a non-project action, the proposal would not be affected by light or glare.

d. Proposed measures to reduce or control light and glare impacts, if any:

No measures are proposed. Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter
16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

The City has many parks, a waterfront trail, and a boat launch. Additional recreation opportunities abound in the mountains to the east of Bellingham.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No, because the proposal is a non-project action it would not affect existing recreational uses.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

None required.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

Because the proposal is a non-project action, it would not directly affect historical sites. The City has a long history and many historic buildings.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

Several Native American tribes populated the area well before the City was founded. There were also several small communities that developed and receded during the boom and bust cycles of the 1800s. This history indicates that archaeologically and historically important sites likely exist within the planning area.

c. Proposed measures to reduce or control impacts, if any:

Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Because the proposal is a non-project action, it is not directly served by public streets.
b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Because the proposal is a non-project action, it does not directly affect public transit operations.

The Whatcom Transit Authority provides service to the Planning Area.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Because the proposal is a non-project action, it does not directly involve the creation or elimination of parking spaces.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Because the proposal is a non-project action, it does not directly involve the creation of new streets or improvement to existing roads.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The proposed action would not seek to employ water, rail, or air transportation facilities.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Because the proposal is a non-project action, it would not directly generate any vehicle trips.

g. Proposed measures to reduce or control transportation impacts, if any:

None are proposed.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

Because the proposal is a non-project action, it will not generate a requirement for increased public services. The plan provides analysis of existing conditions with regard to water service available for potable use and fire protection. This analysis allows for development of improvement recommendations consistent with the goals and policies of the City Comprehensive Plan. The Plan defines the City’s intended measures to reduce or control impacts of growth with regard to water service and related public services.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Implementation of the Capital Improvement Element of the Bellingham Comprehensive Plan will reduce or control future impacts to public services. Future project-level actions which require issuance of any state or local permit or license; and that are not categorically exempt
under Chapter 197-11-800 WAC will be subject to review under the City and County SEPA Ordinances (Chapter 16.20 BMC, Chapter 16.08 WCC). After reviewing applications for such project actions, the City or County may determine that mitigation measures are necessary to avoid probable significant adverse environmental impacts.

16. Utilities

a. The following utilities are currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system.

All of the above utilities are found in the planning area. For more detailed information, please refer to the Comprehensive Plan.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

As growth and development occurs, demands for public services will increase. The Capital Facilities & Utilities Element of the Comprehensive Plan is intended to ensure that new growth and development is provided with adequate public services and facilities concurrent with the approval of new development.

10.1.3 Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: 

Date Submitted: June 24, 2009
10.2 **Supplemental Sheet for Non-Project Actions**

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   The proposed adoption of the Water System Comprehensive Plan will not alter any existing requirements for environmental review under Chapters 16.20 BMC (that is, the SEPA Implementing Ordinance). Environmental review for plan related proposals in the UGA would be conducted under existing Whatcom County Ordinance. These provisions will continue to be employed in the review and mitigation of individual project applications. Possible indirect affects of the proposed action relating to water, air, environmental health, and noise are summarized below:

   **Withdrawal and/or Discharges to Water:** The City of Bellingham Water System Comprehensive Plan outlines a program to utilize the existing water rights. Growth in the City and UGA will cause an increase in the amount of wastewater discharged to Bellingham Bay.

   **Emissions to air, release of toxic or hazardous substances, and noise:** The potential adverse environmental impacts of urban growth relating to increased emissions are not significant as discussed in the Bellingham Comprehensive Plan.

   Proposed measures to avoid or reduce such increases are:

   **Withdrawals of Surface and Ground Water:** The Conservation Chapter of the Water System Plan outlines the City’s programs to promote the efficient use of water resources. As feasible opportunities are identified the City will also pursue wastewater reuse to reduce demands on the water system.

   **Emissions to air, release of toxic or hazardous substance, and noise:** No measures are proposed beyond project specific environmental review and enforcement of implementing ordinances in compliance with the City Comprehensive Plan.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   The Plan will not directly affect plants, animals, fish, or marine life. Growth and development within the service area may negatively impact plant and animal populations. Surface water withdrawals could impact these resources through lower instream flows that affect the migration, spawning, and rearing habitat of fish.
Proposed measures to protect or conserve plants, animals, fish, or marine life are:

_Adoption of this water system plan would not require inclusion of any specific measures to conserve plants, animals, fish, or marine life._

3. How would the proposal be likely to deplete energy or natural resources?

_The proposal would not directly deplete energy or natural resources. Growth and development in the service area will consume energy and natural resources._

Proposed measures to protect or conserve energy and natural resources are:

_The proposal does not require inclusion of any specific measures to conserve energy. The City’s watershed management programs and water conservation programs conserve and protect a broad range of natural resources._

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

_The proposal would not affect environmentally sensitive areas or areas designated for governmental protection._

Proposed measures to protect such resources or to avoid or reduce impacts are:

_No specific measures have been proposed._

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

_Availability of water within the designated service area is consistent with the adopted land use plans of both the City of Bellingham and Whatcom County. The Water System Plan is also consistent with shoreline designations in the City of Bellingham Shoreline Master Program. Potential impacts of changes in land and shoreline use were assessed in the City of Bellingham’s and Whatcom County’s Comprehensive Plans._

_No specific measures have been proposed._

Proposed measures to avoid or reduce shoreline and land use impacts are:

_No specific measures have been proposed. The plan contains policies that assure compatibility with adopted land use designations including those within the Shoreline Management Program jurisdiction within the City of Bellingham and in the unincorporated areas of Whatcom County._
6. How would the proposal be likely to increase demands on transportation or public services and utilities?

    The proposal provides mechanism to assure adequate public water service and supply to the adopted water service area.

    Proposed measures to reduce or respond to such demand(s) are:

    Not applicable.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

    No aspect of the proposal is in conflict with local, state, or federal laws, or requirements for the protection of the environment. The proposal complies with the Washington State enforcement of the Federal Safe Drinking Water Act and the WADOH requirements under 246-290-100 WAC regarding water system plans.
APPENDIX A

Water Facilities Inventory
City of Bellingham Resolution 2009-25
WADOH Approval Letter
APPENDIX B

Coordinated Water System Plan
Designated Water Service Areas
APPENDIX C

City and County Zoning Descriptions
APPENDIX E

Cross-Connection Control
APPENDIX H

Model Calibration Results
APPENDIX I

Water Use Efficiency Program
Nooksack Diversion Dam Interim Agreement
APPENDIX L

Water Shortage Response Plan
APPENDIX M

Emergency Response Plan
Whatcom Watershed Sampling Site Locations
APPENDIX Q

Water Staff Job Descriptions
APPENDIX T

Water System Design Standards
APPENDIX W

Consistency Statement
### WATER FACILITIES INVENTORY (WFI) FORM

**ONE FORM PER SYSTEM**

**RETURN TO:** Northwest Regional Office, 20435 72nd Ave S STE 200, Kent, WA, 98032

<table>
<thead>
<tr>
<th>1. SYSTEM ID NO</th>
<th>2. SYSTEM NAME</th>
<th>3. COUNTY</th>
<th>4. GROUP</th>
<th>5. TYPE</th>
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<tr>
<td>05603 3</td>
<td>BELLINGHAM-WATER DIVISION, CITY OF</td>
<td>WHATCOM</td>
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<tr>
<th>6. PRIMARY CONTACT NAME &amp; MAILING ADDRESS</th>
<th>7. OWNER NAME &amp; MAILING ADDRESS</th>
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<tbody>
<tr>
<td>GEOFFREY M. SMYTH [PUBLIC WORKS S</td>
<td>BELLINGHAM, CITY OF</td>
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<tr>
<td>2221 PACIFIC ST</td>
<td>DIRECTOR OF PUBLIC WOR</td>
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<tr>
<td>BELLINGHAM, WA 98229</td>
<td>CITY HALL</td>
</tr>
<tr>
<td></td>
<td>210 LOTTIE ST</td>
</tr>
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<td></td>
<td>BELLINGHAM, WA 98225</td>
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<th>9. 24 HOUR PRIMARY CONTACT INFORMATION</th>
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<tr>
<td>Primary Contact Daytime Phone: (360) 676-6850 x106</td>
<td>Owner Daytime Phone: (360) 676-6850</td>
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<td>Primary Contact Mobile/Cell Phone:</td>
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<td>Primary Contact Evening Phone:</td>
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<td>Fax: (360) 676-7799</td>
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<tr>
<td>E-mail: <a href="mailto:gsmyth@cob.org">gsmyth@cob.org</a></td>
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WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

### SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- Owned and Managed
- Managed Only
- Owned Only

### WATER SYSTEM CHARACTERISTICS (mark ALL that apply)

- Agricultural
- Commercial / Business
- Day Care
- Food Service/Food Permit
- 1,000 or more person event for 2 or more days per year
- Hospital/Clinic
- Industrial
- Licensed Residential Facility
- Lodging
- Recreational / RV Park
- Residential
- School
- Temporary Farm Worker
- Other (church, fire station, etc.):

### WATER SYSTEM OWNERSHIP (mark only one)

- Association
- County
- Investor
- Special District
- City / Town
- Federal
- Private
- State

### STORAGE CAPACITY (gallons)

- 29,375,000

### SOURCE INFORMATION

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<tr>
<th>Source Number</th>
<th>16 SOURCE NAME</th>
<th>17 INTERTIE</th>
<th>18 SOURCE CATEGORY</th>
<th>19 USE</th>
<th>20 TREATMENT</th>
<th>22 DEPTH</th>
<th>23 SOURCE LOCATION</th>
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<td>SPRING</td>
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**Updated:** 11/06/2007

**Printed:** 06/09/2008
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)

| A. Full Time Single Family Residences (Occupied 180 days or more per year) | 0 | 22193 | Unspecified |
| B. Part Time Single Family Residences (Occupied less than 180 days per year) | 19575 |

26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)

| A. Apartment Buildings, condos, duplexes, barracks, dorms | 0 |
| B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 | 2618 |
| C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 | 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 |
| B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc. | 4066 |

28. TOTAL SERVICE CONNECTIONS

| 26259 |

29. FULL-TIME RESIDENTIAL POPULATION

| A. How many residents are served by this system 180 or more days per year | 81454 |

30. PART-TIME RESIDENTIAL POPULATION

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31. TEMPORARY & TRANSIENT USERS

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32. REGULAR NON-RESIDENTIAL USERS

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33. ROUTINE COLIFORM SCHEDULE

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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: ___________________________
August 21, 2009

GEOFFREY SMYTH
BELLINGHAM, CITY OF
2221 PACIFIC STREET
BELLINGHAM WA 98229

Subject: Bellingham, City of ID # 05600
Whatcom County
2009 Water System Plan - Approval
Submittal # 07-0412A

Dear Mr. Smyth:

The revised City of Bellingham water system plan (WSP), received in this office on July 13, 2009, has been reviewed and in accordance with the provisions of WAC 246-290-100, is hereby APPROVED.

Approval of the update of this water system plan is required on or before August 21, 2015 unless the Department of Health (DOH) requests an update or plan amendment pursuant to WAC 246-290-100(9). Approval of this plan is valid as it relates to current standards outlined in Chapter 246-290 WAC, revised July 2008, Chapter 246-293 WAC, revised September 1997, Chapter 70.116 RCW, the Whatcom County CWSP, the requirements of the Municipal Water Law (SESSHBR 1338), effective September 9, 2003, and is also subject to the qualifications herein. Future revisions in the rules and statutes may be more stringent and require facility modification or corrective action.

This WSP includes capacity information that demonstrates the physical ability of this water system to provide water with any water right limitations that might occur during the 6-year period for which the approval of this WSP is valid.

Based upon information you have supplied, it has been determined that the City of Bellingham water system can support an “unspecified” designation for its approved number of connections. A specific number of approved connections will not be applied to your system at this time. Development within your system may occur in compliance with the schedule and information provided within your WSP. This designation may be rescinded (and replaced with a specified number of approved connections) if it is determined that the WSP is no longer representative of system activities.
This WSP meets local government consistency requirements for WSP approval pursuant to RCW 90.03.386, RCW 43.20.

Because the Department of Ecology has jurisdiction with respect to water rights determinations, DOH’s approval of this WSP cannot be construed as a guarantee of water rights or the City of Bellingham’s legal use of water under the approved plan. DOH’s approval is subject to subsequent determinations by the Department of Ecology concerning the water rights for this system, which may require submittal of additional planning documents or other submittals to Department of Health. Questions concerning water rights or any uncertainties or discrepancies concerning water rights issues should be directed to the Department of Ecology.

Per RCW 43.20.260, your system now has a duty to serve retail connections 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.

*Standard Construction Specifications* for distribution main extensions have been approved as part of this WSP. With this approval and consistent with WAC 246-290-125(2) the City of Bellingham may proceed with the installation of distribution main extensions provided that the City of Bellingham maintains on file completed construction completion reports (a copy of which is attached) in accordance with WAC 246-290-125 (2) and WAC 246-290-120 (5) and makes them available for review upon request by DOH.

Thank you for your cooperation. Whatcom 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,

John Thielemann, PE  
Regional Engineer  
(253) 395-6761

Richard Rodriguez  
Regional Planner  
(253) 395-6771

Encl: Construction Completion Report

cc: Erin Osborn, Whatcom County Planning and Development Services  
Kyle Dodd, Whatcom County Health Department  
Laurette Rasmussen, Whatcom County Health Department  
Andy Dunn, Department of Ecology, NWRO  
Phil Martinez, P.E., CH2M Hill
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.

BELLENGHAM-WATER DIVISION, CITY OF

Name of Water System

GEOFFREY SMYTH

Name of Purveyor (Owner or System Contact)

2221 PACIFIC ST

Mailing Address

BELLENGHAM, WA 98229

City State Zip

DOH System ID No.: 05600

Date Water System Plan that includes

Standard Construction Specifications

Date Standard Specifications

Approved by DOH: 8/21/2009

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.

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
20435 72nd Ave. S, Ste 200
Kent, WA 98032-2358
(253) 395-6750

☐ SWRO Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
(360) 226-3030

☐ ERO Drinking Water
Department of Health
16201 E. Indiana, Suite 1500
Spokane Valley, WA 99216
(509) 456-3115

For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6368).

DOH Form # 331-147 (03/07)
RESOLUTION NO. 2009-25

A RESOLUTION ADOPTING AN UPDATED WATER SYSTEM PLAN, INCLUDING THE DOCUMENTS, MAPS AND REFERENCED STUDIES, REPORTS AND PLANS THAT HAVE NOT BEEN PREVIOUSLY ADOPTED BY THE CITY COUNCIL.

WHEREAS, Washington State Department of Health requires updates of Water System Plans every 6 years; and

WHEREAS, the last complete update of the Water System Plan, approved by the Washington State Department of Health, was completed in 1993, titled Comprehensive Water Plan – 1993 by Barrett Consulting Group (minor updates have occurred between 1993 and 2006); and

WHEREAS, the Bellingham Comprehensive Plan was adopted by City Council by Ordinance No 2006-06-058, providing the base line planning data; and

WHEREAS: the City Council issued a policy on June 14, 2004 as the “Adopted Revision to City Council Policy Regarding Utility Service Zone Extensions” outside of the City Limits; and

WHEREAS the City Council has not authorized the Mayor and staff to enter into Agreements for Utility Service zone extension outside of the Urban Growth Area or within the Urban Growth Area except in areas with existing Utility Serve Zone Ordinances and as authorized by Ordinance #2006-03-026 and #2006-06-064 or as otherwise may be required by law; and

WHEREAS, this updated Water System Plan adopted hereby replaces the 2005 Water System Plan;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BELLINGHAM:

The “City of Bellingham 2009 Water System Plan”, attached as Exhibit A, is hereby adopted.

PASSED by the Council this 27th day of July, 2009.

[Signature]

Council President

City of Bellingham
CITY ATTORNEY
210 Lottie Street
Bellingham, Washington 98225
Telephone (360) 676-6903

Resolution Adopting an Updated Water System Plan
APPROVED by me this 6th day of August, 2009

Mayor

Attest: Finance Director

Approved as to form: Office of the City Attorney

Published:

Resolution Adopting an Updated Water System Plan
EXHIBIT A TO RESOLUTION #2009-25

2009 WATER SYSTEM PLAN

ATTACHMENTS HAVE NOT BEEN SCANNED;
HOWEVER THEY HAVE BEEN ARCHIVED
WITH THE ORIGINAL
RESOLUTION #2009-25
AND ARE MICROFILMED
City and County Zoning Descriptions
## Zoning Descriptions

### CITY OF BELLINGHAM ZONING DESIGNATIONS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS</td>
<td>Residential Single</td>
</tr>
<tr>
<td>RM</td>
<td>Residential Multiple</td>
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<td>I</td>
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<td>Industrial Residential Multiple</td>
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<td>IWF</td>
<td>Industrial Waterfront/Mixed-Use</td>
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<tr>
<td>IN</td>
<td>Institutional</td>
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<td>INRM</td>
<td>Institutional Residential Multiple</td>
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<td>Public</td>
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<td>PIN</td>
<td>Public/Institutional</td>
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<td>PWF</td>
<td>Public/Waterfront Mixed-Use</td>
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### WHATCOM COUNTY TITLE 20 ZONING DESIGNATIONS
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<tr>
<th>Code</th>
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<tr>
<td>HII</td>
<td>Heavy Impact Industrial</td>
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<tr>
<td>LII</td>
<td>Light Impact Industrial</td>
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<td>GM</td>
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<td>GI</td>
<td>Gateway Industrial</td>
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<tr>
<td>AO</td>
<td>Airport Operations</td>
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<td>R(2)</td>
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<td>R(5)</td>
<td>Rural 1 Unit/5 Acres</td>
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<td>RC</td>
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<td>RF</td>
<td>Rural Forestry</td>
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<td>MRL</td>
<td>Mineral Resource Lands (overlay)</td>
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<td>Urban Residential Mixed Use</td>
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<td>URMX(6-12)</td>
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<td>Code</td>
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<td><strong>Other</strong></td>
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<td>ROS</td>
<td>Recreation Open Space</td>
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<td>EI</td>
<td>Eliza Island</td>
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<td>PUD</td>
<td>Planned Unit Development</td>
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</tbody>
</table>
INTERLOCAL AGREEMENT
CITY OF BELLINGHAM - CALIFORNIA STREET WATER ASSOCIATION
PROVISION OF WATER SERVICE

WHEREAS California Street Water Association ("Association") consists of properties whose existing water systems are failing and present a health hazard; and,

WHEREAS, although these properties are within city limits, unique topographic conditions make in impractical to provide water service in the normal manner; and,

WHEREAS the Association desires to have the City of Bellingham ("City") provide water service to the Association for distribution to its customers; and,

WHEREAS the Association applied for such service, pursuant to Bellingham Municipal Code section 15.36.100, and its application was reviewed by the Departments of Public Works and Planning and Community Development; and,

WHEREAS the City Council, on November 8, 1993, found (a) that existing water service to customers of the Association was failing and a health hazard, (b) that customers of the Association were so uniquely situated, both as a matter of geography and hydrology, so as to not have any other source of safe water than to purchase it from the City and (b) that requiring such customers to construct a full-standard water main extension to serve their properties would be extremely and unduly expensive; and,

WHEREAS the Council thereupon duly approved providing the requested service to the Association and authorized the Mayor to enter into this Interlocal Agreement; and,

WHEREAS RCW 39.34 permits governmental agencies to enter into agreements for the purposes set forth herein,

NOW, THEREFORE, IT IS AGREED AS FOLLOWS:

1. The City of Bellingham shall provide water to the California Street Water Association upon the terms and conditions contained herein.
2. The Association will timely pay to the City all charges for such water at rates from time to time assessed upon persons or entities not receiving direct City water service.

3. The Association will distribute water it receives from the City to the dwelling units on the properties indicated on Exhibit "A", attached hereto and incorporated by this reference, and to no others.

4. Properties on Exhibit "A" shall not be further subdivided and shall continue to contain only single family residences.

5. Should the City decide to provide direct services to any property listed on Exhibit "A", such property shall participate pro rata in the costs of construction of such City water service.

6. Owners of properties within the Association specifically understand and agree that the water service provided hereunder is not sufficient to meet applicable fire flow requirements, and that such requirements would otherwise apply to individual properties receiving direct water service from the City. To this end, the Association and its members, and their successors and assigns, waive any and all requirements, rights, or privileges relating to adequate fire flow. Further, the Association and its members, and their successors and assigns, and each of them agree to defend, indemnify, and hold the City harmless as to any claims or liabilities of any sort arising out of this Agreement or operations of the Association, or the provision of water service to the Association or to them individually.

7. The City shall use reasonable diligence to provide regular and uninterrupted service to the Association. The City shall not be liable for damages, breach of contract, or otherwise, for failure, suspension, or diminution of service occasioned by or in consequence of any cause beyond its control, including but not limited to acts of God or of the public enemy, fires, floods, earthquakes or other catastrophes, strikes, or failure of breakdown of transmission facilities.

8. The provisions of this Agreement shall be interpreted as a covenant running with the land and therefore binding on the Association and its members, and their successors and assigns. The Association shall require and cause to be duly recorded covenants embodying the terms of this Agreement.
9. The water distribution system and other assets of the Association shall be security for any financial obligations of the Association to the City arising hereunder. The Association hereby grants to the City a lien upon such system and other assets and shall timely cause to be recorded appropriate documents perfecting the City's security interest. Upon dissolution of the Association, whether voluntarily or by operation of law or otherwise, if requested to do so by the City, the Association will promptly transfer to the City at no cost its water distribution system, easements, franchises and rights-of-way free and clear of all encumbrances.

DATED this 1st day of December, 1993.

CALIFORNIA STREET WATER ASSOCIATION

[Signature]
Director

Dated

CITY OF BELLINGHAM

[Signature]
Mayor

Attest:

[Signature]
Finance Director

Department approval:

Director

[Signature]
[Manager]

Approved as to form:

[Signature]
Office of the City Attorney
PROPERTY #1 - 2500 CALIFORNIA STREET

Lots 19 to 27, inclusive, Block 12, "ADSIT AND ZEDNICK'S ADDITION TO FAIRHAVEN, WASH.,” now a part of the consolidated City of Bellingham, Whatcom County, Washington, as per the map thereof, recorded in Book 3 of Plats, page 42, in the Auditor’s office of said county and state.

ALSO, that portion of Government Lot 2, Section 18, Township 37 North, Range 3 East of W.M., described as follows:

BEGINNING at a point of 30 feet South of the Southwest corner of Lot 35, Block 13, "ADSIT AND ZEDNICK'S ADDITION TO FAIRHAVEN, WASH.,” thence South 150 feet, thence West to the East boundary of a tract conveyed to A.L. Bean by Warranty Deed recorded December 9, 1915, under Whatcom County Auditor’s File No. 188745; thence South to where said East line intersects a creek which flows Northwesterly across Government Lot 2 in said Section 18; thence Northwesterly along said creek to the South line of California Street; thence East along the South line of California Street to the point of beginning.

EXH_A_1
Lots 28 to 36, inclusive, Block 12, "ADSIT AND ZEDNICK'S ADDITION TO FAIRHAVEN, WASH.," now a part of the consolidated City of Bellingham, Whatcom County, Washington, according to plat thereof recorded in volume 3 of plats, page 42, in the Auditor's office of said county and state.

Situate in County of Whatcom, State of Washington.
PROPERTY #3 - 2800 CALIFORNIA STREET

Lots 11 through 30, inclusive, Block 13, "ADSIT AND ZEDNICK'S ADDITION TO FAIRHAVEN," according to Book 3 of Plats, page 42, AND Lots 1 through 12, inclusive, and Lots 29 through 40, inclusive, Block 14, "ADSIT AND ZEDNICK'S ADDITION TO FAIRHAVEN," now a part of the consolidated City of Belligham.
Lots 3 to 10 and 31 through 38, inclusive, Block 13, "ADSIT AND ZEDNICK'S ADDITION TO FAIRHAVEN, WASHINGTON," now a part of the consolidated City of Bellingham, Whatcom County, Washington, as per the map thereof recorded in Book 3 of Plats, page 42 in the Auditor's office of said county and state.
INTERLOCAL AGREEMENT
LUMMI TRIBAL WATER AND SEWER DISTRICT
WATER SERVICE

WHEREAS, the City of Bellingham (the "City") is a municipal corporation formed under the laws of the State of Washington and a first class city which maintains a water supply serving the area within its corporate limits and certain areas outside those limits; and,

WHEREAS, the Lummi Tribal Water and Sewer District (the "District") is a municipal corporation, duly chartered by the Lummi Indian Tribe, which has duly applied for and received City approval of the provision of water for resale by it to its customers pursuant to Bellingham Municipal Code Chapter 15.36; and,

WHEREAS, the foregoing parties are authorized by RCW 39.34 to enter into an Interlocal Agreement finalizing the terms and conditions of the provision of water as herein agreed to;

NOW, THEREFORE, in view of the above recitals and in consideration of the mutual covenants and promises set out below, the parties hereby agree as follows:

1. Provision of water supply. The City agrees to provide to the District up to a maximum of 1000 gallons per minute of uninterrupted daily potable water service, at a minimum of 30 psi, for resale by the District to its customers residing within the District boundary as it exists as of the date hereinbelow. The District boundary is presently co-extensive with that of the Lummi Indian Reservation. Service to areas other than within the existing boundary will be as agreed to by the parties and by amendment to this agreement, except that the District may serve the area between the end of the City of Bellingham line at Marietta Slough and the Reservation boundary.

2. Construction of facilities. The District agrees to construct a transmission main ten (10") inches in diameter, from the City's existing water main on Curtis Road to a point approved by the City along Country Lane near the Marietta Slough, and there to construct a vault, water meter and backflow device(s); all costs shall be solely borne by the District. Such construction shall be in accordance with City standards, and subject to approval by the City Public Works Department. The District shall reimburse the City for its necessary costs of inspection, testing and acceptance of the main and meter assembly.

3. Ownership and maintenance of facilities. Upon approval of construction by the City and commencement of the service provided herein, the District shall forthwith transfer to the City ownership of the main, vault, meter, and backflow device(s). Thereafter, the City will be responsible for maintenance of the portion of the system it owns, and the District for the portion it owns.
4. Rates and billing. The City will charge the District, and the District agrees to pay, for water service herein provided at its usual rates for service out of the city as set forth in BMC 15.08.250(C)(2). It is understood that the cost of such service represents the costs of withdrawal, diversion, treatment, transmission and return on investment. The City will bill the District monthly, and payment thereon shall be due within thirty (30) days of receipt of billing. Failure to so remit in a timely fashion constitutes a breach of this Agreement entitling the City, at its option, to immediately discontinue service hereunder.

5. Latecomer agreement. The City agrees that, for any new sales of water by it to customers connecting to the transmission main described above, it will obtain "latecomer payments" from any party so connecting for reimbursement to the District of a pro rata portion of its construction costs.

6. Hold harmless. The District agrees to defend the City and hold it harmless as to any claims or lawsuits, well-founded or not, arising out of (a) the construction herein, (b) use of the facilities the District owns or maintains, and (c) provision of water services to District customers. The District understands, and will advise its customers as necessary, that no legal relationship exists between them and the City, and that the District is solely responsible for provision of water service to such customers and billing for same.

7. Rights preserved. Nothing in this agreement compromises or adversely affects the Tribe’s reserved water rights under the Winters doctrine or other applicable law; provided, however, that by execution of this agreement, the City neither admits nor denies the existence of the Tribe’s reserved water rights.

DATED this 2nd day of MARCH, 1990, by the LUMMI TRIBAL WATER & SEWER DISTRICT, and the LUMMI INDIAN BUSINESS COUNCIL:

[Signatures]

DATED this 12th day of JANUARY, 1990, by the CITY OF BELLINGHAM:

Attest: [Signatures]

Approved as to form:

[Signatures]
**Interlocal Agreement**

<table>
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<tr>
<th><strong>Originating Department:</strong></th>
<th><strong>Modification of Contract #:</strong></th>
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<tr>
<td>PW</td>
<td>(Attach Copy of Original Contract)</td>
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<tr>
<td>Contract with</td>
<td>Contract Name/Project #:</td>
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<tr>
<td>Water District #2</td>
<td>If Contract is Extended, New Termination Date:</td>
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<tr>
<td>Water Service</td>
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**Termination Date:**

- Certificate of Insurance Attached
- □ Certificate of Insurance Attached

**Signatures:**

- □ Contracting Party
- □ Department Head

**Date Executed:**

- □ Property Index Form
- □ Record Document

**SPECIAL INSTRUCTIONS:**

- Sue Hodges (Sig)

**Distribution**

- Original: Attach to Contract

**Copy:** Return to Originating Department
INTERLOCAL AGREEMENT
CITY OF BELLINGHAM-WHATCOM CO. WATER DISTRICT #2

I. RECITALS

The CITY OF BELLINGHAM (the "City") is a municipal corporation formed under the laws of the State of Washington and a first-class city. It maintains a water supply system serving the area within its corporate limits and certain areas outside those limits.

WHATCOM COUNTY WATER DISTRICT NO. 2 (the "District") is a water district formed under Title 57 of the Revised Code of Washington, which provides water service within its boundaries. Water District 2 is located within an area adjacent to the City of Bellingham. The District currently provides water service within a portion of its District boundary and may wish to serve additional areas within its boundaries.

WHEREAS, pursuant to the Bellingham Municipal Code 15.36, the City is willing and able to sell treated water to the District through metered connections at the common boundary between the City and the District for a limited service area and under certain terms and conditions.

WHEREFORE, in view of the above recitals and in consideration of the mutual covenants and promises set out below, the parties agree as follows:

1. Provision of water supply. The City agrees to provide to the District up to a maximum of 1100 gallons per minute of potable water service, at a minimum of 20 psi, for resale by the District to its customers residing within the District boundary as it exists as of the date hereinbelow. The City further agrees to provide fire flow as it is available from the City's system. The District boundary is shown in Exhibit "A." The District agrees to not resell water beyond the limits of the

City of Bellingham
CITY ATTORNEY
210 Lottie Street
Bellingham, Washington 98225
Telephone (360) 676-6903
district. The District further agrees to not resell said water in areas annexed to the District after January 1, 1997 without the express written approval of the City.

2. Quality of Water. The water provided to the District shall be of the same standard and quality as shall be distributed through the City's system, and the City shall comply with all State and County health regulations in regard to testing and sampling said water up to, but not beyond the District's meter.

3. The District shall pay for all water passing through the meters at the points of delivery at the rate established by the City of Bellingham for service outside the Bellingham corporate city limits. The District shall pay the City promptly when billed for all water passing through the meter.

4. Interruptions of Service. The obligation of the City to furnish water as above described may be subject to temporary interruptions of service caused by necessary repairs to the City's distribution system or other causes beyond the control of the City. In the event the City anticipates a shut down the distribution system for planned repairs, it shall notify the District at least twenty-four (24) hours in advance.

5. Hold harmless. The District shall defend, indemnify and hold harmless the City, its officers, employees, principals and agents from any and all injury or damage to the City or its property, and also from all claims, demands, causes of action, or suits of any kind that arise directly or indirectly out of, are incident to or are due to any actual or alleged negligence, intentional act, or breach of duty by the District, its agents, employees, representatives or subcontractors arising out of this Agreement. In the event of any claim against the City or against both the City and the District involving an allegation
of negligence, intentional act, or breach of duty on the part of
the District, the District shall be responsible for promptly
providing a defense to the City. In the event of an ultimate
finding of sole negligence by the City, its officers, employees,
principals, or agents, the City shall reimburse the District for
its defense costs and shall satisfy any judgment against it. In
the event of an ultimate finding of concurrent negligence by the
District and the City, the District's and the City's
responsibility for defense costs and for satisfying any judgment
shall be proportionate to the percentage of each party's
negligence or that of its agents, employees, representatives and
subcontractors. In the event of an ultimate finding of no
negligence by the City, the District shall have total
responsibility for defense costs and for satisfying any
judgment.

The District understands, and will advise its customers as
necessary, that no legal relationship exists between them and
the City, and that the District is solely responsible for
provision of water service to such customers and billing for
same.

6. This Agreement replaces all earlier agreements between
the parties and constitutes the entire agreement of the parties
and shall not be altered or amended except in writing, signed by
an authorized representative of each of the parties.

DATED this 1st day of December, 1997.

WHATCOM COUNTY WATER DISTRICT NO. 2

[Signature]

City of Bellingham
CITY ATTORNEY
210 Lottie Street
Bellingham, Washington 98225
Telephone (360) 676-6903
CITY OF BELLINGHAM

Mark Asmundson, Mayor

ATTEST:

Finance Director

CERTIFICATION

As Secretary of Whatcom County Water District No. 2, I certify that the above Interlocal Agreement was adopted at a __________ meeting of the Commissioners held on the __________ day of December, 1997, at which time a quorum of ___ was present, and was adopted by a vote of ___ FOR, ___ AGAINST, and ___ ABSTENTIONS.

Secretary
Whatcom County Water District

No. 2
APPROVED AS TO FORM:
City of Bellingham
City Attorney's Office

DEPARTMENTAL APPROVAL:

Director of Public Works
4 December 1997

Jack Garner
Dept. of Public Works
210 Lottie St.
Bellingham, WA 98255

Dear Jack,

Please find the signed contract for water supply.

Thank you for working with us.

Sincerely,

Greg Christensen
Commissioner

Iw
INTERLOCAL AGREEMENT
CITY OF BELLINGHAM-WHATCOM CO. WATER DISTRICT #7

I. RECITALS

The CITY OF BELLINGHAM (the "City") is a municipal corporation formed under the laws of the State of Washington and a first-class city. It maintains a water supply system serving the area within its corporate limits and certain areas outside those limits.

WHATCOM COUNTY WATER DISTRICT NO. 7 (the "District") is a water district formed under Title 57 of the Revised Code of Washington, which provides water service within its boundaries. Water District 7 is located within an area adjacent to the City of Bellingham. The District currently provides water service within a portion of its District boundary and may wish to serve additional areas within its boundaries.

WHEREAS, pursuant to the Bellingham Municipal Code 15.36, the City is willing and able to sell treated water to the District through a metered connection at the common boundary between the City and the District on Britton Road for a limited service area and under certain terms and conditions.

WHEREFORE, in view of the above recitals and in consideration of the mutual covenants and promises set out below, the parties agree as follows:

1. Provision of water supply. The City agrees to provide to the District up to a maximum of 500 gallons per minute of potable water service, at a minimum of 20 psi, for resale by the District to its customers residing within the District boundary as it exists as of the date hereinbelow. The District boundary is shown in Exhibit "A." The District agrees to not resell water beyond the limits of the District. The District further agrees to not resell said water in areas annexed to the District after July 1, 1991 without the express written approval of the City.

Appendix "C"
2. The District agrees to provide throughout the life of this Agreement reservoir capacity sufficient to allow water delivery by the City at a constant rate throughout a peak day and to operate its system in that manner.

3. The District shall pay for all water passing through the meter at the point of delivery at the rate established by the City of Bellingham for service outside the Bellingham corporate city limits. The District shall pay the City promptly when billed for all water passing through the meter.

4. The District agrees it will not sell or resell water for any use other than single-family dwellings on lots of record as of July 1, 1991, without the specific approval of the City of Bellingham.

5. The City may, at some time in the future, wish to install a water line along Britton Road to eliminate dead end water mains. The District agrees to cooperate with the City and support the City's future plans for such a water main and agrees to allow City service to properties within the Districts that lie west of Britton Road.

6. Hold harmless. The District agrees to defend the City and hold it harmless as to any claims or lawsuits, well-founded or not, arising out of use of the facilities the District owns or maintains, and provision of water services to District customers. The District understands, and will advise its customers as necessary, that no legal relationship exists between them and the City, and that the District is solely responsible for provision of water service to such customers and billing for same.

7. This Agreement replaces the earlier agreement between the parties dated September 18, 1967 and constitutes the entire agreement of the parties and shall not be altered or amended except in writing, signed by an authorized representative of each of the parties.
DATED this 13 day of APRIL, 1993.

WHATCOM COUNTY WATER DISTRICT NO. 7

Tom Anderson

CITY OF BELLINGHAM

Tim Douglas, Mayor
d/3/93

ATTEST:

Finance Director

CERTIFICATION

As Secretary of Whatcom County Water District No. 7, I certify that the above Interlocal Agreement was adopted at a REGULAR meeting of the Commissioners held on the 13 day of APRIL, 1993, at which time a quorum of 2 was present, and was adopted by a vote of 2 FOR, 0 AGAINST, and 0 ABSTENTIONS.

Secretary
Whatcom County Water District No. 7

APPROVED AS TO FORM:
City of Bellingham

City Attorney's Office

APPROVED AS TO FORM:
Whatcom County Water District No. 7

DEPARTMENTAL APPROVAL:

Director of Public Works
WATER SUPPLY SERVICE AGREEMENT

CITY OF BELLINGHAM - WHATCOM COUNTY WATER DISTRICT NO. 10

THIS AGREEMENT, made and executed this 3rd day of __________, 1970, between the CITY OF BELLINGHAM, a Municipal Corporation of the State of Washington, hereinafter referred to as "City", and WHATCOM COUNTY WATER DISTRICT NO. 10, a Municipal Corporation of the State of Washington, hereinafter referred to as "District".

W I T N E S S E T H:

WHEREAS, that certain territory which is within the established boundaries of the District, and in proximity to the established boundaries of the City, has not heretofore been served by a Public Water Utility; and

WHEREAS, the District is not now in a position to finance, construct, and operate a municipal water supply system to furnish water supply service to such new developments, but intends to so serve emerging service areas in the future by contract with the City; and

WHEREAS, residential and other type developments have created service areas which now require the District to make arrangements to obtain conventional public water supply service on phase-by-phase when actually requested by the District procedure within said territory; and

WHEREAS, the City is in a position to supply and sell water and water supply service to the District to service a water distribution system within a service area within such territory as
hereafter described upon certain rates and conditions; and the District desires to purchase water and water supply service from the City in order to supply a certain water distribution system or systems; and

WHEREAS, it is necessary that a contract be entered into establishing the rights and duties of the parties;

NOW, THEREFORE, in consideration of the mutual covenants contained herein, IT IS HEREBY AGREED AS FOLLOWS:

1. Definition - Water Service Area. For the purpose of this agreement, "water service area" shall mean that area within the District which area is described in Exhibit A and by reference made a part hereof.

2. Water Supply and Service. The City agrees to furnish the District with potable water, for domestic and fire protection uses only, to the best of its ability within the limits of its present water treatment facilities, but not so as to impair service to the water consumers within the City, or existing consumers outside the City. The number and types of services, or consumers, to be supplied must be approved by the City. City approval of services will not constitute a guarantee that the City will meet peak demands or specific hydrant pressures.

3. Delivery points. Delivery points will be determined by future agreement between the City and the District, and must meet the approval of the City. The City will cooperate with the District in providing a reasonable number of delivery points. The cost of constructing such delivery points, including the cost of meters and necessary extensions, enlargements or improvement of City lines, will be borne by the District.
hereafter described upon certain rates and conditions; and the District desires to purchase water and water supply service from the City in order to supply a certain water distribution system or systems; and

WHEREAS, it is necessary that a contract be entered into establishing the rights and duties of the parties;

NOW, THEREFORE, in consideration of the mutual covenants contained herein, IT IS HEREBY AGREED AS FOLLOWS:

1. Definition - Water Service Area. For the purpose of this agreement, "water service area" shall mean that area within the District which area is described in Exhibit A and by reference made a part hereof.

2. Water Supply and Service. The City agrees to furnish the District with potable water, for domestic and fire protection uses only, to the best of its ability within the limits of its present water treatment facilities, but not so as to impair service to the water consumers within the City, or existing consumers outside the City. The number and types of services, or consumers, to be supplied must be approved by the City. City approval of services will not constitute a guarantee that the City will meet peak demands or specific hydrant pressures.

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4. **Payment to City.** The District agrees to pay the City for water delivered at the rate and according to the terms established, or to be established, by ordinance, for comparable water consumers outside the City.

**WHATCOM COUNTY**  
**WATER DISTRICT NO. 10**  

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**CITY OF BELLINGHAM**

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[Signatures and dates]
EXHIBIT A

Beginning at the meander corner on the section line between Sections 26 and 27, Township 38 North, Range 3 East, Willamette Meridian, said corner being also the city limits of the City of Bellingham.

Thence Northerly along the West line of Sections 26 and 22, Township 10 North, Range 3 East to the Southwest corner of Blackburn's 1st Addition to Scheme; thence Easterly to the center of the Southeast quarter of the Southwest quarter of Section 23, said Township and Range; thence Northerly to the center of the Northeast quarter of the Southwest quarter of said Section 23; thence Easterly to the Southeast corner of the Northeast quarter of the Northeast quarter of the Southwest quarter of said Section 23; thence Northerly to the center of said Section 23; thence Easterly along the East-West quarter section line to the quarter corner between Sections 23 and 24, said Township and Range; thence continuing Easterly through Section 24, said Township and Range, and Section 19, Township 38 North, Range 4 East to the quarter corner between Sections 19 and 20; Township 38 North, Range 4 East. Thence Southerly along the East section lines of Sections 19 and 20 to the quarter corner between Sections 29 and 30, said Township and Range; thence Easterly along the East-west quarter line of Section 29 to the center of Section 29, said Township and Range; thence Southerly along the North-south quarter section line of said Section 29 to the South East-west 1/16 line of said Section 29; thence Easterly on said South 1/16 line to the South 1/16 corner between Sections 28 and 29, said Township and Range; thence Southerly along the West section lines of Section 28 and 33 to the South 1/16 corner between Sections 32 and 33, said Township and Range; thence Easterly along the South East-west 1/16 line of said Section 33 to the West 1/16 line of said Section 33; thence Southerly along the West North-south 1/16 line of said Section 33 to the Township line of Township 38 and 37 North; thence Easterly along said Township line to the Northeast Section corner of Section 4, Township 37 North, Range 4 East; thence Southerly along the East section lines of Sections 4, 9 and 16 to the quarter corner between Sections 15 and 16, said Township and Range; thence Easterly along the East-west quarter line of said Section 15 to the center of said Section 15; thence Southerly along the North-south quarter line of said Section 15 to the quarter corner between Sections 15 and 22, said Township and Range; thence Easterly along the North Section line of said Section 22 to the Northeast section corner of said Section; thence Southerly on the Section line between Sections 22 and 23, said Township and Range to the quarter corner between said Sections; thence Easterly on the East-west quarter line of Section 23 to the center of Section; thence Southerly on North-
south quarter line of Section 23 to the quarter corner between Sections 23 and 26, said Township and Range; thence Easterly on the North Section lines of Sections 26 and 25 to the Range line between Ranges 4 and 5 East; thence Southerly along said Range line to the quarter corner between Section 25, said Township and Range and Section 30, Township 37 North, Range 5 East, Willamette Meridian; thence Easterly along East-west quarter line of said Section 30 to the center of said Section; thence Southerly along the North-south quarter line to the South quarter corner of said Section 30; thence Westerly along the South Section line of said Section 30 to the Range line between Ranges 4 and 5 East; thence Northerly along said Range line to the South 1/16 corner between said Section 30 and Section 25, Township 37 North, Range 4 East; thence Westerly along the South East-west 1/16 line to the North-south quarter line of said Section 25, thence Northerly along the North-south quarter line to the center of said Section 25; thence Westerly along the East-west quarter lines of Sections 25, 26, 27, 28 and 29 to the center of Section 29, said Township and Range; thence Northerly along the North-south quarter line of Sections 29 and 20 to the center of Section 20, said Township and Range; thence Easterly along the East-west quarter line of Section 20 to the East North-south 1/16 line of said Section 20; thence Northerly along the East North-south 1/16 lines of Sections 20 and 17 to the North East-west 1/16 line of Section 17, said Township and Range; thence Westerly on said North East-west 1/16 line to the North-south quarter line of said Section 17; thence Northerly along the North-south quarter line to the quarter corner between Sections 17 and 8, said Township and Range; thence Westerly along the North Section lines of Sections 17 and 18 to the Range line of Ranges 3 and 4 East; thence Northerly along said Range line to the Southeast Section corner of Section 1, Township 37 North, Range 3 East, Willamette Meridian; thence Westerly along the South Section line of said Section 1 to the Southwest Section corner of said Section 1; thence Northerly along the Section line between Sections 1 and 2 to the quarter corner between said Sections 1 and 2; thence Westerly on the East-west quarter lines of Sections 2 and 3 to the center of Section 3; thence Northerly along the North-south quarter line of said Section 3 to the quarter corner between said Section 3 and Section 34, Township 38 North, Range 3 East; thence Westerly along the South Section line of said Section 34 to the Southwest section corner of said Section 34; thence Northerly along the West Section lines of Sections 34 and 27 to the quarter corner between Sections 27 and 28, said Township and Range; thence Easterly along the East-west quarter line of said Section 27 to the harbor line of Lake Whatcom; thence Northeasterly along Bellingham City Limit line across Lake Whatcom to the point of beginning.
REVISED
INTERLOCAL AGREEMENT - NORTH SHORE WATER SERVICE

I. RECITALS

The CITY OF BELLINGHAM (the "City") is a municipal corporation formed under the laws of the State of Washington and a first-class city. It maintains a water supply system serving the area within its corporate limits and certain areas outside those limits.

WHATCOM COUNTY WATER DISTRICT NO. 10 (the "District") is a water and sewer district formed under Title 57 of the Revised Code of Washington, which provides water and sewer services within its boundaries. Water District 10 is located within an area adjacent to the City of Bellingham. The District currently provides no water service on the north shore of Lake Whatcom, and has no facilities for the delivery of such service in that area.

The City is willing and able to sell treated water to the District through a metered connection at the common boundary between the City and the District on North Shore Drive for a limited service area and under certain terms and conditions.

WHEREFORE, in view of the above recitals and in consideration of the mutual covenants and promises set out below, the parties agree as follows:

1. The City has upgraded certain water transmission and service lines within the city limits in order to provide a constant flow of at least 750 gallons per minute to the District at the point of delivery. The specific lines upgraded by the City are set out in Exhibit A, a copy of which is attached to this agreement and incorporated herein by this reference.

2. The District, at its expense, will install a vault and water meter at an agreed-upon location at or near the point of delivery. The City shall approve the design of the vault and the type and installation of the meter. Upon completion of the installation, the District shall transfer ownership of the vault and meter to the City without charge, and shall also provide the City with legal access to the location of the
vault and the meter. Thereafter, the City shall be the owner of the meter and shall be responsible for all maintenance, repair and replacement of the meter. The District will install, own, maintain, repair and replace as necessary an approved backflow prevention device on the District's side of the water meter.

3. A. Upon transfer of the vault and meter, above, the District shall pay the sum of $35,000 to the City as its share of the cost of upgrading the water transmission lines within the City. After the District has made the payments required by this agreement, the District shall have no further obligation to the City for future improvements or betterments to the lines, regardless of whether those improvements benefit the District directly or indirectly, unless the parties specifically so agree in the future in writing. By making the payments called for in this agreement, the District will not acquire any ownership interest in any portion of the City's water service or delivery system.

B. Should the District construct (or have constructed) a water pumping station having a cost exceeding $35,000 prior to the transfer to the City of the vault and meter referred to in Paragraph 2, above, then the $35,000 payment to the City under this section shall be waived.

4. The District shall pay the City a fee of $300 per connection for each connection made to the District's system on the north shore of Lake Whatcom in the area covered by this agreement. Such payments shall be made within sixty (60) days of the date of actual connection by District customers and the District shall annually provide to the City a listing of such new customers. This $300 fee shall apply to all of the lots within the "Eagle Ridge Plat" and to all additional connections in District 10's North Shore Service Area until the District builds its own reservoir sufficient to allow water delivery at a constant rate throughout a peak day to connections in that service area.

5. The City shall supply water service to the District at the rate of 150 gallons per minute for domestic flow and 750 gallons per minute fire flow at the point of delivery. All water will be supplied at a minimum 26 psi pressure as measured on the City's side of the meter at
North Shore Drive. The District shall pay for all water passing through the meter at the point of delivery at the rate established by the City of Bellingham for service outside the Bellingham corporate city limits. The District shall pay the City promptly when billed for all water passing through the meter.

6. The District agrees it will not sell or resell water for any use other than single-family dwellings on lots of record as of June 10, 1988, without the specific approval of the City of Bellingham.

7. This agreement constitute the entire agreement of the parties and shall not be altered or amended except in writing, signed by an authorized representative of each of the parties.

DATED this 8th day of June, 1989.

WHATCOM COUNTY WATER DISTRICT NO. 10

[Signature]
Erin Ungarn, President

CITY OF BELLINGHAM

[Signature]
[Signature]
Lynne Carpenter, Finance Director
Tim Douglas, Mayor

CERTIFICATION

As Secretary of Whatcom County Water District No. 10, I certify that the above Revised Interlocal Agreement was adopted at a regular meeting of the Commissioners held on the 12th day of May, 1989, at which time a quorum of 3 was present, and was adopted by a vote of 3 FOR, 0 AGAINST, and 0 ABSTENTIONS.

[Signature]
Secretary
Whatcom County Water District No. 10

Approved as to form:
CITY OF BELLINGHAM

[Signature]
City Attorney's Office

0180L - 3
Approved as to form:
WHATCOM COUNTY WATER DISTRICT NO. 10

Harry L. Johnsen
Attorney for Whatcom County Water District No. 10

Departmental Approval:

Director of Public Works
ADDENDUM

WHEREAS, the City of Bellingham, hereinafter referred to as "City" and Water District No. 10 of Whatcom County, hereinafter called "District" have an existing contract for the provision of sewer services effective January 1, 1974 covering the District Lake Whatcom South Shore system, and

WHEREAS, the parties now desire to enter into an agreement covering the District Lake Whatcom North Shore system and replacing the agreement between the parties covering the "Edgewater Lane" are of the District, and

WHEREAS, many of the terms and conditions placed in the January 1, 1974 contract are acceptable to both parties with minor modification, and

WHEREAS, it is the intention of the parties to add certain additional terms to the January 1, 1974 agreement to cover the District Lake Whatcom North Shore system and the sewer service to Edgewater Lane,

NOW, THEREFORE, the parties agree as follows:

1. That all terms of the January 1, 1974 agreement between the parties shall be effective as if part of this agreement and the same are hereby incorporated herein, unless hereby amended.

2. The City agrees to accept a peak flow of one hundred fifty (150) gallons per minute from the District Lake Whatcom North Shore system and Edgewater Lane which is part of that system.
3. The District will pay charges for use of the City's trunk system based on the 150 gallons per minute flow rate or maximum peak flow whichever is the greater, which volume shall be established by meter readings. The District will pay charges for treatment based on the total annual flow as established by meter readings.

4. The City reserves and the District hereby acknowledges the right of the city to require the District to remove the 150 gallon per minute flow from the city's trunk facilities in the event that such facilities ever reach capacity flow. In such eventuality the District agrees that it will build its own sewer trunk to the Whatcom Creek trunk line or enter into a joint arrangement with the City to build such a line.

5. The District agrees to pay a pro-rata share of the costs to provide replacement facilities as needed from the District to the Whatcom Creek trunk.

6. The District agrees to assume all responsibility for the maintenance of Edgewater Lane and the parties agree that the previous agreement covering this area of the District dated the 10th day of October, 1974 is hereby rescinded.

7. A metering station similar to that used for the South Shore system shall be placed at the city limits by the District for the purpose of measuring the flow from the North Shore system.

8. The District must agree to adopt a rate structure for this system and for areas already served, which will meet the requirements of any future grants which may be obtained for treat-
ment or transportation of wastes by the City of Bellingham.

9. The District shall pay a pro-rata share based on flow of the costs to operate and maintain the Martin Street and North Shore pump stations based upon the following formula and upon the basis of the contribution by the District of 150 gallons per minute flow rate:

\[
\frac{\text{Total City pumping costs - Oak Street cost}}{\text{Total number of stations - Oak Street}} = \text{Cost/Pump station}
\]

IN WITNESS WHEREOF, the parties by their signatures below have executed this agreement this 15/8/77 day of August, 1977.

CITY OF BELLINGHAM

[Signature]

Att'est: [Signature] Hoffman
Finance Director

Approved as to form:

[Signature]
Bellingham City Attorney

WATER DISTRICT NO. 1.0

By [Signature]
Chairman of Commissioners

Attest:
Secretary of Board of Commissioners

City of Bellingham
CITY ATTORNEY
210 Latta Street
Bellingham, Washington 98225
Telephone (206) 674 6903
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**Contract / Agreement**
AGREEMENT
CITY OF BELLINGHAM - DEER CREEK WATER ASSOCIATION

THIS AGREEMENT is entered into by and between the City of Bellingham, a municipal corporation of the State of Washington, and Deer Creek Water Association, a private water association incorporated under the laws of the State of Washington,

Recitals

Whereas, the Washington State Department of Transportation ("WSDOT") is widening the Gulde Meridian ("SR539") between the general vicinity of Horton Road and Smith Road in Whatcom County, Washington; and,

Whereas, the City of Bellingham ("City"), as a regional purveyor of water, wants to place a transmission water main in SR539 during the SR539 widening project construction in order to serve future customers and minimize present and future disruption; and,

Whereas, the Deer Creek Water Association ("DCWA") provides water in the area adjacent to the location of the SR539 widening project and owns a water main that requires relocation during the SR 539 improvements; and,

Whereas, in order to facilitate future water service needs in the area along the SR539 widening project, the City wishes to buy and DCWA wishes to sell certain water association assets; and,

Whereas, WSDOT will be providing a certain amount in reimbursement for the costs of relocating water mains because of the SR539 widening project; and,

Whereas, appropriate regional water system planning is a goal of the City, DCWA and the Washington State Department of Health ("DOH"); and,

Whereas, the City, DCWA, DOH and WSDOT have determined that the City's transmission water main should be installed during the SR539 widening project to reduce future disruptions to the public and that the water main should provide service, through an agreement, to DCWA's customers in order to reduce the number of water system purveyors in the area;

NOW, THEREFORE, in consideration of the mutual covenants contained herein, the parties agree as follows:

1. Purchase and Sale of Assets. The City agrees to buy from DCWA and DCWA agrees to sell to the City the following specific assets used in connection with DCWA's provision of water ("Assets"):

   1.1. One water main as further described and shown in Exhibit A, which is attached hereto and incorporated herein by this reference.

   1.2. All easements, licenses, and other authorizations or permissions for the water main described in section 1.1.

   1.3. All plans, specifications, maps, diagrams, or other technical documents relating to the water main described in section 1.1.

2. Purchase Price.

   2.1. The parties recognize that WSDOT will be providing reimbursement funding associated with the SR 539 widening project for costs to relocate the existing water facilities that are affected by the project, which include the Assets ("Reimbursement Amount"). The parties agree that the City, as
owner of the Assets, is the eligible party to receive the entire WSDOT Reimbursement Amount.

2.2. The City shall pay DCWA the sum of $459,598.00 for the Assets. This represents approximately 50% of the Reimbursement Amount as currently estimated on the date of this Agreement's execution, which is $919,190.06. DCWA agrees that the City shall receive any increase in the actual Reimbursement Amount as calculated at the time of construction.

2.3. The DCWA shall pay any taxes that may be owing as a result of the transaction contemplated by this Agreement.

3. Closing.

3.1. This transaction shall close on a date mutually agreed to by the parties but, in no event later than June 3, 2005. The City shall be entitled to sole possession of the Assets upon closing, subject to the provisions of paragraph 3.4 below.

3.2. At the time of closing, DCWA shall deliver to the City:

3.2.1. A notarized Bill of Sale covering assets described in paragraph 1 above.

3.2.2. An assignment of all DCWA easement rights, both recorded and prescriptive.

3.2.3. All plans, specifications, maps, diagrams, or other technical documents relating to the water main.

3.3. At the time of closing, the City shall deliver to DCWA:

3.3.1. Full payment as provided in section 2.2.

3.4. Following closing and until such time as the City’s 16 inch water main is completed and operational the parties agree as follows:

3.4.1. DCWA agrees to maintain and operate at its sole expense the 10 inch water main purchased by the City until such time as the 16 inch water main is constructed and put into service.

3.4.2. DCWA will operate the said 10 inch water main as follows:

3.4.2.1. DCWA will furnish all water from DCWA sources. The 10 inch water main will not be connected to the City for service, other than an emergency intertie unless a separate agreement is reached between DCWA and the City per paragraph 4.1.2 below. An emergency intertie may be constructed only upon joint approval of both parties.

3.4.2.2. DCWA will retain their existing members and service connections and may add additional members and service connections to said 10 inch water main at DCWA’s discretion.

3.4.2.3. DCWA agrees to defend, indemnify and hold harmless the City, its officers and employees from any and all action other than the City’s negligence arising from DCWA’s operation, maintenance and use of the 10 inch water main.
3.4.2.4. The City will not charge DCWA for use of the 10 inch water main.

3.4.2.5. When the City’s 15 inch water main is completed and placed in service DCWA will transfer their members’ service connections to the City’s 16 inch water main and will cease to have any interest in or responsibility for the 10 inch water main. The transfer of connections will be at no cost to DCWA and will be performed by the City or the City’s designated construction contractor.

4. Responsibilities of the Parties.

4.1. The City’s responsibilities shall be:

4.1.1. The City, in its discretion and at its cost, shall plan, design, finance and construct a 16-inch diameter water main along SR539 from Horton Road to Smith Road including all appurtenances necessary to provide water service and fire flow to all property located within the “Area to be Transferred” as depicted in Figure 1, which is attached hereto and incorporated herein by this reference (“City Water main Project”). This shall include connection to the DCWA water main on Larson Road, west of Guide Marktlan.

4.1.2. The City Water main Project design shall include and accommodate a future metered emergency inter-tie between the City and DCWA facilities in the vicinity of SR539 and Smith Road; however, the parties agree to negotiate the specific terms and conditions of this inter-tie in good faith under a separate agreement and that this separate agreement shall be completed and signed no later than December 31, 2005. If the parties cannot reach agreement by that date, they agree to retain a mutually agreeable arbiter to resolve the matter. The parties further agree to split the costs of such arbitration evenly and to be bound by the arbiter’s decision.

4.1.3. The City Water main Project shall be coordinated with the WSDOT project schedule.

4.2. The DCWA’s responsibilities shall be:

4.2.1. Purchase water from the City at a rate as provided for in the Bellingham Municipal Code (“BMC”) and to continue to serve their existing members in the “Area to be Transferred”.

4.2.2. Ensure that all existing DCWA Members have individual service lines connected to the City water main. The City will not assess any additional charges, fees or connection costs to existing DCWA customers. For purposes of this section 4.2, “existing DCWA customers” shall mean those DCWA Members in the “Area to be Transferred” as of the date the City Water main Project is operational.

4.2.3. Conduct water meter reading for all existing DCWA customers and provide a combined monthly consumption amount of all existing DCWA customers to the City for billings. DCWA shall be billed bi-monthly based upon the most current established rates for single family customers as defined by the BMC.

4.3. In the event DCWA should add additional members or service connections in the “Area to be Transferred” after the 1C inch water main is operational and such members take water directly from the City, each
additional member or service connection shall pay the City a System
Development Charge based upon the most current rate for Single Family
Residential metered customers or Commercial metered customers
outside the City limits as defined by the BMC at the time of connection.

4.4. DCWA represents and warrants (1) that it has good and marketable title
to the Assets free and clear of any and all mortgages, liens, pledges,
charges or encumbrances of any kind, nature, and description; and, (2)
that the Assets are in good operating condition in all material respects,
reasonable wear and tear excepted considering the age of the Assets or
as otherwise disclosed in writing to the City at least thirty (30) days before
Closing ("Disclosure"). The Disclosure shall list any issues regarding the
Asset's condition or liabilities arising therefrom including, by way of
example and not limitation, known leaks, mechanical failures, or claims of
damage and shall be a condition precedent to Closing. After receiving
the Disclosure, the City shall have fifteen (15) days to accept the
disclosed conditions or to terminate this Agreement, in which case neither
party will have any further rights or obligations hereunder. If the City does
not respond within fifteen (15) days, the City shall be deemed to have
accepted the disclosed conditions.

5. Kline Road DCWA Customers. In the event DCWA should desire water
service from the City to serve existing customers along and around the Kline
Road (see Figure 2 which is attached hereto and incorporated herein by this
reference), DCWA agrees that it will install a master meter and pay the City a
system development fee in the amount of $40,384 at the time of installation.
The Association will pay, in a bi-monthly billing cycle, all charges and fees for
receiving such water through the master meter at a rate set through the BMC.

6. Declared Service Area. The City and DCWA agree to having an overlapped
and shared declared service area covering the Area to be Transferred and
will coordinate their service areas in accordance with the Whatcom County
Coordinated Water Service Plan provisions.

7. Transfer of Service Responsibilities. Responsibility for new customers after
the new 16 inch water main becomes operational by the City shall be as
follows:

7.1. At such time as the City is willing to accept new customers within the
Area to be Transferred, and so notifies DCWA in writing, existing DCWA
Members will be allowed the option of discontinuing their Membership in
DCWA and becoming City customers subject to paying the City a System
Development Charge based upon the most current rate for Single Family
Residential metered customers or Commercial metered customers
outside the City limits as defined by the BMC at the time of connection.

7.2. DCWA will cease offering new Memberships in the Area to be
Transferred at such time as the City is willing to accept new customers in
said area.

8. Service Disruption.

8.1. The City agrees to notify DCWA and affected DCWA Members at least 24
hours in advance of a planned temporary curtailment or other disruption
of water service to DCWA or its members. DCWA will provide the City
with a current address list of Members in the Area to be Transferred.

8.2. The City shall use reasonable diligence to provide regular and
uninterrupted service to DCWA. The City shall not be liable for any
damages, breach of contract, or otherwise, for failure, suspension or
diminution of service occasioned by or in consequence of any cause
beyond its control, including but not limited to acts of God, or of the public
enemy, fires, floods, earthquakes, or other catastrophes, strikes, or failure
of breakdown of transmission facilities.

9. Notices. All notices, demands, requests, consents and approvals which may,
or are required to, be given by any party to any other party hereunder, shall
be in writing and shall be deemed to have been duly given if delivered
personally, sent by facsimile, sent by a nationally recognized overnight
delivery service, or if mailed or deposited in the United States mail and sent
by registered or certified mail, return receipt requested, postage prepaid to:

City: City of Bellingham Public Works Department
      Attn: Geoff Smyth
      2221 Pacific Street
      Bellingham, WA 98226
      (360) 676-7799 (Fax)

DCWA: Deer Creek Water Association
       Attn: Tom Schoen
       P.O. Box 1010
       Lynden, WA 98264
       (360) 354-0936

or to such other address as the foregoing parties hereto may from time-to-
time designate in writing and deliver in a like manner. All notices shall be
deemed complete upon actual receipt or refusal to accept delivery. Facsimile
transmission of any signed original document, and retransmission of any
signed facsimile transmission shall be the same as delivery of an original
document.


10.1. Amendment. No modification, termination or amendment of this
      Agreement may be made except by written agreement signed by
      authorized representatives of the parties.

10.2. Waiver. No failure by any of the parties to insist upon the strict
       performance of any covenant, duty, agreement, or condition of this
       Agreement or to exercise any right or remedy consequent upon a breach
       thereof shall constitute a waiver of any such breach or any other
       covenant, agreement, term or condition. No waiver shall affect or alter this
       Agreement, and each and every covenant, agreement, term and condition of
       this Agreement shall continue in full force and effect with respect to any
       other than existing or subsequent breach thereof.

10.3. Captions. The captions of this Agreement are for convenience and
       reference only and in no way define, limit, or describe the scope or intent of
       this Agreement.

10.4. Severability. In case any one or more of the provisions contained
       in this Agreement shall for any reason be held to be invalid, illegal or
       unenforceable in any respect, such invalidity, illegality or unenforceability
       shall not affect any other provision hereof, and this Agreement shall be
       construed as if such invalid, illegal or unenforceable provision had never
       been contained herein.

10.5. Further Required Action. At any time before, on or after closing,
       the parties agree to execute, acknowledge and deliver any further
       conveyances, deeds, assurances, instruments or other documents as
       may reasonably be required by the other party to effectuate the
       transaction contemplated in this Agreement.
10.6. **Authority to Enter Agreement.** The parties acknowledge that the individuals signing this Agreement below are authorized representatives of the parties and are authorized to bind their respective parties to this Agreement. At or prior to closing, DCWA shall provide the City with an appropriate corporate resolution authorizing DCWA to execute this Agreement and designating corporate officers to execute said Agreement on behalf of DCWA.

10.7. **Binding Agreement.** This Agreement shall be binding upon and inure to the benefit of the parties and their respective successors and assigns and shall not benefit any third party not a party hereto. Neither party may assign or transfer its rights or obligations hereunder without the prior written consent of the other party.

10.8. **Construction of Agreement.** This Agreement is the result of good faith negotiations between the parties and their respective representatives. This Agreement shall be given a fair and reasonable construction in accordance with the intention of the parties and without regard to the identity of the party drafting the Agreement or any provision hereof.

10.9. **Entire Agreement.** The entire agreement between the parties hereto is contained in this Agreement and the exhibits hereto; and this Agreement supersedes all of their previous understandings and agreements, written and oral, with respect to this transaction. In the event of any dispute arising out of this Agreement, the prevailing party shall be entitled to its reasonable attorney's fees.

EXECUTED this 3rd day of June, 2005, for Dear Creek Water Association:

Name: [Signature]
Title: President

EXECUTED this 2nd day of June, 2005, for the City of Bellingham:

[Signature]
Mark Ashmunday, Mayor

Departmental Approval:

[Signature]
Finance Director

[Signature]
Public Works Director

Approved as to form:

[Signature]
Office of the City Attorney
EXHIBIT "A"
AGREEMENT CITY OF BELLINGHAM - DEER CREEK WATER ASSOCIATION

This Exhibit "A" consists of this cover page, a list of the Assets being sold, a set of 3 sheets of engineering drawings depicting the assets being sold, a list of signed utility easements being transferred, copies of the 29 signed easements and a set of 3 sheets of engineering drawings with colored markings indicating the properties with signed easements and the properties with prescriptive easements.

NOTE: DRAWINGS
AND 29 SIGNS
EASEMENTS ARE
MAINTAINED AT
PUBLIC WELLS.

Exhibit A
Exhibit "A"
List of Facilities on SR 538 South of Smith Road

8,428 linear feet of 10 Inch diameter Water Distribution Main.
7 Fire Hydrants
Associated valves, blowoffs and appurtenances.
ASSIGNMENT OF EASEMENT RIGHTS

FOR VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, DEER CREEK WATER ASSOCIATION hereby grants, assigns and transfers unto the City of Bellingham, a municipal corporation, all of its right, title and interest in the easements described in the attached Exhibit "A". The Assignment contained herein is intended as absolute and constitutes an assignment of all of the GRANTOR'S recorded easement interest together with any prescriptive easement interest to GRANTOR.

DATED this 28th day of June, 2005

DEER CREEK WATER ASSOCIATION

BY: Ted Fairhander, President

STATE OF WASHINGTON

COUNTY OF WHATCOM

On this day personally appeared before me, Ted Fairhander, to me known to be the President of DEER CREEK WATER ASSOCIATION, a Washington corporation, described in and who executed the within and foregoing instrument, and acknowledged that he signed the same as his free and voluntary act and deed, for the uses and purposes mentioned in the instrument.

DATED this 3rd day of June, 2005.

KERRY L. MESSER
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES SEPTEMBER 30, 2007

Kerry L. Messer
NOTARY PUBLIC in and for the
State of Washington
EXHIBIT "A"
ASSIGNMENT OF EASEMENT RIGHTS

This Exhibit "A" consists of this cover page, a list of signed utility easements being transferred, copies of the 29 signed easements and a set of 3 sheets of engineering drawings with colored markings indicating the properties with signed easements and the properties with prescriptive easements.
<table>
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BILL OF SALE

KNOW ALL MEN BY THESE PRESENTS, that DEER CREEK WATER ASSOCIATION, of Whatcom County, Washington, for and in consideration of the sum of Ten Dollars ($10.00) lawful money of the United States, and other valuable consideration the receipt whereof is hereby acknowledged, do by these presents grant, bargain, sell and convey unto THE CITY OF BELLINGHAM, the following assets.

SEE EXHIBIT “A” ATTACHED

The Seller herein covenants, agrees and warrants that it is the owner of said property and that the same is free from all liens and encumbrances and that it will defend the sale of said property hereby made, against all and every person or persons whomsoever, lawfully claiming the same or any part thereof.

EXECUTED at Bellingham, Washington, this 3rd day of June, 2005.

DEER CREEK WATER ASSOCIATION

BY: Ted Fahnlander

STATE OF WASHINGTON
) ss.
COUNTY OF WHATCOM

On this day personally appeared before me, Ted Fahnlander, to me known to be the President of DEER CREEK WATER ASSOCIATION, a Washington corporation, described in and who executed the within and foregoing instrument, and acknowledged that he signed the same as his free and voluntary act and deed, for the uses and purposes mentioned in the instrument.

DATED this 3rd day of June, 2005.

KERRY L. MESSER
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES SEPTEMBER 30, 2007

Kerry Messer
NOTARY PUBLIC in and for the State of Washington
My Commission Expires: 9-30-07
EXHIBIT "A"
BILL OF SALE

This Exhibit "A" consists of this cover page, a list of the Assets being sold and a set of 3 sheets of engineering drawings depicting the assets being sold.
Exhibit “A”

List of Facilities on SR 539 South of Smith Road

8,428 linear feet of 18 inch diameter Water Distribution Main.
7 Fire Hydrants
Associated valves, blowoffs and appurtenances.
**CITY OF BELLINGHAM**

**CONTRACT #**

2005-0231A

---

**Contract Authorization Routing**

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<td>Dept.</td>
<td>Public Works</td>
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**Contracting Party:** Deer Creek Water Association

**Original Cost:** 2005-0231

**Name/Project #:**

**Termination Date:**

**City Project Mgr.:** Geoff Smyth

**Certificate of insurance:**

- [ ] Attached
- [ ] Waived
- [ ] N/A

**Is Notary required?:** No

**P.O. Required:** No

**Maximum Payable:** [ ]

**Exhibits Attached:**

- [ ] Yes
- [ ] No

**Special Instructions:**

PLEASE NOTIFY LES BECKAUZ AND GEOFF SYMTH WHEN COMPLETED - THANKS!

---

**Approval Cycle Settings**

1. **Approval conditions:**
   - 100% approval

2. **Routing method:**
   - Send (one at a time)

3. **Allow Approver comments:**
   - [ ] Yes
   - [ ] No

4. **Automatically Delegate to Assistant:**
   - [ ] Yes
   - [ ] No

5. **Automatically Skip Approvers:**
   - [ ] Yes
   - [ ] No

---

**Notification**

- [ ]

---

**Approval Cycle by Wodiflo Systems Inc.**

11/2005

---

**Access**

- [ ]
MODIFICATION TO AGREEMENT
DEER CREEK WATER ASSOCIATION AND
THE CITY OF BELLINGHAM

The CITY OF BELLINGHAM, a first-class municipal corporation of the State of Washington (hereinafter the "City") and DEER CREEK WATER ASSOCIATION, a private water association incorporated under the laws of the State of Washington (hereinafter "DCWA"), in consideration of the mutual covenants hereinafter agree as follows:

I. EXISTING AGREEMENT MODIFIED: The City and DCWA previously entered into an Agreement, which is expressly incorporated herein and made a part hereof, in June 2005 whereby the City purchased DCWA assets (hereinafter the "Agreement"). The parties hereby expressly modify that Agreement as delineated herein.

II. MODIFICATIONS TO EXISTING AGREEMENT: The Agreement is modified in the following respects:

2.1 Section 4.1.2 of the Agreement is hereby modified such that the emergency intertie agreement contemplated thereunder shall be required to be completed by January 31, 2006 instead of December 31, 2005.

III. TERMS AND CONDITIONS OF EXISTING AGREEMENT REMAIN THE SAME: The parties agree that, except as specifically modified hereinabove, the terms and conditions of the Agreement shall continue in full force and effect.

EXECUTED this 30th day of December, 2005, for DCWA:

[Signature]
Name: Thomas R. Schoen
Title: Business Manager, Secretary & Treasurer

EXECUTED this 30th day of December, 2005, for the City:

[Signature]
Mark Ashland, Mayor
Departmental Approval:

Attest:

[Signature]
Richard McPherson
Department Head

Approved as to Form:

[Signature]
Office of the City Attorney

DCWA - City Modification (1)

City of Bellingham
CITY ATTORNEY
210 Lotus Street
Bellingham, Washington 98225
Telephone (360) 676-6903
# Contract Authorization Routing

**CITY OF BELLINGHAM**

**CONTRACT #:** 2006-0035

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<td>Name/Project #</td>
<td>Emergency Intake Agreement, City of Bellingham</td>
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<td>If Contract is Extended, new Termination Date</td>
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<tr>
<td>City Project Mgr.</td>
<td>Jeff Smyth</td>
</tr>
<tr>
<td>Certificate of Insurance</td>
<td>Waived</td>
</tr>
<tr>
<td>In Notary required?</td>
<td>No</td>
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<td>P.O. Required?</td>
<td>Yes</td>
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**Contract eRouter**

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<td>Nick L. Parker</td>
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**Approval Cycle Settings**

- Approval conditions: 100% approval
- Routing method: Serial (one at a time)
- Approvers: GpRouter
- Allow Approver comments: Yes
- Automatically Skip Approver: Yes
- Days until skipped/delegated: 0 Wednesdays

**Notification Access**

Approval Cycle by VariSetto Systems Inc.
EMERGENCY INTERIE AGREEMENT
CITY OF BELLINGHAM - DEER CREEK WATER ASSOCIATION

THIS AGREEMENT is entered into by and between the City of Bellingham, a municipal corporation of the State of Washington ("City"), and Deer Creek Water Association, a private water association incorporated under the laws of the State of Washington ("DCWA").

Recitals

Whereas, the City and DCWA are both public water systems that provide water in their respective regions; and,  
Whereas, the City and DCWA entered into a separate agreement whereby the City purchased certain DCWA assets ("Asset Purchase Agreement"); and,  
Whereas, the City and DCWA agreed in the Asset Purchase Agreement to negotiate an emergency intertie between the City and DCWA facilities; and,  
Whereas, this Emergency Intertie Agreement ("Agreement") details the terms and conditions of the emergency intertie between the parties' facilities as required in the Asset Purchase Agreement; and,  
NOW, THEREFORE, in consideration of the mutual covenants contained herein, the parties agree as follows:

1. Intent.

1.1 The parties intend for this Agreement to satisfy the requirements of the following:

1.1.1 Section 4.1.2 of the Asset Purchase Agreement; and,  
1.1.2 RCW 90.03.390 and WAC 246-280-132 regarding emergency interties.

1.2 The parties intend for the emergency intertie between their two water systems, as contemplated herein, to be limited to the conditions contained in this Agreement, namely to an emergency intertie to permit the exchange of water during short-term emergency situations.

1.3 The City and DCWA covenant and represent that they are public water systems as defined by state law, including WAC Chapter 246-290.

2. Definitions. The parties agree that, for the purposes of this Agreement, the following terms shall mean as indicated herein:

2.1 "Emergency" shall mean an unforeseen event that causes damage or disruption to normal DCWA operations that requires immediate action to protect the public health and safety. By way of example and not limitation, emergency shall include earthquake, fire, flood, building collapse, well contamination, etc.

Emergency Intertie Agreement - 1
2.2 "Short term" or "Temporary" shall mean a limited time period of short duration not to exceed sixty (60) calendar days.

3. Authority. The parties are authorized under the laws of the State of Washington to enter into this Agreement, including under RCW 90.63.390 and WAC 246-290-132.


4.1 Construction. The emergency intertie contemplated by this Agreement shall be constructed by the Washington State Department of Transportation ("DOT") contractor during the DOT SR 539 road widening project. The parties will work cooperatively and in good faith with each other and DOT during the design and construction of the emergency intertie.

4.2 Location. The emergency intertie shall be located at the southwest corner of Smith Road and SR 539 on the City's water line.

4.3 Costs, Ownership, and Maintenance.

4.3.1 DCWA shall bear the full costs and expenses of the emergency intertie's construction and installation. The City shall pay for the emergency intertie's design.

4.3.2 Upon the completion of the emergency intertie's construction and installation, the City shall inspect it and acquires ownership of it, provided it meets City standards as determined in the City's discretion.

4.3.3 After acceptance by the City, the City shall be responsible for the emergency intertie's maintenance and repair. DCWA, agrees to allow the City access to its facilities as may be necessary to properly maintain and repair the emergency intertie upon reasonable notice and at reasonable times.

4.3.4 DCWA shall be authorized to open the emergency intertie contemplated hereunder pursuant to the terms and conditions contained herein.

4.3.5 DCWA shall pay the water rate existing at the time any water is used by DCWA through the emergency intertie. DCWA shall be responsible for providing the City with a good faith and reasonable estimate of their total water consumption for the period of withdrawal, including providing the City with a reasonable figure for billing purposes. This estimate shall be provided after each use of the emergency intertie has ended.

4.4 Use.

4.4.1 The parties intend that DCWA shall only be authorized to use the emergency intertie when required by an emergency situation and only on a short term or temporary basis. If a DCWA emergency requires use of the emergency intertie for longer than a short term or temporary basis, the parties shall enter into a separate written agreement.
4.4.2 During DCWA’s use of the emergency intertie, DCWA agrees to correspondingly reduce its water usage if such is necessary to remain within the limits of its Department of Ecology authorized water rights limits.

5. **Duration.** This Agreement shall begin after the City accepts the emergency intertie and water is accessible through the waterline feeding the emergency intertie. This Agreement shall continue until terminated in writing pursuant to the terms contained herein.

6. **Termination.**

   6.1 This Agreement may not be terminated except for cause until five (5) years has elapsed from the date the City accepts ownership of the emergency intertie pursuant to section 4.3.2. The intent of this five (5) year provision is to allow DCWA to realize a reasonable return on its investment of constructing and installing the emergency intertie. However, at the time this Agreement is being executed, the final construction and installation costs are unknown to the parties. Therefore, if the foregoing five (5) year period does not allow DCWA the ability to realize a reasonable return on its investment as demonstrated by a reasonable depreciation schedule once the construction and installation costs are known, the parties may request negotiations on this sole provision to establish a time period that better reflects a reasonable rate of return. This five (5) year time period may be increased or decreased.

   6.2 After the five (5) year period described in section 6.1 above (or such other period as may be agreed upon by the parties hereunder), either party may terminate this Agreement for any reason upon 60 days written notice to the other. Upon termination, the City shall render the emergency intertie unserviceable for further use by DCWA. The City may use any commercially reasonable method to render the emergency intertie unserviceable and, thereafter, will retain ownership of the emergency intertie. Any costs associated with rendering the emergency intertie shall be borne equally by the parties.

7. **Notices.** All notices, demands, requests, consents and approvals which may, or are required to, be given by any party to any other party hereunder, shall be in writing and shall be deemed to have been duly given if delivered personally, sent by facsimile, sent by a nationally recognized overnight delivery service, or if mailed or deposited in the United States mail and sent by registered or certified mail, return receipt requested, postage prepaid to:

   **City:**
   City of Bellingham Public Works Department
   Attn: Geoff Smyth
   2221 Pacific Street
   Bellingham, WA 98226
   (360) 676-7799 (Fax)

   **DCWA:**
   Deer Creek Water Association
   Attn: Tom Schoen
   P.O. Box 1010
   Lynden, WA 98264
   (360) 354-0036

Emergency Intertie Agreement - 3

8.1 Amendment. No modification, termination or amendment of this Agreement may be made except by written agreement signed by authorized representatives of the parties.

8.2 Waiver. No failure by any of the parties to insist upon the strict performance of any covenant, duty, agreement, or condition of this Agreement or to exercise any right or remedy consequent upon a breach thereof shall constitute a waiver of any such breach or any other covenant, agreement, term or condition. No waiver shall affect or alter this Agreement, and each and every covenant, agreement, term and condition of this Agreement shall continue in full force and effect with respect to any other than existing or subsequent breach thereof.

8.3 Captions. The captions of this Agreement are for convenience and reference only and in no way define, limit, or describe the scope or intent of this Agreement.

8.4 Severability. In case any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision hereof, and this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

8.5 Further Required Action. At any time before, on or after this Agreement's signing, the parties agree to execute, acknowledge and deliver any further conveyances, deeds, assurances, instruments or other documents as may reasonably be required by the other party to effectuate the transaction contemplated in this Agreement.

8.6 Authority to Enter Agreement. The parties acknowledge that the individuals signing this Agreement below are authorized representatives of the parties and are authorized to bind their respective parties to this Agreement.

8.7 Binding Agreement. This Agreement shall be binding upon and inure to the benefit of the parties and their respective successors only and shall not benefit any third party not a party hereto. Neither party may assign or transfer its rights or obligations hereunder without the prior written consent of the other party.

8.8 Construction of Agreement. This Agreement is the result of good faith negotiations between the parties and their respective representatives. This Agreement shall be given a fair and reasonable construction in accordance with the intention of the parties and without regard to the identity of the party drafting the Agreement or any provision hereof.

Emergency Interline Agreement - 4
8.9 **Entire Agreement.** The entire agreement between the parties hereto is contained in this Agreement and the exhibits hereto, and this Agreement supersedes all of their previous understandings and agreements, written and oral, with respect to this transaction. In the event of any dispute arising out of this Agreement, the prevailing party shall be entitled to its reasonable attorney's fees.

EXECUTED this 20th day of **January**, 2006, for Deer Creek Water Association:

Name: Thomas R. Schen
Title: Secretary/Treasurer/Business Manager

EXECUTED this 20th day of **January**, 2006, for the City of Bellingham:

Attest:
Finance Director

Departmental Approval:
Public Works Director

Approved as to form:
Office of the City Attorney
APPENDIX E

Cross-Connection Control
CROSS-CONNECTION CONTROL PROGRAM

CITY OF BELLINGHAM

GEOFF SMYTH
SUPERINTENDENT OF OPERATIONS

MARTY GRAY
WATER STANDARDS SUPERVISOR - DISTRIBUTION

CROSS-CONNECTION CONTROL SPECIALISTS

JUNE 20, 2009
Table of Contents / Article Section

1.00 Purpose

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Article 1.00 Purpose
This document outlines the Cross-Connection Control Program implemented by the City of Bellingham that has the two-fold purpose of protecting the City’s potable water supply against actual or potential contamination through cross-connection and backflow and eliminating existing, unknown Cross-connections through a Citywide Hazard Assessment program.

Article 2.00 Scope
The City's Cross-Connection Control Program contains the following elements to ensure compliance with the Washington Administrative Code 246-290-490 and Bellingham Municipal Code BMC 15.08.260.

- Operating instructions for implementing the Cross-Connection Control Program.
- Performance of surveys to identify water user locations where cross-connections are likely to occur and the degree of hazard.
- Installation of backflow protection by the water customer at the point of hazard or connection.
- Training and experience of personnel delegated to implement the cross connection control program.
- Approved test procedures for testing backflow prevention assemblies to ensure backflow protection.
- Maintenance of records of locations, tests, and repair or replacement of backflow prevention assemblies.

Article 3.00 Administration and Authority
The Water Utility administers the City of Bellingham’s Cross-Connection Control Program under the direction of the Water Utility Supervisor – Distribution and the city of Bellingham’s Superintendent of Operations.

These positions have the formal oversight of the program under the direction of the Washington State Department of Health. The Cross-Connection Control Program Specialist is responsible for the day-to-day management of the program. The City of Bellingham Building Services division and Fire Department will work with the Water Utility to ensure that appropriate backflow assemblies are installed on all new construction projects and tenant improvements.

The authority for the Cross-Connection Control Program is with the:

- Federal Safe Drinking Water Act Amendments of 1996
- Washington State Department of Health WAC 246-290-490
- State of Washington Uniform Plumbing Code WAC 51-56
- Plumbing Code amendments WAC 51-57
- City of Bellingham Municipal Code BMC 15.08.260
- City of Bellingham Uniform Plumbing Municipal Code BMC 17.40
Article 3.50 Responsibility
The City has the responsibility to prevent water from unapproved sources, any other substances, contamination, or pollution from entering the City's water system. Such responsibility begins at the point of origin of the City's water supply, and includes adequate treatment facilities, water mains, and appurtenances ending at the point of connection of the customer’s water service. The City’s Water Utility will insure adequate backflow and back-siphonage protection is maintained on the customer’s water systems directly connected to the City’s water distribution system. The City will not be responsible for any loss or damage directly or indirectly resulting from, or caused by any improper or negligent installation, operation, use, repair, or maintenance of, or interfering with, any approved backflow prevention assembly, required by this program, by any customer or any other person. The customer will bear all costs for the installation of pumps or renovation of existing customer piping, because of any decreases in line pressure attributed to the upgrading of existing backflow prevention assemblies or the installation of approved backflow prevention assemblies. The City will not be held responsible for any losses or damages incurred by the consumer as a result of upgrading existing backflow prevention assemblies or the installation of approved backflow prevention assemblies.

Article 4.00 Definitions
The following definitions describe those terms and phrases that are pertinent to the City of Bellingham’s Cross-Connection Control Program.

4.02 Approved Backflow Prevention Assemblies
Assemblies that have passed laboratory and field evaluation tests performed by a recognized testing organization, which has demonstrated their competency to perform such tests, to the Washington State Department of Health. The Department of Health publishes a list of the assemblies.

4.03 Approved Water Supply
A water source that has been approved by the Washington State Department of Health for domestic use and designated as such in a domestic water supply permit.

4.04 Auxiliary Water Supply
Any water supply on or available to, a premise in addition to the City's approved potable water supply. An auxiliary supply may be a well, pond, creek, rainwater catchment system, etc. The term equipped means that appurtenances such as inactive wells, pumps, power supply, intakes, suction lines, pipelines, connection fittings, or storage tanks are in place and readily available for use.

4.05 AWWA
American Water Works Association

4.06 Backflow
A flow condition caused by a differential in pressure that causes the flow of water or other liquid, gases, mixtures or substances to flow back into the water distribution system of a potable supply from any source or sources other than an approved water supply source. Back siphonage is one cause of backflow and is created by a negative or reduced pressure in the water distribution system. Backpressure may occur when the potable supply piping is connected to a system or fixture that exceeds the operating pressure of the supply piping. This higher pressure can be caused by a booster pump, elevated storage, fire suppression equipment, or high rise buildings.

4.07 Certified Tester
A person who has proven their competency in testing, repair, and making test reports on approved backflow prevention assemblies to the satisfaction of the City Water Standards Supervisor - Distribution. Individuals shall be certified through the Washington State Department of Health.
4.08 City
City of Bellingham.

4.09 Contamination
Degradation of the quality of the potable water by any foreign substance which creates a hazard to the public health or which may impair the usefulness or quality of the water.

4.10 Cross-Connection
The term as used in this document means any unprotected actual or potential connection between a potable water system used to supply water for drinking purposes and any source or system containing unapproved water or a substance that is not or cannot be approved as safe, wholesome, and potable and that is possible to enter the water system by backflow. By-pass arrangements, jumper connections, removable sections, swivel or changeover assemblies, or other assemblies through which backflow could occur shall be considered to be cross-connections.

4.11 Cross-Connection Control Program Specialist
A person certified as a Cross Connection Control Program Specialist by the Washington State Department of Health.

4.12 Critical Services
Water services that cannot be shut off, even for a few moments.

4.13 Customer
The owner or operator of a business or residential property.

4.14 Degree of Hazard
Shall be determined by a Cross-connection Control Specialist from an inspection of conditions upon the customer or water users premises and are classified as either a pollution (non-health), contamination (health) or on the Washington State Department of Health WAC 246-290-490 Table 9.

4.15 Department
The Washington State Department of Health.

4.16 Health Hazard
An actual or potential threat of contamination of a physical or toxic nature to the City of Bellingham’s water distribution system.

4.17 Irrigation system
Use of the public water system for landscape irrigation containing piping, sprinkler heads and control valves or any irrigation system into which fertilizers, herbicides, or pesticides are, or can be pumped or injected.

4.18 Person
An individual, corporation, company, association, partnership, municipality, public utility, or other public body or institution.

4.19 Point of Connection
The downstream point of the water service where the City’s responsibility and liability stops. Also known as the point where the City no longer controls the potable quality of the water.

4.20 Point of Use
The connection with in the users plumbing system where an actual or potential cross connection may exist.
4.21 Pollution
Impairment of water quality to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.

4.22 Potable Water
Any water which, according to the Washington State Department of Health regulations, is safe for human consumption.

4.23 Premises
All areas on a customer’s property that receive service or have the potential to receive service by the City water distribution system.

4.24 Public Water System
A water distribution system that provides for the piping of water to the public for human consumption that has five or more service connections or regularly serves an average of 25 individuals daily at least 60 days out of the year.

4.25 Reclaimed Water
The term "reclaimed water" means a wastewater which, as a result of treatment, is suitable for uses other than potable use.

4.26 Service Connection
Piping, curb stop, meter box, and meter used to convey water service from a City water distribution main to the customer's property line or premises.

4.27 WAC 246-290-490
Washington State Administrative Code, 246-290-490 Cross connection control

4.28 USC Foundation
The University of Southern California Foundation for Cross-Connection Control and Hydraulic Research

4.29 Water Purveyor
The entity that owns or operates the approved water supply system. As cited in this document shall mean the City of Bellingham.

4.30 Water User
Any person or company obtaining water from the City of Bellingham's water distribution system and related appurtenances.
Article 5.00 Operating Instructions for Implementing the Cross-Connection Control Program

5.10 New Construction and Improvement Construction
All applications for new water service, or modification to premises with existing water service(s) are processed through the City’s Building Services Division Development Section. Based upon the information submitted on the application, the following City Cross-Connection Control Program requirements will be enforced on all new construction:

- **Air Gap**
  Severe health hazard

- **Reduced Pressure Detector Assembly (RPDA)**
  Fire sprinkler system with chemical addition

- **Double Check Detector Assembly (DCDA)**
  Commercial fire sprinkler system
  Residential fire sprinkler systems, two inch and larger in size

- **Reduced Pressure – Backflow Assembly (RPBA)**
  Premises isolation for high health hazards
  High health hazards, point of use

- **Double Check Valve Assembly (DCVA)**
  Premises isolation for low Health Hazards
  Residential fire sprinkler systems, none required if connected to water closet
  Irrigation systems
  Low health hazards, point of use

- **Pressure Vacuum Breaker (PVB) Spill Resistant Vacuum Breaker (SVBA)**
  Low health hazard, point of use

Improvement construction applications that are either commercial in nature, or propose to change on-site historical water uses will require an on-site hazard assessment performed by the City’s Cross Connection Control Program Specialist prior to completion of the permitted work. After the inspection, if it is determined that a backflow prevention assembly or a correction to the installation of an assembly is required, a correction notice will be issued. This will include a list of deficiencies along with the City’s Construction Standard for the installation of the required backflow prevention assembly and a list of City approved certified backflow prevention assembly testers will be provided to the customer.

5.11 Hazard Assessment
Through the process of performing surveys to identify water user locations where cross connections are likely to occur, if it is determined that an actual or potential cross connection or backflow condition is present in an existing facility, the installation of an approved backflow prevention assembly commensurate with the actual or potential hazard will be required. Upon written notification, the customer shall install, within a prescribed period, an approved assembly or assemblies at their own expense. Failure, refusal, or inability on the part of the customer to install the assembly or assemblies within this prescribed time period shall result in the termination of water service to the premises until such time the assembly or assemblies is/are properly installed and tested.

In the event that an existing backflow prevention assembly already installed does not comply with the current installation requirements or meet the appropriate level of protection as required by the Cross-Connection Control Program, then the Water Utility Supervisor - Distribution, shall require the assembly be changed to one that is approved and commensurate with the degree of hazard as required by the policy. A letter of confirmation will be sent to the affected customer informing them of their responsibility to correct, install, or upgrade an existing backflow prevention assembly to resolve an actual or potential backflow or cross-connection condition.
5.12 Conditions Requiring a Backflow Prevention Assembly
An approved backflow prevention assembly shall be installed wherever the following conditions exist:

- In the case of premises where water uses include those listed on the WAC 246-290-490 Table 9
  Agricultural (farms and dairies)
  Beverage bottling plants
  Car washes
  Chemical plants
  Commercial laundries and dry cleaners
  Premises where both reclaimed water and potable water are provided
  Film processing facilities
  Food processing plants
  Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers
  Premises with separate irrigation systems using the purveyor's water supply and with chemical addition*
  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
  Premises with an unapproved auxiliary water supply interconnected with the potable water supply
  + For example, parks, playgrounds, golf courses, cemeteries, estates, etc.
  * RPBAs for connections serving these premises are acceptable only when used in combination with an in-plant approved air gap; otherwise, the purveyor shall require an approved air gap at the service connection.

- In the case of premises on which any industrial fluid or any other objectionable substance is handled in such a fashion as to create an actual or potential hazard to the City’s water system. The water system shall be protected against backflow from the premises by installing a backflow prevention assembly commensurate with the degree of hazard. This shall include the handling of process water and waters originating from the City’s water distribution system, which have been subjected to deterioration in quality.

- In the case of premises having (1) internal cross-connections that cannot be permanently corrected and controlled, (2) intricate plumbing and piping arrangements, or it is impractical or impossible to ascertain whether or not dangerous cross-connections exist, the City water system shall be protected against backflow from the premises by the installation of an RPBA.

- In the case of commercial premises that have multiple tenant spaces with a single water service connection that may create an actual or potential hazard to the City’s water system. The building shall be protected by a minimum of a DCVA, and any suites within the building posing a high health hazard that cannot be controlled by the installation of a point of use backflow assembly, or are on the WAC 246-290-490 Table 9 shall be protected by an RPBA on the water supply line to the suite prior to the first branch within the suite. The City's water system
shall be protected against backflow conditions from the premises by a customer installed premise isolation backflow prevention assemblies.

5.13 Type of Backflow Protection Required
The type of protection that shall be provided to prevent backflow into the City water supply shall be commensurate with the actual or potential degree of hazard that exists on the customer's premises. The type of backflow prevention assembly that may be required (listed in an increasing level of protection) includes:

- Pressure Vacuum Breaker (PVB) Spill Resistant Vacuum Breaker (SVBA)
- Double Check Valve Assembly (DCVA)
- Double Check Detector Assembly (DCDA)
- Reduced Pressure Backflow Assembly (RPBA)
- Reduced pressure Detector Assembly (RPDA)
- Air-Gap Separation (AG)

Section 5.14 lists the minimum types of backflow protection required to protect the City water supply at the customer's connection to premises with various degrees of hazard are listed in Section 5.14. Situations that are not covered in Section 5.14 shall be evaluated on a case-by-case basis and appropriate backflow protection determined by the Water Utility Supervisor - Distribution.

5.14 Degree and Minimum Type of Backflow Protection Required

RPBA

- Premises where reclaimed water is used and there is no interconnection with the City water system.
- Premises where there is wastewater pumping and there is no interconnection with the City water system. This does not include a single-family residence that has a sewage lift pump.
- Premises where hazardous substances are handled in any manner in which the substances may enter the City water system. This does not include a single-family residence that has a sewage lift pump.
- Premises where the irrigation system is directly supplied from the City water system into which fertilizers, herbicides, or pesticides are, or can be, injected.
- Premises where the City distribution water pressure is used to inject industrial chemicals.
- Premises where there is a repeated history of cross-connections being established or reestablished.

DCVA

- Premises with a low health assessed degree of hazard
- Premises where the irrigation system is directly supplied from the City water system and does not possess injection capabilities.

5.15 Fire Protection Systems
Fire sprinkler systems with chemical addition shall be protected by the installation of an RPDA
Fire sprinkler systems shall be protected by the installation of a DCDA
Residential fire sprinkler systems, sized two inches and larger shall be protected by a DCDA, those smaller than two inch shall be protected by the installation of a DCVA, unless the end use is connected to a water closet.
5.16 Inspection of Premises Where Cross-Connections May Exist
The customer’s premises shall be open for inspection at all reasonable times to authorized representatives of the City’s Water Utility to determine whether cross-connections, potential cross-connections or other sanitary hazards exist, see BMC15.04.030. When such a condition is identified, the Water Utility Supervisor - Distribution may deny or immediately discontinue water service to the customer’s premises by providing for a physical breach in the water service line until the customer has corrected the condition(s) in conformance with WAC 290-490-460, and Uniform Plumbing Code and City Municipal Codes BMC 15.08.260 relating to cross-connection control. The customer will be informed of their responsibility to provide backflow protection and the type of backflow prevention assembly required in accordance with Bellingham Municipal Codes and Cross connection control standards.

5.17 Installation of Backflow Protection by the Water User at the User’s Connection
Backflow prevention assemblies shall be installed in accordance with WAC 246-290-490 of the Washington State Department of Health, City of Bellingham Cross connection control standards.

5.18 Air-Gap Separation (AG)
The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other assembly and the flood level rim of said vessel. An approved Air-gap shall be at least two times the diameter of the supply pipe, measured vertically, above the flood rim of the vessel, and in no case less than one inch.

5.19 Reduced Pressure Backflow Assembly (RPBA)
An assembly approved by the Washington State Department of Health consisting of two independently operating approved check valves with an automatically operating differential relief valve between the two check valves, tightly closing shut-off valves on either side of the check valves, and properly located test ports for the testing of the check and relief valves. The assembly shall operate to maintain the pressure in the zone between the two check valves at a pressure less than the pressure on the public water supply side of the assembly. When the normal flow of water across an assembly stops, the pressure between the two check valves shall be less than the pressure on the public water supply side of the assembly. In case of leakage of either of the check valves, the differential relief valve shall operate to maintain the reduced pressure in the zone between the check valves by discharging to the atmosphere. When the inlet pressure is two pounds per square inch or less, the relief valve shall open to the atmosphere. In no case shall a cut, tee, or tap be made between the user’s service connection at water meter and the backflow prevention assembly.

5.20 Double Check Valve Assembly (DCVA)
An assembly approved by the Washington State Department of Health consisting of two independently operating approved check valves with tightly closing shut-off valves on each side of the check valves, and properly located test ports for the testing of each check valve. Double-check valve assemblies are used in low health hazard situations. In no case shall a cut, tee, or tap be made between the user’s service connection at water meter and the backflow prevention assembly.

5.21 Pressure Vacuum Breaker (PVB) Spill Resistant Vacuum Breaker (SVBA)
An assembly approved by Washington State Department of Health consisting of a spring loaded check valve with tightly closing shut-off valves, properly located test ports for the testing of the check valve. PVB’s and SVBA’s can provide adequate protection for cross connection control for low health hazard point of use protection if the system has no means of inducing a back pressure condition and the system is supplied from only one water connection.
5.22 Location of Backflow Prevention Assembly
The backflow prevention assembly shall be installed at the point of connection on each service line to a customer's water system, or as close as practical, but in all cases before the first branch line leading off the service line. When the installation of a DCDA is in a vault at the property line all test ports shall be plugged if a flooding condition might occur, in no case shall an RPBA or RPDA be installed in a vault or below grade without the written permission of the Water Utility Supervisor - Distribution. In no case shall a backflow preventer be installed on a public right of way or dedicated easement without the written permission of the Water Utility Supervisor – Distribution. The Water Utility Supervisor – Distribution shall have the final authority to determine the location of a backflow assembly.

5.23 Backflow Prevention Assembly Freeze Protection
It is the responsibility of the property owner to install freeze protection. If the backflow prevention assembly cannot be inspected due to the presence of freeze protection material, the freeze protection may be removed. The City shall not be responsible for reinstallation of freeze protection. The relief port at the bottom of the reduced pressure principle backflow assembly must not be covered over by freeze protection. All test ports must be easily accessible along with the serial number and model number. Freeze protection shall be maintained in a neat, aesthetically pleasing condition. Torn or dislodged freeze protection may be removed by the City.

5.24 Critical Services
In cases where water service cannot be shut off, even for a few moments, at any time, the City Water utility will recommend that two services be established to the premise. In such case, the same level of backflow protection will be required for each service. In cases where water system configuration facilitates only a single point of connection two backflow prevention assemblies shall be installed in parallel. This shall apply only to the domestic water service and shall not apply to the fire protection system point of connection.

5.25 Water Service Termination
When the Water Utility Supervisor - Distribution is notified of a water use that represents a clear and immediate hazard to the City's water supply that cannot be immediately abated, the Water Utility will institute the procedure for discontinuing water service to the premises.

5.26 Basis for Termination
Conditions or water uses that create a basis for water termination shall include, but are not limited to, the following items:

- Refusal to install a required backflow prevention assembly.
- Refusal to allow access onto premise for inspection purposes.
- Refusal to test a backflow prevention assembly.
- Refusal to repair or replace a faulty backflow prevention assembly.
- Removing or bypassing a required backflow preventer.
- Direct or indirect connection between the City water system and sewer line.
- Unprotected direct or indirect connection between the City water system and a system or equipment containing contaminants.
- Unprotected direct or indirect connection between the City water system which presents an immediate health hazard to the City's water system.

5.27 Water Service Termination and Restoration Procedure
The City will terminate service to a customer's premises after two written notices have been sent specifying the corrective action needed and the time in which it must be completed.
The first letter is an information letter that will be sent by Certified United States Mail and outlines the requirements and a specific period to respond. If no response is received in that specified period, a second letter will be sent by Certified United States Mail.
The second letter contains the same information as the first letter plus the added statement that the City will terminate the customer’s water service if no response is received, or corrections made to the premises after the specified time.
If there is still no response from the customer, there will be a hand delivery of notice to the corresponding service address, for compliance within 10 days. Failure to comply will result in termination of water service.

Any notices prescribed or allowed by this article shall be deemed to have been given when personally delivered or when placed in the United States mail, postage fully prepaid, addressed to the owner of the premises or, if different, to the water user as shown from the records of the City. Notwithstanding the above, when conditions create an immediate danger to the City’s water supply, immediate termination of the water service to the customer’s premise(s) may be without notice. However, where practical, the City shall give to the customer or their agent oral notice of the danger and the water service shut off. The customer shall be entitled to an emergency meeting with the Water Utility Supervisor - Distribution. Prompt restoration of Water service shall be done following an inspection that reveals compliance with this code has been attained.

5.28 Backflow Prevention Assembly Maintenance and Testing
As provided in the Washington State Department of Health, WAC 246-290-490 requires backflow prevention assemblies to be tested at least annually and immediately after installation, relocation, or repair by a person who has demonstrated to the City their competency as a Backflow Assembly Tester. All backflow protection assemblies shall be tested in accordance with the procedures outlined in Section 9 of the University of Southern California Manual Of Cross-Connection Control, Ninth Edition. The Water Utility Supervisor - Distribution may require a more frequent schedule if it is determined to be necessary. No assembly shall be placed back in service unless it is functioning as required. A report form supplied by or acceptable to the City Water Utility shall be completed and returned to the City Water Utility each time an assembly is either tested, relocated, repaired, or replaced. These assemblies shall be serviced, overhauled, or replaced whenever they are found to be defective. Each customer with a backflow assembly(s) on their premises will be notified by mail when the annual testing of an assembly is required. The City of Bellingham shall be responsible for administering the testing of backflow prevention assemblies owned by and within the City’s water distribution system Testing shall be by a person that has demonstrated their competency in the testing of these assemblies. Competency is demonstrated by the possession of a valid Washington State Department of Health Backflow Assembly Tester (BAT) Certification.

5.29 Air-gap Separation Inspection Procedure
The installation of each air-gap separation shall be in accordance with the definition for the air gap in WAC 246-290-490 Table 9. The air-gap shall be inspected annually to verify their status.

5.30 Double-Check Valve Assembly Testing Procedure
All double-check valve assemblies shall be inspected and tested in accordance with the procedures outlined in Section 9 of the University of Southern California Manual of Cross-Connection Control, Ninth Edition.

5.31 Reduced Pressure Backflow Assembly Testing Procedure
All reduced pressure backflow assemblies shall be inspected and tested in accordance with the procedures outlined in Section 9 of the University of Southern California Manual of Cross-Connection Control, Ninth Edition.
5.32 Pressure Vacuum Breaker and Spill Resistant Vacuum Breaker Testing Procedure
All pressure vacuum breakers and Spill Resistant Vacuum Breaker shall be inspected and tested in accordance with the procedures outlined in Section 9 of the University of Southern California Manual of Cross-Connection Control, Ninth Edition.

5.33 Tester Competency Requirements
Any person interested in testing backflow assemblies may request the Water Utility Supervisor - Distribution to be added to the list of certified testers. Competency in all phases of backflow prevention assembly testing and repair must be demonstrated by means of education and/or experience in order to be included on the list. Each tester shall be responsible for the competency and accuracy of all tests and reports.

Minimum Competency Requirements:
- Each tester shall have in his possession a valid Washington State Department of Health, Backflow Assembly Tester card
- Each test gauge kit shall have a current certificate of accuracy
- Each tester shall have the required Washington State Contractor's License
- Each tester shall have the required City of Bellingham Business Registration
- Each tester must use the testing procedures outlined in the Manual of Cross-Connection, 9th edition, University of Southern California Foundation for Cross-Connection Control and Hydraulic Research, Chapter 9
- Each tester must be familiar with the City of Bellingham’s Cross Connection Control Program processes and procedures
- Each tester shall furnish evidence to show they have available the necessary tools and equipment to properly test backflow assemblies

After notice and a hearing, a tester may be omitted from the annual list for improper testing, repairs and reporting or any action that indicates a lack of knowledge or support of the City’s program. Such omissions are at the discretion of the Water Utility Supervisor - Distribution.

5.34 Approved Backflow Prevention Assembly Test Gauges
Any test gauge meeting the requirements to perform the necessary tests of the assembly and has received an accuracy calibration certificate within the previous twelve months.

5.35 Backflow Prevention Assembly Test Gauge Calibration
Backflow assembly test gages shall be calibrated at least once every twelve months. Proof of test gauge calibration shall be provided with a testers initial request to be placed on the City’s approved Testers List. Existing approved testers shall submit proof of calibration annually, with their Backflow Assembly Tester renewal card.

5.36 Groundwater Wells - Domestic Auxiliary Supply
In order to comply with the Cross Connection Control Program one of the following alternatives for parcels with groundwater wells may be implemented:
- Install as a minimum level of protection a reduced pressure backflow assembly.
- Abandon the well per Whatcom County Health Department requirements under RCW Title 18 Chapter 18.104.050.
Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.005 - PURPOSES--LIABILITY FOR DAMAGE

This title is enacted as an exercise of the police power of the City, to protect and preserve the public peace, health, safety and welfare by regulating the City's water, sewer, and surface and storm water utility. The City recognizes that it cannot solve all problems related thereto by enactment of this type of legislation; this title is therefore to be construed as an effort to make best possible use of available resources, and not an attempt to provide complete protection to all the City's inhabitants.

A. It is expressly the purpose of this title to provide for and promote the health, safety and welfare of the general public, and not to create or designate any particular class of persons who will or should be especially protected by its terms.

B. It is the specific intent of this title to place the obligation of complying with its requirements on the owner or occupant of premises within its scope, and no provision of this title is intended to impose any duty whatsoever upon the City or any of its officers, for whom the implementation or enforcement of this title is discretionary and not mandatory.

C. Nothing contained in this title is intended to be, nor shall be construed to create, the basis for any liability on the part of the City or its officers for any injury or damage resulting from the failure of the owner or occupier of premises to comply with the provisions of this title, or by reason or in consequence of any act or omission in connection with the implementation or enforcement of this title on the part of the City or its officers.

[Ord. 10056 §3 (part), 1990; Ord. 9073 §4, 1982]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.010 - DEFINITIONS

Unless the context clearly requires otherwise, the definitions in this section apply throughout this title:

A. **Main** means those pipes of the water distribution system and those pipes of the sewer and surface and storm water collection system located in a street, alley or dedicated easement, owned and/or maintained by the City.

B. **Premises** means a single building site, or single lot or aggregation of lots tied together by agreement for the purpose of obtaining a building permit or utility service.

C. **Unmetered duplex** means a single premises receiving water or water and sewer services, whose water service is not metered, and on which a duplex is located. This category includes only those duplexes receiving service as of June 15, 1981, the date the ordinance originally codified in this title was adopted.

[Ord. 2003-05-024 §1; Ord. 2001-05-035; Ord. 2001-02-007 §1; Ord. 9618 §1, 1986; Ord. 8982 §1, 1981]
15.04.020 - RESPONSIBILITY FOR ADMINISTRATION AND ENFORCEMENT

The Director of Public Works is designated as the City's officer responsible for the administration and enforcement of this title.

[Ord. 8982 §2, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.030 - ENTRY OF PREMISES FOR INSPECTION

A. Whenever necessary to make an inspection to enforce any of the provisions of this chapter, or whenever the Director of Public Works has reasonable cause to believe that there exists on any premises any condition not in conformity with any of the provisions of this title, the Director may enter such premises at all reasonable times to inspect the same or to perform any duty imposed upon him; provided, that if such building or premises be occupied, he shall first present proper credentials and demand entry; and if such building or premises be unoccupied, he shall first make a reasonable effort to locate the owner or other persons having charge or control of the building or premises and demand entry. If entry is refused, the director shall obtain an administrative inspection warrant to secure entry.

B. No owner or occupant of any premises shall fail or neglect, after proper demand is made, to permit entry by the director for the purpose of inspection to enforce this title.

[Ord. 8982 §3, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.040 - PROHIBITED ACTS

A. To open, close, or interfere with any fire hydrant, stop valve or stopcock belonging to the City unless authorized to do so by the Public Works Department. The City Fire Department, or volunteer fire departments holding the appropriate permit, are exempt from this subsection;

B. To disturb or damage any pipe, machinery, or other property of the Department of Public Works;

C. To introduce any unauthorized substance into any City reservoir or any other part of the City's water distribution system;

D. To disturb, damage, or interfere with any manhole, pipe, pump station, or other appurtenance of the sewer; or to deposit or discharge, or cause to be deposited or discharged, any solid, liquid, or gaseous waste through other than an approved connection to the sewer system;

E. To violate any restrictions on water usage imposed by the department or as otherwise provided by BMC 15.04.060 (A) or (D);

F. To waste water or allow it to be wasted. For purposes of this section, to waste water includes, by way of example and not limitation, applying water to a landscape in sufficient quantity to cause significant runoff of that water to impervious areas; to allow significant overspray onto impervious areas such as streets, sidewalks, and driveways; applying water to a landscape in sufficient quantity to cause substantial puddling of that water at the ground surface; allowing imperfect or leaking pipes or other fixtures; or to use toilets without self-closing valves; or to allow any pipes or faucets to run open for more than 12 hours for any reason including to prevent the water service from freezing;

G. To apply water to purposes other than that for which the original application for service was made, unless a new application has been approved in the same manner as an original application;

H. To introduce stormwater, surface drainage, or septic tank wastes into the sanitary sewer system.

I. To discharge the following substances into the City sewer system (provided, that the prohibition of discharge of these substances shall not be construed as prohibiting any special agreement -- including one executed under Chapter 15.20 -- between the City and any person whereby waste of unusual strength or character may be admitted to the City sewer system):

1. Any solids, liquids, or gasses which may by themselves or by interaction with other substances cause fire or explosive hazards or be injurious to
persons, property, or the wastewater treatment facility;

2. Any noxious or malodorous solid, liquid, or gas which may be itself or by interaction with other substances is capable of creating a public nuisance or hazard to life or preventing entry into the sewer or treatment works for their maintenance or repair;

3. Any solids, greases, waxes, slurries, or viscous material of such character or in such quantity that may cause an obstruction to the flow in the sewer or otherwise interfere with the proper functioning of treatment works;

4. Any toxic substance, chemical elements, or compounds in quantities sufficient to impair the operation of the treatment works; or that will pass through the treatment works and cause the effluent to exceed Department of Ecology discharge permit limits or cause the receiving water quality standards to be violated;

5. Any liquids having a pH lower than 6.5 or higher than 8.5 or having corrosive properties capable of causing damage, or hazards to the sewer system, persons, equipment, or treatment works;

6. Any radioactive isotopes;

7. Any liquid or vapor having a temperature greater than 140 degrees Fahrenheit;

8. Any garbage that has not been ground or shredded;

9. Any other substance which, in the opinion of the Public Works Director, may be harmful to the structure personnel, processes, or operation of the sewer system.

[Ord. 2006-06-063; Ord. 2001-07-051; Ord. 10093 §§5, 6, 1990; Ord. 10056 §3 (part), 1990; Ord. 9846 §1, 1988; Ord. 8982 §4, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.050 - PENALTY FOR VIOLATION

A. The commission of an act prohibited by Section 15.04.040(A), (B), (C), (D), (E) or (I) shall be considered a misdemeanor, punishable by a fine of not more than $500 per violation. Each and every day that such prohibited act continues shall be considered a separate violation.

B. Before any person(s) is/are charged with a violation of section 15.04.040 (E), (F) or (G), or (H), an attempt shall be made to give such person a written notice of such violation, either by personal service or by certified mail, return receipt requested, advising that the City is contemplating a criminal complaint against that person(s) and that such person(s) shall have 7 days from the date of such notice to discontinue the prohibited activity, except for violations on water usage imposed by the department pursuant to sections 15.04.040(E), and 15.04.060 (A) and (D) for which the prohibited activity shall be discontinued immediately. If such person(s) fails to permanently cease such activity within the foregoing appropriate time period, such person(s) shall be charged with a misdemeanor, punishable by a fine of not more than $500 per violation. Each and every day that such prohibited activity continues beyond the notice period shall be considered a separate violation.

C. This section does not apply to specific civil penalty amounts set out for the late payment of water, sewer and storm and surface water bills as such penalties are civil debts, collected in the same manner as delinquent payments.

[Ord. 2001-07-051; Ord 2001-02-007; Ord. 10093 §9, 1990; Ord. 9618 §2, 1986; Ord. 9371 §1 (part), 1984; Ord. 8982 §5, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.060 - REDUCTION OF WATER SUPPLIED

A. In case of emergency, shortage, or whenever the public health, safety, or the equitable distribution of water demands, the Director of Public Works may change, reduce, or limit the time for uses of water, or may impose restrictions and schedules for specified uses of water, or may temporarily discontinue specified uses of water.

B. Water service may be temporarily interrupted for purposes of making repairs, extensions, or doing other necessary work.

C. Before changing the use of water, the department shall notify, insofar as practicable, all water consumers affected.

D. In addition to the penalties described in 15.04.040 (E) persons found in violation of this section and as provided by 15.04.040 (E) and 15.04.050 (A) and (B) shall be subject to water shutoff upon non-payment of fines, or for continuing violation of this section. Each and every day that such prohibited activity continues beyond the notice period shall be considered a separate violation.

[Ord. 2001-07-051; Ord. 8982 §6, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.070 - REDUCED RATES FOR LOW INCOME SENIOR AND DISABLED CITIZENS

A. Any low income senior or disabled citizen who satisfies the reduced rate criteria in this section and who lives in a residence receiving a separate City of Bellingham water or sewer service and water or sewer bill, is entitled to a rate reduction for water, sewer and storm and surface water utilities.

B. A senior aged 62 or older or a disabled person with a household income of $23,000 or less in 2003 (adjusted annually thereafter for inflation as measured by the Consumer Price Index for Urban Consumers for Seattle, Tacoma, Bremerton) is entitled to have their rates reduced by the following amounts:

<table>
<thead>
<tr>
<th>Household Income Percent Reduction</th>
<th>Reduced Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50% of the qualifying income</td>
<td>75%</td>
</tr>
<tr>
<td>Greater than 50%-75% of the qualifying income</td>
<td>50%</td>
</tr>
<tr>
<td>Greater than 75%-100% of the qualifying income</td>
<td>25%</td>
</tr>
</tbody>
</table>

For purposes of this Section 15.04.070, "gross income" shall have the same definition as provided in 26 United States Code Section 61, as currently enacted or hereafter amended.

C. A non-resident property owner may also obtain the reduction if the premises are rented to a qualified low-income senior or disabled person and the owner certifies the savings are passed to the senior or disabled renter.

D. All persons claiming the discount provided for in this section shall first be required to file an application with the City requesting the reduction. The application shall provide information sufficient for the City to verify the applicant's eligibility to participate in this reduced rate program. Customers receiving the rate reduction must renew their application annually in accordance with administrative procedures promulgated by the Finance Director.

City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.080 - OWNERSHIP AND CONTROL

The ownership of all water, sewer and surface and storm water mains and appurtenances in the public streets or other utility easements owned by the City is vested solely in the city, and the person responsible for the construction of such mains shall furnish a deed of conveyance for such mains upon acceptance by the Department of Public Works. The department will operate and maintain all approved and accepted mains in established city and county streets or other utility rights-of-way. It shall be a misdemeanor to remove or change any part thereof without the approval of the department.

[Ord. 10056 §3 (part), 1990; Ord. 8982 §8, 1981]
Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.090 - PAYMENT, TEMPORARY DISCONTINUANCE, DELINQUENT ACCOUNTS, AND PENALTY

A. Billing shall be completed by the Finance Department on a basis as determined by the Finance Director. Failure to pay said bills in full by the due date listed on the bill shall render the account delinquent.

B. Billings shall be addressed to the occupant of a premises, unless the owner, the purchaser under a real estate contract, or the authorized agent of either requests otherwise in writing.

C. If a billing statement contains charges for more than one utility, the City will apply the monies received in the following manner: First, to pay off any outstanding sewer charges; second, to pay off any outstanding storm and surface water charges; and third, to pay off any outstanding water charges.

D. If water service is temporarily discontinued as provided for in Bellingham Municipal Code 15.08.190 as currently enacted or hereafter amended, the City will not bill for either water or sewer utility service during the prior City authorized temporary discontinuance period. However, during the authorized temporary discontinuance period, storm and surface water utility fees and charges will continue to accrue at the normal rate and will continue to be regularly billed unless the customer prepays the entire amount of the storm and surface water charges that will accrue during the temporary discontinuance period before the temporary discontinuance period begins, unless provided otherwise by written agreement.

E. Delinquent accounts for sewer and storm and surface water utility charges may bear interest at a rate of up to 8% per annum, or at such other rate as may be authorized by law, computed on a monthly basis from the date of delinquency until paid in full.

F. In addition to interest, a delinquent water, sewer and/or storm and surface water utility account may also be charged a late-payment penalty of $5.00 or 1.5% per billing period, whichever is greater.

[Ord. 2004-11-08 §1; Ord. 2001-02-007; Ord. 9846 §3, 1988; Ord. 9618 §4, 1986; Ord. 8982 §9, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.095 - FINANCE DIRECTOR'S AUTHORITY TO ADJUST WATER AND SEWER BILLS

A. The Finance Director or the Finance Director's Designee is authorized to adjust water and/or sewer bills for metered service customers in accordance with the following procedure:

1. When the customer has suffered a service break or leak in the portion of the service between the water meter and the external entrance to the premises or the first branch off of the service line, whichever occurs first.

2. No adjustment for water bills shall be allowed for any leaks or service breaks that occur after the external entrance to the premises. This shall include, by way of example and not limitation, leaks in toilets, faucets, water heaters, and spigots. An adjustment for the sewer bill may be made after the external entrance to the premises when it can be demonstrated that the excess water consumption did not enter the sanitary sewer system.

3. Each metered service shall only be allowed one administrative adjustment during the life of that metered service.

4. The break or leak in the service line and its repair must be documented in a manner that is acceptable to the Finance Director or the Finance Director's designee. Documentation shall include a licensed plumber's itemized invoice, repair order, City of Bellingham Public Works Department inspection documentation or other documentation as necessary to support the adjustment request and to document any repairs.

5. A request for an adjustment shall be on form(s) provided by the Finance Department.

6. The Finance Director's Designee shall determine the amount of the adjustment in his or her discretion. The adjustment amount shall not exceed 50% of the amount determined to be the excess usage charge for water and 100% of the excess usage charge for sewer, provided that the excess water consumption did not enter the sewer system. No adjustment for sewer charges shall be allowed if the excess consumption entered the sewer. Historical records may be used to assist in the determination of the adjustment amount.

B. Any determination made under this section may be appealed in accordance with the procedures in BMC 15.04.120.

[Ord. 2002-03-016]
Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.100 - DELIQUENCY

A. In the event of any nonpayment for water, sewer, or storm and surface water utility services for any billing cycle, the City shall have all remedies as provided in this chapter or by any other applicable law, including, without limitation, liens and/or shutting off the service. However, prior to any service being shut off, the Finance Department shall provide written notice of nonpayment at least 10 days prior to actual shut off of service. The written notice shall be mailed to the premises' occupant and owner or owner's agent, if the owner provides written instructions to the City to do so.

B. The notice shall specify at least:

1. That payment for service is overdue, the total amount due, and that the statutory lien may be imposed.

2. That service will be shut off unless payment in full is made to the City within 10 days;

3. The address and telephone number of the Finance Department;

4. That a hearing may be requested;

5. That the City will charge a turn-on and turn-off fee before service is resumed following a shut off of service; and

6. That service will not be shut off while a hearing is pending.

[Ord. 2006-06-063; Ord 2001-02-007; Ord. 9562, 1986; Ord. 8982 §10, 1981]
Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.105 - LIEN FOR DELINQUENT SEWER PAYMENTS

In addition to any other remedies permitted by law, the City shall have a lien pursuant to RCW 35.67, as currently enacted or hereinafter amended, for all delinquent and unpaid sewer or storm and surface water rates and charges, including interest thereon, against any parcel or premises for which the sewer and/or storm and surface water rates and charges have been furnished. Said lien shall have the superiority, and may be foreclosed upon, as described in RCW 35.67, as currently enacted or hereinafter amended. The City shall be entitled to charge and collect $50 to recover the City's costs associated with recording the lien and an additional $50 to recover the City's costs associated with releasing the lien. The City shall be entitled to recover its costs incurred in collecting any delinquent sewer or surface and storm water payments, including court costs and attorney fees.

[Ord. 2004-11-081 §2; Ord. 2001-02-007; Ord. 9618 §6, 1986]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.110 - PREMISES LIABLE FOR CHARGES - SHUT OFF FOR NON-PAYMENT

A. All water, sewer, and storm and surface water rates and charges will be charged against the premises to which the services are furnished as well as against the owner or the purchaser under a real estate contract of the property.

B. If for any cause any sums owing for either water, sewer, and/or storm and surface water service become delinquent, the water may be shut off after providing notice of delinquency and an opportunity for a hearing as provided for in this chapter before the City's hearing board.

C. Water may not be turned on to the same property until all delinquencies have been paid in full, together with shut-off and turn-on fees, or any other outstanding charges, fees, penalties and interest, except as otherwise provided by the City.

D. No change of ownership or occupancy of the premises shall affect the application of this section.

[Ord. 2001-02-007; Ord. 9618 §7, 1986]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.120 - APPEALS

A. Any person objecting to any water or sewer charge or fee imposed under this chapter may request a hearing before the City's Utility Hearing Board (the "Board") by filing a written request with the Finance Director within five business days of notice of the charge. The City shall make forms available for that purpose. Any persons objecting to surface and storm water utility charges or fees shall use the procedure outlined in BMC 15.16.060.

B. Services shall not be shut off while a hearing is pending. However, the Finance Director may require that payment of any outstanding balance, or portion thereof, be made pending the outcome of the hearing.

C. The members of the hearing Board shall be the Finance Director, the Director of Public Works, and the Assistant Directors of Public Works, or their designees. The City Attorney or a representative of the City Attorney's Office shall serve as the Board's Legal Advisor.

D. At the hearing, the Board will consider the objections made by the applicant and will correct, revise, raise, lower, change, or modify the charge or fee, or set aside the charge or fee, as deemed appropriate by the Board and as allowed by law.

E. Decisions of the Board may be appealed to the City's Hearing Examiner by filing a written request with the Office of the Hearing Examiner within 5 business days of the date of the Board's written decision.

[Ord. 2002-10-069 §32; Ord. 2001-02-007; Ord. 10032, 1990; Ord. 9618 §8, 1986]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.130 - RESTORATION OF SERVICE BY TENANT

A. If the occupant of a premises is neither the owner nor the purchaser under a real estate contract, and service is shut off, or notice is given of an intended shutoff, the occupant may restore or maintain service by:

1. Making an application to the Finance Director which provides sufficient information to satisfy the Finance Director that the occupant is not responsible for the delinquency;

2. Making the required cash deposit; and

3. Agreeing to be responsible for all billings incurred during the period of occupancy.

B. Upon departure of the occupant from the premises, the water shall be shut off until delinquencies, including shut-off and turn-on charges, are paid.

C. Restoration of service to a premises under this section shall not affect any rights the city has against the owner or the purchaser under a real estate contract of the premises, or against the premises itself, for payment of delinquent charges.

[Ord. 9618 §9, 1986]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.140 - CASH DEPOSITS

A. Cash deposits, or other security satisfactory to the Finance Director, may be required by the Finance Director to secure payment of charges:

1. When service is restored by the occupant of a premises which the occupant does not own; or

2. When the customer files bankruptcy; or

3. In such other cases where a substantial need to protect the city is found to exist.

B. The amount of a cash deposit shall be determined by the Finance Director, but shall not exceed the highest payment made for three months' billing during the preceding year, recomputed at the current year's rates. If billings from the previous year are unavailable, then billings to a comparable premises elsewhere in the city shall be used.

C. Cash deposits may be used for the following:

1. Subsequent to making the deposit, if delinquencies in payment result in a shut-off, the deposit shall be applied against the delinquencies and any resultant fees.

2. Upon vacation of the premises by the customer, the deposit may be reimbursed, or applied as a credit to any outstanding account, in the City's sole discretion.

[Ord. 2001-02-007; Ord. 9618 §10, 1986]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 04 WATER AND SEWER ADMINISTRATION AND RATES

15.04.150 - SEVERABILITY

If any provision of this chapter or its application to any person, entity or circumstance is held invalid, the remainder of this chapter or the application of the provision to other persons, entities or circumstances shall not be affected.

[Ord. 2001-02-007]
15.08.010 - TYPES OF WATER SERVICE

The following types of water service are provided by the city:

A. **Single Family** services include only those services connecting the water system to a single-family residence or duplex dwelling unit occupying a single premises on a single family zoned lot. The single family service size shall be 3/4" in diameter, except when the Director of Public Works determines, in his or her discretion, that a 1" or 1.5" service is necessary to meet the flow demands of that single family residence.

B. **Non-Single Family** services include all services not covered by subsections A, C, D, E, or F of this section.

C. **Fire protection** service is a water service installed solely for the purpose of providing water to automatic fire sprinklers, on-site fire hydrants, or standpipes. All privately owned fire protection services shall include a flow-detection device of a type approved by the Director of Public Works. No domestic water supply connections are allowed on a fire protection service.

D. **Resale water** service is a metered service by which potable water is provided under contract to a water district or association for resale.

E. **Industrial water** service is non-potable water supplied for industrial purposes.

F. **Irrigation water** service is a service using potable water for landscaping and irrigation purposes only. All irrigation systems must have a dedicated irrigation service unless one of the following exceptions applies:

1. A Single Family flat rate water service that converts to a Single Family metered rate through the Voluntary Metering Program ("VMP") provide for in BMC 15.08.040; or

2. A Single Family metered water service on a single family zoned lot that is less than or equal to 10,000 square feet.

[Ord. 2006-08-08; Ord. 2005-01-005; Ord. 2004-11-081 §3; Ord. 1999-12-092; Ord. 10093 §10, 1990; Ord. 8982 §12, 1981]
Title 15 WATER AND SEWERS
Chapter 08 WATER SERVICE

15.08.020 - APPLICATION FOR WATER SERVICE

Any person desiring to have a premises connected with the city water supply system shall make application to the Public Works Department on printed forms furnished for that purpose. Every such application shall be made by the owner or the purchaser under a real estate contract of the premises to be benefited, or by his authorized agent.

The application must describe the property to be served, state fully the purposes for which the water is required, and indicate that by signing the form, the applicant agrees to conform to the ordinances, rules, and regulations established as conditions for use of water, and further agrees, as a condition to the furnishing of water, that the city has the right to shut off the water supply as required for such things as, by way of example, non-payment, repairs, extensions, or doing other necessary work.

[Ord. 2006-08-081; Ord. 9618 §11,1986;Ord. 8982 §13, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 08 WATER SERVICE

15.08.030 - LIMITATION ON WATER USE

No person supplied with water from the city mains shall be entitled to use it for any purpose other than those stated in the application for service or to supply other persons or premises in any way.

15.08.040 - WATER SERVICE CONNECTIONS

A. When the premises fully abuts upon a street or City-owned utility easement through which there is a City water main, the premises’ owner may apply for a service. Upon approval of the service by the Director of Public Works and upon such conditions as required by the Director, the Director of Public Works shall issue a permit for its installation. The Public Works Department will install a service pipe from the main to the property line, and will include such equipment as determined by the Public Works Department, such as, by way of example, a curbstop placed within the street right-of-way, a meter box, and a meter assembly. This equipment is part of the "water service" and shall thereafter be maintained by and kept within the exclusive control of the City, except as otherwise provided in this chapter. The water line from the curbstop to the shutoff shall be installed by the property owner subject to inspection by the director, and it shall remain under the exclusive control of the property owner. The inspection shall be conducted before water service is initiated. If the service pipe is adequately sized, more than one service may be connected, provided that each service must have its own curbstop.

B. When the premises within the city limits for which service is sought does not fully abut a street or City-owned utility easement through which there is a City water main, the application for service shall be rejected except when the property being served is the last developable lot that can be served upon the street, in which case the Director of Public Works is authorized to make this determination administratively and grant service under this exception.

C. When the premises for which service is sought does not fully abut a main with sufficient pressure and capacity to provide the required flow at the property line, the application for service shall be rejected.

D. All premises must have their own separate service connection with a City water main, except:

1. Fire protection services.

2. Commercial metered accounts, and industrial water accounts, in which cases each service shall be metered separately.

3. Single family services may share a 1" water service connection where the connection is split at the property line into two separate 3/4" services and meters.

E. All new water service installations shall be metered.
F. Single Family customers who are not currently being served by a water meter may enroll in the "Voluntary Metering Program" ("VMP") through the Department of Public Works. The Director of Public Works shall establish a meter installation fee for each Single Family customer who chooses to participate in the VMP. This meter installation fee shall be adjusted annually by the Director of Public Works based upon the previous year's actual costs and after providing a minimum of 60 days' public notice prior to the adjustment. Once a customer elects to participate in the VMP, the customer cannot return to the flat rate structure.

City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 08 WATER SERVICE

15.08.050 - WATER SERVICE INSTALLATION FEES

A. Prior to approval of an application for water service by the Finance Director, the fees applicable to the requested service shall be determined. The fees consist of the system development charge, assessments, installation fees, and other charges as specified in this chapter.

B. Specified fees shall be paid to the Finance Director in full at the time of application. The Finance Director shall advise the Department of Public Works when payment has been received.

City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 08 WATER SERVICE

15.08.060 - WATER SERVICE INSTALLATION

A. All water services shall be installed in accordance with current American Water Works Association ("AWWA") standards and all city standards and specifications.

B. All materials used for water service installation shall be AWWA approved and accepted for use on the city water system by the Department of Public Works.

C. Installation of a requested water service will be scheduled after the Finance Director has notified the Department of Public Works that all applicable fees and charges have been paid.

D. The Department of Public Works shall be the entity responsible for the installation of the service. The Director may, at his option, select either installation by City forces or by construction contract.

E. The location of the water service will be determined by the Public Works Department. In the event of conflict between the selected service location and the location desired by the applicant, the question may be appealed to the Director of the Public Works Department.

F. The new water service shall consist of the tap to the main, the corporation stop at the main, pipe from the water main to the meter, meter box, meter (if required) and stopcock. This service shall be owned and maintained by the City from the main to house side of the stopcock. The connection to the premises side of the stopcock is not part of the City owned water service.

G. The water service shall be installed within city rights-of-way or easements in accordance with department standards.

H. All services other than single-family residential shall be subject to review by the Public Works Department using the Uniform Plumbing Code and the AWWA "Sizing Water Service Lines and Meters"; except that standby fire-protection services shall be sized based on fire-flow requirements determined by the Fire Department.

I. Water service and electrical services lines shall not share the same trench unless:

1. They are separated by a minimum of 24"; or
2. The electric line is in a rigid metallic conduit.
J. No electric grounding devices or wires from any utility shall be attached to any water service unless authorized by the Director of Public Works.

K. No sewer service shall be installed within 5’ of a water service unless it is located at least 24” below the water service.

[Ord. 2004-11-081 §6; Ord. 10131, 1990; Ord. 9618]
Title 15 WATER AND SEWERS
Chapter 08 WATER SERVICE

15.08.070 - TURNING ON WATER SERVICE

Water service may only be turned on after the Finance Director has notified the Director of Public Works that all applicable fees have been paid, irrespective of whether the service is new, or is one whose water has been shut off for any reason.

[Ord. 8982 §18, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 08 WATER SERVICE

15.08.080 - WHEN MAIN EXTENSION REQUIRED

A main extension is required whenever property within the water service zone is developed and that property does not abut a water main, or when an existing abutting water main is not adequate to provide the required water pressure or flow characteristics. Minimum flow is that set by state law, which is currently 30 psi at normal peak flow.

[Ord. 2004-11-081 §7; Ord. 8982 §19, 1981]
15.08.090 - PETITION FOR WATER MAIN EXTENSION

A. The person desiring a main extension shall petition the Director of Public Works requesting permission to extend the city's water system.

B. The Director of Public Works shall review the request, and if the requested extension is determined to be desirable, shall provide the petitioner with the design requirements for the extension. If the requested main extension is determined to be an undesirable extension of the water system, the petition shall be denied.

[Ord. 8982 § 20, 1981]
Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.100 - DESIGN OF WATER MAIN EXTENSION - CONSTRUCTION PERMIT

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

B. The project for main construction will be carried out in accordance with the provisions of a contract entered into between the city and the petitioner. At the discretion of the Director of Public Works, appropriate security may be required covering construction performance and guaranteeing the construction after completion for a period of one year.

C. After approval of the design and construction details, the Department of Public Works shall provide the petitioner with an estimate of the construction inspection fee. A permit for construction will be issued after the inspection fees and estimated main connection charges have been deposited with the Finance Director.

[Ord. 9234 § 6, 1983; Ord. 8982 § 21, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.110 - CONSTRUCTION OF WATER MAIN EXTENSION

A. The petitioner shall contract with a contractor to install the main extension as approved by the Department of Public Works. The contractor shall be licensed to perform the construction.

B. The Department of Public Works shall inspect the installation of the water main to insure compliance with the specifications. The charges for such inspection, including administrative and overhead charges, shall be withdrawn from the construction inspection fee deposited with the finance director. At such time as the Director of Public Works determines the remaining funds are not adequate to provide necessary inspection for the project, the petitioner shall be notified and an estimate of additional inspection fees required will be provided. The additional fees shall be deposited with the Finance Director prior to depletion of the funds on deposit. The city reserves the right to reject any installation not inspected and approved by the Department of Public Works. Any moneys unexpended from the inspection fee upon completion of the project shall be returned to the petitioner.

C. Upon satisfactory completion of all required tests and acceptance of the main extension, the Department of Public Works shall cause the extension to be connected to the city system. All costs incurred in the connection, including overhead and administrative charges, shall be paid by the petitioner. Any adjustment of the actual cost of installation because of variance between the estimate and the actual cost shall be refunded upon completion of the job to the petitioner, or by payment by the petitioner to the city of any additional expense above the estimate.

D. When a main extension is to service a new single-family residential area, individual services shall be installed by the developer to supply each proposed building site. These services shall be installed to city standards. All fees and charges for installation of the services shall be paid at the time a plumbing permit is obtained.

E. All extensions of water mains shall be subject to the payment of a hydrant fee as required by this chapter. Whenever the installation of a hydrant is required by the Director of Public Works during the course of a water main extension, the established value thereof may be applied to reduce any hydrant fees due for that extension.

[Ord. 8982 § 22, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.120 - RECORD CONSTRUCTION DRAWINGS REQUIRED

A. Upon completion of a main extension, the petitioner shall provide the Department of Public Works a reproducible mylar drawing that accurately indicates the main extension and appurtenances as actually installed, in plan and profile ("Record Construction Drawing").

B. No main extension will be accepted until satisfactory Record Construction Drawings are provided to and approved by the Director of Public Works or designee.

[Ord. 2006-08-081; Ord. 8982 § 23, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.130 - ENERGIZING MAIN EXTENSIONS

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.

[Ord. 8982 § 24, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.140 - TRANSFER OF SERVICE ON NEW WATER MAIN

A. When the water main abutting a premises is replaced, the existing active services will be transferred to the new main without payment of additional fees or charges.

B. When the service connection for a premises is not on a main abutting the premises, and a main extension installs a new water main adjacent to the premises, the owner of the premises will be required to pay the necessary latecomer's or other construction charges before the service will be transferred to the new main. No additional charges will be made to transfer the service.

[Ord. 8982 § 25, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.150 - PAYMENT FOR WATER MAINS

A. Water mains laid in public rights-of-way or easements and connected to city mains may be paid for by:

1. The person benefiting from the installation; or

2. The city; or

3. A local improvement district, as provided by law.

B. The City may, in accordance with state law, grant the person constructing a new water main the right to reimbursement from other abutting property owners benefited by the improvement pursuant to Bellingham Municipal Code Chapter 14.02.

[Ord. 10906 §§1, 4, 1997; Ord. 8982 § 26, 1981]
15.08.160 - AUTHORITY TO SHUT OFF WATER

A. The Department of Public Works has the right at any time, after giving reasonable notice, to shut off the water supply for repairs, extensions, violations of this code, and any other reason other than nonpayment of rates.

B. The City is not responsible for any damage caused by the breaking, bursting or collapsing of any boilers, tanks, pipes or fixtures, or any damage whatever resulting directly or indirectly from shutting off of water, when timely notice is given.

[Ord. 8982 § 27, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.170 - PERSONS AUTHORIZED TO SHUT OFF OR TURN ON WATER

A. Only employees of the Department of Public Works are authorized to shut off and turn on water services, except as follows:

1. A licensed plumber with written authorization of the Director of Public Works may turn a water service on at the curb stop for the sole purpose of testing service pipes within a premises. Such a test period shall not exceed 4 hours, and the curb stop shall be returned to the off position at the conclusion of the test;

2. A licensed plumber with the written authorization of the Director of Public Works may turn a water service off at the curb stop to effect repairs of service pipes within a premises, provided a shut-off is installed as required prior to restoration of water service by the licensed plumber; or

3. Any City official given authorization by the Director of Public Works.

B. An unauthorized shut-off hereunder is not considered an interruption of service for billing purposes and billing for water and sewer services shall continue during the period authorized.

C. Unauthorized turn-on or shut-off of water service is expressly prohibited. Should any person cause a water service to be turned on at the curb stop prior to the service being authorized or after being shut off by the Department of Public Works as provided in this chapter, the water service will be shut off by the Department of Public Works and the account will be charged the prescribed tampering fee. Subsequent violation will be cause for the Director of Public Works to order the service shut off in a manner selected by the Department of Public Works and the account charged with all costs incurred in such shut-off. Payment of all such costs plus an amount equal to the estimated cost of restoring the service will be made to the Finance Director prior to service being resumed.

[Ord. 2006-08-081; Ord. 9371 § 1(part), 1984; Ord. 8982 § 28, 1981]
15.08.180 - TAMPERING WITH WATER SERVICE AFTER SUSPENSION

A. Should any person turn on a water service without authorization after it has been shut off by the city, the account shall be assessed the tampering fee for the first occurrence. Further incidents of tampering will cause the account to be assessed at twice the tampering fee for each additional occurrence. The Owners or the purchasers under a real estate contract of the premises who do not occupy the premises will, if possible, be notified of the imposition of a tampering fee.

B. After any person has tampered in three consecutive occurrences, the city shall disable the water service in such a manner that there is a physical disconnection of the water service from the city water main. The account shall be charged a disabling fee for the cost to disconnect the service line. The fee shall include the total cost of labor, material, equipment, and any administrative or overhead charges.

C. Should any person turn on a new water service before opening a water account, a tampering fee shall be assessed and paid before the owner can open a new water account or begin receiving water service.

City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.190 - TEMPORARY DISCONTINUANCE OF SERVICE

A. A temporary discontinuance of water service may be requested by the owner of a premises or an agent of the owner with the express written authority to make such a request. The request shall be in writing, be submitted at least 10 working days before the requested discontinuance, state the estimated duration of the discontinuance, and be on forms provided for that purpose in the office of the Finance Director.

B. The minimum period of time for a temporary discontinuance of water service is 30 days, but in no case shall be longer than 3 years, in which case the service shall be considered abandoned under section 15.08.200.

C. Resumption of water service shall be in writing on the forms provided for that purpose in the office of the Finance Director.

D. Water and sewer service billing shall stop for the duration of the temporary discontinuance, provided such temporary discontinuance is approved hereunder. However the shut-off and turn-on shall be subject to the fees for such service provided by this chapter.

[Ord. 2006-08-081; Ord. 2001-02-007; Ord. 9371 § 1(part), 1984; Ord. 8982 § 30, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.200 - ABANDONED SERVICES

A. An abandoned service is any water service that has not been used for a period of 3 years or longer except for services installed as part of a main extension and not put into service, which will not be considered abandoned. Abandonment under this section shall not relieve the property owner or other responsible party of any financial responsibility for charges incurred at the premises for water service.

B. A new water service for a premises where an abandoned service exists may use the existing abandoned water service if it is determined to be in satisfactory condition by the Director of Public Works or his designee. If the abandoned service is reactivated without modification, the applicant shall be refunded that portion of the fees and charges expressly stated for service installation. All other fees and charges shall be the same as for a new service.

[Ord. 2006-08-081; Ord. 9371 § 1(part), 1984; Ord. 8982 § 31, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.210 - ACCOUNTS - FUNDS

A. All accounts for water shall be kept by the Finance Director by reference to the address, or, if necessary, the legal description of the property to which water service is provided.

B. Accounts shall be billed on a regular schedule determined by the Finance Director.

C. The water fund is created. Moneys deposited to this fund shall be used for capital, operation and maintenance of the water system, including water system improvements.

[Ord. 2007-12-107; Ord. 8982 § 32, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.215 - INSTALLATION PERMIT FEES

An installation permit fee is charged for each service connection, and:

A. The installation permit fee is $35 per service, except when combined with a sewer permit, when the fee for both permits is a total of $50.

B. Monies received for this fee shall be deposited into the water fund unless the permit is a combined permit, in which case one-half of the fee shall be deposited to the water fund, and one-half to the sewer fund.

[Ord. 2004-11-081 §9; Ord. 9618 § 16, 1986; Ord. 9073 § 6, 1982]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.220 - CALCULATION OF INSTALLATION FEE - METERS

An installation fee will be charged for each service requested. This fee is for the cost of installing the water service from the main to the property line including, but not limited to, main taps, corporation cocks, valves, pipes, meters, site restoration, and other materials, labor, and equipment charges necessary.

A. The fee for water services less than 1½" in diameter shall be a flat rate for each size. The Director of Public Works shall analyze previous actual installation costs for each size, shall determine the fee annually, and shall give 60 days' public notice thereof.

B. The fee for water services 1½" in diameter and larger will be actual cost of installation plus administrative and overhead charges. The water system superintendent shall prepare an estimate of installation costs to determine the amount of money to be deposited. Any adjustment in the actual cost of installation because of variance between the estimate and the actual cost shall be refunded upon completion of the job to the applicant, or by payment by the applicant to the city of any additional expense above the estimate.

C. The cost of the meter and meter installation will be in addition to the water service fees. The Director of Public Works shall establish a flat rate for meter installations less than 1½" in diameter, shall annually adjust that rate based on the previous year's costs, and shall give 60 days' public notice thereof. Meters 1½" and larger shall be estimated as in subsection B above. All meters shall be and remain the property of the city, and may be installed or removed by the Department of Public Works in conformity with this chapter.

D. If a meter is found to be out of order by failing to register properly, the account shall be charged at the average monthly consumption as shown by the meter during the corresponding period of the preceding year.

E. In all cases where meters are lost, injured or broken by carelessness or negligence of owners or occupants of premises, they shall be replaced or repaired under the direction of the Director of Public Works and the cost charged against the owner or occupant; and in case of nonpayment for meter damage, the water shall be shut off, and will not be turned on until such charge and the charge for turning on the water are paid in the same manner as provided for delinquent payments.

F. Meters shall be of the type designated by the Director of Public Works and shall be installed at the cost of the person requiring water service.
G. If the owner or occupant of a premises served by a metered service desires to have a water meter tested for accuracy, the following procedures shall apply:

1. The owner or occupant must request a meter test.

2. Upon receiving the request, the Department of Public Works shall prepare an estimate of the cost to perform the test, including overhead and administrative charges.

3. The owner or occupant must deposit an amount equal to the estimated test costs with the Finance Director.

4. Upon notice from the Finance Director that the necessary fee has been received, the department will schedule the meter test. The owner or occupant will be notified of the test and may witness the test if desired.

5. Should the meter over-register consumption, repair or replacement of the meter will be made by the department and the meter test fee will be refunded to the owner or occupant. If the meter is accurate (AWWA Standards) or under-registers, the meter test fee shall be deposited to the water fund.

[Ord. 2004-11-081 §10; Ord. 9371 § 1(part), 1984; Ord. 8982 § 33, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.230 - CONNECTION CHARGES

A. Charges imposed to connect to and receive city water service shall consist of the following:

1. A system development charge determined pursuant to 15.08.250(C), reflecting the demand placed on the system.

2. If applicable, a connection fee for the specific property involved, as determined by the Department of Public Works, to insure that each connected property bears its equitable share of the cost of the system, plus interest pursuant to subsection 3 below.

3. The connection fee herein shall include accrued interest at a rate fixed at the Federal Reserve rate for a 10-year Treasury Note, as determined on the recording date of the Statement of Intent to Collect;

PROVIDED, that interest shall only be accrued for a period not to exceed 10 years; and PROVIDED FURTHER, that no interest shall be collected within the first 90 days of recording of the Statement of Intent to Collect; and PROVIDED FURTHER, that the aggregate amount of the interest shall not exceed the equitable share of the cost of the system allocated to a given property owner.

4. Any applicable private latecomer charges and interest.

B. System development charge credits are available and shall be calculated as follows:

1. If an existing service is exchanged for a larger service, credit shall be given for the smaller service at the current rate.

2. No refunds will be given for exchange or reactivation to smaller size services.

3. If an abandoned service is reactivated within 3 years of abandonment, credit shall be given for the service being activated. Value of credit shall be current charge for that size service irrespective of whether a fee was ever collected.

4. If the abandoned service is reactivated after 3 years of abandonment, credit will be given only up to the amount
previously paid.

[Ord. 2004-11-081 §11; Ord. 2002-01-002; Ord. 10571 §1, 1994; Ord. 9846 §4, 1988; Ord. 9738 §1, 1987; Ord. 9371 §34, 1981]
City of Bellingham Municipal Code

Title 15 WATER AND SEWERS
Chapter 08 WATER SERVICE

15.08.240 - COMPUTATION OF USE RATES

Use rates for water service and consumption are determined as follows:

A. Single family unmetered water services and unmetered duplex water services shall be charged a monthly rate for each month of service or portion thereof.

B. Single family metered water services including metered duplexes shall be charged a fixed rate based on meter size and a volume rate per hundred cubic feet of water used.

C. Contract sales of water for reuse shall be as covered by agreement between the city and the water district or association. Rates for reuse shall be covered by subsection B of this section unless specifically modified by the agreement in recognition of substantial differences in service provided by the city.

D. Non-single family water services including multiple dwelling units, commercial, and institutional, shall be charged a fixed rate based on meter size and a volume rate per hundred cubic feet of water used.

E. Irrigation water services shall be charged a fixed rate based on meter size and a volume rate per hundred cubic feet of water used.

F. Funds received for the connection charges shall be credited to a reserve cash line in the water fund.

G. Funds received for the connection charges covered under Section 15.08.230 A(2) and 15.08.230 A(3) shall be credited to a capital cash line in the water fund. All system development charges covered under 15.08.250 shall be credited to a capital cash line in the water fund.

[Ord. 2007-12-107; Ord. 2004-10-071; Ord. 2002-03-016]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.250 - WATER RATES AND CHARGES

A. The rates charged for each shut-off or turn-on are:

1. During normal work hours: $25 each; and
2. After normal work hours: $75 each.

B. The hydrant fee assessed for each lineal foot of main extension or portion thereof is: $5.

C. System Development Charges are as follows:

1. For a new or exchanged service:

   (a) Beginning on January 1, 2008 and continuing until December 31, 2008

<table>
<thead>
<tr>
<th>Service Meter Size</th>
<th>System Development Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; x 3/4&quot;</td>
<td>$2,911.00 ($192 Watershed)</td>
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<tr>
<td>3/4&quot; x 3/4&quot;</td>
<td>$4,367.00 ($288 Watershed)</td>
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<td>1&quot;</td>
<td>$7,278.00 ($480 Watershed)</td>
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<td>1-1/2&quot;</td>
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<td>3&quot;</td>
<td>$46,582.00 ($3,075 Watershed)</td>
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<tr>
<td>4&quot;</td>
<td>$72,784.00 ($4,804 Watershed)</td>
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<tr>
<td>6&quot;</td>
<td>$145,568.00 ($9.608 Watershed)</td>
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<tr>
<td>8&quot;</td>
<td>$232,908.00 ($15,373 Watershed)</td>
</tr>
<tr>
<td>10&quot;</td>
<td>$363,919.00 ($24,020 Watershed)</td>
</tr>
</tbody>
</table>

   (b) Beginning on January 1, 2009 and continuing until December 31, 2009, the charge shall be:

<table>
<thead>
<tr>
<th>Service Meter Size</th>
<th>System Development Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; x 3/4&quot;</td>
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<td>8&quot;</td>
<td>$263,897.00 ($30,745 Watershed)</td>
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<tr>
<td>10&quot;</td>
<td>$412,339.00 ($48,040 Watershed)</td>
</tr>
</tbody>
</table>

   (c) Beginning on January 1, 2010 and continuing until December 31, 2010, the charge shall be:
**Service Meter Size System Development Charge**

<table>
<thead>
<tr>
<th>Service Meter Size</th>
<th>System Development Charge</th>
</tr>
</thead>
<tbody>
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<td>5/8&quot; x 3/4&quot;</td>
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<td>10&quot;</td>
<td>$460,760.00 ($72,060 Watershed)</td>
</tr>
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</table>

(d) For service beginning on or after January 1, 2011 and each year thereafter, the charges levied in 2011 shall continue with an annual adjustment each year in January by an inflationary factor tied to the Consumer Price Index, All Urban Consumers (CPI-U), Seattle-Tacoma-Bremerton index.

2. For all services located outside the corporate limits of the City, the demand charge is computed in the same fashion, except that an additional surcharge of 50% is imposed.

3. An Irrigation System Development Charge ("ISDC") is hereby created and shall apply to all new Irrigation Water services.

(a) The charge for an ISDC shall be as follows:

<table>
<thead>
<tr>
<th>Service Meter Size</th>
<th>System Development Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot; x 3/4&quot;</td>
<td>$2,139.00</td>
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<td>3/4&quot; x 3/4&quot;</td>
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<td>$171,099.00</td>
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<td>10&quot;</td>
<td>$267,343.00</td>
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</table>

(b) Irrigation System Development Charges shall be applied to all new irrigation systems that are required to have a dedicated Irrigation Water service. No ISDC shall apply to new irrigation systems that are excepted from that term's definition under **BMC 15.08.010 F**.

D. The following water use rates are:

1. **The rates effective January 1, 2008 shall be:**

   (a) Flat Rate (per month)
   - Single Family Unmetered $21.18
   - Unmetered Duplexes $42.36

   (b) Volume Rates (ccf)
   - Single Family Metered $1.12
   (including duplexes and resale)
   - Non-Single Family $1.12
   (multi-family, commercial, institutional)
   - Irrigation $1.84
(c) Fixed Rates - Single Family (per month)

**Meter Size Per Account Per Meter Equivalent Total Fixed Rate**
5/8"x3/4" $1.59 $7.64 $9.23

- 3/4"x3/4" $1.59 $11.45 $13.04
- 1" $1.59 $19.09 $20.68
- 1.5" $1.59 $38.18 $39.77
- 2" $1.59 $61.09 $62.68
- 3" $1.59 $122.18 $123.77
- 4" $1.59 $190.91 $192.50
- 6" $1.59 $381.82 $383.41

(d) Fixed Rates - Non-Single Family and Irrigation (per month)

**Meter Size Per Account Per Meter Equivalent Total Fixed Rate**
5/8"x3/4" $1.59 $10.51 $12.10

- 3/4"x3/4" $1.59 $15.76 $17.35
- 1" $1.59 $26.26 $27.85
- 1.5" $1.59 $52.53 $54.12
- 2" $1.59 $84.05 $85.64
- 3" $1.59 $168.09 $169.68
- 4" $1.59 $262.64 $264.23
- 6" $1.59 $525.29 $526.88
- 8" $1.59 $840.46 $842.05
- 10" $1.59 $1,313.22 $1,314.81

2. The rates effective January 1, 2009 shall be:

(a) Flat Rate (per month)
- Single Family Unmetered $23.23
- Unmetered Duplexes $42.36

(b) Volume Rates (per ccf)
- Single Family Metered (including duplexes and resale) $1.22
- Non-Single Family (multi-family, commercial, institutional) $1.22
- Irrigation $2.01

(c) Fixed Rates - Single Family (per month)

**Meter Size Per Account Per Meter Equivalent Total Fixed Rate**

- 5/8"x3/4" $1.74 $8.37 $10.11
- 3/4"x3/4" $1.74 $12.57 $14.33
- 1" $1.74 $20.94 $22.68
- 1.5" $1.74 $41.88 $43.62
- 2" $1.74 $67.01 $68.75
- 3" $1.74 $134.04 $135.78
- 4" $1.74 $209.43 $211.17
- 6" $1.74 $418.86 $420.60

(d) Fixed Rates - Non-Single Family and Irrigation (per month)

**Meter Size Per Account Per Meter Equivalent Total Fixed Rate**
3. The rates effective January 1, 2010, shall be:

(a) Flat Rate (per month)
Single Family Unmetered $25.47
Unmetered Duplexes $50.95

(b) Volume Rates (per ccf)
Single Family Metered (including duplexes and resale) $1.32
Non-Single Family (multi-family, commercial, institutional) $1.32
Irrigation $2.11

(c) Fixed rates - Single Family (per month)

<table>
<thead>
<tr>
<th>Meter Size</th>
<th>Per Account</th>
<th>Per Meter Equivalent</th>
<th>Total Fixed Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot;x3/4&quot;</td>
<td>$2.12</td>
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(d) Fixed Rates - Non-Single Family and Irrigation (per month)

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<thead>
<tr>
<th>Meter Size</th>
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<th>Total Fixed Rate</th>
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4. The rates effective January 1, 2011, shall be:

(a) Flat Rate (per month)
Single Family Unmetered $27.72
Unmetered Duplexes $55.43
(b) Volume Rates (per ccf)
Single Family Metered (including duplexes and resale) $1.43
Non-Single Family (multi-family, commercial, institutional) $1.43
Irrigation $2.20

(c) Fixed Rates - Single Family (per month)

<table>
<thead>
<tr>
<th>Meter Size Per Account</th>
<th>Per Meter Equivalent</th>
<th>Total Fixed Rate</th>
</tr>
</thead>
<tbody>
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(d) Fixed Rates - Non-Single Family and Irrigation (per month)

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5. The rates effective January 1, 2012, shall be:

(a) Flat Rate (per month)
Single Family Unmetered $29.96
Unmetered Duplexes $59.92

(b) Volume Rates (per ccf)
Single Family Metered (including duplexes and resale) $1.53
Non-Single Family (multi-family, commercial, institutional) $1.53
Irrigation $2.30

(c) Fixes Rates - Single Family (per month)

<table>
<thead>
<tr>
<th>Meter Size Per Account</th>
<th>Per Meter Equivalent</th>
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(d) Fixed Rates - Non Single Family and Irrigation (per month)

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The foregoing use rates will remain effective until December 31, 2012. Thereafter, beginning on January 1, 2011, the rates may be adjusted annually by the City Council and reflect, at a minimum, an inflationary factor tied to the Consumer Price Index, All Urban Consumers CPI-U (Seattle-Tacoma-Bremerton index).

6. The use rates shall contain the Lake Whatcom Watershed Land acquisition and Preservation Program charges as follows:

   (a) $5.00/month for flat rate, single family residences.
   (b) $10.00/month for flat rate, unmetered duplexes.
   (c) $5.00/month plus a $0.27 per 100 cubic feet of water consumed in excess of 1,100 cubic feet for all metered service accounts.

7. Untreated Industrial Water

   (a) A Monthly Fixed Rate of:
       2008 $13,539
       2009 $13,425
       2010 $13,359

   (b) Volume Rate:

      (i) Block 1 – per ccf up to and equal to 296,000 ccf per month
          2008 $0.067/ccf
          2009 $0.069/ccf
          2010 $0.070/ccf

      (ii) Block 2 – per ccf greater than 296,000 ccf per month
          2008 $0.735/ccf
          2009 $0.745/ccf
          2010 $0.756/ccf

E. The Fire Protection Service rate is $125 per year.

F. The tampering fee is $100 per occurrence.

G. Water rates and charges for services outside the city limits are 150% of the aforementioned rates and charges, except the cost reimbursable installation fee described by this Chapter.
H. The water rate provided for in 15.08.250 (D)(6) shall be used to fund land acquisition and other land preservation measures in the Lake Whatcom Watershed. Acquisitions and other land preservation measures and prioritization of such, and allowed uses and improvements to acquired property shall be determined by the City Council. Land preservation measures include, but are not limited to, items such as purchases of transfer of development rights, conservation easements, access/use rights, and their associated maintenance and administration expenses. Funds generated by the water rate increase may also be used for repayment and debt service on bonds or other financing instruments used to further the stated objectives of watershed land acquisition and other land preservation measures. 250(D)(1), (2) and (3) shall be used to fund land acquisition and other land preservation measures and priorities.

City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 08 WATER SERVICE

15.08.260 - CROSS-CONNECTION CONTROL

A. Abbreviations and Acronyms

DOH - Washington State Department of Health
RCW  - Revised Code of Washington (Laws of the State)
WAC - Washington State Administrative Code

B. Definitions

Approved air gap means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be an air gap approved by the DOH, the separation must be at least:

1. Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and

2. 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 one and one-half inches.

Approved atmospheric vacuum breaker means an atmospheric vacuum breaker of make, model, and size that is approved by the DOH. Atmospheric vacuum breakers that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research, or that are listed, or approved by other nationally recognized testing agencies (such as the International Association of Plumbing and Mechanical Officials, American National Standards Institute, or Underwriter Laboratories) and acceptable to the local administrative authority are considered approved by the DOH.

Approved backflow preventer means an approved air gap, an approved backflow prevention assembly, or an approved atmospheric vacuum breaker, relied upon by the purveyor for the protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventers installed for other purposes.

Approved backflow prevention assembly means a reduced pressure backflow assembly, reduced pressure detector assembly, double check valve assembly, double check detector assembly, pressure vacuum breaker assembly, or spill resistant vacuum breaker assembly, of make, model, and
size that is approved by the DOH. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research, or other nationally recognized testing agencies and acceptable to the local administrative authority are considered approved by the DOH.

**Auxiliary water supply** means a water supply, other than the purveyor's water supply, on or available to the consumer's premises.

**Backflow** means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer's potable water system by means of backpressure or backsiphonage.

**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 the consumer's water system.

**Consumer** means any person receiving water from a point of delivery of the public water system. For purposes of cross-connection control, "consumer" means the owner or operator of a premise receiving water from a point of delivery of the public water system.

**Consumer's water system**, as used in WAC 246-290-490, means any potable and/or industrial water system that begins at a point of delivery from the public water system and is located on the consumer's premises. The consumer's water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

**Contaminant** means a substance present in drinking water that may adversely affect the health of the consumer or the aesthetic qualities of the water.

**Cross-connection** means any actual or potential physical connection between a public water system or the consumer's water system and any source of non-potable liquid, solid, or gas that could contaminate the potable water supply by backflow.

**Cross-connection control program** means the administrative and technical procedures the water purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.

**Cross-connection control specialist** means a person holding a valid Cross-connection control specialist certificate issued by DOH in accordance with chapter 246-292 WAC.

**Director** means Director of Public Works or duly authorized representative.

**DOH** means the Washington State department of health or health officer as identified in a joint plan of operation in accordance with WAC 246-290-030(1).

**High health cross-connection hazard** means a cross-connection that could impair the quality of potable water and create an actual public health hazard through poisoning or spread of disease by a contaminant source.

**Human consumption** means the use of water for drinking, bathing or
showering, hand washing, food preparation, cooking, or oral hygiene.

**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 premise by the installation of an approved air gap or approved backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

**Local administrative authority** means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under chapter 19.27 RCW.

**Low health cross-connection hazard** means a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters.

**Point of delivery** means the point at which the consumer’s water system connects to the public water system.

**Potable** means water suitable for human consumption.

**Premise** means a single building site, or single lot or aggregation of lots tied together by agreement for the purpose of obtaining a building permit or utility service.

**Premise isolation** means a method of protecting a public water system by installation of approved air gap or approved backflow prevention assembly at or near the service connection or alternative location acceptable to the purveyor to isolate the consumer’s water system from the purveyor’s distribution system.

**Public water system** means the water supply source, including all water treatment, storage, transmission, and distribution facilities, to the point of delivery to the consumer.

**Purveyor** means the City of Bellingham, owner and operator of the public water system.

**Service connection** means the point of delivery from which potable water is provided to a single-family residence, or other residential or nonresidential population.

**State board of health** and **board** means the board created by RCW 43.20.030.

**Uniform Plumbing Code** means the code adopted under RCW 19.27.031(4) and amended under chapter 51-46 WAC. This code establishes statewide minimum plumbing standards applicable within the property lines of the consumer’s premises.

**Used water** means water that has left the control of the purveyor.

**C. Applicability**: All consumers with service connections to the purveyor’s public water system.

**D. Purpose**

1. Protect the public water system from contamination due to backflow through cross-connections; and
2. Eliminate or control cross-connections between the public water system and
the consumer's water system.

E. Responsibility

1. The consumer's responsibility for cross-connection control shall begin at the
service connection.

2. Consumers shall be responsible for the:
   a. Elimination of cross-connections when possible; or
   b. Control of cross-connections at the service connection (premise isolation); or
   c. Control of cross-connections, within the consumer's water system, by
      relying on in-premise protection when premise isolation is not required by
      WAC 246-290-490 and this method is approved by the Director.

3. Consumers are responsible for the installation, testing, inspection, repair,
maintenance, and proper operation of approved backflow preventers required
for the control of cross connections between their premise and the public water
system.

F. General Requirements

1. The rules and regulations of the Washington State
   Department of Health as published in WAC 246-290-490 are
   hereby adopted by reference as they may be from time to time
   amended.

2. Consumers shall comply with the City's cross-connection
   control program policies and procedures as they may be from
   time to time amended.

3. An approved backflow preventer is required on all private fire lines,
   appropriate to the assessed degree of cross-connection health hazard, and
   shall incorporate a water meter for detecting water consumption. The
   approved backflow preventer shall be placed such that access for the City is
   provided to physically or electronically read the detecting meter.

4. Consumers shall permit periodic entry to their premise (in
   accordance with BMC 15.04.030), by a cross-connection control
   specialist, for the determination of cross-connection health
   hazards and compliance with cross-connection control
   requirements.

G. Enforcement

1. In the event a consumer fails to comply with cross-connection control
   requirements the Director shall have the authority to issue to the consumer a
   final order to achieve compliance with this Ordinance, WAC 246-290-490, and
   or City cross-connection control policy and procedures. The order shall
   include:

   a. A description of the specific nature, extent and
time of the violation and the damage or potential
damage that reasonably might occur;

b. A notice that the violation cease and desist and, in appropriate cases, the specific corrective actions to be taken;

c. That water service will be denied until corrective actions are completed, or discontinued unless corrective actions are completed within a reasonable time to comply, depending on the circumstances.

d. The address, telephone number and contact person that the consumer may contact if a dispute exists as to the corrective action required;

e. That the consumer may request a hearing with the Hearings Examiner;

f. That the City will charge a turn-on and shut-off fee before service is resumed following discontinuance, and/or impose civil penalties;

g. That the local administrative authority will be notified; and

h. That service will not be shut off while a hearing is pending.

2. The local administrative official shall be notified prior to the City:

a. Denying water service; or

b. Discontinuing water service.

3. When an unprotected connection between the public water system and the consumer’s water system constitutes an imminent threat of contamination to the City’s public water system, water service may be shut off immediately without the notices provided above. In that case, notice of shut-off, corrective action, and appeal procedures and notice to the local administrative official shall be sent immediately upon such action being taken.

H. Civil penalty

1. In addition to any other remedy or sanction available, a consumer who fails to comply with a final order issued by the Director or Hearings Examiner pursuant to this chapter, or who fails to conform to the terms of an approval issued, shall be subject to a civil penalty.

a. Amount of Penalty. The penalty shall be not less than $100 or exceed $5,000 for each violation. Each day of continued violation or repeated violation shall constitute a separate violation.

b. Aiding or Abetting. Any person who, through an act of commission or omission, aids or abets in the violation shall be considered to have committed a violation for the purposes of the civil penalty.
c. **Notice of Penalty.** A civil penalty shall be imposed by the Director, by a notice in writing, which shall be served either by certified mail with return receipt requested or by personal service, to the person incurring the same. The notice shall describe the violation, the date(s) of violation, and shall order the acts constituting the violation to cease and desist, and, in appropriate cases, require necessary corrective action within a specific time.

d. **Appeal of Civil Penalty.** Persons incurring a penalty imposed by the Director may appeal in writing within 10 days of the receipt of the notice of penalty to the Hearings Examiner. The Hearings Examiner shall hold a hearing to consider the appeal and may affirm, modify or reverse the penalty. Review of the Hearings Examiner’s decision may be obtained by filing an action for a writ of certiorari with a court of competent jurisdiction within 10 days of the date of the decision.

2. Penalties imposed under this Section shall become due and payable 10 days after notice of the penalty is mailed or delivered, whichever occurs first, unless an appeal is filed. Whenever an appeal is made, penalties shall become due and payable after a final decision has been issued confirming all or part of the penalty. If the amount of a penalty owed is not paid within the time specified in this Section, the City may take actions necessary to recover such penalty.

3. Penalties shall be paid to the water fund.

I. **Operating Policies:** The Director shall promulgate and implement the City’s policy on cross-connection control for the operation of the Cross-Connection Control Program. The Cross-Connection Control Program policy shall be enforced under the requirements of the City’s Cross-Connection Control Ordinance.

[Ord. 2000-07-045; Ord. 8982 §37, 1981]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.010 - WATER SERVICE ZONE ESTABLISHED

The City Council establishes a water service zone outside the corporate limits of the City, within which water distribution service may be obtained directly from the City and main extensions made to the City's water distribution system, pursuant to the terms and conditions provided in this chapter and within all other applicable statutes, ordinances or City regulations including necessary and appropriate utility-related practices of the City's Department of Public Works. The said water service zone is identified as such on a map, a copy which available at the Public Works Department.

[Ord. 2004-09-063; Ord. 8982 §70 (part), 1981; Ord. 8728 §3, 1979]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.030 - INTERPRETATION OF CHAPTER

A. The terms of this chapter relate principally to the City’s water distribution and sewerage collection (transmission) systems and in no way shall be construed or otherwise inferred to constitute a refusal on the part of the City to treat sewerage otherwise delivered to its sewerage treatment plant or to sell potable water at its point of entrance into the City’s distribution system.

B. While the City operates a combined water and sewerage system, the zones of service outside the City for the respective services are not coterminous and have been so formulated based on areas to which such service had been formerly extended and such other areas which should be so served based on service or system related criteria.

C. Agreement to provide any service to a given area shall in no way whatsoever be construed to constitute approval of the City Council to provide any other service within the same area.

D. It is specifically declared to be the policy of the City only to so expand such service zones or to otherwise contract water distribution and sewerage collection services with districts and associations where the City can be assured that the development which will use the City’s system will not impose adverse impact upon the City.

[Ord. 2004-09-063; Ord. 8728 §5,1979]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.040 - AUTHORITY OF CITY COUNCIL TO EXPAND EXISTING SERVICE ZONES

A. The City Council reserves unto itself the authority to enlarge the herein established water and sewer service zones subject to applicable statutory limitations and procedures. No direct water distribution or sewerage collection service shall be provided to ultimate users outside the corporate limits of the City unless the property to which such service is directed is situated within the established service zones, as provided in this chapter or hereafter modified. In no circumstance whatsoever shall the Public Works Department be empowered to authorize main extensions or itself install such main extensions without the amendment of the applicable service zone as provided in Section 15.36.070 to include the property upon which such extensions are proposed to be laid.

B. The Public Works Director, however, shall be empowered to grant main extensions to serve property outside the direct service zone, but inside the urban growth area, provided the property to be served is single family residential developed to the maximum density practical, the extension is for three units or less, and there is a compelling health-related need to connect to City water and/or sewer. Compelling health-related needs shall be limited to failing septic tanks or wells or to protect environmentally sensitive areas. Where a property is outside the direct service zone, but is inside the urban growth area and abuts a water or sewer main, the Public Works Director shall be authorized to connect the property to the water and/or sewer main in order to avoid installation of a well and/or septic system, provided the property to be served is single family residential developed to the maximum density practical and the connection is for three units or less. In no event shall the Public Works Director be empowered to grant main extensions under this section in the Lake Whatcom Watershed. All decisions regarding requests for extensions in the Lake Whatcom Watershed shall be made by City Council pursuant to the procedures established in this chapter.

[Ord. 2004-09-063; Ord. 9461 §2 (B) 1985; Ord. 8728 §6 1979]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.050 - URBAN SERVICE AREA POLICIES

The City Council adopts the following policies regarding the urban growth area and service extensions:

A. The City identifies and establishes an urban growth area as that area which has been adopted as the valid urban growth area for the City of Bellingham pursuant to RCW 36.70A.110, as such area may from time to time be amended.

B. The City will deliver services (including municipal water, sewer, police and fire protection) within the urban growth area by means of annexation to the City. Where it is determined by the City Council that it is in the best interest of the City and the area seeking service to extend City sewer and water service without annexation, that service may be extended within the urban service area consistent with Chapter 15.36 of Bellingham's Municipal Code (as amended). The extension of City fire and/or police services, including dispatching/communications and other support services, to jurisdictions beyond the City's boundaries may also be permitted by contractual arrangement, in compliance with applicable state laws, where it is determined that such contractual arrangements are in the best interests of the City. Mutual aid agreements between the City and other governmental entities for police and fire protection shall include an agreement not to protest City initiated annexations within the urban growth area unless it is determined by the City Council public safety committee upon the recommendation of the City administration that such an inclusion is not in the best interests of the City.

[Ord. 2004-09-063; Ord. 10899 §2, 1997; Ord. 9461 §1, 1985]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.060 - REQUESTS FOR SERVICE OUTSIDE ESTABLISHED SERVICE ZONES

Requests for service outside the herein established service zones, whether made by an existing water and/or sewer district or association currently contracting with the City, by an existing district or association initially requesting services, by one or more persons proposing to form such an entity or by a person or persons requesting direct service from the City, shall be made in writing on a form approved by the City Attorney to the Director of Public Works of the City. Such request shall be accompanied by the payment of a fee as provided in Section 15.36.110.

[Ord. 8728 §7, 1979]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.070 - ENLARGEMENT OF SERVICE ZONES

Further expansion of the water and/or sewer service zone(s) may be accomplished only in accordance with this chapter. In no event will the City consider incorporating any property into existing service zone(s) where the requesting party is unable to describe the proposed development which would be served by the main extensions which the applicant proposes to install. Neither will the City consider extending water and/or sewer service zones into areas which are not within the City's Urban service area, as described in Section 15.36.065 of this code. Extension of water and/or sewer service zones within the urban service area may be conditional upon the commitment of property owners to annex whenever the City initiates such proceedings. Failure to provide that commitment may result in denial of service by the City, regardless of the reasons for the lack of a commitment.

The City administration will initiate a cost-revenue analysis described in Section 15.38.020 at such time as land valued at 75% of the total assessed valuation of the neighborhood area (as identified in the City Comprehensive Plan for the urban growth area) is to be serviced by City sewer and/or water and has made commitments to annex as a condition of receiving that service. The City may initiate a cost-revenue analysis with any utility extension request, if the City Council deems it appropriate. Based on the results of the cost-revenue analysis and other considerations enumerated in Section 15.38.010, the City Council will determine whether to initiate annexation proceedings for the affected neighborhood area. The City may, but will not necessarily, require annexation prior to extending utilities based on the results of the cost-revenue analysis. As a general rule the Council should have required cost-revenue analysis results before making their utility extension or annexation decision, but they may choose to extend services prior to having those results and without requiring immediate annexation.

Direct water distribution service shall not be provided to any area that is not contiguous to the existing water service zone or the corporate limits of the City. Direct sewerage collection service shall not be provided to any area that is not contiguous to the existing sewer service zone or the corporate limits of the City.

In the event the City Council agrees to the enlargement of one or both of the service zones so as to authorize main extensions, the owner or owners of the property to be so served shall be required to execute an agreement with the City describing the terms and conditions upon which such service is granted and the failure of the owner, a tenant or a successor in interest to comply with the terms and conditions upon which service is granted shall constitute a breach of contract thereby authorizing the Public Works Department to discontinue service altogether.
The procedures for requesting enlargement of the service zones and the criteria which shall be considered in determining whether or not such requests shall be granted shall be exactly the same as are utilized in considering contract services with districts and associations pursuant to BMC Sections 15.36.080, 15.36.090, 15.36.100 and 15.36.110, with the exception that enlargement of service zones may also be denied where the City finds that the affected property should be served by a district or association.

[Ord. 2004-09-063; Ord. 9461 §2(C), 1985; Ord. 8728 §8, 1979]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.080 - CONTRACT SERVICES TO DISTRICTS AND ASSOCIATIONS

A. All contracts for water distribution and/or sewerage collection services, whether new or extensions of existing agreements shall be executed by the Mayor as provided in Section 5.02 of the City Charter. In no event shall the Mayor execute such agreements without the express authorization of the City Council. Requests for such contract services shall first be directed to the Director of Public Works, and shall thereafter be processed as provided in Section 15.36.100. Existing contracts with districts and associations for water distribution and sewerage collection services may be renewed or extended and contracts negotiated with newly formed districts or associations, but all such contracts shall be subject to the terms and conditions of this chapter.

B. All new contracts as well as existing contracts being negotiated for renewal relating to sewerage collection services shall include provisions specifically providing the maximum quantities of effluent that will be accepted for transmission and treatment. All new contracts as well as existing contracts being negotiated for renewal relating to water distribution shall include provisions specifically providing the maximum quantities that will be supplied at the point of distribution.

C. Such contracts shall further specifically prohibit the district or association from enlarging its area of jurisdiction or service without the express approval of the City Council, if such enlargement would in any way affect the obligation of the City to provide services pursuant to an existing contract with that district or association.

[Ord. 2004-09-063; Ord. 8728 §9,1979]
15.36.090 - REQUESTS FOR CONTRACT SERVICES OR ENLARGEMENT OF SERVICE ZONES - PROCEDURE

As provided in Section 15.36.090, all requests for contract services, and all requests for enlargement of either service zone, shall be made to the Director of Public Works. Preliminary consideration of the request shall be directed to service and/or system related matters, including the question of the most appropriate manner of providing the service. The Public Works Department shall prepare a feasibility report with recommendations addressing these issues. Such feasibility report shall be completed within 30 days of the City receipt of the request including all necessary material to make a decision. Should such final report recommend denial of the request, the applicant shall be so notified and if such party requests that the denial be reviewed by the City Council, such request along with the feasibility report and recommendations shall be forwarded to the City Council for review.

In the event the recommendation of the City Council is that the service can be feasibly provided, based on service and/or system related criteria, or where the initial recommendation of the Public Works Director was that the service could be provided based only upon service and/or system related criteria, the request with recommendations shall be forwarded to the Department of Planning and Community Development. The Planning and Community Development Department shall thereafter prepare an impact report with recommendations addressing those criteria set out in Section 15.36.110. It shall be the obligation of the applicant to provide the Planning and Community Development Department with all information reasonably necessary to prepare the impact report. Such report shall be completed within 45 days from the date of receipt of the applicant’s request from the City Council or Public Works Department. Such report as well as a statement of conditions to service that should be included within the contract for services shall thereafter be forwarded to the City Council for final disposition of the request.

Applications for enlargement of service zones and/or contract services shall expire two years after the date a request for service is made to the Director of Public Works, unless an extension, not to exceed one year, is granted by the Director of Public Works.

Following further consideration of the matter by the City Council in public hearing, the City Attorney shall be advised as to whether or not an amendatory ordinance should be prepared enlarging the boundaries of the existing service zone(s) and what terms should be included in the contract for services. In making its determinations the City Council shall consider the recommendation of the administrative departments, and the criteria set out in Section 15.36.110.
as well as any other applicable statutes, ordinances or policies and procedures of the City.

With the exception of those agreements executed pursuant to the Public Works Director’s administrative powers under BMC §15.36.040, a motion to be considered by the City Council to authorize the Mayor to execute any agreement for the extension of utility services shall be required and only made after the formal agreement has been prepared and presented to the City Council for review.

[Ord. 2004-09-063; Ord. 9352 §5 (part), 1984; Ord. 8728 §10, 1979]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.100 - REQUESTS FOR CONTRACT SERVICES OR ENLARGEMENT OF SERVICE ZONES - APPLICATION FEES

A. Requests for enlargement of service zones must be accompanied by the payment of an application fee based upon the proposed development to be served by the property covered by the contract or the property to be included within the enlarged service zone. The City shall collect such application fee in accordance with the schedule as established by City Council resolution.

Requests for contract services within existing service zones shall be accompanied by a payment also established by City Council resolution.

B. In the event the City Council denies a request for service, no further applications for services may be submitted for 6 months following such denial unless the subsequent request is substantially different than the preceding request.

[Ord. 2004-09-063; Ord. 8728 §11, 1979]
15.36.110 - CRITERIA FOR DETERMINING WHETHER SERVICES SHOULD BE PROVIDED

The criteria to be considered in determining whether services should be provided are:

A. The consistency of the proposed development with the following land use plans and development standards acceptable to the city:

1. Consistency with the goals, policies and land use designations in Whatcom County's adopted subarea plan for the area; the applicable goals and policies in Bellingham's Comprehensive Plan; and the provisions of the city/county interlocal agreement related to annexation and development in Bellingham's urban growth area.

2. Consistency with all City design and development standards and environmental regulations;

B. The expected impact such development might have on City streets and arterials as currently developed;

C. For property located within the Lake Whatcom watershed, whether the proposed development might be expected to adversely impact the watershed;

D. Whether or not adequate consideration has been given to retention and discharge of stormwater so as to preclude adverse impact upon the City;

E. Whether it is in the best interests of the city to authorize the requested extension even though sufficient capacity is available within existing transmission lines if the City Council finds that such capacity should be reserved for future development within the corporate limits of the City.

[Ord. 2004-09-063; Ord. 9461 §2(D), 1985: Ord. 8728 §12, 1979]
15.36.120 - BOUNDARY REVIEW BOARD
APPROVAL REQUIRED

As required by RCW 36.93.090(4) relating to the jurisdiction of the county wide boundary review board, no extension of permanent water and/or sewer services outside City's existing service area, as defined in RCW 36.93.090(4), whether within the service zones as herein provided or hereinafter enlarged, or by the City's agreement to provide services pursuant to contract, shall be approved unless the initiators thereof have gained the approval of the Whatcom County boundary review board. For the purposes of this section "extension of permanent service" shall be deemed to be limited to that service which requires the installation of additional water mains or sewer mains whether to be a part of the City's system or a district or association's system.

While it shall be the obligation of the requesting party to process the application through the boundary review board, such requests should not be made in advance of the City's approval to provide service and in the event the applicant gains the approval of the board prior to City approval, the City reserves the right to refuse or to condition any such service.

[Ord. 2004-09-063; Ord. 8728 §13, 1979]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 36 WATER AND SEWER SERVICE OUTSIDE CORPORATE LIMITS

15.36.130 - COUNTY PLAN LAND USE DESIGNATIONS ADOPTION AND PROVISION FOR CREATION OF CITY/COUNTY SUBAREA PLAN FOR BELLINGHAM’S URBAN GROWTH AREA

Pursuant to State Law RCW 35.13.177, the City adopts the land use designations in Whatcom County’s Urban Fringe Subarea Land Use Plan for Bellingham’s northern growth area. The City also adopts, as an interim measure, the land use designations in the Lake Whatcom Subarea Land Use Plan for the Geneva portion of Bellingham’s urban growth area and the land use designations in the Chuckanut/Lake Samish Subarea Land Use Plan for the Yew Street portion of Bellingham’s growth area. The City and County will jointly develop, adopt and update subarea land use plans that contain appropriate City land use designations for all lands in Bellingham’s urban growth area. Until such time as these plans are completed and adopted, lands annexing to the City should, upon annexation, be given City land use designations which most closely match the County’s subarea plan designations.

[Ord. 2004-09-063; Ord. 9461 §3, 1985]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 38 ANNEXATION CRITERIA AND PROCEDURES

15.38.010 - PROPOSAL--CONSIDERATIONS

When considering annexation proposals, the following criteria will be given consideration:

A. Revenues gained by the city through annexation should be at least equal to the additional costs incurred by the city for provision of all city services to the area requesting annexation. The probability of substantial future financial benefit to the city should be considered when deciding on annexation proposals. Where reasonable, newly annexed areas may be required to assume a proportionate share of the city's outstanding bonded indebtedness at the time of annexation. Reasonableness shall be determined by the City Council using the following criteria:

1. Whether and the degree to which the area to be annexed will benefit from the improvements funded by the bonded indebtedness;

2. The obligation of property owners within the area to be annexed to pay other outstanding bonded indebtedness for special district improvements and the extent of that financial burden;

3. Whether other financial obligations (such as LID's) will be placed on property owners upon annexation and the extent of those obligations;

4. The desirability to the city of annexing the area under consideration.

B. Areas to be annexed should be contiguous to current city limits, should have regular, logical boundaries, and should include all, not just part, of a recognized neighborhood or community area. Such community areas should be identified by the city's comprehensive land use plan for the urban service area. Annexation should not create fingers or "islands" of incorporated or unincorporated land.

C. The public health and welfare of areas to be annexed and the city as a whole should be enhanced through annexation and provision of city services.

D. The city should have the capacity to provide the full range of urban services to newly annexed areas in a timely manner without reducing the level of those
services to other city residents and businesses.

**E.** Existing and proposed uses and development standards for areas considered for annexation should be consistent with adopted city plans and standards.

**F.** Consideration should be given to the availability of land within the city for the uses which would be developed upon annexation, encouraging infilling of existing undeveloped areas before extending services which allow similar development in peripheral areas unless there is a benefit to the community at large.

[Ord. 9461 § 4 (part), 1985]
City of Bellingham Municipal Code

Title 15 Water and Sewers
Chapter 38 ANNEXATION CRITERIA AND PROCEDURES

15.38.020 - INFORMATION REQUIRED

In order to adequately assess the merits of annexation proposals, the following information should be gathered, analyzed and presented during city consideration of annexation proposals. This information, together with a similar analysis of the impacts on property owners within the area being proposed for annexation, should be made publicly available, and should be made available to the boundary review board.

A. Statistical Data. Necessary facts including acreage; number of residential units; businesses; industries; estimated population; street mileage, paved and unpaved; assessed valuations; existing utility services; existing parks and playgrounds; schools and public buildings.

B. Maps. Preparation of maps to show present and proposed city boundaries relative to the urban service area, general land use patterns, existing and proposed land use designations, present major trunk water mains and proposed extensions, present sewer interceptors and proposed extensions, existing streets, and existing public areas such as playgrounds and schools.

C. Existing Public Services. Existing public services should be surveyed and evaluated. Affected special districts should be conferred with to assess the impact of annexation. The city should work cooperatively with those special districts to determine the most rational and cost-effective means for providing services to newly annexed areas on both a short and long term basis, within parameters allowed in state statutes RCW 39.34, 35.13, 35.13A, 35A.14, 52.08, 52.22, 56.04, and 57.04. The methods of providing such services should be described, and their costs determined. These would include: police protection, fire protection, water service, sewage collection and disposal, garbage disposal, street maintenance, street lighting, storm sewers, animal control, planning, building inspection, public health protection, recreation, and library services.

D. Urban Services Needs. Urban services such as sanitary sewers, storm sewers, streets, police and fire protection, park and recreational facilities and services should all be analyzed for the need for major capital improvements as well as annual operating needs. Service needs should be evaluated by priority of importance. In determining such priorities, prevailing sentiments of residents in the area should be considered. These prioritized needs should be incorporated into the city's capital improvement program if the proposed annexation is effected.

E. Special Issues. Any special circumstances created by the proposed annexation area should be discussed. This may include infrastructure, public health or public safety problems which the city may or may not be able to cost-effectively resolve, and potential impacts to the city due to development within
proposed annexation areas at the expense of other developable areas within the city.

**F. Service Requirement Costs.** Estimated service requirements should be converted into financial requirements to determine the cost of extending or improving services. Needs and costs should be estimated for 5 years from the time of annexation, projecting a rate of growth which would also be used for projecting revenue estimates. Considerations of service costs should include:

1. **Police protection:** additional personnel, equipment, police station

2. **Fire protection:** additional personnel, equipment, hydrants, fire stations;

3. **Public works:** additional street lighting, maintenance, construction, storm drainage, garbage collection, water and sewer construction and maintenance (including line replacement, pump stations);

4. **Parks and recreation:** additional park acreage, recreational programs, new facilities;

5. **Other city governmental services such as:** library, animal control, planning, building inspection, social service programs.

**G. Estimate of Revenues.** An estimate of potential revenues to accrue from the area should be made, and projected over a 5 year period. Existing methods of raising revenue that the city now has should be applied to the area being considered for annexation. These would include property taxes, state shared revenues, sales taxes, federal revenue sharing, business and occupation taxes, utility taxes, inspection and license fees, planning and zoning charges.

**H. Cost-Revenue Analysis.** The anticipated revenues should be compared with anticipated costs, including both projected additional annual operating expenses and major capital expenses. The cost-revenue analysis should be projected for 5 years in order to gain an understanding of the impact which development of the newly annexed area would have.

**I. Community Identity.** The nature of the area proposed for annexation relative to surrounding unincorporated areas as well as to adjacent city areas should be considered as well.

[Ord. 9461 § 4 (part), 1985]
APPENDIX G

Water Quality Data
City of Bellingham Drinking Water

Of the 237 substances the City of Bellingham tests for, the following table shows those that are regulated by the Environmental Protection Agency and have been detected. As the table shows, the City's treated water is always in compliance.

ppm = parts per million  ppb = parts per billion

<table>
<thead>
<tr>
<th>Detected Substances</th>
<th>2002 (or most recent) Level Detected</th>
<th>Maximum Contaminant Level (MCL) or Action Level (AL)</th>
<th>In Compliance?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disinfection By-products</strong>&lt;br&gt;Total Trihalomethanes &amp; Haloacetic Acids&lt;br&gt;The City establishes compliance for disinfection by-products by sampling 4 times a year. Each sampling consists of 4 sites representing areas of the distribution system, including the furthest point. Trihalomethanes are the most common and haloacetic acids are the next most common of the disinfection by-products.</td>
<td>Bellingham's 2002 running annual average of trihalomethanes of all sites sampled in the distribution system was 26 ppb. The range of detection in the 16 distribution samples was 9.0 to 34 ppb.&lt;br&gt;The running annual average of haloacetic acid of all sites sampled in the distribution system was 14 ppb. The range of detection in the 16 distribution samples was 10 to 15 ppb.</td>
<td>The MCL for Trihalomethane is 80 ppb.&lt;br&gt;The MCL for Haloacetic acid is 60 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Turbidity</strong>&lt;br&gt;The City monitors turbidity continuously at the beginning, middle and end of the treatment process. The turbidity reported for compliance is from the treated water.</td>
<td>Bellingham's single highest turbidity level for treated water in 2002 was 0.07 Nephelometric Turbidity Units (NTU).</td>
<td>Must meet turbidity limit of 0.3 NTU or less, 95 percent of the time, and at no time exceed 1 NTU.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Total &amp; Fecal Coliform Bacteria</strong>&lt;br&gt;The City samples a minimum of 89 sites in the distribution system each month for total and fecal coliform. There were no fecal coliform detections and no total coliform detections.</td>
<td>We had no detection of total or fecal coliform bacteria in our distribution system in 2002.</td>
<td>Allowable highest percentage of total coliform positive samples a month is 5 percent.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Chlorine</strong>&lt;br&gt;Chlorine levels are monitored continuously at the water treatment plant and daily at different points throughout the water distribution system.</td>
<td>Of the 965 chlorine samples taken in the distribution system in 2002, (not utilizing contact reservoir samples), the range of free chlorine residual was 0 to 0.84 ppm with an average of 0.27 ppm.</td>
<td>The current regulation requires a 0.2 ppm minimum at the first house in the distribution system.&lt;br&gt;EPA regulation limits the maximum allowable chlorine level to an average of 4 ppm in the distribution system.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Inorganics</strong>&lt;br&gt;Two inorganic substances were detected in the treated water in 2002.</td>
<td>Of the 28 inorganic substances monitored for in 2002, sodium was detected at 6 ppm and nitrate was detected at .4 ppm.</td>
<td>There is no MCL for sodium but there is a secondary MCL of 90 ppm as a level of concern for those consumers that may need to restrict sodium in their diets.&lt;br&gt;The MCL for nitrate is 10 ppm.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Lead</strong>&lt;br&gt;The homes selected for lead monitoring represented the most at risk of having lead in the water due to plumbing installed prior to the 1988 ban on lead solder.</td>
<td>The 90th percentile value from 65 sites in 2002 was 6 ppb. Two (2) sites were above the action level.</td>
<td>Allowable highest 90th percentile lead level is 15 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Copper</strong>&lt;br&gt;Copper is monitored along with lead in our customers' homes. Since most home water pipes are made of copper, it helps determine the level of corrosion in the system.</td>
<td>The 90th percentile value from 65 sites in 2002 was 87 ppb. No sites were above the action level.</td>
<td>Allowable highest 90th percentile copper level is 1300 ppb.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
## City of Bellingham Drinking Water

### Detected Substances 2003

Of the 937 substances the City of Bellingham tests for, the following table list shows those that are regulated by the Environmental Protection Agency and have been detected.

- ppm = parts per million
- ppb = parts per billion
- NTU = nephelometric turbidity unit

<table>
<thead>
<tr>
<th>Detected Substances</th>
<th>2003 (or most recent) Level Detected</th>
<th>Maximum Contaminant Level (MCL) or Action Level (AL)</th>
<th>In Compliance?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disinfection By-products</strong></td>
<td>Bellingham's 2003 running annual average of trihalomethanes of all sites sampled in the distribution system was 30 ppb. The range of detection in the 16 distribution samples was 21 to 35 ppb. The running annual average of haloacetic acid of all sites sampled in the distribution system was 15 ppb. The range of detection in the 16 distribution samples was 4 to 18 ppb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The MCL for Trihalomethanes is 80 ppb. The MCL for Haloacetic acid is 60 ppb.</td>
<td>Must meet turbidity limit of 0.3 NTU or less, 95 percent of the time, and at no time exceed 1 NTU.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Turbidity</strong></td>
<td>Bellingham's single highest turbidity level for treated water in 2003 was 0.05 Nephelometric Turbidity Units (NTU).</td>
<td>Allowable highest percentage of fecal and total coliform-positive samples a month is 5 percent</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Total &amp; Fecal Coliform Bacteria</strong></td>
<td>Bellingham's highest percentage of total coliform-positive samples for 2003 was 2.4 percent in October. Both sets of follow-up samples were coliform absent. Bellingham had 3 percent positive samples for all other months.</td>
<td>The current regulation requires a 0.2 ppm minimum at the first house in the distribution system. The MCL is 4 ppm free-chlorine residual for a distribution system average.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Chlorine</strong></td>
<td>Of the 963 chlorine samples taken in the distribution system in 2003, (not utilizing contact reservoir samples), the range of free-chlorine residual was 0.01 to 0.66 ppm with an average of 0.20 ppm.</td>
<td>There is no MCL for sodium but there is a secondary MCL of 20 ppm as a level of concern for those consumers that may need to restrict sodium in their diets. The MCL for nitrate is 10 ppm and the MCL for sulfate is 250 ppm.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Inorganics</strong></td>
<td>Of the 28 inorganic substances monitored for in 2003, sodium was detected at 7 ppm, nitrate was detected at 28 ppm, and sulfate was detected at a level of 10 ppm.</td>
<td>Allowable highest 90th percentile lead level is 15 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Lead</strong></td>
<td>The 90th percentile value from 65 sites sampled in 2003 was 6 ppb. Two (2) sites were above the action level.</td>
<td>Allowable highest 90th percentile copper level is 1300 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Copper</strong></td>
<td>The 90th percentile value from 65 sites sampled in 2002 was 87 ppb. No sites were above the action level.</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

Bellingham’s treated water is always in compliance.

For more information contact: Peg Wendling at 676-7689 or pwendling@cob.org
City of Bellingham 2004

Water Quality Monitoring Results

Of the 250 substances the City of Bellingham tests for, the following table shows those that are regulated by the Environmental Protection Agency and have been detected.

<table>
<thead>
<tr>
<th>Detected Substances</th>
<th>2004 (or most recent) Level Detected</th>
<th>Maximum Contaminant Level (MCL) or Action Level (AL)</th>
<th>In Compliance?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISINFECTION BY-PRODUCTS</td>
<td>Bellingham's 2004 running annual average of trihalomethanes of all sites sampled in the distribution system was 33.8 ppb. The range of detection in the 16 distribution samples was 20.6 to 48.9 ppb.</td>
<td>The MCL for trihalomethane is 80 ppb. The MCL for haloacetic acid is 60 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Trihalomethanes &amp; Haloacetic Acids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The City establishes compliance for disinfection by-products by sampling 4 times a year. Each sampling consists of 4 sites representing areas of the distribution system, including the furthest point. Trihalomethanes are the most common and haloacetic acids are the next most common of the disinfection by-products.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TURBIDITY</td>
<td>Bellingham's single highest turbidity level for treated water in 2004 was 0.06 Nephelometric Turbidity Units (NTU).</td>
<td>Must meet turbidity limit of 0.3 NTU or less, 95 percent of the time, and at no time exceed 1 NTU.</td>
<td>Yes</td>
</tr>
<tr>
<td>The City monitors turbidity continuously at the beginning, middle and end of the treatment process. The turbidity reported for compliance is from the treated water.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL &amp; FECAL COLIFORM BACTERIA</td>
<td>Bellingham's highest percentage of total coliform-positive samples for 2004 was 1.2% in January. Both sets of follow-up samples were coliform absent. Bellingham had 0 percent positive samples for all other months.</td>
<td>Allowable highest percentage of total coliform-positive samples a month is 5 percent.</td>
<td>Yes</td>
</tr>
<tr>
<td>The City samples a minimum of 82 sites in the distribution system each month for total and fecal coliform. There were no positive fecal coliform samples and one total coliform detection out of 994 samples.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHLORINE</td>
<td>Of the 994 chlorine samples taken in the distribution system in 2004, (not utilizing contact reservoir samples), the range of free-chlorine residual was 0.01 to 0.77 ppm with an average of 0.26 ppm.</td>
<td>The current regulation requires a 0.2 ppm minimum at the first house in the distribution system.</td>
<td>Yes</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>INORGANICS</td>
<td>Of the 20 inorganic substances monitored for in 2004, sodium was detected at 10 ppm, and sulfate was detected at a level of 12 ppm.</td>
<td>There is no MCL for sodium but there is a secondary MCL of 20 ppm as a level of concern for those consumers that may need to restrict sodium in their diets. The MCL for sulfate is 250 ppm.</td>
<td>Yes</td>
</tr>
<tr>
<td>LEAD</td>
<td>The 90th percentile value from 65 sites sampled in 2002 was 6 ppb. Two sites were above the action level. Testing is required every three years.</td>
<td>Allowable highest 90th percentile lead level is 15 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td>COPPER</td>
<td>The 90th percentile value from 65 sites sampled in 2002 was 87 ppb. No sites were above the action level. Testing is required every three years.</td>
<td>Allowable highest 90th percentile copper level is 1300 ppb.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

ppm = parts per million  
ppb = parts per billion  
NTU = nephelometric turbidity unit
## City of Bellingham 2005 Water Quality Monitoring Results

Of the hundreds of substances the City of Bellingham tests for, the following table shows those that are regulated by the Environmental Protection Agency and have been detected.

<table>
<thead>
<tr>
<th>Detected Substances</th>
<th>2005 (or most recent) Level Detected</th>
<th>Maximum Contaminant Level (MCL) or Action Level</th>
<th>In Compliance?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DISINFECTION BY-PRODUCTS</strong></td>
<td>Bellingham’s 2005 running annual average of trihalomethanes of all sites sampled was 29.2 ppb. The range of detection was 20.5 ppb to 45.0 ppb in a total of 16 distribution system samples. The running annual average of haloacetic acid 5 of all sites sampled was 14.1 ppm. The range of detection was 0.6 ppm to 18.8 ppm in a total of 16 distribution system samples.</td>
<td>The MCL for trihalomethanes is 80 ppb. The MCL for haloacetic acid is 60 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>TURBIDITY</strong></td>
<td>Bellingham’s single highest turbidity level for treated water in 2005 was 0.09 Nephelometric Turbidity Units (NTU).</td>
<td>Compliance means filtered water turbidity shall be less than or equal to 0.3 NTU in at least 95% of the measurements made each month and shall never exceed 1.0 NTU.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>TOTAL &amp; FECAL COLIFORM BACTERIA</strong></td>
<td>Bellingham’s highest percentage of total coliform-positive samples for 2005 was 1.2% in March and October. Both sets of follow-up samples were coliform absent. Bellingham had 0% positive samples for all other months.</td>
<td>Allowable highest percentage of total coliform-positive samples a month is 5 percent.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>CHLORINE</strong></td>
<td>Of the 965 chlorine samples collected in the distribution system in 2005, the range of free-chlorine residual was 0.01 to 0.67 ppm, with an average of 0.26 ppm.</td>
<td>The current regulation requires a 0.2 ppm minimum at the first house in the distribution system. The MRLD is 4 ppm free-chlorine residual for a distribution system average.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>INORGANICS</strong></td>
<td>Of the 26 inorganic substances monitored for in 2005, sodium was detected at 9.8 ppm in treated water entering the City’s distribution system. No volatile organic or synthetic organic compound was detected in treated water in 2005.</td>
<td>There is no MCL for sodium but there is a secondary MCL of 20 ppm as a level of concern for those consumers who may need to restrict sodium in their diets.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>LEAD</strong></td>
<td>The 90th percentile value from 53 sites in 2005 was 6 ppb. Two (2) sites were above the action level (AL).</td>
<td>Allowable highest 90th percentile lead level is 15 ppb.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>COPPER</strong></td>
<td>The 90th percentile value from 53 sites in 2005 was 93 ppb. No sites were above the action level (AL).</td>
<td>Allowable highest 90th percentile copper level is 1300 ppb.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

---

### Impurities and your health

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or human activity. To ensure that tap water is safe to drink, the EPA prescribes regulations to limit the amount of these contaminants in the water provided by public water systems.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency’s Safe Drinking Water Hotline, 800-426-4791.

Cryptosporidium, a parasitic microbe found in most surface water supplies, can pose a potential health threat. If swallowed, it may produce cryptosporidiosis, with symptoms of diarrhea, stomach cramps, upset stomach, and slight fever. Some people are more vulnerable to Cryptosporidium than others.

In 2005 the City of Bellingham tested for Cryptosporidium in both source and treated water monthly. In one instance, the City detected a very low level of Cryptosporidium (0.04 organisms/liter) in the untreated water. The sample taken at the same time of treated water had no detection of Cryptosporidium, nor did any other sample for the year.
The City of Bellingham tests its drinking water for more than 150 substances. The table below shows those that are regulated by the U.S. Environmental Protection Agency (EPA) and were detected in 2006 or during the most recent sampling period prior to 2006. This information is required to be provided to drinking water customers each year.

<table>
<thead>
<tr>
<th>DETECTED SUBSTANCES</th>
<th>2006 (or most recent) LEVEL DETECTED</th>
<th>EPA Maximum Contaminant Level (MCL) or Action Level (AL)</th>
<th>IN COMPLIANCE?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disinfection By-Products:</strong> Total Trihalomethanes (THM) and Haloacetic Acids (HAA). THMs and HAAs are the most common type of disinfection by-products. The City establishes compliance for disinfection by-products by sampling four times a year at four specific sites in our system.*</td>
<td>Bellingham's average disinfection by-product levels for 2006 were: THM: Average: 28.4 ppb Range: 19.1 to 45.1 ppb HAA: Average: 16.0 ppb Range: 4.7 to 22.2 ppb</td>
<td>Average MCL must be: below 80 ppb THM and below 80 ppb HAA</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Free Chlorine Residual:</strong> Chlorine levels are monitored continuously at the water treatment plant and daily at different points throughout the water distribution system.</td>
<td>Of the 983 chlorine samples collected in the distribution system the average chlorine was 0.26 ppm with a range of 0.00 - 0.66 ppm</td>
<td>There is a requirement for a 0.2 ppm minimum chlorine residual to the first customer in the distribution system. There is also an average maximum residual disinfection level (MRDL) of 4.0 ppm in the distribution system.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Lead and Copper:</strong> Lead and copper are monitored every three years in our customers' homes to assess the amount of corrosion occurring in home plumbing. Homes selected are those with leaded solder and copper pipe. The most recent sampling was in 2005.</td>
<td>Lead: The 90th percentile value of 53 homes sampled showed lead at the 6 ppb level. Two homes were above the action level. Copper: The 90th percentile value of the 53 homes sampled was 93 ppb. No sites were above the action level.</td>
<td>The allowable highest 90th percentile values are: Lead: 15 ppb Copper: 1,300 ppb</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Total and Fecal Coliform Bacteria:</strong> The City samples a minimum of 80 sites in the water distribution system each month for indicator bacteria.</td>
<td>Of the 983 samples collected for total and fecal coliform in 2006, none tested positive for either coliform bacteria.</td>
<td>Allowable highest percentage of total coliform positive samples a month is five percent. The presence of any fecal coliform in drinking water samples would require public notification of this problem within 24 hours.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Turbidity:</strong> Turbidity is a measurement of the clarity of the water. The City monitors turbidity continuously at the beginning, middle and end of the treatment process. Turbidity reported for compliance is in the treated water.</td>
<td>Bellingham's single highest turbidity level for 2006 was 0.09 nephelometric turbidity units (NTU).</td>
<td>Compliance means filtered water turbidity shall be less than or equal to 0.3 NTU in at least 95% of the measurements made each month and shall never exceed 1.0 NTU.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Inorganics:</strong> Two inorganic substances were detected in the treated water in 2006. Neither of these substances has a maximum contaminant level, but the City has opted to report these for your information.</td>
<td>Of the 28 inorganic substances monitored in 2006, aluminum and sodium were the only substances detected. Aluminum was found at 0.019 ppm and sodium was detected at 9.8 ppm.</td>
<td>No maximum contaminant level is established for aluminum or sodium but there are secondary maximum contaminant levels set (goals for treated water) of 0.2 ppm for aluminum and 20 ppm for sodium.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*In 2006 the City sampled 11 additional THM and 7 additional HAA sites to assess worse-case scenario levels. The range of detections for these samples was THM: 32–60 ppb. and HAA: 11–13 ppb.

This report provided to customers of the City of Bellingham, Washington, Public Water System ID # 056003 providing water from the Lake Whatcom Reservoir, a surface water source located in Whatcom County. ODW Source ID # 01. Please contact City of Bellingham Laboratory Supervisor Peg Wendling at 676-7689 if you have any questions about your drinking water or this report. Additional information about City of Bellingham drinking water and Lake Whatcom is available at www.cob.org
Pharmaceuticals in Drinking Water

The City of Bellingham tests its drinking water for more than 150 substances. This report is prepared pursuant to the authority of the City of Bellingham, Washington, Public Water System 11, under the authority of the Safe Drinking Water Act (SDWA) of 1974, as amended, and the Clean Water Act (CWA) of 1977, as amended. The City of Bellingham drinking water and Lake Whatcom are available at www.cob.org/waterquality.

What is water conservation?

- Reduce household water demand to improve overall city population growth rate.
- Develop and implement a water conservation education program for the City.
- Develop and implement a water conservation education program for the City.
- Test for the presence of water systems. U.S. Food and Drug Administration (FDA) and Washington State Department of Health prescribe regulations for contaminants in drinking water. These regulations are enforceable in the state of Washington, and they must be followed by all water systems.
- The highest level of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of certain contaminants. The presence of these contaminants does not necessarily indicate that the water poses a threat to health.
- More information about safe drinking water.
APPENDIX H

Model Calibration Results
The purpose of this technical memorandum is to document the steady state model calibration results for the City of Bellingham water system. The “City of Bellingham Field Pressure and Flow Testing Plan” was submitted to the City in April, 2008. The methodology outlined within that technical memorandum was used to conduct field testing throughout the City’s water system.

Field Testing
Field testing was conducted on April 21, 2008 at the locations shown in the field testing plan. There were a total of 16 pressure recording locations and 16 adjacent flow test locations. SCADA data was recorded simultaneously as the testing was conducted. When testing concluded, the SCADA reports were gathered and analyzed to determine system boundary conditions during each of the field tests. Hydraulic model scenarios were set up to simulate the testing conditions that were observed in the field. Boundary conditions in the scenario data sets included:

- Water level elevations for the tanks
- Pump status (on/off), pressure, and flow for each pump station

Calibration Results
The model calibrated to a high level of confidence with the static pressure data across all zones. Generally, the model calibrated to a high level of confidence with the flow, or residual pressure, test results. There were 12 tests that calibrated to a high level of confidence overall, with the model predicting values within 10 percent of the field static pressure results and 15 psi of the field pressure drop. The remaining 4 tests calibrated to a low level of confidence. For these tests, the model predicted static pressures within 5 percent of field results, but estimated pressure drops during residual testing were more than 25 psi different than field values. For 3 of the 4 tests, the model overestimated the pressure drop at the low confidence test locations, resulting in a more conservative prediction. This conservatism is desirable when using the model for planning and preliminary design purposes. The location where the model under predicted the pressure drop was in the closed end Upper Yew pressure zone. In general, the results that were achieved for both the static and residual pressure testing established a high confidence level for the City’s water system model. Table 1 shows the model calibration results.
### Table: Fire Flow Modeling Locations

<table>
<thead>
<tr>
<th>Location ID</th>
<th>Zone</th>
<th>Land Use Classification</th>
<th>Fire Flow Required (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>350 Cordata</td>
<td>Commercial</td>
<td>2,500</td>
</tr>
<tr>
<td>2</td>
<td>350 Cordata</td>
<td>Industrial</td>
<td>3,500</td>
</tr>
<tr>
<td>3</td>
<td>519 Dakin &amp; Yew</td>
<td>Industrial</td>
<td>3,500</td>
</tr>
<tr>
<td>4</td>
<td>276 North</td>
<td>Industrial</td>
<td>3,500</td>
</tr>
<tr>
<td>5</td>
<td>276 North</td>
<td>Institutional</td>
<td>2,000</td>
</tr>
<tr>
<td>6</td>
<td>276 North</td>
<td>Institutional</td>
<td>2,000</td>
</tr>
<tr>
<td>7</td>
<td>730 Alabama Hill</td>
<td>Multi Family Residential</td>
<td>1,500</td>
</tr>
<tr>
<td>8</td>
<td>276 North</td>
<td>Multi Family Residential</td>
<td>1,500</td>
</tr>
<tr>
<td>9</td>
<td>519 Dakin &amp; Yew</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>10</td>
<td>276 North</td>
<td>Commercial</td>
<td>2,500</td>
</tr>
<tr>
<td>11</td>
<td>276 North</td>
<td>Multi Family Residential</td>
<td>1,500</td>
</tr>
<tr>
<td>12</td>
<td>519 Dakin &amp; Yew</td>
<td>Institutional</td>
<td>2,000</td>
</tr>
<tr>
<td>13</td>
<td>696 Padden Yew</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>14</td>
<td>457 South</td>
<td>Commercial</td>
<td>2,500</td>
</tr>
<tr>
<td>15</td>
<td>541 College Way</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>16</td>
<td>870 Upper Yew</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>17</td>
<td>457 South</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>18</td>
<td>873 Governor Road</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>19</td>
<td>696 Padden Yew</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>20</td>
<td>457 South</td>
<td>Single Family Residential</td>
<td>750</td>
</tr>
<tr>
<td>Pressure Zone</td>
<td>Test No.</td>
<td>Field Flow (gpm)</td>
<td>Static Pressure Test</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
<td>------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Field (psi)</td>
</tr>
<tr>
<td>730 Alabama Hill</td>
<td>5</td>
<td>1,240</td>
<td>100</td>
</tr>
<tr>
<td>350 Cordata</td>
<td>1</td>
<td>1,932</td>
<td>86</td>
</tr>
<tr>
<td>350 Cordata</td>
<td>2</td>
<td>1,519</td>
<td>104</td>
</tr>
<tr>
<td>519 Dakin &amp; Yew</td>
<td>4</td>
<td>2,248</td>
<td>142</td>
</tr>
<tr>
<td>519 Dakin &amp; Yew</td>
<td>6</td>
<td>1,048</td>
<td>52</td>
</tr>
<tr>
<td>519 Dakin &amp; Yew</td>
<td>9</td>
<td>1,589</td>
<td>58</td>
</tr>
<tr>
<td>873 Governor Road</td>
<td>14</td>
<td>1,904</td>
<td>104</td>
</tr>
<tr>
<td>276 North</td>
<td>3</td>
<td>1,444</td>
<td>72</td>
</tr>
<tr>
<td>276 North</td>
<td>7</td>
<td>970</td>
<td>86</td>
</tr>
<tr>
<td>276 North</td>
<td>8</td>
<td>1,589</td>
<td>82</td>
</tr>
<tr>
<td>696 Padden &amp; Yew</td>
<td>10</td>
<td>894</td>
<td>110</td>
</tr>
<tr>
<td>696 Padden &amp; Yew</td>
<td>15</td>
<td>1,754</td>
<td>71</td>
</tr>
<tr>
<td>457 South</td>
<td>11</td>
<td>1,146</td>
<td>116</td>
</tr>
<tr>
<td>457 South</td>
<td>16</td>
<td>910</td>
<td>122</td>
</tr>
<tr>
<td>541 College Way</td>
<td>12</td>
<td>925</td>
<td>84</td>
</tr>
<tr>
<td>870 Upper Yew</td>
<td>13</td>
<td>271</td>
<td>90</td>
</tr>
</tbody>
</table>
APPENDIX I

Water Use Efficiency Program
MUNICIPAL WATER LAW REQUIREMENTS

Background

In 2003 the Washington State Legislature passed Engrossed Substitute House Bill 1338, known as the Municipal Water Law (MWL) to address increasing demand on our state’s water resources. The Department of Health (DOH) was directed to oversee and enforce a Water Use Efficiency Program (WUE) to help support the collective goal of ensuring a safe and reliable drinking water supply. The WUE seeks to support this goal in the following ways:

- Contribute to long-term water supply reliability and public health protection
- Promote good stewardship of the state’s water resources
- Ensure efficient operation and management of water systems

This program became effective on January 22, 2007, and established certain responsibilities that water suppliers must fulfill. Fundamental elements include the following:

- Water Use Efficiency Program
- Distribution Leakage Standard
- Goal setting and Performance Reporting
- Metering Requirements

The requirements and deadlines are listed below and in order of due date for Group A municipal water suppliers.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Deadline for municipal water suppliers with 1,000 or more connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin collecting production and consumption data</td>
<td>January 1, 2007</td>
</tr>
<tr>
<td>Include WUE program in planning documents</td>
<td>January 22, 2008</td>
</tr>
<tr>
<td>Set your own WUE goals</td>
<td>January 22, 2008</td>
</tr>
<tr>
<td>Submit service meter installation schedule</td>
<td>July 1, 2008</td>
</tr>
<tr>
<td>Submit first annual performance report</td>
<td>July 1, 2008</td>
</tr>
<tr>
<td>Meet distribution leakage standard (based on 3-year rolling average)</td>
<td>July 1, 2010, or three years after installing all service meters</td>
</tr>
<tr>
<td>Complete installation of all service meters</td>
<td>January 22, 2017</td>
</tr>
</tbody>
</table>
Water Use Efficiency Program
City of Bellingham

**Water Use Efficiency Program**

As part of the Planning Requirements of the WUE, municipal water suppliers are required to collect data, forecast demand, evaluate WUE measures, calculate distribution leakage and implement a WUE program to meet their goals. As of January 1, 2007, water suppliers have been obligated to collect production and consumption data on a regular basis to report in planning documents and annual performance reporting. As part of this data collection, demand forecasting is also an essential component for determining future use and potential savings through a water use efficiency program. A description of the water supplier’s water source and supply characteristics must also be provided.

**Distribution Leakage Standard**

Prior to adoption of the MWL, the Department of Health did not have a set distribution leakage standard, but a 20 percent or less figure was encouraged. Municipal water suppliers must now meet a **10 percent or less** system leakage rate to comply with the new state standard. Leakage must be presented both as a percentage and as leakage volume, and based on a rolling three-year average. Compliance with the distribution leakage standard must be met by July 1, 2010- if unable to meet this standard, a Water Loss Control Action Plan must be developed and implemented which outlines the steps and timelines to get to the leakage rate. Additionally, a meter installation schedule is also required for all service connections currently not metered.

**Goal Setting and Performance Reporting**

Municipal water suppliers must set WUE goals through a public process and report annually on performance to customers and DOH by July 1st of each year. WUE goals established through a public process are for a six-year period, and should be re-evaluated each cycle. Goals must be measurable, address water supply and demand forecasting, and include an implementation schedule for each goal. Performance reports are required to be made available to the public- this requirement may be fulfilled by including the performance report information in the annual Consumer Confidence Report. Annual water system production total, distribution system leakage information, and a description of the WUE goals and progress of achieving them must also be included in this publication.
WATER SUPPLY CHARACTERISTICS

Source

The City of Bellingham (City) water system originates from the rain and snow deposited on the Deming Glacier on Mt. Baker, which then feeds streams that flow into the Middle Fork of the Nooksack River. Water from the Middle Fork is diverted via a dam through an underground tunnel in Bowman Mountain. From here, the water travels to Mirror Lake, where fine sediment settles out, and then on to Anderson Creek and its final destination of Lake Whatcom, which acts as a supply reservoir for the system. Water withdrawn from Lake Whatcom is screened then treated at the water treatment plant, located near Whatcom Falls Park. The current average production from the Water Treatment Plant (WTP) is about 11 million gallons per day (mgd). Treated water is pumped through nine pump stations and stored in one of 14 storage reservoirs placed throughout the City. The combined capacity of the storage reservoirs is 28.43 million gallons (MG). The City’s system has six main pressure zones with storage and seven constant pressure neighborhood zones that do not contain water storage.

EXISTING WATER CONSERVATION PROGRAM

Background

The City has had a water conservation program in place since the early 1990s. Both supply and demand measures have been included in the program, and seek to focus efforts on the customer classes that use the most water as well as seasonal usage issues. Reducing outdoor water use during peak demand periods (summer months) has been promoted through education and outreach. Reductions in indoor water usage have been encouraged through distribution of water conservation kits that contain a low-flow showerhead, faucet aerators, a toilet displacement bag, and water conservation information. A Voluntary Metering Program was established that encourages water conservation and accountability. The City of Bellingham also conducts scheduled annual leak detection on water system zones to ensure efficiency and accountability. Detailed information about the City of Bellingham’s water conservation program can be found in Chapter 4 of the Draft 2008 Water System Plan (DWSP).

Measures

Table 1 below lists the city’s current water conservation measures and the associated sectors they are targeted to. Several of these measures will be continued and expanded upon as part of the WUE program.
Table 1.

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>SECTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Source Meters (S)</td>
<td>X</td>
</tr>
<tr>
<td>B. Service Meters (S)</td>
<td>X</td>
</tr>
<tr>
<td>C. System Leak Detection and Repair (S)</td>
<td>X</td>
</tr>
<tr>
<td>D. Voluntary Metering Program (S)</td>
<td>X</td>
</tr>
<tr>
<td>E. Ordinance adoption/modifications (D)</td>
<td>X</td>
</tr>
<tr>
<td>F. Video Production (D)</td>
<td>X</td>
</tr>
<tr>
<td>G. Water Conservation Kits (D)</td>
<td>X</td>
</tr>
<tr>
<td>H. Water Consumption History on Water Bill (D)</td>
<td>X</td>
</tr>
<tr>
<td>I. Water Conservation Survey (D)</td>
<td>X</td>
</tr>
<tr>
<td>J. Rain Barrel Workshops (D)</td>
<td>X</td>
</tr>
<tr>
<td>K. Sprayhead replacement (D)</td>
<td>X</td>
</tr>
<tr>
<td>L. Public Outreach (D)</td>
<td>X</td>
</tr>
</tbody>
</table>

SF- Single-family residential water customers
MF- Multi-family residential water customers
ICI- Industrial, Commercial, Institutional water customers
(S)- Supply side measure
(D)- Demand side measures

A. Source Meters

At the City’s Water Treatment Plant (WTP), one source meter measures the water entering the facility from the Lake Whatcom Reservoir.

B. Service Meters

Service meters are required on all multi-family, commercial, industrial, irrigation, college & university, and City facility accounts. In 1995, the City adopted municipal code that mandates all new single-family residential (SFR) construction must install meter-ready assembly’s, in 2005 code was amended to state that all new SFR water customers be a metered water customer.

C. System Leak Detection and Repair

The City has been operating a leak detection program on its water system since 1994. A systematic approach to finding and repairing leaks through the distribution system was adopted through annual valve exercising and leak detection equipment. The City has a meter maintenance crew and meter testing facilities to facilitate this process. Meters 3-inch and larger are tested annually, and meters 1.5- to 2-inch are tested every five years. An average of 10 miles of water main in the distribution system has been tested annually since 1994. The City established leak detection zones to prioritize areas of the system that contain water mains that are older and more prone to leaks to conform to state water accountability measures. Due to advances in technology through the industry, the City now contracts with a vendor to continue surveying water main for leaks each year.

D. Voluntary Metering Program

In January 2005, City Council adopted municipal code that established the Voluntary Metering Program (VMP). The City subsidizes a portion of the cost to single-family residential water customers that would like to switch from a
flat-rate water service to a metered water service. The cost to the water
customer to make this switch has been a one-time fee of $150. Goals of the
VMP are to encourage water conservation, work towards metering the
remaining 15,000+ water customers that are flat rate, and allow customers an
opportunity to save money on their water bill.

E. Ordinance Adoption/Modifications

Annual review of existing municipal code and ordinances related to water use
and conservation is on-going and aims to support long-range water resource
planning efforts and goals of the City’s water conservation program.

F. Video Production

The City promotes water conservation through various mediums, video
production being one of them. Public Service Announcements (PSA’s) and
30-minute television segments on outdoor and indoor water conservation are
among these products and are aired on BGTV10 (Bellingham Government
Television Channel 10) and presented at various workshops and events.

G. Water Conservation Kits

Water conservation kits contain a 2.5 gallons per minute (gpm) showerhead,
2.0 gpm kitchen faucet aerator, 1.5 gpm bathroom faucet aerator, toilet tank
bank (flushes with 1 gallon less of water), and water conservation information.
Kits are free to Bellingham water customers and available in two locations.

H. Water Consumption History on Water Bill

In 2006 the City implemented a new customer billing format and template to
include a monthly water consumption chart and message box for water
conservation tips and announcements.

I. Water Conservation Survey

The City has conducted 3 water conservation surveys to single-family
residences over the past 13 years. Two have been in the form of mailers, the
third via telephone. Information solicited in the survey was about customer
attitudes, beliefs, and practices related to water conservation.

J. Rain Barrel Workshops

A rain barrel program has been in place for approximately 5 years, focusing
on education and outreach about outdoor water usage during summer
months. Brochures, workshops, and rain barrel sales have been on-going
and give an opportunity to educate residents about peak demand during low
rain event periods and their role in helping to reduce the problem.

K. Sprayhead Replacement Program

In partnership with Puget Sound Energy, commercial water customers
received commercial water-efficient sprayheads for dishwashing that are 1.6
gpm, compared to conventional that can use up to two times as much water.
L. Public Outreach

Outreach to water customers and residents has been in the form of brochures, booths, presentations, displays, video production, web, and mailers.

Partnerships and Affiliations

The City of Bellingham believes that building strong relationships and partnerships locally, regionally, and nationally helps to better serve the needs of its water customers and community members. Research, support and networking with other utilities, non-profit organizations, and the private sector aide in the planning and protection of our vital resource. The City of Bellingham is a member of the following organizations that promote water conservation:

- Partnership for Water Conservation (http://www.partners4water.org/)
- Alliance for Water Efficiency (http://www.allianceforwaterefficiency.org/)
- American Rainwater Catchment Systems Association (http://www.arcsa.org)
- Whatcom Water Alliance
- Lake Whatcom Management Team (http://lakewhatcom.wsu.edu/)
- WaterSense (http://www.epa.gov/watersense/)
2008-2014 WATER USE EFFICIENCY (WUE) PROGRAM

Adopted Goals and Measures

For the past two years City of Bellingham staff has been researching various water conservation measures that could compliment and expand upon its existing measures, as well as produce greater water savings. As was stated in the previous section above and demonstrated in Chapter 2 of the Draft Water System Plan (DWSP), the largest water customer class and consumer of the City of Bellingham’s water supply is single-family residences. The focus of the water conservation program has been to provide programs and information targeted towards this customer class and to reduce peak demand during periods of low rainfall. After review of historical consumption data, the City of Bellingham determined that this is still an important focus for its programs.

In preparation for the WUE goal and measure adoption, City staff presented to City Council an overview of its existing water conservation program as well as some proposed goals and measures for 2008-2014. The presentation took place on December 10, 2007 at the City Council afternoon Public Works Committee meeting at City Hall. This meeting was open to the public and information was available on the website one week in advance. Staff received input from Council members on the proposed goals and measures for consideration for the formal adoption at the January 14, 2008 meeting.

On January 14, 2008, City Council formally adopted by resolution two Water Use Efficiency Goals and nine measures:

Goals

1. Maintain city-wide per capita daily consumption at an average of 105 gallons per capita per day (gpcd) for residential usage, and 77 gpcd for non-residential usage for the next six years.
2. Keep city-wide water demand equal to or below city population growth rate for the next six years.

Measures

1. Toilet retrofit program for SFR water customers
2. Toilet retrofit program for Multi-family water customers
3. Toilet retrofit program for Commercial customers
4. Develop and implement a water conservation education program for 6th grade students
5. Create lawn-watering door hanger for distribution during peak demand periods to educate water customers about proper outdoor watering techniques
6. Evaluate and Develop High-Efficiency Fixture Program
7. Develop future water rate structures with an emphasis on water conservation
8. Upgrade City Parks to high-efficiency irrigation systems
9. Continue existing public outreach measures

Measures #1-3, toilet retrofit program for SFR, Multi-family, and Commercial water customers, was adopted to focus on reducing water consumption on the largest indoor water consuming fixture (based on usage). These three customer classes also make up the largest water customer base and usage within the utility. Providing financial incentives for these customer classes to replace older, inefficient fixtures can have a substantial impact on the planning and development of future water supply source and infrastructure. A pilot toilet retrofit program will be launched in late 2008 to determine the most appropriate and preferred approach to upgrading older fixtures.

Measure #4, develop and implement a water conservation education program for 6th grade students, will begin late 2008 and early 2009. This measure was adopted to follow-up with existing environmental education programs that have been in progress for 4th and 5th grade elementary school students for the past several years. Research and development of a new water conservation-focused program will look at the appropriate age group and implementation at that level.

Measure #5, lawn watering door hanger for peak demand periods, was developed and implemented summer 2008. The door hanger aims to educate water customers about water conservation and smart watering tips during the summer months when outdoor watering puts the heaviest strain on the water supply. The door hangers will be distributed each summer season annually.

Measure #6, evaluate and develop high efficiency fixture program, is expected to begin late 2008 and continue indefinitely. The goal of this measure is to evaluate existing code and associated impacts of modifying it to accommodate mandatory installation of high efficiency fixtures.

Measure #7, develop future water rate structure with an emphasis on water conservation, is expected to begin in 2010. In 2004 the city adopted a water rate structure based on a cost-of-service model. In 2007, the City Council adopted a schedule of rate increases through 2012. The city will be evaluating inclining block rate structures as well as seasonal rates for feasibility within the city’s water system and customer base.

Measure #8, upgrade city parks to high efficiency irrigation systems, is expected to be evaluated beginning 2012 or as needed per system. This measure will look at existing systems and prioritize those that need upgrades and/or repairs.

Measure #9, continue existing public outreach measures, will continue throughout the duration of the six-year period. The existing public outreach is described above and includes education to the city’s water customers.
Funding for a pilot program for measures #1-3 will be incorporated into the 2009 water conservation budget; measure #4 is budgeted through the existing 2008 budget, and measures #5 and #9 have been paid for through the established 2008 water conservation budget. Measures #6-8 will be financed through budgets in later years. An evaluation of all measures will be on-going throughout the six year period for positive results in water savings, education, and social and environmental benefits; cost-sharing opportunities with other local utilities will also be explored. The adopted measures will continue to be implemented as long as they result in water savings, water conservation education, and are cost-effective to the utility.

The existing water conservation program and newly adopted measures focus primarily on the demand side of water efficiency within the utility customer base. Supply side water efficiency has been addressed for several years through the city’s on-going leak detection program, and will continue in the existing measures option 9. A timeline for the adopted goals and measures can be found in Appendix A.

**Water Meter Installation Schedule**

On August 11, 2008, Bellingham City Council adopted Resolution 2008-26, which outlines the City’s Water Meter Installation Schedule as required by DOH Staff. Scheduled two meetings with Council prior to the adoption meeting that were open to the public and gave a myriad of options the City could look at implementing to meet the state’s metering deadline. Staff were directed by Council on specific options to pursue and schedule over the next several years. This schedule outlines the steps over the next nine years the City will be taking to meet the service meter installation mandate of 2017.
WATER CONSUMPTION

Historical Data

A complete breakdown of water consumption by customer class is provided in Chapter 2 of the City of Bellingham’s 2008 DWSP. From 1990 to 2007, the city has seen a 41% increase in water services and population. Despite these increases, average daily water production has remained steady, fluctuating by approximately 2% on average, which is equal to the 2% average annual population growth rate during the same time period. Of the total water produced, 56% is metered. Figures 1 and 2 displays these trends.

Figures 1. and 2.

As is shown in Table 2 below, the largest number of service connections is made up by the single-family residential customer class, which also happens to be the largest water consumer. This customer class includes both metered and flat-rate water customers, consuming approximately 30% of the total water produced. (Figure 2 above)
### Table 2.

<table>
<thead>
<tr>
<th>Customer Class</th>
<th>Number of Service Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTP Usage</td>
<td>1</td>
</tr>
<tr>
<td>ADU</td>
<td>35</td>
</tr>
<tr>
<td>Colleges &amp; Universities</td>
<td>49</td>
</tr>
<tr>
<td>Commercial General</td>
<td>1,912</td>
</tr>
<tr>
<td>Commercial Lodging</td>
<td>40</td>
</tr>
<tr>
<td>Duplex 1 Svc Single Lot</td>
<td>835</td>
</tr>
<tr>
<td>Duplex 2 Svcs Single Lot</td>
<td>25</td>
</tr>
<tr>
<td>Industrial General</td>
<td>49</td>
</tr>
<tr>
<td>Institution-City</td>
<td>71</td>
</tr>
<tr>
<td>Institution-General</td>
<td>89</td>
</tr>
<tr>
<td>Institution-Public Schools</td>
<td>35</td>
</tr>
<tr>
<td>Institution-Whatcom</td>
<td>14</td>
</tr>
<tr>
<td>Irrigation</td>
<td>419</td>
</tr>
<tr>
<td>MBCS - 1 Svc Duplex</td>
<td>108</td>
</tr>
<tr>
<td>MBCS - 1 Svc SFR</td>
<td>112</td>
</tr>
<tr>
<td>MBCS - 2 Svc Duplex</td>
<td>100</td>
</tr>
<tr>
<td>Multi-Family Apartment</td>
<td>1,265</td>
</tr>
<tr>
<td>Single Family Residence</td>
<td>2,982</td>
</tr>
<tr>
<td>Water District</td>
<td>11</td>
</tr>
<tr>
<td>Unmetered/Flat Rate Consumption:</td>
<td>16,222</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24,374</strong></td>
</tr>
</tbody>
</table>

Historical water demand from the above water customers is presented in Table 3. Average Daily Demand (ADD) represents average daily water production, including unaccounted uses throughout the year, and is used to estimate the total annual amount of supply needed. Maximum Daily Demand (MDD) represents the day of the year during which the maximum water usage occurs as a result of customer consumption. Supply, pumping, and treatment facilities are typically designed with a capacity equal to the projected future MDD.
Table 3.

<table>
<thead>
<tr>
<th>Year</th>
<th>ADD (mgd)</th>
<th>MDD (mgd)</th>
<th>PHD (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>9.48</td>
<td>15.84</td>
<td>23.76</td>
</tr>
<tr>
<td>2001</td>
<td>9.46</td>
<td>15.33</td>
<td>23.00</td>
</tr>
<tr>
<td>2002</td>
<td>10.38</td>
<td>17.91</td>
<td>26.87</td>
</tr>
<tr>
<td>2003</td>
<td>10.63</td>
<td>19.52</td>
<td>29.28</td>
</tr>
<tr>
<td>2004</td>
<td>10.81</td>
<td>20.69</td>
<td>31.04</td>
</tr>
<tr>
<td>2005</td>
<td>10.60</td>
<td>17.77</td>
<td>26.66</td>
</tr>
<tr>
<td>2006</td>
<td>10.85</td>
<td>19.38</td>
<td>29.07</td>
</tr>
<tr>
<td>2007</td>
<td>10.32</td>
<td>18.34</td>
<td>27.51</td>
</tr>
</tbody>
</table>

Peak Hour Demand (PHD) represents the maximum usage that occurs in a 1-hour period during the MDD. PHD is used for sizing distribution system piping and distribution system reservoir storage. Reservoir storage capacity is developed based on a combination of ADD, MDD, and PHD, and their relative differences. The City has developed diurnal demand curves for extended period modeling of the water distribution system based on records from its Supervisory Control and Data Acquisition (SCADA) system. The diurnal curve represents the variation in demand throughout the day as a function of total demand. Based on the data evaluated for the diurnal curve, the PHD/MDD peaking factor is 1.5.

The ratios of MDD/ADD and PHD/MDD are often referred to as “demand ratios” or “peaking factors” and are computed for the purpose of characterizing demand in a given water system. The calculation of the MDD/ADD peaking factor is presented in Table 4. Based on a review of the historical data, the MDD/ADD peaking factor has been as high as 1.92 for the time period evaluated. Therefore, this factor will be applied to generate the projected MDD. The PHD/MDD peaking factor of 1.5 as developed from the diurnal curve will also be applied to generate the projected PHD.

Table 4.

<table>
<thead>
<tr>
<th>Year</th>
<th>MDD/ADD Peaking Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1.67</td>
</tr>
<tr>
<td>2001</td>
<td>1.62</td>
</tr>
<tr>
<td>2002</td>
<td>1.73</td>
</tr>
<tr>
<td>2003</td>
<td>1.84</td>
</tr>
<tr>
<td>2004</td>
<td>1.92</td>
</tr>
<tr>
<td>2005</td>
<td>1.68</td>
</tr>
<tr>
<td>2006</td>
<td>1.79</td>
</tr>
<tr>
<td>2007</td>
<td>1.78</td>
</tr>
</tbody>
</table>
Historical consumption by customer class is shown in Table 5 and Figure 3 below. Flat rate and metered single-family residential water customers make up the largest consumer of water produced.

**Table 5.**

<table>
<thead>
<tr>
<th>Customer Class</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTP Usage</td>
<td>0.17</td>
<td>0.17</td>
<td>0.18</td>
<td>0.17</td>
<td>0.16</td>
<td>0.13</td>
<td>0.14</td>
<td>0.12</td>
<td>0.15</td>
</tr>
<tr>
<td>Flat-rate and Metered Single Family Residential</td>
<td>3.23</td>
<td>3.06</td>
<td>3.72</td>
<td>3.95</td>
<td>3.80</td>
<td>3.55</td>
<td>3.90</td>
<td>3.83</td>
<td>3.63</td>
</tr>
<tr>
<td>Multi-Unit Residential</td>
<td>1.51</td>
<td>1.51</td>
<td>1.67</td>
<td>1.64</td>
<td>1.72</td>
<td>1.70</td>
<td>1.77</td>
<td>1.75</td>
<td>1.66</td>
</tr>
<tr>
<td>Institutional</td>
<td>0.47</td>
<td>0.47</td>
<td>0.40</td>
<td>0.43</td>
<td>0.45</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
<td>0.43</td>
</tr>
<tr>
<td>Commercial</td>
<td>1.80</td>
<td>1.76</td>
<td>1.83</td>
<td>1.84</td>
<td>1.87</td>
<td>1.83</td>
<td>1.85</td>
<td>1.74</td>
<td>1.81</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.31</td>
<td>0.24</td>
<td>0.30</td>
<td>0.32</td>
<td>0.31</td>
<td>0.32</td>
<td>0.33</td>
<td>0.29</td>
<td>0.30</td>
</tr>
<tr>
<td>Irrigation</td>
<td>0.25</td>
<td>0.29</td>
<td>0.47</td>
<td>0.45</td>
<td>0.48</td>
<td>0.44</td>
<td>0.46</td>
<td>0.44</td>
<td>0.41</td>
</tr>
<tr>
<td>Water District †</td>
<td>0.52</td>
<td>0.50</td>
<td>0.50</td>
<td>0.52</td>
<td>0.39</td>
<td>0.33</td>
<td>0.33</td>
<td>0.30</td>
<td>0.42</td>
</tr>
<tr>
<td>Total</td>
<td>8.26</td>
<td>8.01</td>
<td>9.07</td>
<td>9.32</td>
<td>9.17</td>
<td>8.73</td>
<td>9.20</td>
<td>8.89</td>
<td>8.83</td>
</tr>
</tbody>
</table>

† The Water District customer class refers to the purveyors served by the City.
Per capita water consumption for 2000-2007 is presented in Table 6 below. City of Bellingham residential water customers are just above the national average of 101 gallons per capita per day (gpcd). An estimated 60% of daily per capita use is attributed to indoor water usage, and 30% for outdoor use. Due to the high proportion of flat rate single-family residential water customers, the water production and water consumption figures for total residential consumption are estimated based on known metered single-family residential water customer data.

Table 6.

<table>
<thead>
<tr>
<th>Non-Revenue Water Summary</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Consumption</td>
<td>5.50</td>
<td>5.32</td>
<td>6.16</td>
<td>6.34</td>
<td>6.15</td>
<td>5.81</td>
<td>6.22</td>
<td>6.10</td>
<td></td>
</tr>
<tr>
<td>(mgd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Non-Revenue Water</td>
<td>1.22</td>
<td>1.45</td>
<td>1.31</td>
<td>1.31</td>
<td>1.63</td>
<td>1.87</td>
<td>1.65</td>
<td>1.42</td>
<td></td>
</tr>
<tr>
<td>(mgd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Residential</td>
<td>6.72</td>
<td>6.77</td>
<td>7.47</td>
<td>7.65</td>
<td>7.78</td>
<td>7.68</td>
<td>7.87</td>
<td>7.52</td>
<td></td>
</tr>
<tr>
<td>Consumption (mgd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>67,171</td>
<td>68,890</td>
<td>69,260</td>
<td>69,850</td>
<td>71,080</td>
<td>72,320</td>
<td>75,150</td>
<td>75,220</td>
<td></td>
</tr>
<tr>
<td>Residential Per-capita Use</td>
<td>100</td>
<td>98</td>
<td>108</td>
<td>110</td>
<td>109</td>
<td>106</td>
<td>105</td>
<td>100</td>
<td>105</td>
</tr>
<tr>
<td>(gpcd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-residential</td>
<td>2.59</td>
<td>2.51</td>
<td>2.73</td>
<td>2.81</td>
<td>2.87</td>
<td>2.78</td>
<td>2.84</td>
<td>2.67</td>
<td></td>
</tr>
<tr>
<td>Consumption (mgd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment Population</td>
<td>32,350</td>
<td></td>
<td>37,317</td>
<td>38,973</td>
<td>40,814</td>
<td>42,666</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-residential Per-capita</td>
<td>77</td>
<td>1</td>
<td>2</td>
<td>77</td>
<td>71</td>
<td>70</td>
<td>63</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Use (gpcd)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

gpcd = gallons per capita per day

Current Distribution System Leakage (DSL)

Until all City water customers are metered, the City does not need to meet the mandated 10% or less DSL rate. However, included in each Annual Performance Report, the City must include information on its efforts to minimize system leakage. At present, the City’s DSL is approximately 13.9%. The City has had an ongoing leak detection program since the early 1990s. In 2005 and 2006, the City took a more efficient and aggressive approach to its traditional leak detection process, and hired a consultant to increase the mileage in leak detection, surveying 16 miles in 2005 and 25 miles in 2006. Leak detection figures for 2001 and 2002 are significantly higher than more recent years due to the zone area surveyed, which contain water mains constructed in the early 1900s. When the origin of a leak is determined to be on the City water main, the City repairs the leak at its own cost in a timely manner. If the leak is determined to be on the property owner’s water service line, it is the responsibility of the property owner to repair the leak.
Estimated Water Savings

Estimated water savings through the City’s current water conservation program is based on estimated quantitative figures through its water conservation kit distribution to residential water customers, sprayhead replacement program for commercial water customers, and rain barrel sales to residential water customers. Leak detection figures are also included in the water conservation program (Table 7 below).

Table 7.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rain Barrels</th>
<th>H2O Kits</th>
<th>Sprayhead Replacement</th>
<th>Leak Detection</th>
<th>Total Estimated Annual Savings (gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7,884,000</td>
<td>7,884,000</td>
</tr>
<tr>
<td>2001</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14,235,000</td>
<td>22,119,000</td>
</tr>
<tr>
<td>2002</td>
<td>8,954</td>
<td>5,314,400</td>
<td>5,314,400</td>
<td>22,600,800</td>
<td>30,066</td>
</tr>
<tr>
<td>2003</td>
<td>7,220</td>
<td>5,314,400</td>
<td>5,314,400</td>
<td>0</td>
<td>10,801</td>
</tr>
<tr>
<td>2004</td>
<td>0</td>
<td>13,286,000</td>
<td>13,286,000</td>
<td>0</td>
<td>30,066</td>
</tr>
<tr>
<td>2005</td>
<td>10,801</td>
<td>13,286,000</td>
<td>13,286,000</td>
<td>0</td>
<td>36,007</td>
</tr>
<tr>
<td>2006</td>
<td>30,066</td>
<td>13,286,000</td>
<td>13,286,000</td>
<td>0</td>
<td>36,007</td>
</tr>
<tr>
<td>2007</td>
<td>36,007</td>
<td>13,286,000</td>
<td>13,286,000</td>
<td>0</td>
<td>93,108</td>
</tr>
</tbody>
</table>

Water Demand Forecast

Table 8 below demonstrates recent figures for population, number of water services, rainfall and average daily demand.

Table 8.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>% Change Population</th>
<th># Services</th>
<th>% Change Services</th>
<th>Rainfall (in)</th>
<th>ADD (mgd)</th>
<th>% Change Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>67,170</td>
<td>2.27%</td>
<td>21,493</td>
<td>2.37%</td>
<td>28.00</td>
<td>9.48</td>
<td>2.71%</td>
</tr>
<tr>
<td>2001</td>
<td>68,890</td>
<td>2.56%</td>
<td>22,076</td>
<td>2.71%</td>
<td>36.00</td>
<td>9.46</td>
<td>-0.21%</td>
</tr>
<tr>
<td>2002</td>
<td>69,260</td>
<td>0.54%</td>
<td>22,352</td>
<td>1.25%</td>
<td>24.00</td>
<td>10.38</td>
<td>9.73%</td>
</tr>
<tr>
<td>2003</td>
<td>69,850</td>
<td>0.85%</td>
<td>23,240</td>
<td>3.97%</td>
<td>34.00</td>
<td>10.63</td>
<td>2.41%</td>
</tr>
<tr>
<td>2004</td>
<td>71,080</td>
<td>1.76%</td>
<td>23,464</td>
<td>0.96%</td>
<td>35.83</td>
<td>10.80</td>
<td>1.60%</td>
</tr>
<tr>
<td>2005</td>
<td>72,320</td>
<td>1.74%</td>
<td>23,905</td>
<td>1.88%</td>
<td>31.06</td>
<td>10.59</td>
<td>-1.94%</td>
</tr>
<tr>
<td>2006</td>
<td>73,460</td>
<td>1.58%</td>
<td>24,210</td>
<td>1.28%</td>
<td>34.99</td>
<td>10.85</td>
<td>2.46%</td>
</tr>
<tr>
<td>2007</td>
<td>75,220</td>
<td>2.40%</td>
<td>24,573</td>
<td>1.50%</td>
<td>32.03</td>
<td>10.31</td>
<td>-4.98%</td>
</tr>
</tbody>
</table>

If the trends above continue with the City being able to meet its goal of maintaining its current per capita water use throughout the planning period, the ADD and MDD for the City’s system will be reduced 12 percent in 2028 from projections without conservation measures. (Table 9)
Using the population and employment projections and applying the per capita unit demand factors, future water demand requirements for the City’s water distribution system were determined. To project the future water demands, it was also assumed that the unit demand factors and the peaking factors would remain constant through the planning period. The projected water system demands for the required 6-year and 20-year planning periods are summarized in Table 10 and in Figure 4 below.

Table 10.
Reclaimed Water Opportunities

The City of Bellingham recognizes the importance of reuse of treated wastewater in reducing the demand for potable water and coordinating the Water System Plan and the Sewer Comprehensive Plan (see Appendix X). The City of Bellingham’s wastewater treatment facility would serve as the supply of reclaimed wastewater. However, creating reclaimed water would require significant and costly improvements to existing treatment processes to generate the Class-A standard for effluent required for reuse.

The City has considered potential customers for reuse water from two perspectives. One is to identify current large water customers of the city. Table 4-X provides a listing of the top 20 water customers of the city.

<table>
<thead>
<tr>
<th>Last Name</th>
<th>Total Consumption (ccf)¹</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Washington University</td>
<td>113,063</td>
<td>4.31%</td>
</tr>
<tr>
<td>Whatcom County Water District 2</td>
<td>71,783</td>
<td>2.74%</td>
</tr>
<tr>
<td>Whatcom County Water District 7</td>
<td>54,280</td>
<td>2.07%</td>
</tr>
<tr>
<td>Port of Bellingham</td>
<td>52,115</td>
<td>1.99%</td>
</tr>
</tbody>
</table>
**TABLE 4-X**
Top 20 Users of Reclaimed Water Consumption

<table>
<thead>
<tr>
<th>Last Name</th>
<th>Total Consumption (ccf)$^1$</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Bellingham</td>
<td>43,675</td>
<td>1.66%</td>
</tr>
<tr>
<td>Bellingham Cold Storage</td>
<td>43,096</td>
<td>1.64%</td>
</tr>
<tr>
<td>Bellingham School District</td>
<td>33,524</td>
<td>1.28%</td>
</tr>
<tr>
<td>Bellingham Golf and Country</td>
<td>32,415</td>
<td>1.24%</td>
</tr>
<tr>
<td>Saint Joseph’s Hospital</td>
<td>30,798</td>
<td>1.17%</td>
</tr>
<tr>
<td>Haggens</td>
<td>27,995</td>
<td>1.07%</td>
</tr>
<tr>
<td>Bellingham Housing Authority</td>
<td>27,464</td>
<td>1.05%</td>
</tr>
<tr>
<td>Bellis Fair</td>
<td>27,340</td>
<td>1.04%</td>
</tr>
<tr>
<td>Trans-Ocean Products, Inc.</td>
<td>23,470</td>
<td>0.89%</td>
</tr>
<tr>
<td>Habitat Properties, LP</td>
<td>21,916</td>
<td>0.84%</td>
</tr>
<tr>
<td>Britax Heath Tecna, Inc.</td>
<td>21,903</td>
<td>0.83%</td>
</tr>
<tr>
<td>Northwest Health Care Linen</td>
<td>21,131</td>
<td>0.81%</td>
</tr>
<tr>
<td>Kimco Realty Corporation</td>
<td>18,932</td>
<td>0.72%</td>
</tr>
<tr>
<td>Icicle Seafoods</td>
<td>18,882</td>
<td>0.72%</td>
</tr>
<tr>
<td>Whatcom County Administrative Services</td>
<td>17,055</td>
<td>0.65%</td>
</tr>
<tr>
<td>Bornstein Seafoods, Inc.</td>
<td>16,312</td>
<td>0.62%</td>
</tr>
</tbody>
</table>

$^1$Total Consumption measured from 01/01/2007 to 12/31/2007. CCF equals hundred of cubic feet of water.

A review of Table 4-x reveals the following facts. First, many of the largest customers actually represent many smaller points of consumption. For example, Bellingham Housing Authority, Bellingham School District, City of Bellingham, Haggens and Western Washington University. Other large water users are food processors such as Bornstein Seafoods and Icicle Seafoods where reclaimed water use would not be permitted.

Two of the largest city water customers are wholesale customers of the city (Whatcom County Water Districts 2 and 7). The city could not substitute reclaimed water to these wholesale customers.

This assessment still leaves several potential reuse customers from the list of top water users. The city looked at these potential customers and assessed the feasibility of extended reclaimed water service from the wastewater treatment plant to these potential customers. The location of six potential reclaimed water users and their...
locations in relationship to the WWTP are shown on Figure 4-3. An assessment of these potential reclaimed customers revealed the following facts:

- Fairhaven Park is located about 5,000 feet away from the WWTP at about elevation 170 feet.
- Lake Padden golf course is located about 20,000 feet away from the WWTP at about elevation 470 feet. It could potentially use reclaimed water for 3 to 4 months. In addition, the golf course’s proximity to the lake could limit reuse potential.
- Boulevard Park and the new waterfront area is located about 15,000 feet away from the WWTP at about elevation 170 feet. It could potentially use reclaimed water for 3 to 4 months.
- Fairhaven Middle School is located about 3,000 feet away from the WWTP at about elevation 150 feet. It could potentially use reclaimed water for 3 to 4 months.
- Bellingham Golf & Country Club is located about 35,000 feet away from the WWTP at about elevation 170 feet. It could potentially use reclaimed water for 3 to 4 months.
- PSE and the Cogeneration Plant is a peaking power plant that has unpredictable water demands. When operating it uses up to about 200,000 gal/day.

The combination of the costs of adding Class Treatment to the WWTP, and of pumping and piping of reclaimed water to existing potential customers make reuse of treated wastewater economically unfeasible. The cost of the additional treatment would be great. Even greater would be the cost of constructing miles of transmission and distribution pipes to convey the treated wastewater to the points of application. The total amount of water that would be off-set from the City’s supply would be relatively small considering the large cost of additional treatment and conveyance. As a result, reuse of treated wastewater does not make sense for the City of Bellingham at this time and is not something the City will pursue in the during the life of this Water System Plan.

However, the City understands the importance of reuse of treated wastewater in potentially reducing demand for potable water. Bellingham will continue to evaluate the use of reclaimed water and will pursue any viable opportunities that are identified.

**Rate Structure Analysis**

At present, the City uses a “cost-of-service” basis for its water rate structure that was adopted in 2004. The City of Bellingham provides water service to roughly 24,000 customers (91,000 people) inside and outside of its boundaries. Customers pay water rates under a structure the City most recently modified in 2007 through Ordinance No. 2007-12-106, establishing a multi-year rate strategy extending through 2012. In 2010, the City will begin reviewing other water rate structure models that encourage water demand efficiency for consideration for the new rate adoption beginning 2013.
WUE Goals and Measures

Goals:
1. Maintain city-wide per capita daily consumption
2. Keep city-wide water demand equal to or below city population growth rate

Measures:
1. Toilet retrofit program for SFR customers
2. Toilet retrofit program for Multi-family customers
3. Toilet retrofit program for Commercial customers
4. Develop and implement a 6th grade water conservation program
5. Create lawn watering door hanger campaign
6. Evaluate and develop a high-efficiency fixture program
7. Develop future water rate structures with emphasis on water conservation
8. Upgrade city parks to high-efficiency irrigation systems
9. Continue existing public outreach measures
### Anticipated WUE Measure Timeline

#### WUE Goals
1. Maintain city-wide per capita daily consumption
2. Keep city-wide water demand equal to or below city population growth rate

#### WUE MEASURES

<table>
<thead>
<tr>
<th>WUE MEASURES</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Toilet Retrofit Program for SFR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Toilet Retrofit Program for Multi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Toilet Retrofit Program for Comm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 6th Water Conserv. Grade Prog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Lawn watering Doorhanger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. High-Efficiency Fixture Prog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Existing Measures</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Months with an 'X' indicate the measure is in effect.*
### Anticipated WUE Measure Timeline

#### WUE Goals
1. Maintain city-wide per capita daily co
2. Keep city-wide water demand equal 1

#### WUE MEASURES

<table>
<thead>
<tr>
<th>WUE MEASURES</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Toilet Retrofit Program for SFR</td>
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</tr>
<tr>
<td>2. Toilet Retrofit Program for Multi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Toilet Retrofit Program for Comm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 6th Water Conserv. Grade Prog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Lawn watering Doorhanger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. High-Efficiency Fixture Prog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Existing Measures</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX J

Water Rights
CERTIFICATE OF CHANGE
TO CHANGE THE PURPOSE OF USE OF SURFACE WATERS

THIS IS TO CERTIFY THAT the City of Bellingham has complied with the requirements of the Revised Code of Washington, 90.01.200 and 90.01.320, and is hereby granted a change of purpose of use of surface waters as previously granted in Surface Water Right Certificate SI-00547C, recorded in Whatcom County.

That the previous purpose of use was recorded as: municipal supply, industrial and domestic supply – continuously.

That the purpose of use is changed and will be recorded as:
Municipal supply, industrial and domestic supply – continuously.
Power generation – only when water is being transported in the pipeline for the purposes of municipal supply, industrial and domestic supply.

That the instantaneous quantity, source and place of use will remain unchanged and are: 125 cfs, Middle Fork Nooksack River and area served by City of Bellingham.

Given under my hand and seal of this office, Department of Ecology, Northwest Region, this 25 day of June, 1985.

Department of Ecology
Andrea Batty Rinker

RECORDED:
Certificate of Change
Vol. 3, page 56

RECORDED:
Sec'y of Ecology
Jan 6, 2 47 PM 85

[Signature]
[Stamp]

[Stamp]
CERTIFICATE OF WATER RIGHT

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE NUMBER: 81-00376
PERMIT NUMBER: 9855
APPLICATION NUMBER: 13150
PRIORITY DATE: October 6, 1954

01025

CITY OF BELLINGHAM
210 Lottie Street
Bellingham
Washington 98225

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

SOURCES
Middle Fork Hoosac River

TREATMENT OF SURFACE WATERS
Hoosac River

MAXIMUM CUBIC FEET PER SECOND
125.0

MAXIMUM GALLONS PER MINUTE

MAXIMUM ACRE-FT PER YEAR

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply, industrial and domestic supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
South 48° West at distance of 1800 feet from Northeast corner of Sec. 19

RECORDED PLATTED PROPERTY

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by City of Bellingham.
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.

It is further provided that the diversion shall cease when the flow of the Middle Fork of the Nooksack River falls to between 10 and 15 c.f.s. (The exact figure to be determined by study) in the immediate vicinity of the diversion and the diversion intake shall be screened in a manner which is mutually acceptable to the Departments of Fisheries and Geology and the City of Bellingham.

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 90.16.180.

Given under my hand and the seal of this office at Olympia, Washington, this 15th day of September 1976.

J ohn A. Biggs, Director
Department of Ecology

By: N. Jerry Dollar, Assistant Director

For County Use Only

City of Bellingham

Vol. 233 Page 217
STATE OF WASHINGTON
DEPARTMENT OF ECOSYSTEMS
WATER RIGHT CLAIM REGISTRATION

WATER RIGHT CLAIM

1. NAME: City of Bellingham
   ADDRESS: 210 Lottie Street
   Bellingham, Wash. 98225
   PHONE NO: 676-6961

2. SOURCE FROM WHICH THE RIGHT TO TAKEN AND MAKE USE OF WATER IS CLAIMED:
   Lake Whatcom
   (SURFACE OR GROUND WATER)
   Surface Water

A. IF GROUND WATER, THE SOURCE IS: Lake Whatcom
B. IF SURFACE WATER, THE SOURCE IS: Lake Whatcom

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:
   A. QUANTITY OF WATER CLAIMED: 25 MGD Dom.
   PRESENTLY USED: 57 MGD Ind.
   CURIC FEET PER SECOND OR GALLONS PER MINUTE
   B. ANNUAL QUANTITY CLAIMED: 92,000 acre feet
   PRESENTLY USED: 70,730 acre feet
   (ACRE FEET PER YEAR)
   C. IF FOR IRRIGATION, ACRES CLAIMED: 
   PRESENTLY IRRIGATED: 
   D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: Continuously
   E. DATE OF FIRST PUTTING WATER TO USE: MONTH: April
   YEAR: 1883
   F. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL:
   FEET: 990 feet north and 520 feet east from the southwest corner of section 26
   BEING WITHIN T 38 N R 3E (E.O.R.W.) W.M.
   IF THIS IS WITHIN THE LIMITS OF A REGISTERED PLATTED PROPERTY, LOT BLOCK OF

GIVE NAME OF FARM OR ADDRESs:

6. LEGAL DESCRIPTION OF LAND ON WHICH THE WATER IS USED:
   Corporate City of Bellingham

7. PURPOSE(S) FOR WHICH WATER IS USED: Domestic and Industrial

8. THE LEGAL DOCUMENT(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: Appropriation

I, HEREFORBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Theron L. Martin
210 Lottie Street
Bellingham, Wash. 98225

ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE.

PRINTED BY VIEW DIRECTOR ACTIVEX 2.0 DEMO USING VIEW DIRECTOR VERSION 4.110B.
CERTIFICATE OF WATER RIGHT

For rights perfected under original, unassigned or secondary permits,

in accordance with the provisions of Chapter 137, Laws of Washington for 1917, and the regulations of the State
Superintendent of Hydraulics (hereunder)

This is to certify that ___City of Bellingham___
of ___Bellingham___, State of ___Washington___, has made
proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of
the waters of ___Lake Whatcom___, a tributary of ___Reservoir___,
under Permit No. ___-121___, issued by the State Supervisor of Hydraulics, and
that said right to the use of said waters has been perfected in accordance with the laws of Washington,
and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in
Volume ___-5___, on the ___24th___ day of ___May___, 19 ___4___.

The right hereby confirmed dates from ___March 9, 1937___; that the amount of water to
which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount
actually beneficially used for said purposes, and shall not exceed ___20,000 acre-feet___.

A description of the lands under such right to which the water hereby confirmed is appurtenant,
and the place where such water is put to beneficial use, is as follows:

<table>
<thead>
<tr>
<th>PLACE OF USE</th>
<th>LEGAL SUBDIVISION</th>
<th>FOR IRRIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOCATION OF POWER PLANT</th>
<th>LEGAL SUBDIVISION</th>
<th>FOR POWER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location of Impounding Dam:</th>
<th>LEGAL SUBDIVISION</th>
<th>FOR OTHER USES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 Section 39, Chapter 137, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this ___24th___ day
of ___May___, 19 ___4___.

Engineering Date

State Supervisor of Hydraulics.

#70
APPENDIX K

Nooksack Diversion Dam Interim Agreement
Mr. Ken Thomas, Assistant Director  
Department of Public Works  
City of Bellingham  
2221 Pacific Street  
Bellingham, WA 98226-5898

Subject: Nooksack Diversion Dam Interim Agreement

Dear Ken,

I want to thank you for summarizing the interim agreement reached on the operation of the Middle Fork of the Nooksack River Diversion dam for the 1998-99 winter operation period and to clarify our understanding of the meeting that occurred on August 28, 1998.

As you know, the meeting participants were: Brett DeMond and Jeff McGowan from Washington Department of Fish and Wildlife (WDFW), Jim Bucknell and Jeff Marti from the Department of Ecology (Ecology), Ken Thomas and Bill Evans from the City of Bellingham (COB), Bob Kelly and Dale Griggs from the Nooksack Tribe, Leroy Deardorff, Mike McKay, and Jeremy Freimund from the Lummi Nation, and Charles Ahlrichs from STS HydroPower, Ltd.

Brett DeMond (Hydroelectric Project Coordinator for WDFW) requested the meeting with Charles Ahlrichs of STS HydroPower, Ltd to discuss operational issues regarding the Mirror Lake Hydroelectric Project (FERC Project No. 7747-000). Specific issues addressed during the meeting were: screening of the intake, instream flow, ramping rates, monitoring and compliance, and the rule curve for the Lake Whatcom operation. Our understanding of the discussion around each of these issues is summarized below.

**Screening:** A condition of the Small Conduit Facility Exemption for the hydroelectric project is that screening of the intake will be provided during times of operation. The purpose of the screening is to prevent fish from moving into the intake and then being killed by the turbines. Ms. DeMond reported that there have been several documented (photographed) instances when the diversion was operating and the fish screens were either missing or damaged. Mr. Ahlrichs stated that inspections were conducted by their local contractor (Canyon Industries) on an average of twice a week. Inspections reportedly occur more often if there is a lot of debris in the river. Mr. Ahlrichs committed to ensuring that his contractor would have one or more screens on hand with their inspection crews so that damaged or missing screens can be replaced as soon as possible, that the screens would be inspected more frequently, and that monthly operation and maintenance logs transmitted to Brett DeMond would now also include a written record of the diversion screen condition and any maintenance that occurs during each inspection visit.
Instream Flow: A condition of the Small Conduit Facility Exemption for the hydroelectric project is that the instream flow in the Middle Fork Nooksack River will be maintained at 275 cfs or natural flow (if natural flow is less than 275 cfs) at the USGS gaging station located near river mile 5.6 during the period October 1 through January 31. The instream flow during February is to be 525 cfs or natural flow, whichever is less, except that instream flow will be 375 cfs or natural flow, whichever is less, if no steelhead redds are observed during helicopter overflights. Mr. Ahlrichs contested the 525 cfs flow limit during February and stated that, although he did not have documentation, it was his understanding that the IRPP flow of 380 cfs during February was the permit condition. Jeremy reported that the condition for 525 cfs was issued in a letter from WDFW dated after the IRPP flows were established and that the 525 cfs reflects the optimal instream flow for spawning steelhead determined during the Instream Flow Incremental Methodology (IFIM) study conducted as part of the IRPP. This disagreement is to be resolved by WDFW and Mr. Ahlrichs prior to February 1, 1999.

It was noted that the minimum instream flow established by the Washington Instream Resources Protection Program (IRPP) is 275 cfs for the period August 1 through January 31. The WDFW maintained that their conditions on the exemption only apply during the October 1 through February 28 period; achieving other minimum instream flows throughout the year is not part of the Small Conduit Facility Exemption.

During the meeting, the long-standing disagreement over whether or not the IRPP flows, which were established on January 3, 1986 (WAC Chap. 173-501) apply throughout the year to the diversion was discussed. The Lummi Nation maintains that the IRPP is the “study” referred to in the City of Bellingham water right permit and that the resultant minimum instream flows established by the IRPP should be achieved as an interim measure until studies are conducted to quantify the tribal rights to instream flow. The City maintains that the “study” referred to in the water rights permit was to determine if the minimum instream flow is to be 10 or 15 cfs. During the August 28, 1998 meeting, there was agreement to continue to disagree over this issue. It was agreed that a future instream flow study, a study of the impacts of the diverted water on the water quality in Lake Whatcom, provision for future on-Reservation consumptive needs, and discussions related to the on-going Lummi Reservation federal negotiations will likely be necessary to resolve the minimum instream flow questions. It is noted that the Endangered Species Act (ESA) will also likely affect diversions that impact instream flows throughout the Nooksack River watershed.

Despite this disagreement, the City of Bellingham committed to achieving a minimum instream flow of 275 cfs or natural flow, whichever is less, at the USGS gaging station until January 31, 1999. Because the diversion is either on or off, and the diverted quantity of water is about 67 cfs, this commitment means that the diversion will remain off during this period unless the average daily flow at the USGS gaging station exceeds 345 cfs. The diversion is currently off. Any changes in operations will be proceeded by a minimum one-day notification to interested parties. In February 1999, the minimum instream flow will be either 525 cfs or 380 cfs as will be determined by WDFW and Mr. Ahlrichs. As co-managers of the fishery resources with the State of Washington, the Lummi Nation position is that the minimum instream flow during February should be 525 cfs as an interim measure until additional instream flow studies allow a final determination of the Nation’s water rights to instream flow.

Ramping Rates: A condition of the Small Conduit Facility Exemption for the hydroelectric project is that ramping rates during any project startup and shutdown must be established prior to
project operation. Ramping rates refer to how fast the diversion is opened. This condition applies year-round in order to avoid the stranding of fish in the Middle Fork Nooksack River below the diversion dam. It was noted that the required ramping rates have never been established for the project. Ms. DeMond reported that the flow records indicate that ramping rates are excessive. Mr. Ahlrichs reported that during low flow periods, all of the river flow goes into the diversion when the diversion is initially turned on. Flow in the river does not resume until after the tunnel and piping system fills and the excess water overflows the spillway.

Ms. DeMond stated that the maximum allowable ramping rate in Washington is two inches per hour. Mr. Ahlrichs stated that he will draft an approach for ramping consistent with the allowable rate and then conduct experiments during the spring or early summer of 1999 to test the approach. The approach will potentially include phasing in the activation of the turbines.

**Monitoring and Compliance:** Mr. Ahlrichs will add information to his monthly reports to WDFW that address the screen operation and maintenance during each maintenance visit (a minimum of twice per week during operations) and add information on the average daily discharge at the USGS gaging station. If problems are noted in the facility operation, a similar meeting will be reconvened to address them.

**Rule Curve for Lake Whatcom:** The City tries to achieve a Lake Whatcom water surface elevation of 311.5 ft msl during the winter operation period that runs from November 1 through February 28.

Again, I appreciate the City of Bellingham’s willingness to meet the IRPP minimum instream flows as an interim measure during the 1998-99 winter season. I hope that instream flow and the other identified studies can occur in the near term so that a permanent arrangement can be worked out and we can put our conflict over the operation of the Middle Fork Diversion behind us. The City’s willingness to commit to the described operation regime this year is encouraging.

Sincerely,

Merle Jefferson, Executive Director
Lummi Natural Resources Department

cc Robert Anderson, Office of Secretary Babbitt
Bob Kelly, Nooksack Tribe
Jim Bucknell, Ecology
Brett DeMond, WDFW
The following is a summary of the interim agreement between interested agencies in the operation of the Nooksack diversion dam. These procedures were laid out during the meeting on August 28th at the City of Bellingham’s Public works conference room. The meeting was held to voice concerns and to put together a interim standard operating procedure for the diversion dam.

The interim agreement shall be as follows:

1. The minimum flow at the middle fork gauging station through January of 1999 shall be 275 cfs. If the river flow is at or below this flow rate then the diversion system shall remain off-line.

2. In February of 1999 the minimum stream flow shall be either 525 cfs or 380 cfs. This issue will be decided between STS Hydropower and WDFW.

3. In the near future (next couple of months) there will be a permanent agreement written for the operation of the diversion dam. If however, there is not an agreement by January of 1999 the group consisting of the Lummiis, Nooksack, WDFW, DOE, STS, and the City of Bellingham shall meet again for this purpose.

4. During this interim period a chain of notification was established. The purpose of this was to let interested parties know when the diversion dam was to be operated or shutdown. It was decided that a one days notice was sufficient before operation. The following people will be notified by fax machine:

   MIKE MACKAY  Fax # 360 384-4737
   JEFF McGOWAN  Fax # 360 428-1571
   DALE GRIGGS  Fax # 360 592-5753
   CHUCK AHLRICH  Fax # 425 557-4306
   BILL EVANS  Fax # 360 676-7799
   JIM BUCKWELL  Fax # 360 738-6253

BE:cht

C: William McCourt
May 1, 2000

Mr. Bill McCourt, Superintendent
Department of Public Works
City of Bellingham
2221 Pacific Street
Bellingham, WA 98226-5898

Subject: Information on Ramping Rates

Dear Bill,

Pursuant to your telephone conversation with Jeremy Freimund of my staff, enclosed please find the March 15, 1999 meeting notes about the City of Bellingham’s Middle Fork Diversion and the hydropower operation. The meeting notes include the ramping rate criteria for rivers. Also enclosed are excerpts from Technical Report No. 119 forwarded to us by Brett Demond following the meeting.

Sincerely,

[Leroy Deardorff, Director
Environmental Protection Program
Lummi Natural Resources Department]
Middle Fork Diversion Hydropower Operation Meeting
Meeting Notes

Date: March 15, 1999
Time: 9:00 to 11:00 a.m.

Location: City of Bellingham Public Works Building (2221 Pacific Street)

Participants:
Ken Thomas (KT), Assistant Director of Public Works, City of Bellingham
Bill McCourt (BM), Public Works Superintendent, Operations, City of Bellingham
Leroy Deardorff (LD), Environmental Protection Program Director, Lummi Nation
Mike MacKay (MM), Senior Habitat Biologist, Lummi Nation
Jeremy Freimund (JF), Water Resources Division Manager, Lummi Nation
Dale Griggs (DG), Fish Habitat Biologist, Nooksack Tribe
Jim Bucknell (JB), Water Resources Specialist, Department of Ecology
Brett DeMond (BD), Hydroelectric Div., Washington Department of Fish and Wildlife
Jeff McGowan (JM), Habitat Biologist, Washington Department of Fish and Wildlife
Ted Thygesen (TT), Hatchery Division, Washington Department of Fish and Wildlife
Hal Michael (HM), Hatchery Division, Washington Department of Fish and Wildlife
Chuck Ahlrichs (CA), Vice-President, STS Hydropower, Ltd

Note: Hal Michael joined the meeting via a conference telephone.

Agenda:
1. Introductions
2. Instream Flows
3. Ramping Rates
4. Screens

Overview:
The purpose of this meeting was to follow-up on a meeting among many of the same participants that was held on August 28, 1998. A summary of the meeting conclusions on each of the agenda items is presented first followed by a more detailed record of the discussion that occurred during the meeting.

1. Instream Flows
The City of Bellingham will evaluate the extent to which the minimum instream flows established by Washington State on January 3, 1986 (Ch. 173-501 WAC) as part of the Instream Resource Protection Program (IRPP) can be met while still achieving water supply needs. It is understood that these streamflows are interim until further studies can be completed. These studies will be completed either as part of the watershed planning process currently underway as part of ESHB 2514 or as an element of the Lummi Reservation water negotiations. Jeremy Freimund is to provide Bill McCourt with some additional information on Middle Fork Nooksack River streamflows to assist in this evaluation.
2. **Ramping Rates**

STS Hydropower believes that the ramping rate (the rate at which the diversion is either turned on or turned off) is a City of Bellingham/water supply issue rather than a hydropower plant issue. Although during the August 28, 1998 meeting STS Hydropower indicated that they would draft an approach to ramping the operation consistent with the rates allowed by WDFW and then conduct experiments during the spring or early summer of 1999 to test the approach, they no longer plan on conducting the experiments. The City representatives indicated that the maximum ramping rate of 2 inches per hour as a goal is reasonable, but the people in the room did not have the authority to commit the City to a specific ramping rate. The City of Bellingham needs more time to evaluate the diversion operation to determine what is needed to keep the ramping rates below the threshold.

3. **Screens**

There was general agreement that the adequacy of the screens needs to be improved. It is possible that the existing mesh size of the screens does not meet current WDFW standards. The City of Bellingham will evaluate and determine what changes are needed as part of their diversion repair project.

**Record of Discussion**

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Remark</th>
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<tbody>
<tr>
<td><strong>Instream Flow</strong></td>
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<tr>
<td>JB</td>
<td>Gave an overview of the Lummi Reservation water negotiations and the possible range of impacts to the diversion operations. He also provided an overview of the Watershed Management Project underway under ESHB 2514 and related that both efforts will evaluate instream flow needs.</td>
</tr>
<tr>
<td>JF</td>
<td>Reiterated the Lummi Nation position from the August 28, 1998 meeting that the IRPP flows (attached) should be adhered to as an interim measure until the flow studies are completed.</td>
</tr>
<tr>
<td>KT</td>
<td>Philosophically the City of Bellingham agrees with this approach with the proviso that the water supply needs of the City need to be addressed.</td>
</tr>
<tr>
<td>TT</td>
<td>Is concerned about the Lake Whatcom level impacts on the Whatcom Creek fish hatchery. As the lake level goes down, the hydraulic head is reduced and less flow moves through the hatchery. Are the lower lake levels going to be a recurring event?</td>
</tr>
<tr>
<td>KT</td>
<td>Likely yes, a management regime will be developed but greater lake level fluctuations are anticipated.</td>
</tr>
</tbody>
</table>


<table>
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<tr>
<th>Speaker</th>
<th>Remark</th>
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<tbody>
<tr>
<td>HM</td>
<td>The lower lake levels also negatively impact the Kokanee hatchery on Lake Whatcom. The may need to dredge a channel to allow access to the hatchery. Another concern about the Kokanee hatchery is the discussion related to putting a fish ladder on the diversion and the associated potential for disease transmission. The fish ladder issue needs to be further addressed.</td>
</tr>
<tr>
<td>KT</td>
<td>Back to the instream flow issue. The City is voluntarily adhering to the IRPP flows for the most part. The City will conduct a closer evaluation to determine the extent that instream flow needs can be met in the interim.</td>
</tr>
<tr>
<td>MM</td>
<td>Were any helicopter flights taken in February as per the permit exemption conditions placed by WDFW?</td>
</tr>
<tr>
<td>CA</td>
<td>Due to the expense, no helicopter flights taken. STS will not operate the hydropower plant during February unless 525 cfs of instream flow can be maintained.</td>
</tr>
<tr>
<td>JM</td>
<td>Can the disease transmission issue also be addressed as part of the Lake Whatcom studies?</td>
</tr>
<tr>
<td>Several People</td>
<td>Yes</td>
</tr>
<tr>
<td>JF</td>
<td>Summarized his notes on the issue of instream flows (see overview above)</td>
</tr>
</tbody>
</table>

**Ramping Rates**

<table>
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<tr>
<th>Speaker</th>
<th>Remark</th>
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<tbody>
<tr>
<td>CA</td>
<td>The ramping rate is a city issue due to the pipe size. STS conducted some experimentation over the weekend and concluded based on data obtained from the USGS Middle Fork gaging station that 125 turns of the gate results in about 120 cfs diversion; about 90 turns results in about 70 cfs diversion. At a river flow of 350 cfs, to achieve no more than a 2-inch drop, can only open gates to 70 cfs. However, this results in a near instantaneous drop.</td>
</tr>
</tbody>
</table>
| BD      | Brett handed out a one-page excerpt from WDFW Technical Report No. 119 that presents ramping rate guidelines for different seasons and times of day (attached). After reviewing USGS records, the natural recession of hydrographs on the Middle Fork appears to be approximately 2 inches per hour. As a result, opening the diversion on the receding limb of the hydrograph can result in a 4 inch drop per hour. This compounded drop can be avoided if the diversion is
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<td>turned on during the rising limb of the hydrograph.</td>
<td>A threshold value or condition of instream flow needs to be determined where ramping rates are not important (e.g., during a rapidly rising hydrograph where targeted instream flow levels are exceeded).</td>
</tr>
<tr>
<td>CA</td>
<td>The ramping rates result in increased operation costs. These increased costs are particularly problematic due to decreasing revenues that have resulted from reduced operations of the hydropower plant.</td>
</tr>
<tr>
<td>JB</td>
<td>What about automatic gate controls to reduce the ramping rate?</td>
</tr>
<tr>
<td>BM</td>
<td>No power on site - bring power lines to site would be very expensive. Could use a generator.</td>
</tr>
<tr>
<td>BD</td>
<td>Despite the increased operation costs, the ramping rates are a FERC permit exemption requirement.</td>
</tr>
<tr>
<td>CA</td>
<td>It is a water supply issue not a power plant issue. STS will continue to attempt to find a diversion rate that does not exceed the 2-inches per hour threshold. Problem is that there is a lag in the USGS data transmission so it is not possible yet to accurately determine changes in water surface elevation when the gates are being opened.</td>
</tr>
<tr>
<td>KT</td>
<td>The City will attempt to only open the diversion on the ascending limb of the hydrograph to avoid excessive ramping.</td>
</tr>
<tr>
<td>JF</td>
<td>Who operates the diversion? The City or STS Hydropower?</td>
</tr>
<tr>
<td>CA</td>
<td>STS operates the diversion on behalf of the City.</td>
</tr>
<tr>
<td>JF</td>
<td>A staff gage and/or preferably a stilling well with a recorder could be installed on site to determine if the hydrograph is increasing and if the ramping rate exceeds the threshold.</td>
</tr>
<tr>
<td>BM</td>
<td>City needs to do some additional experimenting to determine what is needed to keep ramping rates below threshold.</td>
</tr>
<tr>
<td>MM</td>
<td>Ramping rates are important as they result in stranding. This is a real problem that has been documented on numerous occasions.</td>
</tr>
<tr>
<td>KT</td>
<td>Whether or not the ramping rate criteria applies to only the hydropower interest or to the City also, ESA does apply. The City needs more time to evaluate the issue.</td>
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<tr>
<td>Speaker</td>
<td>Remark</td>
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<tr>
<td>JF</td>
<td>Summarized his notes on the issue of ramping rates (see overview above)</td>
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**Fish Screens**

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Remark</th>
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<tbody>
<tr>
<td>BD</td>
<td>Requested that photographs taken on March 8, 1999 of the diversion be distributed so that the current condition of the screens could be observed. The photographs show that the screens are not seated at the bottom of the trash rack and that cobbles substantially greater than the screen size are in the diversion canal.</td>
</tr>
<tr>
<td>All</td>
<td>The adequacy of the screens needs to be improved. Discussion of the actual practices of cleaning the screens ensued and CA stated that he was not familiar with the actual practices used. JF suggested that one set of screens may be needed to be placed at the bottom of the trash rack and a removable set placed above the lower screens so that cobbles do not get lodged in the trash rack and prevent the screens from being seated properly after removal and cleaning operations. There are currently a total of six screens on the trash rack.</td>
</tr>
<tr>
<td>KT</td>
<td>Proper operation of the existing screens are critical and is a goal of the diversion operation. The City will evaluate and determine what changes are needed as part of the diversion repair.</td>
</tr>
<tr>
<td>JF</td>
<td>Summarized his notes on the issue of fish screens (see overview above)</td>
</tr>
<tr>
<td>All</td>
<td>Decided that JF would draft the meeting notes.</td>
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<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Nooksack River (Middle Fork)</th>
<th>Nooksack River (North Fork nr. Deming)</th>
<th>Nooksack River (South Fork)</th>
</tr>
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<tbody>
<tr>
<td>Jan.</td>
<td>1</td>
<td>275</td>
<td>1100</td>
<td>650</td>
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fluctuations on streams (i.e., average annual flows less than 500 cfs), and at this time, WDF does not have a clearly defined set of criteria to apply to smaller projects. Criteria for these smaller projects will be influenced by site specific observations and future research.

a. Consultation

During consultation, the agencies identify concerns and informational needs, and the applicant collects information and performs studies as requested.

The applicant should identify the fish species present and locate the barriers to anadromous fish passage. This information will give biologists a rough idea of which impacts may occur. Pre-project information on flow, species composition, and fish also serve as a baseline to compare against post-construction information. A life history schedule of the important fish species should be developed to determine time periods when stranding or redd dewatering are likely to occur.

i. Under most circumstances, permanent ramping rate criteria can be established for projects located on rivers, as listed below. These criteria also serve as interim ramping rate criteria for facilities located on streams:

<table>
<thead>
<tr>
<th>Season</th>
<th>Daylight Rates(^3)</th>
<th>Night Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 16 to June 15(^1)</td>
<td>No Ramping</td>
<td>2 inches/hour</td>
</tr>
<tr>
<td>June 16 to October 31(^2)</td>
<td>1 inch/hour</td>
<td>1 inch/hour</td>
</tr>
<tr>
<td>November 1 to February 15</td>
<td>2 inches/hour</td>
<td>2 inches/hour</td>
</tr>
</tbody>
</table>

1  Salmon fry are present
2  Steelhead fry are present
3  Daylight is defined as one hour before sunrise to one hour after sunset

ii. The applicant should collect information for a rating table at the most confined (i.e., narrowest) river transect immediately downstream of the source of the flow fluctuations (i.e., powerhouse, and for run-of-the-river projects, diversion dam). For some projects, this transect will be located close to the tailrace of the project. The location of this transect must be approved by agency biologists. This transect becomes the control point for measuring the ramp rate.
APPENDIX L

Water Shortage Response Plan
WATER SHORTAGE CONTINGENCY PLAN

SUPPLEMENT TO THE BELLINGHAM
WATER SYSTEM PLAN

July 2001
CITY OF BELLINGHAM
WATER SHORTAGE CONTINGENCY PLAN

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  E. Enforcement Procedural Check List and Key Employee Checklist
  F. Rule Curves for Supply and Demand “Triggers”
APPENDIX M

Emergency Response Plan
City of Bellingham

Public Works Department
Emergency Response Plan

Water, Wastewater, Streets and Stormwater

Prepared By:

CH2M HILL

January 2005
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  6 Severe Weather
  7 Water Shortage
  8 Earthquake
9 Medical Emergency
10 Fire/Explosion
11 Aluminum Sulfate Spill at Water Treatment Plant
12 Chlorine Release at Water Treatment Plant
13 Diesel Fuel Spill at Water Treatment Plant
14 Soda Ash Spill at Water Treatment Plant
15 Polymer Spill at Water Treatment Plant
16 Source or Diversion System Destruction/Failure
17 Water Treatment Plant Destruction/Failure
18 Distribution System Destruction/Failure
19 Dam Failure
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  11 Hazardous Materials Spill to Streets or Storm Water System
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  14 Storm Water Retention Dam Failure
  15 Bomb Threat
  16 Unauthorized Entry
  17 Workplace Violence
  18 Civil Disorder/Terrorism

Appendix C - Public Works Incident Management Team Responsibilities

PW Incident Commander
PW Public Information Officer
PW Liaison Officer
PW Safety Officer
PW Operations Section Chief
PW Planning Section Chief
PW Logistics Section Chief
PW Financial Section Chief

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Appendix E - Forms

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E-2 Unit Log

This document contains confidential information and is exempt from public disclosure.
RCW 42.17.310(1)(ww)
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| F-8 | Sample Packaging and Transport |
| F-9 | Accredited Laboratories |
| F-10 | Snow and Ice Control |
# General System Information

## PW Water System

### Emergency Response Plan

<table>
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<th><strong>System ID number</strong></th>
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| **System name and address** | 3201 Arbor Court  
Bellingham, WA 98225 |
| **Directions to the system** | From Interstate 5 take exit 253 to Lakeway Drive. Follow Lakeway Drive approximately 1.5 miles east to Kenoyer Drive. Turn left at Kenoyer Drive light. Turn into Whatcom Falls Park and proceed 0.2 miles. Turn left on Arbor Court and proceed to the main gate of the Water Treatment Plant. |
| **Basic description and location of system facilities** | The Bellingham water system consists of a diversion dam, Lake Whatcom, screenhouse, Lake Whatcom Control Dam, 15 storage reservoirs for a total of 29 million gallons, 12 pump stations, and 363 miles of distribution piping. Drinking water is provided by an in-line filtration plant which employs alum for coagulation, 6 dual media filters, chlorine for disinfection, and soda ash for pH control. |
| **Location** | Bellingham, WA |
| **Population served** | 87,500 |
| **Number of service connections** | 23,500 |
| **System Owner** | City of Bellingham |
| **Emergency Contacts:** |  
**Primary**  
Bill Evans, 360-739-3576  
**Alternate**  
Gary Hess, 360-676-6977  
**After Hours**, 360-676-6896 |
# General System Information

## PW Wastewater System

### Emergency Response Plan

<table>
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<th>System permit number</th>
<th>WA-002374-4</th>
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| System name and address | Post Point Wastewater Treatment Plant  
200 McKenzie Avenue  
Bellingham, WA  98225 |
| Directions to the system | From Interstate 5, take exit #250. Go west on Old Fairhaven Parkway to 12th Street. Take 12th Street north three blocks to Harris Street, and turn left. Follow Harris Street for six blocks, turn left onto 4th Street, and turn right onto McKenzie Avenue. Follow McKenzie Avenue into the plant site. |
| Basic description and location of system facilities | The Bellingham wastewater system consists of 312 miles of sewerage collection piping, 26 pumping stations, and the Post Point Wastewater Treatment Plant.  
The Post Point Wastewater Treatment Plant incorporates preliminary, primary, and secondary treatment, followed by chlorination and dechlorination. Effluent is discharged into Bellingham Bay via two separate outfall pipes. |
| Location | Bellingham, WA |
| Population served | 87,500 |
| System Owner | City of Bellingham |
| Emergency Contacts: | |
| Primary | Larry Bateman, 360-676-6977 |
| Alternate | Mike Sowers, 360-676-6937  
Gary Hess, 360-676-6977 |
| After Hours, 360-676-6896 |
General System Information

PW Streets and Storm Water System
Emergency Response Plan

<table>
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<th>Basic description and location of system facilities</th>
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<td>The Bellingham streets system includes approximately 250 miles of street, 219 miles of sidewalk, 41 miles of alleys, 33 bridges, and 18,300 feet of guardrails. The Bellingham drainage system is a network of open ditches, closed ditches, catch basins, retention ponds, and creeks that control runoff from storms and other sources in order to minimize its impact.</td>
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Location: Bellingham, WA
Population served: 87,500
System Owner: City of Bellingham

Emergency Contacts:
Primary: Jeff Thistle, 360-676-6850 x208
Alternate Streets: Bill Dom, 360-676-6850 x107
Alternate Storm: Scott Brown-Davis, 360-676-6850 x117
November 6, 2008

Craig L. Riley, P.E.
State of Washington
Department of Health
1500 West Fourth Ave, Suite 403
Spokane, WA 99204-1656

Dear Mr. Riley:

RE: City of Bellingham, Whatcom County, Comprehensive Sewer Plan,
DOH Project #: R07-31, Response to DOH Comments

This letter is in response to Department of Health comments regarding how the City’s Comprehensive Sewer Plan addresses water reclamation opportunities. The City’s Draft Water System Plan has identified “Recycling/Reuse” as a conservation program measure. The City recognizes the importance of coordinating the Water System Plan and the Sewer Comprehensive Plan. The Draft Water System Plan will have additional language added regarding water reclamation, including identifying potential reuse opportunities, public outreach programs, and pursuing industrial and commercial partnerships.

The City understands the importance of reuse of treated wastewater in reducing the demand for potable water. Potential users of reclaimed water have been identified including nearby parks and golf courses; however, the City’s wastewater treatment facility would require additional treatment process to bring it up to the required Class-A standard for reuse at these locations. The cost of the additional treatment and construction of miles of transmission and distribution pipes to convey the treated wastewater to the points of application would be great. The total amount of water that would be off-set from the City’s Lake Whatcom supply would be relatively small considering the large cost of additional treatment and conveyance. As a result, reuse of treated wastewater is not currently economically feasible.

The City will continue to evaluate the use of reclaimed water and will pursue any viable opportunities that are identified. We look forward to the approval of the City’s Sewer Comprehensive Plan, please contact me at (360) 778-7900 if you have any additional questions.

Sincerely,

Dick McKinley
Public Works Director

c: Brian Matson, Carollo Engineering
   Martin Kjelstad, Project Engineer
APPENDIX O

Whatcom Watershed Sampling Site Locations
Lake Whatcom Monitoring Project
2004/2005 Final Report

Dr. Robin A. Matthews,
Mr. Mike Hilles
Ms. Joan Vandersypen
Institute for Watershed Studies,
Western Washington University

Dr. Robert J. Mitchell
Geology Department
Western Washington University

Dr. Geoffrey B. Matthews
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This figure was created using source files provided by Gerald Gabrisch using data obtained from Western Washington University, Skagit County, the Nooksack Tribe, and the City of Bellingham.

Figure A1: Lake Whatcom 2004/2005 lake sampling sites.
This figure was created using source files provided by Gerald Gabrisch using data obtained from Western Washington University, Skagit County, the Nooksack Tribe, and the City of Bellingham.

Figure A2: Lake Whatcom 2004/2005 creek sampling sites.
WATER SYSTEM OPERATIONS MANUAL

Volume I
Water Supply and Treatment
Chapters 1-4

City of Bellingham, Washington
Public Works Department

Prepared by:

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Edited by:

Kelly Reed and Cherry Thomas
Department of Public Works
Operations Division
WATER SYSTEM OPERATIONS MANUAL

Volume II
Water System Operation
Chapters 5-8 and Appendices

City of Bellingham, Washington
Public Works Department

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JOB SUMMARY:

The Public Works Superintendent of Operations is responsible for management of the operation and maintenance of the City's watershed, water supply, water treatment, water distribution and wastewater treatment systems. This includes responsibility for water/wastewater treatment management, budgets, process control systems, quality standards, laboratory services, distribution activities and for overall supervision of supervisors and personnel in both the plants and distribution groups. The person in this position ensures that all federal, state, and local regulations are met and that departmental policies and procedures are followed to provide a safe, dependable and cost-effective operation of the municipal water and wastewater facilities. This position is responsible for the City's water and sewer utility which includes establishing business practices, rates and long-range plans.

SUPERVISORY RELATIONSHIP:

Reports to the Assistant Director of Public Works/Operations Division. Serves as a member of the Public Works management team. Supervises staff members who oversee the day-to-day operations of the Wastewater Treatment Plant, wastewater collection system, Water Treatment Plant, water distribution system, maintenance of plants, and monitoring of water and wastewater quality. Works independently under well-established Departmental and City policies and procedures as well as standards of the American Water Works Association (AWWA) and Water Environment Federation (WEF).

ESSENTIAL FUNCTIONS OF THE JOB:

1. Supervises and directs the City's Water Utility and components of the Sewer Utility. Is responsible for the management of the Water Fund, the utility business plan, the computation of utility water/sewer rates, the water conservation program and is part of the City's utility billing management team.

2. Manages and provides overall supervision and direction to the operation and maintenance of the Lake Whatcom Watershed and the raw water supply system including the diversion structures, conduits, pipeline, and water courses.

3. Acts as the City's Water Supply Manager by providing overall supervision for the operation and maintenance of the water filtration and distribution facilities including the supply intake, screenhouse, filtration plant, pump stations, and reservoirs.

4. Manages and provides overall supervision for the operation and maintenance of the City's wastewater treatment plant, incinerators, and lift stations.

5. Manages and provides overall supervision for laboratory services including water quality, wastewater, and environmental assessment.
6. Manages and provides overall supervision for the operation and maintenance of the water distribution system; manages activities of the operations utility unit.

7. Develops maintenance planning schedules and recommends physical improvements necessary or desirable to maintain or improve efficient operation of the water distribution system.

8. Plans annual work schedules and prioritizes projects taking into account the resources of the Department and the Public Works Department's overall progress and goals. Schedules preventative maintenance and emergency repairs.

9. Leads and provides overall coordination and supervision in the implementation of new rules, regulations, and standards and ensures compliance with all applicable policies and practices.

10. Responsible for personnel functions for areas supervised including organization plans, staffing, employee training and professional development, performance appraisals, disciplinary actions and final selection of employees.

11. Prepares annual budgets for assigned responsibilities and operates facilities and systems within fiscal constraints. Prepares recommendations for the annual capital improvement program.

12. Guides development, with engineering and other resources, of short and long-range water and wastewater plans and programs.

13. Leads and coordinates, in conjunction with other personnel, the Public Works/Plants division public education and community relations activities. Supervises consumer and community service activities such as utility locations, complaint investigation, claims and citizen inquiries.

**ADDITIONAL WORK PERFORMED:**

1. Performs project and committee responsibilities and serves as a member of the Public Works management team.

2. Coordinates and performs consultant selection and liaison activities in support of the Public Works project manager and project management team.

3. Prepares contract proposals, cost estimates and construction specifications for construction contract work in the areas of assigned responsibility.

4. Performs other duties and responsibilities as assigned.

**PERFORMANCE REQUIREMENTS (Knowledge, Skills, and Abilities):**

- Thorough knowledge of both water and wastewater treatment plant theory and operation including knowledge of maintenance practices, hydraulics, chemistry, laboratory testing, bacteriology, and microbiology.

- Thorough knowledge of both water and wastewater treatment plant process controls including knowledge of computerized systems and programs.

- Thorough knowledge of the field of water distribution and operations utility engineering, including legal, technical and organizational aspects, as well as sources of current knowledge of the field.
Strong management skills including leadership, supervision, problem analysis, planning and organization and decision making, interpersonal sensitivity, adaptability/flexibility, stress tolerance, and time management.

- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.
- Strong knowledge and ability in fiscal management including cost analysis, budget development and analysis.
- Excellent written and oral communication skills for working with a diversity of personnel, public officials, and citizens.
- Ability to plan, organize and execute programs.
- Ability to lead and respond effectively in emergency, hazardous, or other high stress circumstances.
- Willingness to accept on-call status and be available to respond to on-call circumstances.
- Physical ability to perform essential functions of the job.

**WORKING ENVIRONMENT:**

Work is carried out both in an office setting and out of doors in all weather conditions. Business travel is required.

**EXPERIENCE AND TRAINING REQUIREMENTS:**

- B. S. in Civil Engineering, Environmental Sciences or related field.
- Six years of experience required in a comparable water and/or wastewater system involving automated systems. Must include two years of management experience with responsibility for operation and maintenance of treatment system(s), budgets, standards development; and supervision and training of laboratory, maintenance, and operations staff. Experience with full responsibility as an operations manager preferred.
- A combination of education and experience that provides the applicant with the required skills and abilities will be considered.

**NECESSARY SPECIAL REQUIREMENTS:**

- Valid Washington State driver’s license and good driving record. A three-year driving abstract must be submitted at time of hire.
- Must possess a minimum of one of the following Washington State Certificates of Competency at time of hire and be able to obtain the others within 30 months of hire:
  - Water Treatment Plant Operator IV
  - Water Distribution Manager IV
  - Wastewater Treatment Plant Operator IV

Comparable certifications obtained in other states will be evaluated on a case-by-case basis.

NOTE: Substitutions for education and training requirements are available as outlined in:
Water Certification - Washington Administrative Code 246.292.060, 12/27/90;
Position reclassified to Department Manager 2 effective 1-1-07 as result of market salary study
CITY OF BELLINGHAM

CLASSIFICATION SPECIFICATION

CLASS TITLE: UTILITY OPERATIONS ENGINEER
DEPARTMENT: Public Works\Engineering

NATURE OF WORK:

Performs a variety of civil engineering duties for the City's water and sewer systems. Identifies, analyzes and resolves system needs. Provides guidance and technical information to the Department and the public in the field of water and sewer system management.

DISTINGUISHING CHARACTERISTICS:

The Utility Operations Engineer position is distinguished from the senior-level engineering technician positions by the former's responsibility for developing engineering guidelines and standards, working directly with other engineers, providing guidance in resolution of issues particular to the specialty field, completing complex technical reports and studies, and reviewing studies completed by private engineers.

SUPERVISORY RELATIONSHIPS:

Reports to the Superintendent of Operations. Works independently under informal supervision, appropriate utility engineering standards and applicable City regulations, policies, and guidelines.

ESSENTIAL FUNCTIONS:

1. Assists Development Section in computer modeling for proper water and sewer main sizing for any new development and/or future development. Facilitates the design of water and sewer systems through modeling.

2. Creates, modifies and uses both the water and sewer hydraulic computer models. Updates both models with the addition of new pipes that are added to the systems each year and corrects modeling parameters as necessary.

3. Sits on the City's Public Utilities Replacement Committee (PURC). Analyzes each system using both the hydraulic models and rating criteria and develops a recommended list for the City's annual water and sewer replacement program.

4. Meets with consultants, engineers and citizens to answer questions or concerns regarding the City's water and sewer system. Assists in new development planning to determine the required pipe sizing that will meet system demands.

5. Assists in the review of technical memos completed by consultants, engineers for City projects related to the City's wastewater system and water systems.
6. Provides computer model fire flow information to consultants, engineers and sprinkler design companies to assist in the design of their projects. Reviews studies completed by private engineers and assures accuracy using hydraulic models.

7. Reviews construction plans submitted to the City and verifies that the water and sewer plans meet City standards and requirements and that water and sewer pipe sizing will meet system demand for future development on the system.

8. Coordinates and maintains data for annual fire flow testing program. Currently developing a unidirectional flushing program to run annually with flushing program.

9. Maintains the City's eight permanent sewer flow meters with the collection of data along with coordinating the quarterly conformations to maintain the operation of those meters. Assists in locating sites for new meter locations.

10. Installs, maintains, operates and collects data on the operation of the City's four portable sewer flow meters.

11. Makes presentations at public hearings and meets with the public, as needed. Works with citizens who have questions or concerns regarding water and/or sewer issues.

12. Assists in calculating flows from water and sewer main breaks to determine the amount of water lost or the amount of sewage that spilled so that it can be reported to the appropriate agencies.

**ADDITIONAL WORK PERFORMED:**

1. Performs other related duties of a similar nature and level.

**KNOWLEDGE AND SKILLS:**

- Thorough knowledge of, and technical skills in, water and sewer engineering principles, practices, standards and methods.
- Working knowledge of applicable local, State, and federal laws and standards related to water and sewer systems management.
- Working knowledge of a variety of engineering-related computer equipment, hardware, and software applications, including spreadsheet, database and word processing applications.
- Strong oral and written communication skills to make public presentations, to communicate with confidence, tact, courtesy and good judgment and to prepare technical materials and reports.
- Ability to read, interpret and apply a variety of written regulations, standards and instructions.
- Ability to conduct studies and analyze various types of information related to water and sewer systems management.
- Ability to establish and maintain effective working relationships with other employees, contractors and developers, community groups and the general public.
- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.
- Physical ability to perform essential functions of the job including:
  - occasional lifting of moderately heavy objects up to 50 lbs,
  - correctable visual acuity to read a computer screen and a typeset page, and
  - fine finger dexterity to manipulate computer keyboard and mouse.
Utility Operations Engineer

WORKING ENVIRONMENT:

Work is performed in an office setting with extensive work at a computer work station, and occasionally outdoors in all weather conditions. Outdoor working environments include working on City streets and right-of-ways in close proximity to roadway traffic, near noxious fumes, around heavy equipment and occasionally in confined spaces. Work may also require occasional lifting of moderately heavy objects up to 50 lbs. Some travel to attend professional meetings is expected.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Bachelor's degree in civil or related engineering required. Additional coursework in hydraulics/hydrology or related areas preferred.
- Three years of directly related experience.
- A combination of experience and training that provides the applicant with the necessary knowledge and skills to perform the job will be considered.

NECESSARY SPECIAL REQUIREMENTS:

- Valid Washington State driver's license and good driving record required. Candidates must submit a three-year driving abstract prior to hire.
- Must be willing and able to work long and/or unusual hours in emergency situations.

PREPARED BY: G. Smyth
L. Klemanski
J. Bergner
2/08

REVIEWED BY: Ted Carlson
Asst. Director of Public Works, Operations

Richard E. McKinley
Director of Public Works

JOINT CLASSIFICATION COMMITTEE ADOPTION: March 18, 2008
CITY OF BELLINGHAM

JOB DESCRIPTION

JOB TITLE: WATER CONSERVATION SPECIALIST
CLASS TITLE: Program Specialist
DEPARTMENT: Public Works, Operations

UNION:231
SG:S-6
CS:N
FLSA:N
EEO4CODE:PR

JOB SUMMARY:

Performs a variety of work and field duties associated with the City of Bellingham’s water conservation program in accordance with State Municipal Water Supply – Efficiency Requirements. Examples of responsibilities include coordinating and developing methods, standards and practices for water management planning; performing a variety of tasks associated with conservation education; researching, evaluating and designing innovative technologies for water use; providing technical help with the implementation of conservation measures; assisting with the City of Bellingham’s water shortage contingency plan; facilitating partnerships with fellow purveyors through participation in coalition and committee workshops; coordinating financial assistance for joint projects and partnerships with other agencies, water conservation projects or awareness; and, reporting water conservation performance as required under RCW 70.119A. Interacts with a variety of Public Works staff, other city personnel and local agencies, organizations and utilities.

SUPERVISORY RELATIONSHIP:

Reports to the Superintendent of Operations who assigns and reviews the work. May also receive work direction from the Associate Utility Engineer. Works under general guidance and policy direction to gain an independent working knowledge of applicable local, state and federal regulations, policies, guidelines and applicable water conservation standards. May provide daily direction to other staff, interns, work study and/or volunteers.

ESSENTIAL FUNCTIONS OF THE JOB:

1. Coordinates the development and implementation of an effective water conservation program. Coordinates implementation of water management measures that would affect other City programs and policies.

2. Studies and analyzes water use by various sectors and customer classes, and identifies ways to increase and promote more efficient water use. Uses data to implement methods and practices for citywide water management planning by developing indoor and outdoor water efficiency programs.

3. Develops the draft budget and implements the water conservation operating budget and special programs budget. Develops and prepares annual work plans. Researches availability of funding opportunities, prepares grant applications, and administers grants to promote water conservation measures.

4. Conducts research and analysis of water conservation issues by gathering data, conducting feasibility studies, preparing reports and making recommendations. Maintains conservation program databases, files, and records related to the City’s water system.

PWWWaterConservationSpecialist.jd
5. Plans, develops and implements an effective program for public information on water conservation and technology that makes use of various media resources to increase and maintain community awareness of the need for water conservation. Creates and distributes informational material, including but not limited to brochures, flyers, bill inserts, pamphlets, electronic presentations and web pages. Coordinates and conducts workshops on water conservation.

6. Responds to reported water violations, maintains records and prepares correspondence related to violations. Develops draft language for the development of Municipal Code Sections that promote water use efficiency. Reviews data and provides input to developing, updating and implementing the City’s Water Shortage Contingency Plan.

7. Responds to questions and concerns from a variety of Public Works staff and other city personnel, as well as, local agencies, organizations, utilities and the public. Meets with citizens, professional associations and community groups as required.

**ADDITIONAL WORK PERFORMED:**

1. Assists the Associate Utility Engineer.

2. May use small hand tools in the performance of some duties.

3. Performs other water supply and distribution system duties as assigned.

4. Performs other related duties within the scope of the classification.

**PERFORMANCE REQUIREMENTS (Knowledge, Skills, and Abilities):**

- Knowledge of general principles, practices and methods of water resources management and water utility operations.
- Knowledge of applicable local, state and federal laws and standards related to water distribution systems and water conservation.
- Knowledge of engineering related computer applications and programs, including geographic information systems (GIS).
- Knowledge of basic methodology used in statistical analysis.
- Ability to interpret and apply a variety of regulations, statutes, and instructions.
- Ability to plan and organize meetings, and present recommendations and reports.
- Ability to make accurate mathematical calculations using scientific calculator and computer.
- Ability to communicate effectively, both orally and in writing.
- Ability to prepare technical materials and reports.
- Ability to establish and maintain effective working relationships with other employees, contractors and developers and the public.
- Physical ability to perform essential functions of the job including lifting up to 25 pounds on an infrequent basis.
- Excellent written communication skills to develop and write grant applications and reports, and to prepare informational materials for various media including print, television and web publication.
- Ability to read, write and interpret statutes.
WORKING ENVIRONMENT:

Work is performed in an office setting and outdoors, exposing employee to inclement weather, noise, fumes, construction environment, and traffic hazards. Employees are required to use appropriate safety equipment and follow standard safety practices.

EXPERIENCE AND TRAINING REQUIREMENTS:

- BA/BS degree in physical sciences, environmental science or related field.
- One year of professional experience related to resource management, resource planning or water utility operations required; two years preferred.
- Coursework or experience in geographic information system (GIS) preferred.
- A combination of education and experience that provides the applicant with the required knowledge, skills and abilities will be considered.

NECESSARY SPECIAL REQUIREMENTS:

- Valid Washington State driver’s license and good driving record. A three-year driving abstract must be submitted at the time of hire.

PREPARED BY: Smyth  
Joint Classification Committee  
4/05 

REVIEWED BY: Thomas L. Rosenberg  
Asst. Director of Public Works 

Richard E. McKinley, Director  
Public Works 

JOINT CLASSIFICATION COMMITTEE ADOPTION: May 17, 2005
CITY OF BELLINGHAM

JOB DESCRIPTION

JOB TITLE: TECHNICAL SUPERVISOR - WATER QUALITY

DEPARTMENT: PUBLIC WORKS, Operations

UNION:231
CS:N
FLSA:N
EE04CODE:PR

JOB SUMMARY:

The Technical Supervisor - Water Quality is responsible for the supervision and management of the monitoring and testing programs for the City's potable water, drainage, and wastewater systems. Also prepares reports per local, state and federal requirements; conducts personnel functions; and handles citizen inquiries and complaints regarding water issues.

SUPERVISORY RELATIONSHIPS:

Reports to the PW Superintendent - Operations. Works under the standards and requirements of the Environmental Protection Agency, Department of Ecology, Department of Health, and other pertinent state regulations. Supervises the potable water laboratory, wastewater laboratory and field water quality monitoring programs. Maintains close working relationships with other plant supervisors.

ESSENTIAL FUNCTIONS OF THE JOB:

1. Plans, organizes and directs laboratory operations at the Water Filtration Plant and Wastewater Treatment Plant; has signatory responsibility for assuring that the methods and conclusions of the microbiological and other tests are technically correct; establishes laboratory methods, procedures and quality control standards; institutes procedural changes; establishes timely flow and quality of work, and maintains adequate inventories of all necessary supplies and materials.

2. Supervises environmental monitoring programs for the water, wastewater, and drainage systems; has responsibility for assuring the methods used by City and/or private contractors are technically correct, reviews and evaluates the results, and prepares reports summarizing the programs.

3. Supervises laboratory personnel; determines priorities, assigns and distributes work, assists with selection processes and makes hiring recommendations; trains personnel in procedures and equipment; prepares performance evaluations, vacation schedules, and recommends disciplinary action.

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action as necessary.

4. Supervises the operation and maintenance of on-line water quality instrumentation including particle counters, residual analyzers, turbidimeters, automatic samplers, rain gauges, and all laboratory equipment; develops procedures for preventive maintenance of equipment; establishes quality control for their operation and calibration and recommends purchase/repair/replacement of all equipment.
5. Prepares and submits reports in accordance with local, state and federal regulatory requirements.

6. Handles citizen inquiries regarding general health concerns and drinking water. Responds to complaints on specific water quality problems such as tastes, odors, cloudy water, etc. Conducts tours, develops educational materials and participates in the public information programs for the public schools and the general public.

7. Performs laboratory tests, procedures and analyses. Develops and implements sampling procedures for the optimization of the water and wastewater processes.

8. Acts as technical advisor for professional services contracts.

9. Performs technical research and makes recommendations on equipment or processes to enhance methods and procedures for plant or laboratory operations. Researches information and make recommendations for capital expenditures. Serves on project team as necessary.

ADDITIONAL WORK PERFORMED:

1. Performs other duties as assigned within the scope of the position.

PERFORMANCE REQUIREMENTS (knowledge, skills, and abilities):

-Knowledge of bacteriology, chemistry, related technical sciences, as well as techniques, equipment, and quality control used in the standard analyses of water and wastewater.
-Knowledge of data assessment and management techniques.
-Knowledge of related research methods and sources of current information.
-Strong management skills including planning and organizing, problem solving/decision making, management control, time management, supervisory and interpersonal skills.
-Strong oral and written communication skills. Ability to interact effectively with diverse groups of people such as co-workers, subordinates, outside agencies; and to explain and diffuse situations of conflict.
-Ability to gain a working knowledge of State and Federal regulations related to environmental rules.
-Ability to competently perform the necessary procedures, analyses and microscopic examinations.
-Ability to understand and follow oral and written instructions and formulae.

PW0106.JD
- Ability to formulate, write, and implement policies and procedures.
- Ability to work independently and accomplish assigned results and goals.
- Ability to conduct research and interpret technical information and manuals.
- Willingness to accept "on-call" status for emergencies.
- Ability to perform the essential functions of the job.
TECHNICAL SUPERVISOR - WATER QUALITY

WORKING ENVIRONMENT:

Work is performed in an office and laboratory environment. The laboratory is a moderate risk environment, designed to optimize safe and efficient working conditions. However, hazards are present when working with chemical agents, biological samples and laboratory testing equipment. Employees are required to follow established safety procedures. The work also includes travel between facilities, for site visits, and occasionally to public and professional meetings.

EXPERIENCE AND TRAINING REQUIREMENTS:

Bachelor's degree in public health, environmental science, chemistry, microbiology or related field required. A minor in chemistry or equivalent 24 quarter/16 semester hours must be obtained within two years of hire.

Two years of related laboratory or field experience required. Advanced coursework in an environmental field requiring laboratory research and technical writing may be substituted for one year of experience.

Supervisory or lead worker experience preferred with responsibility for prioritizing/assigning work, training and skills development of staff.

Master's degree in a related area preferred.

Valid Washington State Drivers License and a good driving record. A three-year driving abstract must be submitted at the time of hire.

NECESSARY SPECIAL REQUIREMENTS:

Certification or ability to meet the certification standards of Washington State in each the following areas:
Laboratory Approval Program for Water Bacteriology Laboratories within six months of employment (Department of Health).
Water Treatment Plant Operator I within two years of employment (Department of Health).
Wastewater Treatment Plant Operator I within two years of employment (Department of Ecology).

PREPARED BY: Bill McCourt
12/85

REVIEWED BY:

PW0106.JD
REVISED BY: McCourt/Sellin
         9/90
         Hirsch/McCourt/Sellin
         10/94

REF: 0544S

Kenneth D. Thomas
Asst Director of PW for Operations

John M. Garner
Director of Public Works
CLASS TITLE: WATER QUALITY SPECIALIST

DEPARTMENT: Public Works\Operations

NATURE OF WORK:

The Water Quality Specialist evaluates water quality and plant process data; develops and implements laboratory and field projects; evaluates laboratory methodology and recommends changes; and prepares scientific and technical reports, including reports for local, State and federal compliance. The Water Quality Specialist utilizes computer software to perform research and data management; performs technical laboratory work; performs fieldwork for environmental monitoring programs; and responds to citizen inquiries and complaints regarding water and wastewater issues. Work requires a high degree of accuracy since error or negligence may compromise the City's water and wastewater treatment systems, as well as have an impact on its water, wastewater and storm water capital improvement programs.

DISTINGUISHING CHARACTERISTICS:

The Water Quality Specialist classification is distinguished from the Laboratory Technician by its responsibilities: researching and writing scientific and technical reports; designing and implementing field and laboratory studies; analyzing data; validating data; performing quality control checks on data; and training and monitoring the work of Laboratory Technicians, temporary workers and interns. The Water Quality Specialist works independently to evaluate and interpret process control data, compliance data, and data from environmental monitoring programs. The Water Quality Specialist also performs research and recommends areas for improvement for both the laboratory and monitoring programs. The Water Quality Specialist classification requires a higher level of experience and training than the Laboratory Technician.

The Laboratory Technician provides technical level laboratory work under specific procedures and receives direction from the Analyst.

SUPERVISORY RELATIONSHIPS:

Reports to the Water Quality Supervisor. Works independently under the standards and requirements of applicable federal and State regulations and City regulations, policies and procedures. Provides direction to and trains Laboratory Technicians, temporary extra help and student interns.

ESSENTIAL FUNCTIONS:

1. Researches, develops, implements, monitors and evaluates laboratory testing methods, quality assurance/quality control programs and procedures.

2. Researches, develops, implements, monitors and evaluates laboratory and field testing methods for storm and surface water environmental monitoring programs.

PWWaterQualitySpecialist.cs.doc
3. Writes scientific and technical reports resulting from special project work. May also write technical reports explaining laboratory processes and procedures for State and federal compliance purposes.

4. Evaluates and interprets process control and compliance data for plant operations, identifies problem areas and recommends solutions.

5. Uses various computer programs, databases and spreadsheets to validate, analyze and manage data and to generate technical reports for environmental monitoring programs.

6. Conducts field monitoring for environmental programs relating to drinking water, wastewater and surface water.

7. Performs duties in specialized technical areas, such as special monitoring programs for secondary wastewater treatment, storm water and drinking water as assigned. Collects wastewater, drinking water and surface water samples for laboratory testing from identified sites.

8. Operates and maintains a variety of laboratory equipment and instrumentation; performs a variety of physical, chemical and biological analyses on wastewater, drinking water and surface water samples.

9. Responds to citizen inquiries regarding general health concerns and drinking water. Handles complaints on specific water quality problems such as taste, odors, etc., and contacts customers regarding test results. Participates in public information programs to educate customers.

ADDITIONAL WORK PERFORMED:

1. Assists Technical Supervisor in training laboratory employees and has delegated oversight of their assignments and work product.

2. Performs related duties within the scope of the classification.

KNOWLEDGE AND SKILLS:

- Knowledge of the principles of chemistry and microbiology and the application of scientific methods including research methods and statistical analysis.
- Knowledge of appropriate laboratory techniques, testing methods and equipment and ability to develop and implement new or advanced laboratory methods and procedures.
- Knowledge and skill with computer applications and data analysis.
- Knowledge of research methods, problem-solving, and decision-making models.
- Working knowledge of quality assurance and quality control principles and techniques in the laboratory environment.
- Working knowledge of applicable State and federal regulations and standards.
- Ability to independently plan and organize work assignments in order to meet critical deadlines.
- Knowledge of laboratory hazards and necessary safety precautions applicable to work environment.
- Good oral communication skills to work effectively with co-workers and the public.
- Good technical writing skills to produce a variety of reports.
Physical ability necessary to perform job duties: visual acuity to differentiate color and to work with microscopic materials and computer screens; fine finger dexterity to manipulate laboratory equipment and computer keyboard; adequate hearing for telephone and radio communications; ability to stand for long periods of time; ability to move over and through rough terrain on a regular basis; frequent lifting up to 25 lbs.

WORKING ENVIRONMENT:

The position works a majority of time in a laboratory environment that is designed to optimize safe and efficient working conditions. However, a number of hazards are present when working with chemical agents, biological samples and laboratory testing equipment. Employees must be constantly aware of safety requirements. Some work is conducted out-of-doors in all types of weather and on irregular terrain.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Bachelor's degree in an environmental support science such as chemistry, biology, hydrology, or environmental science required. A Master's degree is preferred.
- Minimum of two years related laboratory or field experience required.
- Group I operators certification in water and wastewater required within two years of employment.
- A combination of experience and training that provides the applicant with the knowledge and skills to perform the job will be considered.

NECESSARY SPECIAL REQUIREMENT:

- Valid Washington State driver's license and good driving record. Candidates must submit a three-year driving abstract prior to hire.

PREPARED BY: L. McGowan
S. Mahaffey
1/01

REVIEWED BY: Tom Rosenberg, Asst. Director
Public Works, Operations

REVISED BY:
P. Wendling
L. McGowan-Smith
12/01
P. Wendling/Rowlson
04/02
P. Wendling/L. Klemanski (Change of titles/wage only)
10/07

REVIEWED BY: Richard E. McKinley, Director
Public Works

JOINT CLASSIFICATION COMMITTEE ADOPTION: January 18, 2005

REF: Lab Analyst
City of Bellingham  
Classification Specification - Civil Service or AFSCME  

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**NATURE OF WORK:**

The Laboratory Technician has the primary responsibility of collecting and testing surface water, drinking water and wastewater samples for regulatory compliance, plant process control, and the monitoring of environmental programs as they apply to water and wastewater compliance. Positions in this class are accountable for quality control procedures in the laboratory. Additional duties include assisting in information gathering and initial preparation of compliance reports, in implementation of new laboratory procedures, in the training of new employees in standard laboratory operating procedures, and special project assignments. Positions in this class are accountable for quality control procedures in the laboratory, including analyzing performance evaluation samples to ensure state certification of both laboratories. Additional duties include working with lab and process control instrumentation. Responsible for monitoring, calibrating, maintaining, troubleshooting, and repairing PROCESS instruments and lab-related instruments. Maintains an inventory of lab supplies and procures equipment and supplies as needed. Communicates and coordinates with coworkers to ensure proper sequence of events for sampling and analysis. Coordinates with reference laboratory personnel to ensure proper supplies are obtained, sample is properly prepared and delivered, and chain of custody is maintained.

Error or negligence in performance may have serious detrimental consequences for the City's water/wastewater and secondary treatment systems.

**DISTINGUISHING CHARACTERISTICS:**

Positions in this class require the performance of technical level laboratory work, procedures and quality control practices as required by state and federal compliance regulations for both the water and wastewater laboratories. This includes the successful completion of required performance evaluation check standards. Knowledge and skills are usually acquired through college coursework and experience.

**SUPERVISORY RELATIONSHIP:**

The Laboratory Technician reports directly to the Technical Supervisor. May receive special assignments and direction from the Laboratory Analyst. Daily tasks are expected to be carried out independent of supervisory oversight. May act as lead to extra help employees and student interns.
ESSENTIAL FUNCTIONS:

1. Collects samples from various sites for quality control purposes and compliance monitoring using a variety of technical methods and equipment.

2. Prepares reagents and standardized chemical solutions needed to test collected samples.

3. Performs a variety of chemical and microbiological tests for water and wastewater samples including, but not limited to bio-chemical oxygen demand; chemical oxygen demand; solids; pH; chlorine residual; hardness; alkalinity; coliforms; heterotrophic plate count; grease and oil; iron; turbidity.

4. Performs testing required for secondary wastewater treatment including, but not limited to nutrient analyses, microbiological screening and extended solids testing.

5. Performs laboratory quality control testing and procedures and maintains standard reports in compliance with state requirements.

6. Performs algebraic calculations on laboratory raw data, enters results into computer; compiles and maintains computerized records for quality control and compliance purposes.

7. Calibrates, maintains and performs minor repairs on laboratory equipment and laboratory-related plant instrumentation. Coordinate with Maintenance staff on troubleshooting and more involved repairs.

8. Performs sample collection and testing for special project assignments; assists in information gathering for research done by Technical Supervisor and Laboratory Analyst. Included here are such duties as evaluating new instruments and procedures under the advice of the Technical Supervisor or Lab Analyst, for the purpose of making lab procedural or purchase recommendations.

9. Responds to citizen inquiries regarding general health concerns and drinking water. Handles complaints on specific water quality problems such as tastes, odors, etc.; contacts customers regarding test results.

10. Maintains an inventory of routine lab supplies and procures equipment and supplies as needed. Prepares requisitions for warehouse purchase of equipment and supplies.

ADDITIONAL WORK PERFORMED:

1. Assists in the instruction and training of personnel in laboratory related tasks.

2. Performs Plant Operator equipment checks during weekend/holiday duty.

3. Performs related duties as assigned.
KNOWLEDGE AND SKILLS:

- Knowledge and skill in laboratory techniques and testing methods used in the analyses of water and wastewater.
- Knowledge of laboratory hazards and ability to apply safety precautions applicable to work environment, such as safe storage and handling of equipment, supplies and use of safety clothing.
- Familiarity with analytical instruments and an understanding of how to properly maintain, monitor, calibrate and troubleshoot process control instruments.
- Ability to inventory and procure laboratory and instrumentation equipment and supplies.
- Ability to read and follow technical written and oral instructions.
- Ability to perform data entry and to utilize associated computer software in a computerized recordkeeping system.
- Ability to perform algebraic calculations of test results.
- Working knowledge of quality assurance and quality control principles and techniques in a laboratory setting.
- Ability to acquire knowledge of technical standards, procedures and regulations of water and wastewater testing in compliance with laboratory certification requirements.
- Ability to independently problem solve using good judgement in performing assigned duties.
- Ability to calibrate, use and troubleshoot a variety of laboratory and process control equipment.
- Good oral communication skills to courteously and tactfully interact with coworkers and citizens.
- Good technical writing skills, sufficient to write detailed procedural instructions to be understood by lab staff; legible handwriting.
- Physical ability necessary to perform job duties: visual acuity and color differentiation; fine finger dexterity to manipulate laboratory equipment and computer keyboard; adequate hearing for telephone and radio communications; standing for long periods of time; ability to move over and through rough terrain on a regular basis; frequent lifting up to 25 lbs.

WORKING ENVIRONMENT:

The position works a majority of time in a laboratory environment which is designed to optimize safe and efficient working conditions. However, a number of hazards are present when working with chemical agents, biological samples and laboratory testing equipment. Employees must be constantly aware of safety requirements. Some work is conducted out-of-doors in all types of weather and on irregular terrain.

EXPERIENCE AND TRAINING REQUIREMENTS:

- BA/BS degree in chemistry, biology, microbiology, environmental science or related field.
- One year of related laboratory work experience required excluding laboratory work performed for academic credit. Internships, assistantships and volunteer experience may be used as work experience.
- Valid Washington State drivers license at time of hire. Must submit a three-year driving record abstract prior to hire.

NECESSARY SPECIAL REQUIREMENT:

- Work weekends, holidays and swing shift on a rotating basis.

PREPARED BY: Bill McCourt

Julie Hirsch
Darlene Mcleod
5/92, 10/94, 11/95
Pegeen Wendling

REVIEWED BY:

Dick McKinley, Director
Public Works

Lynn V. Starcher, SPHR
7/97
Holt Consulting
7/00
L. McGowan-Smith

3/02

REVIEWED BY:

Ken Thomas
Assistant Director
Public Works/Operations

COMMISSION ADOPTION:
CITY OF BELLINGHAM

JOB DESCRIPTION

JOB TITLE: MAINTENANCE SUPERVISOR - WATER DISTRIBUTION

CLASS TITLE: Division Supervisor

DEPARTMENT: Public Works, Operations Division

UNION:231
SG:S-8
CS:N
FLSA:N
EEO4CODE:PR

JOB SUMMARY:

This position combines supervisory and customer service responsibilities and the application of technical knowledge in the installation, maintenance, improvement, operation, monitoring, testing, inspection and repair of water distribution system facilities and equipment. Error or negligence in the performance of the maintenance unit could have serious consequences for the viability of the City’s water supply, public safety, the successful operation of the water distribution system, or potential legal liability or financial impacts due to non-compliance with federal and state requirements.

SUPERVISORY RELATIONSHIP:

Reports to Superintendent – Utilities. Works independently under general supervision. Supervises office and fieldwork of extra labor employees, Utility Workers, Water Distribution Specialists II, III, and IV. Works as part of a team and coordinates work with division supervisors (including Water Street, Wastewater Collection, Water Plant, Water Lab, Fleet Maintenance, Warehouse and Traffic supervisors), Public Works construction inspectors, Public Works engineering staff, private contractors, information management staff, meter reading and Finance staff. Performs work under the guidance of state regulations, City, departmental, and division ordinances, policies and procedures.

ESSENTIAL FUNCTIONS OF THE JOB:

1. Plans, organizes, directs and supervises staff performing preventive and corrective maintenance, operation, and new installation activities of the water distribution system.

2. Assists maintenance staff in analysis and diagnosis of problems, troubleshooting equipment and system failures.

3. Coordinates with other division supervisors, Public Works engineering staff, private contractors, Public Works inspectors, information management staff, meter readers and Finance staff to identify and resolve problems and to mitigate and minimize operational conflicts.

4. Evaluates the performance of the water distribution staff. Develops and/or coordinates ongoing, on-the-job training, vendor and in-house training for all water distribution system work tasks. Assists with the development of and enforces safety and training policies and procedures. Participates in selection and hiring processes; handles minor disciplinary actions; conducts performance evaluations; approves vacation requests and timesheets.
5. Provides accurate and courteous communication to the public. Ensures that customer service requests are properly handled. Investigates damage claims and service requests and takes appropriate actions to limit City liability and expense.

6. Utilizes computerized systems such as maintenance management, warehouse inventory, geographic information, utility billing, permitting and as-built archive systems to schedule, assign, track and record work requests and monitor program accomplishments; maintains records on assets and services; accesses maps and drawings of the water distribution system; responds to customer requests; and identifies improvements to the maintenance program.

7. Reviews work priorities, schedules and work assignments; coordinates availability of materials, equipment and personnel. Reviews daily accomplishments and modifies work priorities as necessary. Determines inventory needs for specific equipment/materials. Ensures work standards adhere to regulations, policies and procedures. Develops work-site plans for significant construction and maintenance activities.

8. Reviews the status of water distribution systems and equipment, and recommends capital replacements and improvements. Reviews new development plans and specifications for compliance with division standards. Researches technical information from a variety of sources to determine compatibility and serviceability of equipment with present system.


10. Inspects the water distribution-related work of private contractors (end-of-construction walkthrough); recommends acceptance or rejection of work as necessary. Also provides assistance to project engineers or private contractors as needed at pre-construction meetings and during construction activity.

11. Responsible for assigning and ensuring the availability of on-call stand-by personnel on a rotating basis.

12. Fills in for Maintenance Supervisors in Sewer, Street, and Storm Drainage units, as requested, during absences of regularly assigned supervisor.

ADDITIONAL WORK PERFORMED:

1. Assists Superintendent in the evaluation and preparation of annual maintenance work plans.

2. Performs skilled labor as necessary in emergency situations.

3. Performs other related duties as assigned.

PERFORMANCE REQUIREMENTS (Knowledge, Skills, and Abilities):

- Thorough knowledge of the methods, materials, and tools used in water distribution system construction, maintenance and operation.
- Working knowledge of and technical skill to perform preventive and corrective maintenance, new installation activities, and to analyze, troubleshoot, and correct faults in public environment.
- Working knowledge of the following: hydraulic theory, excavation principles, backflow and cross-connection control, sonic leak detection equipment, utility locating equipment, "live"-tapping equipment, meter testing equipment, measuring instruments; variety of fire hydrants, meters, pumps, valves, fittings, pipes; and chemical dosage applications, etc.
- Working operational knowledge of water distribution, wastewater collection, and treatment plants.
- Strong management skills including planning and organizing, problem analysis and decision-making, management control, time management, leadership and interpersonal sensitivity.
- Good supervisory skills to train and evaluate Water Distribution staff, administer comprehensive performance standards, safety rules, policies and procedures.
- Good leadership skills including the ability to act effectively in emergency situations.
- Good oral and written communication skills to interact effectively with diverse groups of people such as co-workers, subordinates, outside agencies, contractors, engineers, etc.
- Ability to research, understand and interpret to others information in complex technical manuals, blueprints, legal codes, drawings, schematics, etc.
- Ability to maintain and assist in the development of accurate computerized maintenance records systems; ability to assist with input on division/department computer systems.
- Willingness to accept "on-call" status for emergencies.
- Physical mobility to make on-site inspections/visitations of work sites at all facilities.
- Physical and mental ability to perform the work assigned.

WORKING ENVIRONMENT:

Work is performed primarily indoors in an office setting. May also work outdoors in all weather conditions, providing directions to crew, making on-site inspections or troubleshooting, etc.

Hazards are infrequent, but may include: fumes, dust, asbestos, gases, moving mechanical equipment parts, extreme temperatures, maintenance and repair of pressurized water systems (up to 200 psi), inadequate lighting, confined spaces, trenches, loud noises and exposure to traffic. Normal safety precautions are taken into consideration for these hazards, as well as for a variety of daily physical demands (i.e. climbing, balancing, stooping, kneeling, crouching, crawling, reaching, standing, pushing, pulling, lifting, grasping, hearing, etc.). Safety precautions also extend to the driving and operation of a variety of vehicles and equipment in the course of performing duties.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Eight (8) years experience in the Water Distribution section or equivalent related experience.
- Two (2) years experience as supervisor and/or lead worker, such as Bellingham Water Distribution Specialist IV or equivalent related experience.
- Coursework in areas such as engineering/construction technology, hydraulics and math is desirable.
- Additional training and experience in supervision is desirable.
- Training and experience in asbestos pipe work practices and procedures is desirable.
- Training and experience in trench excavation and shoring work practices and procedures is desirable.

NECESSARY SPECIAL REQUIREMENT:
- Must possess a valid first aid/CPR card within 6 months of hire.
- Washington State Certification as a Water Distribution Manager III required within one year of hire.
- Washington State Certification as Cross-Connection Control Specialist within one year of hire.
- Completion of the City's Supervisory and Management Development Program required within 3 years of assignment to the position.
- Secure and maintain a Class A Commercial Driver's License (CDL) with air brakes endorsement throughout term of employment.
- Must pass a drug and alcohol test prior to hire. Must submit to CDL-related random drug and alcohol testing during length of employment.
- Must be capable of responding to emergency call-out within one (1) hour's time.

PREPARED BY: Kathryn Hanowell
Ken Thomas
10/01/82

REVISED BY: Lorna McGowan
Tony Seman
03/01
Andy Rowison
Geoff Smyth
04/02

REVIEWED BY: Ken Thomas, Assistant Director
Public Works Operations

REVIEWED BY: Richard McKinley, Director
Public Works
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: WATER DISTRIBUTION SPECIALIST V - CROSS CONNECTION CONTROL SPECIALIST
DEPARTMENT: Public Works/Operations

UNION: 114
SG: 13
CS: Yes
FLSA: Y
EE04CODE: TE

NATURE OF WORK:
Performs inspections of construction projects and inspects existing facilities to ensure compliance with specifications and standards for cross connection control. Performs recordkeeping to ensure that state regulations are met and results are compiled according to standards. As a secondary focus: as time permits performs construction, maintenance and repair of the City's water distribution system, applying special expertise and in-depth knowledge to a variety of more complex, difficult or specialized assignments. Functions as lead worker to crews of WDS II's, III's, IV's, Utility Workers and extra labor employees, or performs independently on specialized assignments requiring well-developed skills, abilities and knowledge. Performs all work of the classes below.

DISTINGUISHING CHARACTERISTICS:
This class is distinguished from the WDS IV classification by the depth and breadth of specialized experience in the area of cross connection devices and backflow prevention inspection. The class focuses on projects of considerable variety and complexity, with a high level of responsibility for public health. The Cross Connection Control Specialist is expected to perform WDS IV duties, as time permits. Cross trains with the Sr. Permit Reviewer in inspection of new construction cross connection control devices. Must have full working knowledge of the Department's policies and procedures, as well as the ability to plan, organize and problem-solve. Promotion to this classification is dependent upon meeting relevant training, experience and certification requirements and the availability of an open position. Requires State Certification as a Water Distribution Manager II, Washington State Cross Connection Control Specialist certification and certification as Backflow Assembly Tester.

SUPERVISING RELATIONSHIPS:
Works independently under informal supervision in accordance with applicable City regulations, policies, guidelines and applicable engineering standards. Adheres to Department of Health Cross Connection Control Standards. As lead worker, assigns and directs the work of other Water Distribution personnel. Reports to a Water Distribution Maintenance Supervisor or designee.

ESSENTIAL FUNCTIONS:
1. Inspects existing buildings to ensure proper backflow operation and performance; may test, repair and troubleshoot as required.

2. Cross trains with, and serves as back up for, Sr. Permit Reviewer in order to perform specialized water meter and backflow prevention device inspection during new construction processes and for final acceptance.

3. Maintains appropriate recordkeeping systems to ensure that state regulations are met and followed throughout the testing and recording of test results.

4. May serve as lead worker for water distribution crews, planning, organizing, problem-solving and directing their work, including initiating and completing work orders and associated reports, and ensuring worksite safety. Provides training in the proper use of materials, tools, equipment and work practices. Notifies “one-call” system as appropriate.

5. Assists supervisor in the planning and execution of major projects.

6. Performs specialized utility locating for City water, sewer, street and traffic utilities.

7. Provides recommendations and courses of action regarding conditions in the field that may affect work practices and procedures.

8. Performs all the duties of the lower classes in the Water Distribution series.

**ADDITIONAL WORK PERFORMED:**

1. May act in responsible charge in the absence of the Water Supervisor.

2. Assists supervisor in developing, implementing and evaluating annual work plans.

3. Performs other related duties within the scope of the classification as assigned.

**KNOWLEDGE AND SKILLS:**

- Strong knowledge of backflow inspection testing practices, procedures, techniques, calculations, and instruments. Considerable knowledge of causes of backflow, health aspects, legal aspects, recommended backflow prevention procedures and application of procedures.

- Strong knowledge of applicable local, state and federal laws, codes and standards related to backflow inspection.

- Extensive knowledge of backflow devices.

- Demonstrated competence in all the performance requirements of the classes below (Utility Worker, WDS II, WDS III, WDS IV).

- Skilled in applying craft techniques, processes and principles in the accomplishment of assigned work, as well as a thorough knowledge of Division materials, methods and procedures.

- Good supervisory skills including leadership, interpersonal sensitivity,
adaptability/flexibility and time management.  
- Skilled in the use of Division computer software to perform various assignments.  
- Good independent judgement in leading small crews, including the ability to plan and carry out work assignments, maintain required standards of work (production, quality and safety) and to give clear and efficient direction to crewmembers.  
- Strong communication skills and the ability to maintain effective working relationships with co-workers, other City employees, business owners, contractors and the general public.  
- Thorough knowledge and skill in the operation of the mechanical equipment used in maintenance and operation of the water system.  
- Ability to prepare technical materials and reports.  
- Ability to provide guidance, direction and training to construction inspectors.  
- Physical ability to perform essential functions of the job.

WORKING ENVIRONMENT:

Work is performed both inside and outdoors in all weather conditions. Some work is performed indoors at a desk or computer terminal. While conducting inspections, will work alone on tasks assigned. Hazards may include: fumes, dust, gases, asbestos, moving mechanical equipment parts, extreme temperatures, maintenance and repair of pressurized (up to 200 psi) water systems, inadequate lighting, confined spaces, trenches, loud noises and exposure to traffic. General safety precautions are taken into consideration for most of these hazards, as well as for a variety of daily physical demands required to perform the essential functions of the job. Special safety precautions are taken into consideration for asbestos, confined space, trench and pressurized water system hazards. Safety precautions also extend to the daily driving and operation of a variety of vehicles and equipment in the course of performing duties.

EXPERIENCE AND TRAINING REQUIREMENTS:

When a vacancy in this classification occurs, regular City employees who meet the experience and training requirements will be considered for promotional opportunities in this class.

- Minimum one (1) year of experience in the WDS IV classification.  
- Must demonstrate and maintain proficiency in the safe and efficient use of specialized equipment used in specialized assignments for this class.  
- Washington State certification as Cross Connection Control Specialist and Backflow Assembly Tester.

NECESSARY SPECIAL REQUIREMENTS:

- Must possess and maintain a Washington State certification as a Water Distribution Manager II.  
- Valid Washington State driver's license and good driving record. A three-year driving abstract must be submitted prior to hire.  
- Must possess and maintain a Commercial Driver's License (Class A CDL) with air brake endorsement throughout term of employment (CSC 7-11-90).  
- Must possess and maintain a valid first aid/CPR card throughout term of employment.
- Must possess and maintain a valid Flagging/Traffic Control Card throughout term of employment.
- Must pass CDL-related drug and alcohol testing throughout term of employment.
- Must be capable of responding to emergency call-out within one (1) hour's time.

PREPARED BY: L. Nelson

Director

L. McGowan-Smith

6/03

REVIEWED BY: ____________________________

Director

Tom Rosenberg, Asst.

Public Works Operations

Richard E. McKinley,

Public Works

COMMISSION ADOPTION: ____________________________
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: WATER DISTRIBUTION SPECIALIST IV
DEPARTMENT: Public Works\Operations
UNION: 114
SG: 11
CS: Promotional
FLSA: Y
EE04CODE: SC

NATURE OF WORK:
This is the highest level of skilled manual labor and equipment operation in the self-advancing Water Distribution series. Performs all phases of construction, maintenance and repair of the City's water distribution system. Regularly applies special expertise and in-depth knowledge to a variety of more complex, difficult or specialized assignments. Functions as lead worker to crews of WDS II's, III's, IV's, Utility Workers and extra labor employees, or performs independently on specialized assignments requiring well-developed skills, abilities and knowledge. Performs all work of the classes below.

DISTINGUISHING CHARACTERISTICS:
Fourth in the promotional series of Utility Worker, WDS II, WDS III, and WDS IV. This position is distinguished from the lower classifications in the series by requiring a high level of knowledge and skill in all phases of the City's water distribution system, as well as having obtained a high level of competency in the use and operation of nearly all equipment and machinery related to the job or specialized assignment. The WDS IV is expected to have full working knowledge of the Department and its policies and procedures, as well as the ability to plan, organize, problem-solve, and direct the work of crews and utilize equipment and resources to maximum advantage. Promotion to this classification is dependent upon meeting relevant training, experience and certification requirements. Requires State certification as a Water Distribution Manager II.

SUPERVISORY RELATIONSHIPS:
Reports to a Water Distribution Maintenance Supervisor or designee.

ESSENTIAL FUNCTIONS:
1. Serves as lead worker to crews, planning, organizing, problem-solving and directing their work, including initiating and completing work orders and associated reports, and ensuring worksite safety. Notifies “one-call” system as appropriate.

2. Assists supervisor in the planning and execution of major projects.

3. Trains less experienced workers in the proper use of materials, tools and equipment and
proper work practices.

4. Performs specialized utility locating for City water, sewer, street and traffic utilities.

5. Performs specialized water meter and backflow preventer inspection, testing, repair, troubleshooting and related record keeping and reporting.

6. Provides recommendations and courses of action to the supervisor regarding conditions in the field that may affect work practices and procedures.

7. Performs all the duties of the classes below.

ADDITIONAL WORK PERFORMED:

1. Occasionally performs additional duties and responsibilities in the absence of the supervisor.
2. Assists supervisor in developing, implementing and evaluating annual work plans.
3. Other related duties as assigned.

PERFORMANCE REQUIREMENTS (Knowledge, Skills and Abilities):

- Demonstrated competence in all the performance requirements of the classes below (Utility Worker, WDS II, and WDS III).
- Skilled in applying craft techniques, processes and principles in the accomplishment of assigned work.
- Good supervisory skills including leadership, interpersonal sensitivity, adaptability/flexibility and time management.
- Skilled in the use of Division computer software to perform various assignments.
- Good independent judgement to plan and carrying out work assignments and supervising small crews.
- Skilled in maintaining required standards of work (production, quality and safety) independently and in the direction of others.
- Strong communication skills to work effectively with co-workers, other City employees, contractors and the general public.
- A thorough working knowledge of Division materials, methods and procedures.
- Thorough knowledge and skill in the operation of the mechanical equipment used in maintenance and operation of the water system.

WORKING ENVIRONMENT:

Work is performed primarily outdoors in all weather conditions. May work alone on tasks assigned by supervisor. Hazards may include: fumes, dust, gases, asbestos, moving mechanical equipment parts, extreme temperatures, maintenance and repair of pressurized (up to 200 psi) water systems, inadequate lighting, confined spaces, trenches, loud noises and exposure to traffic. General safety precautions are taken into consideration for most of these hazards, as well as for a variety of daily physical demands required to perform the essential functions of the job. Special safety precautions are taken into consideration for asbestos,
confined space, trench and pressurized water system hazards. Safety precautions also extend to the daily driving and operation of a variety of vehicles and equipment in the course of performing duties.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Two (2) years of experience in the Water Distribution Specialist III classification.
- Advanced Training Certificate in Cross Connection Control within 6 months of appointment to this classification.
- Must demonstrate and maintain proficiency in the safe and efficient use of equipment used in specialized assignments for this class.
- Must demonstrate and maintain proficiency in the safe and efficient direction of assigned work crews for this class.

NECESSARY SPECIAL REQUIREMENT:

- Must possess and maintain a valid first aid/CPR card throughout term of employment.
- Must possess and maintain a valid Flagging/Traffic Control Card throughout term of employment.
- Must possess and maintain a Washington State certification as a Water Distribution Manager II.
- Some assignments may require Washington State certification as a Cross-Connection Control Specialist I and/or Backflow Assembly Tester.
- Must possess and maintain a Commercial Driver’s License (Class A CDL) with air brake endorsement throughout term of employment (CSC 7-11-90).
- Must pass CDL-related drug and alcohol testing throughout term of employment.
- Must be capable of responding to emergency call-out within one (1) hour’s time.

PREPARED BY: Kathryn Hanowell
Ken Thomas
Director
10/01/82
Lorna McGowan
Tony Seman
04/01

REVIEWED BY:
Ken Thomas, Assistant
Public Works/Operations

COMMISSION ADOPTION:
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: WATER DISTRIBUTION SPECIALIST III
DEPARTMENT: Public Works \ Operations
UNION: 114
SG: 10
CS: Promotional
FLSA: Y
EE04CODE: SC

NATURE OF WORK:

Combines manual labor and the operation of various types of specialized mechanical equipment in order to install, maintain and service the City’s water distribution system. Primarily works as part of an assigned crew, assisting higher classified workers with more complex and skilled tasks. Occasionally works independently and may organize the work of a particular assignment involving others. May receive assignments focused on one or two areas of particular skill, ability or work needs. Receives training in all functions of water distribution system maintenance and operation. Has a well-rounded working knowledge of the City’s water distribution system, policies and procedures, and the purpose of assigned maintenance tasks. Assists in the development of knowledge and skills in less experienced co-workers through on-the-job training. Attention to safety and protection of personnel and equipment is integral to the work. Also performs the work of the classes below (Utility Worker and WDSII).

DISTINGUISHING CHARACTERISTICS:

Third in the promotional series of Utility Worker, WDS II, WDS III and WDS IV. This position is distinguished from the lower classifications in the series by requiring 2 years of experience as a WDSII in the Water Distribution Section. The WDS III has a more highly developed working knowledge of the City’s water distribution system, policies and procedures; the ability to function competently and efficiently as a member of a work crew with less direct supervision, and has the skills and abilities to independently operate most tools and equipment. The WDSIII notices potential project improvements and makes recommendations to senior staff. This position is distinguished from the WDS IV by performing less frequently in specialized, difficult and/or complex assignments; requiring fewer years of experience, and fewer advanced professional certification requirements.

SUPERVISORY RELATIONSHIPS:

Reports to a Water Distribution Maintenance Supervisor or designee.

ESSENTIAL FUNCTIONS:

1. Installs and repairs all types and sizes of water mains, water service lines, valves, hydrants, meters and other water distribution system appurtenances.
2. Operates manual, hydraulic and electric boring machines used for live (up to 200 psi) water main connections (up to 20" diameter) and water service installations.

3. Operates dump trucks (up to 10-yd. capacity), service and pick-up trucks, boom truck and backhoes.

4. Restores excavation sites: may include concrete work, re-vegetation, grass seeding, erosion control, general cleanup, etc.

5. Field checks measurements and locations of facilities, marks-up maps and drawings used for updating computer maintenance and GIS records.

6. Uses a variety of hand and power tools, including jackhammer, compactors, pipe-threaders, shovels, saws, picks, drills, pumps, wrenches, CO2 freezing equipment and other construction related tools.

7. Locates and marks water mains and water services using electronic pipe locating devices, stakes, paint or other appropriate marking materials.

8. Turns water service on or off, per customer request or Finance Department request.

9. Completes lock-out/tag-out procedures, actions and records, and conducts end of construction inspections for contractor installed facilities.

10. Organizes, sets up and takes down traffic control and trench shoring apparatus.

11. Responds to after hours call-outs and investigates customer service requests.

12. Operates, maintains, inspects and tests distribution facilities, including main flushing, main pressure testing, main disinfection, valve exercising, leak detection, backflow assemblies and meters.

13. Performs all the duties of the class below.

ADDITIONAL WORK PERFORMED:

1. May lead a group of lower classified and/or extra labor employees in the completion of smaller, less complex assignments.

2. Provides guidance and on-the-job training to less experienced co-workers.

3. Other related duties as assigned.

PERFORMANCE REQUIREMENTS (Knowledge, Skills and Abilities):

- Demonstrated competence in all the performance requirements of the classes below (Utility Worker and WDS II).
- Ability to recognize and take appropriate action regarding equipment and machinery
maintenance problems.
- Skilled in the use of a wide variety of tools and equipment.
- Skilled and knowledgeable in the appropriate response to customer complaints.
- Demonstrated understanding of Department materials, work methods and procedures, as well as a good working knowledge of the City’s water system.
- Ability to instruct others in worksite safety and proper use of tools and equipment.
- Skilled in safely and effectively leading a group of lower classified workers in the completion of smaller, less complex projects.
- Skilled in the use of Division computer software to perform various assignments.

**WORKING ENVIRONMENT:**

Work is performed primarily outdoors in all weather conditions. May work alone on tasks assigned by supervisor.

Hazards may include: fumes, dust, gases, asbestos, moving mechanical equipment parts, extreme temperatures, maintenance and repair of pressurized (up to 200psi) water systems, inadequate lighting, confined spaces, trenches, loud noises and exposure to traffic. General safety precautions are taken into consideration for most of these hazards, as well as for a variety of daily physical demands required to perform the essential functions of the job. Special safety precautions are taken into consideration for asbestos, confined space, trench and pressurized water system hazards. Safety precautions also extend to the daily driving and operation of a variety of vehicles and equipment in the course of performing duties.

**EXPERIENCE AND TRAINING REQUIREMENTS:**

- Two (2) years of experience in the Water Distribution Specialist II classification.
- Training Certificate in Trenching/Shoring/Excavation Practices within 6 months of appointment to this classification.
- Must demonstrate and maintain proficiency in the safe and efficient use of equipment used by this class.

**NECESSARY SPECIAL REQUIREMENTS:**

- Must possess and maintain a valid first aid card/CPR card throughout term of employment.
- Must possess and maintain Washington State Certification as a Water Distribution Manager I throughout term of employment.
- Must possess and maintain a valid Flagging/Traffic Control Card throughout term of employment.
- Must possess and maintain a Commercial Driver’s License (Class A CDL) with air brakes endorsement throughout term of employment (CSC 7-11-90).
- Must pass CDL-related drug and alcohol testing throughout term of employment.
- Must be capable of responding to emergency call-out within one (1) hour’s time.
- Some assignments may require Washington State Certification as a Backflow Assembly Tester.
City of Bellingham  
Classification Specification - Civil Service or AFSCME

CLASS TITLE: WATER DISTRIBUTION SPECIALIST II  
DEPARTMENT: Public Works\Operations  
UNION: 114  
SG: 9  
CS: Promotional  
FLSA: Y  
EE04CODE: SC

NATURE OF WORK:

Combines manual labor and the operation of various types of specialized mechanical equipment in order to install, maintain and service the City’s water distribution system. Primarily works as part of an assigned crew, assisting higher classified workers. Receives training in all functions of water distribution system maintenance and operation. Is developing working knowledge of the City’s water distribution system, policies and procedures, and the purpose of assigned maintenance tasks. Attention to safety and protection of personnel and equipment is integral to the work. Also performs the work of the class below (Utility Worker).

DISTINGUISHING CHARACTERISTICS:

Second in the promotional series of Utility Worker, WDS II, WDS III and WDS IV. This position is distinguished from the entry-level Utility Worker class by requiring 2 years of experience as a Utility Worker in the Water Distribution Section (2 years of equivalent experience outside the section may be substituted) and professional certification prior to entry into this class. It is distinguished from the higher level Water Distribution Specialists by receiving closer supervision while acquiring a working knowledge of the water distribution system policies and procedures.

SUPERVISORY RELATIONSHIPS:

Reports to a Water Distribution Maintenance Supervisor or designee.

ESSENTIAL FUNCTIONS:

1. Assists with the installation and repair of all types and sizes of water mains, water service lines, valves, hydrants, meters and other water distribution system appurtenances.

2. Assists in the operation of manual, hydraulic and electric boring machines used for live (up to 200 psi) water main connections (up to 20" diameter) and water service installations.

3. Operates dump trucks (up to 10-yd. capacity), boom truck, service and pick-up trucks.

4. Assists with surface restoration of excavation sites; may include concrete work,
re-vegetation, grass seeding, erosion control, general cleanup, etc.

5. Uses a variety of hand and power tools, including jackhammer, compactors, pipe threaders, shovels, saws, picks, drills, pumps, wrenches, CO2 freezing equipment and other construction-related tools.

6. Assists with the locating and marking of water mains and water services using electronic pipe locating devices, stakes, paint or other appropriate marking materials.

7. Turns water service on or off, per customer request or Finance Department request.

8. Assists with organizing, setting up and taking down traffic control and trench shoring apparatus.

9. Assists with field check measurements and locations of facilities, marks maps and drawings used for updating computer maintenance and GIS records.

10. Assists with completion of lock-out/tag-out procedures, actions and records, and with end-of-construction inspections for contractor installed facilities.

11. Responds to after hours call-outs and investigates customer service requests.

12. Assists in the operation and preventative maintenance of distribution facilities, including main flushing, main pressure testing, main disinfection, valve exercising, leak detection and meter testing.

13. Performs all the duties of the class below.

**ADDITIONAL WORK PERFORMED:**

1. Responds to snow/ice emergencies. May operate dump trucks with sanders or assist with hand sanding operations.

2. Other related duties as assigned.

**KNOWLEDGE AND SKILLS:**

- All the performance requirements of the class below (Utility Worker).
- Competency in intermediate math (including ability to add, subtract, multiply and divide, including fractions, decimals, and percentages), basic principles of physics and science that relate to water quality and hydraulics.
- Skill in reading and understanding basic technical writings, and to read and follow maps and blueprints.
- Written communication skills for accurately recording information in logs, forms, lock-down/tag-out procedures and short reports as required.
- Good oral communications skills for dealing effectively with the public.
- Manual dexterity and eye-hand coordination.
- Skill in using a wide variety of tools and equipment to perform tasks.

06/16/2008
Working knowledge of Department materials, work methods and procedures, as well as a working knowledge of the City’s water system.

- Ability to perform repetitious work while maintaining attention to detail and commitment to accuracy.
- Skill in utilizing computers, files, maps, and tap books to locate water system details.
- Ability to use Division computer software to perform various assignments.
- Knowledge of and ability to apply safe work procedures in the use of equipment and performance of assignment.
- Ability to work independently with minimal supervision.

WORKING ENVIRONMENT:

Work is performed primarily outdoors in all weather conditions. May work alone on tasks assigned by supervisor.

Hazards may include: fumes, dust, gases, asbestos, moving mechanical equipment parts, extreme temperatures, maintenance and repair of pressurized (up to 200 psi) water systems, inadequate lighting, confined spaces, trenches, loud noises and exposure to traffic. General safety precautions are taken into consideration for most of these hazards, as well as for a variety of daily physical demands required to perform the essential functions of the job. Special safety precautions are taken into consideration for asbestos, confined space, trench and pressurized water system hazards. Safety precautions also extend to the daily driving and operation of a variety of vehicles and equipment in the course of performing duties.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Two years of experience as Utility Worker in the Water Distribution Section (or equivalent outside experience may be substituted).
- Physical and mental ability to perform the work assigned.
- Must demonstrate and maintain proficiency in the safe and efficient use of equipment used by this class.
- Completion of City or other agency-sponsored Basic or Refresher Cross Connection Control coursework.

NECESSARY SPECIAL REQUIREMENT:

- Must pass job-related physical capacities evaluation, if entry position.
- Must possess and maintain a valid first aid card/CPR card throughout term of employment.
- Must possess and maintain a valid Flagging/Traffic Control Card throughout term of employment.
- Must possess and maintain Washington State Certification as a Water Distribution Manager I throughout term of employment.
- Must possess and maintain a Commercial Driver's License (Class A CDL) with air brake endorsement throughout term of employment (CSC 7-11-90).
- Must pass CDL-related drug and alcohol testing throughout term of employment.
Must be capable of responding to emergency call-out within one (1) hour's time.

PREPARED BY: Kathryn Hanowell
Ken Thomas
Director
10/01/82

REVISED BY: Lorna McGowan

__________________________
Tony Seman
04/01

REVIEWED BY:
Ken Thomas, Assistant
Public Works/Operations

REVIEWED BY:
Dick McKinley, Director
Public Works

COMMISSION ADOPTION:
City of Bellingham  
Classification Specification - Civil Service or AFSCME

CLASS TITLE: UTILITY WORKER 1/UTILITY WORKER 2
DEPARTMENT: Public Works\Operations
UNION: 114
SG: 8/9
CS: Yes
FLSA: Y
EE04CODE: SM

NATURE OF WORK:

Performs a variety of manual labor in the construction, maintenance, and service work of all public works facilities. Operates hand and power tools and motorized equipment. Usually works as part of an assigned crew in an assigned section but may have an individual or specialized assignment. Works indoors and outdoors in all weather conditions and sometimes under hazardous conditions. May be called out for emergency work.

DISTINGUISHING CHARACTERISTICS:

Utility Worker 1 is an entry-level position which may be assigned to the Streets, Stormwater, Water, Wastewater Collection, Traffic, Clean Green or Treatment Plants units of Public Works Operations Division. Utility Workers assist higher class workers in the construction, maintenance and service of public works facilities. Classes above require specialized training or experience, experience in the division or department, and/or additional certifications or licensing. The Utility Worker 2 is differentiated from the Utility Worker 1 by the achievement of certain job specific certifications and 2 years of service as a Utility Worker 1, both of which provide a higher level of skill.

SUPERVISORY RELATIONSHIPS:

Reports to the Supervisor of the assigned unit. May receive direction and training from higher classified positions within the unit.

ESSENTIAL FUNCTIONS:

1. Shovels, rakes, picks, cleans, hammers, sands, and other such manual labor.

2. Assists workers in higher classes: cuts, fits, lays, connects, installs various sizes of water, sewer and storm lines; installs valves, tees, crosses, reducers, sleeves, manholes, catch basins, etc., per instructions.

3. Uses hand tools and operates drills, jack hammers, sewer rodding machines, mowers, street sweepers, five-, ten- and 12-yard dump trucks.

4. Turns on or shuts off water services to customers per order and according to
established procedures.

5. Sets up traffic control devices including barricades, flags, and performs other safety-related duties.
6. Logs information, completes work orders and paperwork as necessary.

ADDITIONAL WORK PERFORMED:

1. Performs other manual labor within the scope of the classification.
2. Participates in job-related training.

KNOWLEDGE AND SKILLS:

- Knowledge of hand and power tools and equipment of the trades.
- Knowledge of basic written, reading comprehension, and math skills.
- Ability to use or operate, or learn to use or operate, a variety of hand and power tools and motorized equipment safely and efficiently.
- Ability to match the appropriate tool to the task and be aware of the basic cause and effect relationships in the operation of machinery.
- Ability to learn the knowledge and skills needed for a variety of assignments.
- Ability to perform assigned work following written and oral instructions.
- Ability to complete required forms documenting work performed.
- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.
- Ability to follow established safety rules and regulations, and be able to independently recognize hazards at the work site.
- Willingness to work outdoors in all types of weather conditions.
- Willingness to accept "on-call" status for emergency situations.
- Willingness to work with electricity in some positions.
- Willingness to work from heights up to 180 feet on a ladder truck or communication tower in some positions.

Physical abilities to perform assigned duties:
- Manual dexterity sufficient to operate hand and power equipment safely and efficiently.
- Correctable vision to read instructions and work safely around equipment.
- Adequate hearing to effectively hear voice radio and crew communications, roadway traffic and alarms in a noisy environment.
- Physical ability to continuously stoop, bend, climb, occasionally work in confined spaces or from heights, and frequently lift and carry heavy objects in the 50 lb. range, and occasionally weights of approximately 100 lbs. utilizing proper body mechanics, mechanical and other assistance.
- Positions in Water, Sewer and Streets require the physical ability to operate a 60 lb. jackhammer for extended periods of time intermittently throughout the year.

WORKING ENVIRONMENT:

Work may be performed both indoors and outdoors in all weather conditions on City streets and rights-of-way, in close proximity to roadway traffic, or in an industrial plant environment. The
work involves moderate risks which require special safety precautions, e.g. working around moving equipment, high speed or high voltage equipment, or with exposure to irritant chemicals or raw sewage. Employees may be required to use protective clothing such as coveralls, rain gear, hard hats, safety vests, masks, boots, goggles, gloves, or shields.

EXPERIENCE & TRAINING REQUIREMENTS:

Utility Worker 1:
- One year of experience or related training using hand and power tools and motorized equipment to perform manual labor required.

Utility Worker 2 – Advancement requires, in addition to the above:
- Two (2) years’ experience as Utility Worker 1, AND
- Possession of the following certifications, based on the requirements of the unit to which assigned:
  - Wastewater Collection Unit:
    - WWCPA (Washington Wastewater Collection Personnel Assn.) WWC – 1
  - Streets, Stormwater and Clean Green Units:
    - Regional Road Maintenance Endangered Species Act Program (Track 3)
  - Traffic Unit:
    - Work Zone Safety Certification
  - Plants:
    - Chlorine Disinfection course completion

Note: Those Utility Worker 1's who do not wish to pursue certifications will advance to Skilled Worker 1 after completing five years of employment as a Utility Worker 1.

NECESSARY SPECIAL REQUIREMENTS:

- Valid Washington State driver’s license at the time of hire. Must submit a three-year abstract of driving record prior to hire.
- Ability to obtain Flagging/Traffic Control Card within one year of employment.
- Ability to obtain First Aid/CPR Card within one year of employment.
- Some positions require the ability to secure a Commercial Driver’s License within six months of initial hire and to maintain a valid CDL during length of employment.
- Some positions require Fork Lift Operator's Card within one year of employment.
- Must be able to report to Operations Division for emergency call-out within one hour response time.

PREPARED BY: K. Hanowell
K. Thomas
10/82

REVIEWED BY: Richard E. McKinley, Director
Public Works

REVISED BY:
C. Sellin
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8/05
L. McGowan-Smith

06/16/2008
COMMISSION ADOPTION: December 13, 2006

3315S
CITY OF BELLINGHAM

JOB DESCRIPTION

JOB TITLE: MAINTENANCE SUPERVISOR - PLANTS
CLASS TITLE: Program Manager 1
DEPARTMENT: Public Works Operations

UNION: 231
SG:S-11
CS:N
FLSA:N
EEO4CODE:PR

JOB SUMMARY:

This position combines supervisory responsibilities, the application of technical knowledge, and occasional skilled labor to maintain the equipment and facilities for the water and wastewater treatment plants, water distribution and wastewater collection systems, and associated facilities. Ensures 24-hour operation of equipment and facilities. Error or negligence in performance of the maintenance unit could have serious consequences for the City’s water supply or public safety, the water and wastewater systems and treatment plant operation, or result in potential legal liability or financial impacts due to non-compliance with federal and State requirements.

SUPERVISORY RELATIONSHIP:

Reports to the Superintendent of Operations. Works independently under general supervision. Performs work under the guidance of State regulations, City, departmental, and division policies and procedures. Works as a team and coordinates work with the water/wastewater plant supervisors and laboratory supervisor. Supervises the work of office and field maintenance crews.

ESSENTIAL FUNCTIONS OF THE JOB:

1. Plans, organizes, and directs preventive and corrective maintenance activities of the water and wastewater plants, water distribution and water collection systems. Coordinates with other section supervisors to identify problems and minimize operational conflicts.

2. Supervises, directs and evaluates the performance of a technical staff. Develops and provides ongoing, on-the-job training or coordinates vendor training for all plant systems. Administers related correspondence training courses. Oversees safety training, develops and enforces safety policies and procedures. Participates in selection processes, makes hiring recommendations, handles minor disciplinary action, conducts performance evaluations, approves vacation requests and timesheets.

3. Oversees a computerized maintenance management system. Manages utilization of maintenance system to track work requests, maintenance records on equipment and services for fault analysis, costs effectiveness of servicing, and life cycle costs of equipment. Maintains up-to-date library of maintenance manuals, specifications, plans and other documents.

4. Reviews work priorities, schedules and assignments; coordinates availability of materials, equipment and personnel. Reviews daily accomplishments and modifies work priorities as necessary. Determines inventory needs for specific equipment/materials. Ensures work standards adhere to regulations, policies and procedures.
5. Evaluates and recommends the appropriateness of contracting maintenance work. Monitors contracts providing inspection, acceptance or rejection of projects as necessary. Provides assistance to project engineers or outside contractors as needed.

6. Reviews the status of the systems and equipment, and recommends capital improvements. May act as project manager/coordinator on special projects. Researches/determines compatibility and serviceability of equipment with present system, as well as availability of parts and manufacturer service.

7. Researches technical information from a variety of sources; designs, draws plans or writes specifications for equipment and facility improvements as necessary.


ADDITIONAL WORK PERFORMED:

1. Assists maintenance staff in analysis and diagnosis of problems, troubleshooting equipment and system failures, and performing skilled labor as necessary in emergency situations.

PERFORMANCE REQUIREMENTS (Knowledge, Skills, and Abilities):

- Thorough knowledge of the methods, materials and tools used in equipment maintenance in an industrial plant environment.
- Working knowledge of and technical skill to perform preventive and corrective maintenance and to analyze, troubleshoot, and correct faults on electro-mechanical pumps, motors, hydraulic and pneumatic systems, electrical and electronic systems and instrumentation within a process plant environment.
- Working knowledge of the following: National Electric Code, operation of electrical test equipment, instrumentation theory and process control application, electrical generation, programmable logic controllers, precision measuring instruments; variety of motors, motor controls, pumps, valves, fittings; hydraulic theory and chemical dosage applications, etc.
- Working knowledge of City's water distribution system, wastewater collection system, and treatment plants.
- Strong management skills including planning and organizing, problem analysis and decision-making, management control, time management, and interpersonal sensitivity.
- Good supervisory skills to train and evaluate a technical staff, develop comprehensive performance standards, safety rules, policies and procedures.
- Good oral and written communication skills to interact effectively with diverse groups of people such as co-workers, subordinates, outside agencies, contractors, engineers, etc.
- Ability to research, understand and interpret to others, information in complex technical manuals, blueprints, drawings, schematics, etc.
- Ability to develop and maintain accurate computerized maintenance records systems.
- Willingness to accept "on-call" status for equipment failures.
- Physical mobility to make on-site inspections/visitations of worksites at all facilities.
WORKING ENVIRONMENT:

Work is performed primarily in an office setting in an industrial plant. Providing directions to crew, making on-site inspections or troubleshooting, etc., may require working outdoors in all weather conditions. The wastewater plant is a high risk environment which requires special safety precautions, i.e. working near heavy operating equipment, toxic or volatile chemicals, noxious gases, and with exposure to raw sewage. Employees may be required to wear protective clothing such as coveralls, rain gear, masks, boots, goggles, gloves, or shields and use respirator and self-contained breathing apparatus when appropriate.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Successful completion of 90 credit hours comprising a combination of training in electrical, electronics or instrumentation, mechanical maintenance, hydraulics, pneumatics, engineering technology or closely related area. Training must have been completed through community college, technical or vocational school, equivalent military institution or other City-approved institution.
- Five (5) years of experience in an industrial or process plant environment performing corrective and preventive maintenance on complex industrial equipment.
- Two years of supervisory or lead experience including responsibility for organizing, prioritizing, and assigning work.
- Additional coursework in areas such as engineering technology, system design, drafting desirable.
- Experience in a maintenance function for a water distribution or wastewater collection system and/or treatment plant desirable.

NECESSARY SPECIAL REQUIREMENT:

- Must have or be able to obtain Washington State Certification in the following areas:
  - Cross Connection Control Specialist within one year of hire.
  - Water Distribution Manager III within three years of hire.
- Valid Washington State driver's license at the time of hire and with proof of good driving record. Candidates must submit a three-year driving record abstract prior to hire.
- Must obtain a forklift card within one year of hire and maintain a valid forklift card during length of employment.
* Note: Substitution for education and training requirements are available as outlined in the Washington Administrative Code Chapter 246-292.

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               5/84

REVISED BY:   R. Bailey, B. McCourt, C. Sellin
              1/93
             R. Bailey, B. McCourt, L. McGowan-Smith
              9/02

REVIEWS BY:  Tom Rosenberg, Asst. Director
             Public Works/Operations

REVIEWS BY:  Richard E. McKinley, Director
              Public Works
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: MAINTENANCE SPECIALIST - MAINTENANCE PLANNING
DEPARTMENT: Public Works/Operations

UNION: 114
SG: 16
CS: Entry
FLSA: Y
EE04CODE: SC

NATURE OF WORK:

Implements and maintains the computerized maintenance management system for corrective and preventive maintenance of the treatment plants, pumping stations, water distribution and wastewater collection systems. Prepares and distributes work assignments for the section; performs complex technical and troubleshooting tasks on mechanical, electrical and electronic equipment associated with the systems. Error or negligence in performance could have serious consequences for City's water and wastewater systems.

DISTINGUISHING CHARACTERISTICS:

The Maintenance Specialist - Maintenance Planning is distinguished by the responsibility for oversight of the maintenance management system and acting as a lead worker in distributing work of the Plant Maintenance Section. The position also requires the highest level of technical expertise in electrical, electronics, mechanical, pneumatics or hydraulic fields. This technical skill is utilized to provide oversight of the preventive and corrective maintenance for the assigned area and to perform advanced troubleshooting and repair of the system's equipment. Works under established City and Departmental policies and procedures, and recognized state and national standards.

SUPERVISORY RELATIONSHIPS:

Reports to and receives work assignments from the Maintenance Supervisor. Works independently under general supervision. Acts as lead worker in assigning work, providing direction and guidance as needed for Maintenance Specialists, Maintenance Technicians, Utility workers and temporary personnel as assigned.

ESSENTIAL FUNCTIONS:

1. Implements and maintains a comprehensive preventive maintenance management system for the mechanical, electrical, electronic, hydraulic, pneumatic and instrumentation equipment in the City's water and wastewater treatment plants and associated facilities. Recommends modifications and updates of the maintenance management system to supervisor.

2. Acts as lead worker in organizing work, prioritizing tasks and assigning duties to other
employees of the section. Provides day to day direction and guidance of Maintenance Technicians, Utility Workers and temporary employees as needed.

3. Provides on-the-job training for Maintenance Technicians in safe and efficient maintenance techniques and specialized skills as needed. Ensures work methods comply with recognized City, state, and national standards.

4. Performs complex troubleshooting and repair of mechanical, electrical and electronic equipment in the water and wastewater treatment plants and associated facilities as needed.

5. Performs programming of programmable logic controllers, program troubleshooting and modifications to existing programs as needed.

6. Maintains a computer-based library system for all equipment.

7. Works laterally with other Maintenance Specialists to coordinate mechanical and electrical work when the task requires multiple skills.

8. Contacts other departments, vendors, and outside agencies to gather information regarding equipment, acquisition, and support services as necessary. Assists contractors when needed with system information and coordination of new system installations.

ADDITIONAL WORK PERFORMED:

1. Occasionally fills in and acts as lead for other Maintenance Specialists as needed.

2. Performs other duties within the scope of the classification.

KNOWLEDGE AND SKILLS:

For mechanical specialty:
- Knowledge and good understanding of precision measuring instruments such as micrometers, precision pressure/vacuum gauges, tachometers, manometers, etc.
- Knowledge and good understanding of the relationships between various mechanical, hydraulic and pneumatic equipment components within a plant process.
- Knowledge and good understanding of all types of pumps, valves, fittings and accessories.
- Knowledge of cross connection control principles (training provided).

For electrical/electronics specialty:
- Working knowledge of the National Electric Code and its application.
- Knowledge in operation of electrical test equipment such as digital and analog volt/ohm meters, oscilloscope, pulse/frequency counter, current/volt generators, logic probes, etc.
- Knowledge of instrumentation theory and process control application.
- Knowledge and understanding of current source and pulse width modulated variable frequency drives.

06/16/2008
Knowledge and understanding in theory and operation of DC and AC motors from fractional horsepower to 500 horsepower.
- Knowledge of electrical generation.
- Ability to understand, program and troubleshoot the logic in a variety of sizes and types of programmable logic controllers.
- Ability to read, understand and interpret to others, information in complex technical manuals.
- Ability to draw, read, understand and interpret to others, information on complex drawings, blueprints and schematics
- Ability to quickly analyze, diagnose, troubleshoot and correct faults in various types of mechanical and electrical equipments.
- Ability to evaluate existing equipment and determine most efficient repair or replacement procedure. Ability to evaluate new or replacement equipment for most efficient life cycle.
- Ability to perform basic math and algebraic calculations as related to hydraulic theory and chemical dosage applications.
- Ability to follow established safety rules and regulations, and be able to independently recognize and rectify hazardous safety situations.
- Ability to work independently as well as part of a work crew.
- Good skills in leadership, planning and organizing, problem analysis and decision making, interpersonal sensitivity, time management, and ability to resolve minor conflicts.
- Good communication skills to interact effectively with people at all levels of the organization, coworkers, vendors; and ability to communicate technical information in a clear manner.
- Ability to evaluate technical skills of less experienced workers and to provide training and guidance for skill development.
- Ability to maintain records accurately and legibly.
- Willingness to accept "on call" status for equipment failures.
- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.
- Physical requirements of the job include:
  - Ability to perform heavy physical work including the ability to infrequently lift and carry approximately 50 lbs., and very infrequently approximately 70 lbs.
  - Correctable vision suitable for working on small parts, distinguishing between color coded electronic parts, and viewing a computer terminal.
  - Sufficient manual and finger dexterity to work with small parts.
  - Adequate hearing to effectively hear telephone and radio conversations.

WORKING ENVIRONMENT:

Work is performed indoors at a computer workstation, as well as outdoors in all types of weather, at heights to 100 feet, in confined spaces, working with exposure to raw sewage and in proximity to potential chemical and industrial hazards.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Successful completion of 90 credit hours of training in mechanical maintenance,
hydraulics, and pneumatics; OR electrical, electronics, and instrumentation; OR any combination thereof. Structured coursework may be completed through programs at a community college, technical or trade school, apprenticeship, equivalent military training, or other City-approved institution.

- Two years experience in a process plant environment performing preventive and corrective maintenance for a combination of mechanical, hydraulic, pneumatic, electrical, electronics, or instrumentation equipment.
- One year supervisory or lead experience in electrical/electronic or mechanical maintenance and repair preferred.
- Experience working with a computer based maintenance management system is preferred.
- Experience in a maintenance function for a water distribution or wastewater collection system desirable.

NECESSARY SPECIAL REQUIREMENTS:

- Valid Washington State driver’s license at time of hire and good driving record. Candidates must submit a three year driving record abstract prior to hire.
- Emergency call-out response time of 20 minutes may be required.

PREPARED BY: B. McCourt
               R. Bailey
               S. Mahaffey
               4/91

APPROVED BY:
               Tom Rosenberg, Asst. Director
               Public Works/Operations

REVISED BY: R. Bailey
              C. Sellin
              4/92
              M. Sowers
              L. McGowan-Smith
              3/05

Richard E. McKinley, Director
Public Works

COMMISSION ADOPTION:

0636S
City of Bellingham  
Classification Specification - Civil Service or AFSCME  

CLASS TITLE: MAINTENANCE SPECIALIST - ELECTRICAL/ELECTRONIC  
DEPARTMENT: Public Works/Operations  
UNION: 114  
SG: 16  
CS: Entry  
FLSA: Y  
EE04CODE: SC  

NATURE OF WORK:  
Coordinates, directs, assists and performs preventive and corrective maintenance on all electrical, electronic and instrumentation equipment associated with the water and wastewater systems. Error or negligence in performance could have serious consequences for the City’s water and wastewater systems.  

DISTINGUISHING CHARACTERISTICS:  
The Maintenance Specialist - Electrical/Electronic is distinguished by the requirement for the highest level of expertise in the electrical, electronic and instrumentation fields as applicable to equipment of the City’s water and wastewater systems. This technical skill is utilized to provide oversight of the preventive and corrective maintenance for the assigned areas and to perform advanced troubleshooting and repair of the system’s equipment. Works under established City and Departmental policies and procedures, and recognized state and national standards.  

SUPERVISORY RELATIONSHIPS:  
Reports to the Maintenance Supervisor. Receives work distribution through maintenance planning process and assigns work to crews. Works independently at remote work sites under general supervision. Acts as lead worker in assigning work, providing day to day direction and guidance to the Maintenance Technicians, Utility Workers and temporary personnel as assigned.  

ESSENTIAL FUNCTIONS:  
1. Performs corrective and preventive maintenance and repair work on a variety of electric, electronic and instrumentation equipment: electrical motors, transformers, electrical distribution systems, variable frequency drives, complex equipment control systems, and programmable logic controllers. Installs electrical appurtenances. Inspects and adjusts plant equipment as part of a comprehensive preventive maintenance program.  

2. Troubleshoots equipment failures, analyzes and diagnoses problem, plans corrective action to plant and system maintenance problems. Replace or rebuild parts and equipment as needed.
3. Reviews work assignments, assigns work to crews, and provides day to day direction and guidance to Maintenance Technicians, Utility Workers and temporary personnel. Inspects work to insure compliance with prescribed maintenance standards. May recommend modifications in scheduling, work procedures and assignments.

4. Provides on-the-job training for Maintenance Technicians in safe and efficient maintenance techniques and specialized skills. Ensures work methods comply with recognized City, state, and national standards.

5. Works laterally with other Maintenance Specialists to coordinate mechanical and electrical work when the task requires multiple skills.

6. Prepares basic maintenance records related to daily activities.

7. Operates a variety of tools and test equipment such as volt/ohm meters, oscilloscope, megometer, logic probes, current and frequency generators, tachometers, hand and power tools. May perform some limited fabrication of parts.

8. Contacts other departments, vendors, and outside agencies to gather information regarding equipment, acquisition, and support services as necessary.

ADDITIONAL WORK PERFORMED:

1. Occasionally fills in and acts as lead for other Maintenance Specialists as needed.

2. Performs other duties within the scope of classification.

KNOWLEDGE AND SKILLS:

- Working knowledge of the National Electric Code and its application.
- Knowledge in operation of electrical test equipment such as digital and analog volt/ohm meters, oscilloscope, pulse/frequency counter, current/volt generators, logic probes, etc.
- Knowledge of instrumentation theory and process control application.
- Knowledge of cross connection control principles (training provided).
- Knowledge and understanding of current source and pulse width modulated variable frequency drives.
- Knowledge and understanding in theory and operation of DC and AC motors from fractional horsepower to 500 horsepower.
- Knowledge of electrical generation.
- Ability to understand, program and troubleshoot the logic in a variety of sizes and types of programmable logic controllers.
- Ability to read, understand and interpret to others, information in complex technical manuals.
- Ability to draw, read, understand and interpret to others electrical diagrams and complex circuit schematics.
- Ability to understand the relationships of components within a system.
- Ability to analyze, troubleshoot and correct faults in complex electrical, electronic and instrumentation systems.
- Ability to perform basic math and algebraic calculations as related to electrical theory.

06/16/2008
- Ability to work independently as well as part of a work crew.
- Ability to follow established safety rules and regulations, and be able to independently recognize and rectify hazardous safety situations.
- Good skills in leadership, planning and organizing, problem analysis and decision making, interpersonal sensitivity, time management; and ability to resolve minor conflicts.
- Good communication skills to interact effectively with people at all levels of the organization, coworkers, vendors; and ability to communicate technical information in a clear manner.
- Ability to evaluate technical skills of less experienced workers and to provide training and guidance for skill development.
- Ability to maintain records accurately and legibly.
- Willingness to accept "on call" status for equipment failures.
- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.
- Physical requirements of the job include:
  - Ability to continuously walk, stoop, bend and climb to perform heavy physical work including the ability to infrequently lift and carry approximately 50 lbs, and very infrequently approximately 70 lbs.
  - Correctable vision suitable for working on small parts, distinguishing between color coded electronic parts, and viewing a computer terminal.
  - Sufficient manual and finger dexterity to work with small parts.
  - Adequate hearing to effectively hear telephone and radio conversations.
  - Must be willing and able to work outdoors in all types of weather, at heights to 100 feet, in confined spaces, work with exposure to raw sewage, and in proximity to potential chemical and industrial hazards.

**WORKING ENVIRONMENT:**

Work may be performed indoors at a computer workstation, as well as outdoors in all types of weather, at heights to 100 feet, in confined spaces, working with exposure to raw sewage and in proximity to potential chemical and industrial hazards.

**EXPERIENCE AND TRAINING REQUIREMENTS:**

- Successful completion of 45 credit hours of electrical training AND 45 credit hours of electronic or instrumentation training at a community college, technical school, equivalent military institution or other City approved institution.
- Two years experience in a process plant environment performing preventive and corrective maintenance on electrical, electronic and instrumentation equipment required.
- One year supervisory or lead experience in electrical, electronic or instrumentation maintenance and repair preferred.
- Experience in a maintenance function for a water distribution or wastewater collection system desirable.

**NECESSARY SPECIAL REQUIREMENTS:**

- Valid Washington State driver's license at time of hire and good driving record. Candidates must submit a three year driving record abstract prior to hire.
- Emergency call-out response time of 20 minutes may be required.

PREPARED BY:  B. McCourt

R. Bailey
C. Sellin
03/92

APPROVED BY:  Tom Rosenberg, Asst. Director
Public Works/Operations

REVISED BY:  M. Sowers

L. McGowan-Smith
3/05

COMMISSION ADOPTION:

0626S
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: MAINTENANCE SPECIALIST - MECHANICAL
DEPARTMENT: Public Works/Operations

UNION: 114
SG: 16
CS: Entry
FLSA: Y
EE04CODE: SC

NATURE OF WORK:
Coordinates, directs, assists and performs preventive and corrective maintenance on all mechanical, pneumatic and hydraulic equipment associated with the water and wastewater systems. Error or negligence in performance could have serious consequences for the City’s water and wastewater systems.

DISTINGUISHING CHARACTERISTICS:
The Maintenance Specialist - Mechanical is distinguished by the requirement for the highest level of expertise in the mechanical, pneumatic and hydraulic fields as applicable to equipment of the City’s water and wastewater systems. This technical skill is utilized to provide oversight of the preventive and corrective maintenance for the assigned areas and to perform advanced troubleshooting and repair of the system's equipments. Works under established City and Departmental policies and procedures, and recognized state and national standards.

SUPERVISORY RELATIONSHIPS:
Reports to the Maintenance Supervisor. Receives work distribution through maintenance planning process and assigns work to crews. Works independently at remote work sites under general supervision. Acts as lead worker in assigning work, providing day to day direction and guidance to the Maintenance Technicians, Utility Workers and temporary personnel as assigned.

ESSENTIAL FUNCTIONS:
1. Performs corrective and preventive maintenance and repair work on a variety of mechanical, pneumatic and hydraulic equipment and systems such as compressors, generators, oxygen generation equipment, gear reducers, valves, piping, bracing, steel doors and platforms. Inspects and adjusts plant equipment as part of a comprehensive preventive maintenance program.

2. Troubleshoots equipment failures, analyzes and diagnoses problem, plans corrective action for plant and system maintenance problems. Adjusts, replaces or rebuilds parts and equipment as needed.
3. Reviews work assignments, assigns work to crews, and provides day to day direction and guidance to Maintenance Technicians, Utility Workers and temporary personnel. Inspects work to insure compliance with prescribed maintenance standards. May recommend modifications in scheduling, work procedures and assignments.

4. Provides on-the-job training for Maintenance Technicians in safe and efficient maintenance techniques and specialized skills. Ensures work methods comply with recognized City, state, and national standards.

5. Works laterally with other Maintenance Specialists to coordinate mechanical and electrical work when the task requires multiple skills.

6. Prepares basic maintenance records related to daily activities.

7. Operates a variety of tools, machinery and equipment including hand and power tools, precision tools, hydraulic presses, pullers, hoists, forklift, boom truck, etc. Also performs pipe fitting, welding and metal fabrication.

8. Contacts other departments, vendors, and outside agencies to gather information regarding equipment, acquisition, and support services as necessary.

**ADDITIONAL WORK PERFORMED:**

1. Occasionally fills in and acts as lead for other Maintenance Specialists as needed.

2. Performs other duties within the scope of the classification.

**KNOWLEDGE AND SKILLS:**

- Knowledge and good understanding of precision measuring instruments such as micrometers, precision pressure/vacuum gauges, tachometers, manometers, etc.
- Knowledge and good understanding of the relationships between various mechanical, hydraulic and pneumatic equipment components within a plant process.
- Knowledge and good understanding of all types of pumps, valves, fittings and accessories.
- Ability to read, understand and interpret to others, information in complex technical manuals.
- Ability to draw, read, understand and interpret to others, information on complex drawings, blueprints and schematics.
- Ability to quickly analyze, troubleshoot and correct faults in various types of mechanical, hydraulic and pneumatic equipment.
- Ability to perform basic math and algebraic calculations as related to hydraulic theory and chemical dosage applications.
- Knowledge of cross connection control principles (training provided).
- Ability to follow established safety rules and regulations, and be able to independently recognize and rectify hazardous safety situations.
- Ability to work independently as well as part of a work crew.
- Good skills in leadership, planning and organizing, problem analysis and decision making, interpersonal sensitivity, time management, and ability to resolve minor conflicts.
- Good communication skills to interact effectively with people at all levels of the organization, coworkers, vendors; and ability to communicate technical information in a clear manner.
- Ability to evaluate technical skills of less experienced workers and to provide training and guidance for skill development.
- Ability to maintain records accurately and legibly.
- Willingness to accept "on call" status for equipment failures.
- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.

- Physical requirements of the job include:
  - Ability to continuously walk, stoop, bend and climb to perform heavy physical work including the ability to infrequently lift and carry 50 lbs, and very infrequently approximately 70 lbs.
  - Correctable vision suitable for working on small parts, distinguishing between color coded electronic parts, and viewing a computer terminal.
  - Sufficient manual and finger dexterity to work with small parts.
  - Adequate hearing to effectively hear telephone and radio conversations.
  - Must be willing and able to work outdoors in all types of weather, at heights to 100 feet, in confined spaces, work with exposure to raw sewage, and in proximity to potential chemical and industrial hazards.

**WORKING ENVIRONMENT:**

Work may be performed indoors at a computer workstation, as well as outdoors in all types of weather, at heights to 100 feet, in confined spaces, working with exposure to raw sewage and in proximity to potential chemical and industrial hazards.

**EXPERIENCE AND TRAINING REQUIREMENTS:**

- Successful completion of 90 credit hours of mechanical training at a community college, technical or trade school, or equivalent military institution or other City approved institution, in mechanical maintenance including training in hydraulics, plant math, and welding required.
- Two years experience in a process plant environment performing preventive and corrective maintenance on mechanical, hydraulic and pneumatic equipment is required.
- One year supervisory or lead experience in mechanical, hydraulic and pneumatic equipment maintenance and repair preferred.
- Experience in a maintenance function for a water distribution or wastewater collection system desirable.

**NECESSARY SPECIAL REQUIREMENTS:**

- Valid Washington driver's license at time of hire and good driving record. Candidates must submit a three year driving record abstract prior to hire.
- Emergency call-out response time of 20 minutes may be required.
COMMISSION ADOPTION:

0625S
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: MAINTENANCE TECHNICIAN
DEPARTMENT: Public Works/Operations

UNION: 114
SG: 14
CS: Entry
FLSA: Y
EE04CODE: SC

NATURE OF WORK:
The Maintenance Technician performs multi-discipline preventive, corrective, rebuild, upgrade, and special project maintenance for complex plant process systems, equipment, and facilities at the water and wastewater treatment plants, pumping stations, lift stations, reservoirs, and other facilities. Examples of duties include performing troubleshooting, preventive, corrective, and special project maintenance on industrial electrical, electronic, electrical generating and distribution, electronic process control instrumentation, distributed control systems, programmable logic controllers (PLC), remote telemetry units, HVAC, mechanical pumping equipment, high horsepower motors, compressors, heavy industrial process machinery, piping, and pneumatic and hydraulic systems.

DISTINGUISHING CHARACTERISTICS:
This classification is distinguished by the necessity to perform multi-discipline diagnostic, preventive, corrective, rebuild, upgrade, and special project maintenance tasks in all technical skill areas including but not limited to electrical, electronics, mechanical, pneumatics, and hydraulic systems. It is distinguished from the Maintenance Specialist classifications by the Maintenance Specialist level of expertise and experience, primary responsibility for specialty projects, and for the Maintenance Specialists work planning, distribution, planning group, and other functions.

SUPERVISORY RELATIONSHIPS:
Reports to the Maintenance Supervisor. Works independently at plant and remote work sites under general supervision. Receives work assignments, training, and guidance from Maintenance Specialists. Serves as lead worker for Utility Workers and extra help personnel as assigned.

ESSENTIAL FUNCTIONS:

1. Initiates and performs corrective electrical/electronic maintenance troubleshooting, replacing, adjusting, and rebuilding electrical, electronic, process control instrumentation, distributed control systems, programmable logic controllers (PLC), remote telemetry units, or related systems.

2. Initiates and performs corrective mechanical maintenance troubleshooting, replacing, adjusting, and rebuilding defective machinery, parts and associated systems. Installs
new machinery or related components.

3. Performs diagnostic and fault analysis on electric, electronic, mechanical, process control, pneumatic, pumping, hydraulic, and other systems.

4. Plans and performs projects for equipment, instrument, and system upgrade or replacement; conducts project research, planning, designs, working with engineering, vendor or contractor liaison, fabrications, testing, and installations.

5. Performs preventive maintenance such as inspection, cleaning, lubrication, checking tolerances, and exercising pumps, motors, compressors, instrumentation, telemetering, and metering equipment; also does new installation reviews and inspections, quality control, and punch lists, etc.

6. Participates in meetings, informal training, communications, and related activities.

7. Performs maintenance management system computerized data entry, work order, and report functions to log, chart, plan, and report complete and accurate records of work performed.

8. May work weekend, holiday, or emergency shifts independently with and without supervision.

**ADDITIONAL WORK PERFORMED:**

9. Performs duties of Plants Skilled Worker I classification such as routine equipment checks or maintaining buildings and remote facilities.

10. Performs other duties as assigned.

**KNOWLEDGE AND SKILLS:**

- Working knowledge of and technical skill to perform multi-discipline trouble shooting, fault analysis, preventive and corrective electro-mechanical maintenance on programmable logic controllers (PLC), remote telemetry units, pumps, motors, hydraulic and pneumatic systems and instrumentation.
- Must be proficient in use of common electronic and electrical tools such as digital volt-ohm meters, ammeters, oscilloscopes, and mechanical hand and machine tools.
- Basic computer skills to use computer applications required performing the job: word processing e-mail, basic data entry and database search tasks.
- A working knowledge of the City's water production, water distribution, wastewater collection, and wastewater treatment operations, laboratory, and management systems.
- Understanding of the functional nature of industrial plant continuous process control systems, machines, and instruments and ability to visualize the relationship of parts, systems, and controls.
- Ability to work independently in carrying out assigned tasks.
- Ability to read, research, and follow technical manuals, blueprints, drawings, and to keep up on Maintenance Technician skills and knowledge.
- Ability to add, subtract, multiply, divide and work effectively with quantitative methods applicable to an industrial process plant such as algebra to convert feet and head to
water pressure or do trigonometric calculations to figure area sizes.
- Ability to use a variety of hand, power, test, and electronic tools and equipment.
- Ability to safely work with and around toxic wastes and hazardous chemicals, to follow established policies and safety guidelines, and to be able to independently recognize and secure safety, hazard, and cross connection situations.
- Ability to concentrate while performing routine repetitive tasks.
- Ability to communicate orally in English, to spell and write legibly on forms and other documents.
- Ability to accept "on call" status for equipment failures and 24-hour emergency call out.
- Physical requirements of the job include:
  1. Ability to perform heavy physical work including the ability to routinely lift and carry 60 lbs. and occasionally lift and carry 100 lbs.
  2. Correctable vision suitable for working on small parts, hearing, and manual dexterity to execute work to close tolerances and perform assigned tasks.
  3. Must be willing and able to work outdoors in all types of weather, at heights to 100', in confined spaces, and work with exposure to raw sewage.

WORKING ENVIRONMENT:

The Maintenance Technicians work is performed both indoors and outdoors in all weather conditions in an industrial plant environment at the water and wastewater plants, pump stations and other facilities of the water distribution and sewage collection systems. The work is in a high-risk environment which requires special safety precautions, i.e., working around high speed, high horsepower, and high voltage rotating equipment; with irritant chemicals; and with exposure to raw sewage. Employees may be required to use protective clothing such as coveralls, rain gear, masks, boots, goggles, gloves, shields, respirator, or other equipment. The person in this position independently lifts and handles a variety of moderately heavy components and may be required to work weekends, Saturdays, holidays, or emergency shifts.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Successful completion of the two years post-secondary education (equivalent of 90 credit hours on the quarter system or 3000 clock hours from a technical college) of accredited training in the full-range of industrial related mechanical maintenance, hydraulics, pneumatics, electrical, electronics, process control instrumentation, or closely related vocational areas. Structured coursework may be completed through programs at military training centers, community college, technical or trade school, apprenticeship, or other City-approved institutions.
- Three years technical maintenance experience with fault analysis, preventative and corrective maintenance in a continuous process industrial environment such as wastewater collection and treatment, pulp and paper or refinery. Experience must reflect independent work in one or more of the following disciplines: electrician, process control technician, electronics technician, machinist, millwright, industrial plant maintenance mechanic, pipe fitter/plumber.
- Ability to obtain and maintain a valid Washington State driver’s license during length of employment.

NECESSARY SPECIAL REQUIREMENTS:
- Must obtain and maintain WDLI First Aid Card within one year of employment.
- Must obtain and maintain WDLI Fork Lift Operator's card within one year of employment.
- Must be able to report for emergency call-out within twenty (20) minute response time. Holiday, emergency, and weekend work may be required.

PREPARED BY:  Bill McCourt

Kathryn Hanowell
5/24/83
Operations

REVISED BY:  Ray Bailey
Steve Mahaffey
4/91

Charlotte Sellin
4/92
Plant Maintenance Staff
Lynn Starcher
Ross Ardrey
12/99
Ray Bailey
Lorna McGowan
5/00

REVIEWED BY:  Kenneth D. Thomas
Assist. Director of PW for

John M. Garner
Director of Public Works

COMMISSION ADOPTION:

PW0262.cs
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: SKILLED WORKER 1
DEPARTMENT: Public Works/Operations

UNION: 114
SG: 10
CS: Promotional
FLSA: Y
EE04CODE: SC

NATURE OF WORK:
This class represents experienced employees who perform manual and semi-skilled labor of all kinds, indoors and outdoors, in all types of weather and under sometimes hazardous conditions. Employees in this classification may be assigned to the following units: Streets, Stormwater, Plants Maintenance or Operations, Traffic, Clean Green, or Wastewater Collection. Operates a variety of hand and power tools, motorized mobile equipment, and/or electronic test equipment, depending upon the assigned unit. Usually works as part of an assigned crew but may be given an individual or special assignment. Performs all duties of the classes below (Utility Worker 1 and 2). Attention to safety and protection of personnel and equipment is integral to work.

DISTINGUISHING CHARACTERISTICS:
The Skilled Worker 1 class represents employees who are fully skilled in most work tasks of the assigned unit and able to independently perform tasks. It is distinguished from the Utility Worker 1 and 2 by its journey-level skill in the operational work of the unit. It is distinguished from the Skilled Worker 2 by the latter's responsibility to provide lead guidance to crews within the unit and the expectation that SW2's will be skilled at visualizing the desired end product, be able to problem solve, and use equipment and resources to maximum advantage. Skilled Worker 1's may receive assignments focused on one or two areas of particular skill, ability or work needs; they are expected to notice potential project improvements and make recommendations to senior staff. They share knowledge and teach necessary skills to co-workers and may be called upon to organize the work of a particular assignment or project involving others. Incumbents progress to this level after performing 2 years as a Utility Worker 2 (with specified certifications) in the assigned division, or 5 years as a Utility Worker 1 (without certifications) in the assigned division.

SUPERVISORY RELATIONSHIPS:
Reports to the Supervisor of the assigned unit. Receives work direction and training from higher classified positions in the unit. May provide guidance to lower classified staff.

ESSENTIAL FUNCTIONS:
Depending upon the unit to which assigned:
1. Operates machinery and power equipment on an interchangeable basis (for example, dump trucks, trucks and trailers, back hoes, paving machines, loaders, rollers, brush cutters, etc.) or may be regularly assigned to a single piece of mobile equipment requiring substantial manual dexterity, without direct supervision and responsible for reporting maintenance problems and determining whether immediate service by a skilled mechanic is required (for example, street sweepers).

2. Performs many heavy manual semi-skilled and skilled tasks such as operating chain saws, jack hammers and pavement saws, and raking asphalt in an accomplished fashion; may perform right-of-way patching, pavement overlays, maintenance and repair of guardrails, sidewalk, repair signing and street marking tasks, repair storm drainage catch basins and surrounding pavement involving masonry, concrete, and asphalt work.

3. May install, maintain and repair traffic signal equipment, street lighting, operate a boom and ladder truck and electronic test equipment; may make, install and maintain traffic signs, work on communication tower to install and maintain equipment; locate underground utilities, etc.

4. May install, replace and repair sewer pipes, inspect and clean sewer mains and make repairs involving operation of a rodding machine, or other appropriate machine or device; may operate a video scanner to assess sewer system conditions and identify problems; may raise manholes and make related street grade adjustments; may respond to citizen complaints.

5. May perform waste treatment plant service and clean up tasks (for example, cleans restrooms, floors, clarifiers, incinerators, grounds and maintains protective coatings of facilities) and perform designated preventive maintenance tasks and complete computerized maintenance records; performs initial fault analysis on pneumatic, pumping, hydraulic and electrical systems; prepares, plans and schedules daily work, as well as inspects and establishes standards for the work done; may operate water diversion systems to supply water to Lake Whatcom.

6. May clean water and wastewater treatment equipment (for example, reservoirs, pump stations, pumps, wet wells, dry wells, lift stations, etc.) and inspect and perform cleaning, lubrication, tolerance checks, and exercising of pumps, motors, compressors, instrumentation, chemical metering equipment, etc.; may install new machinery or components; may monitor and check performance of water pumping stations, reservoirs, wastewater lift stations and other remote facilities.

ADDITIONAL WORK PERFORMED:

1. Performs duties of the classes below.

2. Other duties as assigned within the scope of the classification.

KNOWLEDGE AND SKILLS:

06/16/2008
- Ability to operate safely and efficiently a wide variety of equipment including, but not limited to, back hoe, boom truck, front end loader, pipe saw, hydraulic boring machine, trucks above five yard capacity, and other light equipment needed for the safe and efficient completion of job assignments.
- Depending on assignment, may require working knowledge of basic electricity, how to recognize and prevent cross connections, understanding of the functional nature of machines, ability to read and follow technical manuals and drawings, ability to perform fault analysis and troubleshoot equipment problems, and safely handle toxic chemicals.
- Working familiarity with Public Works technical and general tools and work methods and practices.
- Working knowledge of the location, type and extent of remote facilities throughout the system and how these operate.
- Working knowledge of proper use of hydraulic machinery.
- Ability to recognize and take appropriate action regarding machinery maintenance problems.
- Ability to safely and efficiently carry out job assignments independently or as crew leader.
- Ability to instruct others in and strictly adhere to safe work requirements and practices and pay strict attention to hazardous conditions, implementing appropriate precautions.
- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.
- All the requirements of the classes below.

WORKING ENVIRONMENT:

Work may be performed both indoors and outdoors in all weather conditions on City streets and rights-of-way, in close proximity to roadway traffic, or in an industrial plant environment. The work involves moderate risks which require special safety precautions, e.g. working around moving equipment, high speed or high voltage equipment, or with exposure to irritant chemicals or raw sewage. Employees may be required to use protective clothing such as coveralls, rain gear, hard hats, safety vests, masks, boots, goggles, gloves, or shields.

EXPERIENCE AND TRAINING REQUIREMENTS:

Promotion is automatic upon the achievement of:
- Five (5) years as Utility Worker 1, two of which are in the assigned unit, OR
- Two (2) years as a Utility Worker 2 within the unit, with appropriate certifications based upon the unit assigned:
  o Wastewater Collection Unit:
    ▪ WWCPA (Washington Wastewater Collection Personnel Assn.) WWC – 1
  o Streets, Stormwater and Clean Green Units:
    ▪ Regional Road Maintenance Endangered Species Act Program (Track 3)
  o Traffic Unit:
    ▪ Work Zone Safety Certification
  o Plants:
    ▪ Chlorine Disinfection course completion

Physical abilities to perform assigned duties:
- Manual dexterity sufficient to operate hand and power equipment safely and efficiently.
- Correctable vision to read instructions and work safely around equipment.
- Adequate hearing to effectively hear voice radio and crew communications, roadway traffic and alarms in a noisy environment.
- Physical ability to continuously stoop, bend, climb, occasionally work in confined spaces or from heights, and frequently lift and carry heavy objects in the 50 lb. range, and occasionally weights of approximately 100 lbs. utilizing proper body mechanics, mechanical and other assistance.
- Positions in Wastewater Collection, Stormwater and Streets require the physical ability to operate a 60 lb. jackhammer for extended periods of time intermittently throughout the year.

**NECESSARY SPECIAL REQUIREMENTS:**

- Valid Washington State driver’s license and proof of good driving record.
- Required to possess a valid First Aid/CPR card at time of appointment.
- Must demonstrate proficiency in the safe and efficient use of equipment used by this Class.
- Some units require the ability to secure a Commercial Driver’s License within six months of hire and maintain a valid CDL during length of employment (CSC 7-11-90).

**PREPARED:** L. McGowan-Smith  
G. Smyth, C. Bedlington  
C. Williams  
12/06

**REVIEWED BY:**  
Richard E. McKinley, Director  
Public Works

**COMMISSION ADOPTION:**  
December 13, 2006
CITY OF BELLINGHAM

JOB DESCRIPTION

JOB TITLE: CHIEF OPERATOR - WATER TREATMENT

DEPARTMENT: PUBLIC WORKS, Operations

EXEMPT
CS:N
FLSA:N
EEO4CODE:PR

JOB SUMMARY:

The Chief Operator - Water Treatment is responsible for supervision and direction of watershed, water supply, water treatment, and water distribution operations; serves as the system administrator for water and wastewater computerized automated control and data acquisition systems; and recommends budgets, standards, and operations. Error or negligence in supervision or performance could jeopardize municipal water supplies, facilities, and water/wastewater computerized process controls; put public health at risk; result in loss of life, property, financial resources, and equipment; and violate water quality, air, and other standards. Works under the Washington State regulations and procedures for water supply and water treatment as well as City and departmental policies and procedures.

SUPERVISORY RELATIONSHIPS:

Reports directly to the Public Works Superintendent - Operations. Works independently under general supervision. Maintains close working relations with supervisors at the waste water treatment plant and other city personnel. Supervision of Plant Operators is a joint responsibility with the Operations Supervisor - Wastewater Treatment. Serves as a member of the plant operations management team.

1. Plans, organizes, directs the day-to-day operation of the water treatment plant. Schedules work activities, making all necessary arrangements for supplies, equipment, and staffing. Determines service levels and establishes operating criteria for operators.

2. Jointly responsible for plant operator supervision with the Operations Supervisor - Wastewater including recommending employee hiring, operator training, supervision, evaluations, disciplinary actions, vacation scheduling, etc., of plant operators.

3. Coordinates and performs quality control testing and evaluation in conjunction with water treatment plant and other laboratory personnel to optimize the quality and quantity of water produced.

4. Develops and implements policies and procedures for proper operation of the plant and distribution system.

5. Performs project, plant operations team, vendor, and consultant responsibilities.

6. Coordinates watershed and water supply functions such as operation of the Lake Whatcom control dam, responding to public concerns on lake levels, producing flow reports, and collaborating with other departments.

7. Performs administrative duties in compliance with all City and departmental policies and procedures.
procedures, state and federal water quality regulations such as completion of state reports, planning documents, performance documentation, inventory control, requisitioning supplies, bid specifications, etc.

8. Coordinates and performs systems administrator duties and responsibilities for water and wastewater supervisory control and data acquisition computer systems. This includes responsibility for training plant operators, system backup, and writing system reports.

9. Recommends preliminary annual budget for the section; includes researching information for capital expenditures, and performing cost analyses for items such as chemical costs, water quality control, conservation, and regulatory compliance.

10. Assists the Superintendent on capital projects for plants and other facilities which may include providing operating data to engineers, reviewing construction documents, or recommending changes appropriate to operations. Also works with engineers and other persons on capital improvement plans.

ADDITIONAL WORK PERFORMED:

1. Facilitates and performs public education and community relations activities.

2. Plans and implements improved water supply and water treatment management, quality, reporting, and monitoring systems to meet new or revised water treatment standards.

3. Operates the water treatment pilot plant filter system to optimize treatment plant performance.

4. Performs other duties and responsibilities as assigned.

PERFORMANCE REQUIREMENTS (Knowledge, Skills, and Abilities):

- Knowledge of management, industry, and technical standards and procedures required for the operation and maintenance of a water treatment facility and distribution system involving multiple advanced unit processes associated with water systems such as direct filtration water treatment and computer based control systems.
- Excellent written and oral communication skills for working with a diversity of personnel and citizens.
- Knowledge of computer applications to process control, scheduling, data recording, and reporting.
- Strong skills in leadership, supervision, problem analysis, and decision making, planning and scheduling, interpersonal sensitivity, adaptability/flexibility, stress tolerance and time management.
- Ability to attain skills in cost analysis, budget development, and analysis.
- Ability to identify problems and perform basic troubleshooting on machinery and associated systems.
- Ability to establish and maintain effective working relations with employees, engineers, vendors, colleagues and supervisors.
- Ability to lead and respond effectively in emergency, hazardous, or other high stress circumstances.
- Ability to formulate written policies and procedures.
- Ability to identify training needs, develop materials, and instruct operators.
- Ability to courteously and tactfully receive and respond to emergency calls from the public.
- Willingness to accept non-call status and be available to respond to on-call circumstances.
- Physical ability to perform essential functions of the job, including infrequently lifting up to 50 pounds.
- Ability and willingness to demonstrate the Public Service Competencies of Service Orientation, Results Orientation, and Teamwork and Cooperation.

EXPERIENCE AND TRAINING REQUIREMENTS:

- Two years vocational or college coursework in technical areas such as environmental science, civil engineering, or computer technology.
- Four years of experience required in a comparable water-related plant operations industry involving automated systems. Must include two years of supervisory experience with responsibility for leadership, scheduling, training and skills development. Experience with full responsibility for plant operations preferred.
- Familiarity with computer technology required. Experience with systems development and troubleshooting preferred.
- A combination of education and experience that provides the applicant with the required skills and abilities will be considered.
- Valid Washington State driver's license and a good driving record. A three-year driving abstract must be submitted at the time of hire.
- Must pass job-related physical capacities evaluation prior to hire.

NECESSARY SPECIAL REQUIREMENTS:

- Must have or be able to obtain a Washington State Department of Social and Health Services Water Treatment Plan Operator IV within one year of employment.

NOTE: Substitutions for education and training requirements are available as outlined in Washington Administrative Code 246.292.060, 12/27/90.

PREPARED BY: Bill McCourt
Kathryn Hanowell
5/24/83

REVISED BY: Ardrey/Evans
McCourt/Sellin
9/94

REF: 0141S

REVIEWED BY: Kenneth D. Thomas
Assistant Director of PW for Operations

John M. Garner
Director of Public Works
City of Bellingham  
Classification Specification - Civil Service or AFSCME

CLASS TITLE: PLANT OPERATOR II
DEPARTMENT: Public Works/Operations
UNION: 114
SG: 
CS: Promotional
FLSA: Y
EE04CODE: SC

NATURE OF WORK:

This classification acts a lead worker and performs water and wastewater treatment operations, work scheduling, plant computer functions, training, and technical resource services to assist in supervisory activities and ensure proper operation of direct filtration water treatment, water distribution, wastewater collection, primary wastewater treatment, and advanced secondary wastewater treatment plant systems. The Plant Operator II may perform relief duties for the Plant Operator I or Incinerator Operator I and serve as a shift operator-in-charge. Error or negligence in performance could have serious consequences for the city’s water supply and/or wastewater treatment system.

DISTINGUISHING CHARACTERISTICS:

The Plant Operator II position is distinguished from the Plant Operator I by (1) emphasis upon leadership and assistance in supervision, (2) breadth of skills for water, wastewater, and incineration, and (3) responsibility as a technical resource person.

SUPERVISORY RELATIONSHIPS:

Reports to the Operations Supervisor - Wastewater for wastewater related functions and to the Chief Operator - Water Treatment for water related functions. Receives assignments, work direction, and training from supervisory personnel. Works under State regulations and procedures for water and wastewater treatment plants as well as City, departmental and plant policies, procedures and safety rules. Provide lead worker direction, scheduling, training, and instruction to other plant personnel or seasonal extra help.

ESSENTIAL FUNCTIONS:

1. Assists the Operators Supervisor Wastewater and the Chief Operator Water Treatment in the preparation of work schedules and makes daily job assignments and arrangements for equipment and supplies.

2. Serves as a technical resource person regarding primary wastewater treatment, advanced secondary wastewater treatment, and other plant operations, makes rounds and inspections, and reviews work performed for quantity and quality.
3. Uses a computer based supervisory control and data acquisition system for water and wastewater utilities. Duties include developing modifications to existing computer programs, backing up and editing files, modifying graphic displays, generating reports, and system adjustments based upon operational trends.

4. Assists the Operations Supervisor-Wastewater and the Chief Operator-Water Treatment in the preparation and implementation of operational policies and procedures.

5. Plans, conducts, and evaluates training programs for water, wastewater, and incinerator systems to meet and keep up with State certifications, skill standards, and other requirements.

ADDITIONAL WORK PERFORMED:

1. Performs relief Plant Operator I and Incinerator Operator I shift duties and monitors and controls the (1) Water Treatment Plant; (2) water distribution system; (3) Wastewater Treatment Plant; (4) wastewater collection system; and (5) incinerator by computer system and manual checks.

2. Completes on-the-job training, education, and certification related assignments; and assists supervisors or other plant operators on projects and day-to-day activities.

3. Performs other duties and responsibilities as assigned.

PERFORMANCE REQUIREMENTS (knowledge, skills, and abilities):

- Substantial knowledge of the technical standards and procedures required for the production and distribution of potable water, and the collection and treatment of wastewater.
- Knowledge of work scheduling procedures.
- Knowledge of basic training planning and teaching skills.
- Knowledge of safe handling techniques for toxic materials.
- Strong problem solving, decision making, and contingency operations skills.
- Ability to monitor multiple activities, interpret operating data, prioritize tasks, do operations simultaneously, and conduct quality and other control checks.
- Ability to utilize and effectively operate the computer system to collect data, check plant operations and make adjustments as needed.
- Ability to identify and resolve problems on a variety of mechanical and electrical equipment.
- Ability to lead and assist in supervising others in carrying out assigned work.
- Ability to establish and maintain effective working relationships with diverse groups including employees, personnel from other City departments, and the general public.
- Ability to courteously and tactfully receive and respond to emergency calls from citizens.
- Ability to communicate effectively both orally and in writing.
- Ability to operate a variety of hand and power tools and equipment.
- Willingness to work outdoors in all types of weather.

Physical ability to perform essential functions:

06/16/2008
- Correctable vision suitable for color comparisons, fine detail work and viewing computer monitors for extended periods of time.
- Hearing adequate for phone and radio communication in a noisy environment.
- Manual dexterity and eye/hand coordination suitable for computer use and operating tasks.
- Ability to both walk and sit for extended periods on shift.
- Ability to infrequently stoop, bend, climb ladders, work from heights and in confined spaces.
- Ability to lift and carry bulky, heavy objects of approximately 50 pounds. Heavier objects are lifted with mechanical or other assistance.
- Ability to use respirator and self-contained breathing apparatus.

**WORKING ENVIRONMENT:**

Work is performed both indoors and outdoors in all weather conditions in an industrial plant environment at the water and wastewater plants. The work is in a high risk environment which requires special safety precautions, i.e., working near heavy operating equipment, toxic or volatile chemicals, noxious gases, and with exposure to raw sewage. Employees may be required to wear protective clothing such as coveralls, rain gear, masks, boots, goggles, gloves, or shields, and use respirator and self-contained breathing apparatus when appropriate.

**EXPERIENCE AND TRAINING REQUIREMENTS:**

At least two years experience as a Plant Operator I with demonstrated skills in leadership, training, and problem solving.

Valid Washington State drivers license and good driving record. A three year driving abstract must be submitted at time of hire.

Must pass job related physical capacities evaluation at time of hire.

**NECESSARY SPECIAL REQUIREMENTS:**

Must maintain the following certifications during length of employment:
Washington State Department of Health certification as a Water Treatment Plant Operator III; and Department of Ecology as a Wastewater Treatment Plant Operator Group III.

**PREPARED BY:** Hanowell 11/84

**REVISED**

1/86
McCourt/Mahaffey

**REVIEWED BY:**

McCourt/Mahaffey

**BY:**

Kenneth D. Thomas
Asst Director of PW for Operations

06/16/2008
11/90 Plant

Sellin/RA 11/94

REF: 0614S

COMMISSION

PW0113.CS

Staff

John M. Garner
Director of Public Works

ADOPTION:
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: PLANT OPERATOR I
DEPARTMENT: Public Works\Operations
UNION: 114
SG: Entry
CS: FLSA: Y
EE04CODE: SC

NATURE OF WORK:
This classification acts as shift operator-in-charge and performs water and wastewater computer console operations, process control, and trouble shooting functions to ensure proper operation of direct filtration water treatment, water distribution, wastewater collection, primary wastewater treatment, and advanced secondary wastewater treatment plant systems. Duties are performed on a rotating shift basis and include swing shift, graveyard, weekend, and after hours public works dispatch responsibilities. Error or negligence in performance could have serious consequences for the city’s water supply and/or wastewater treatment system.

DISTINGUISHING CHARACTERISTICS:
The Plant Operator I is a fully qualified operator who has met the State certification requirements for the position, has satisfactorily completed extensive on-the-job training in the operation of the water treatment and distribution systems and the wastewater treatment and collection systems, and also has satisfactorily completed extensive correspondence coursework in water treatment operations, wastewater treatment operations, collection system operations, and water distribution system operations.

SUPERVISORY RELATIONSHIPS:
Reports to the Operations Supervisor - Wastewater for wastewater related functions and to the Chief Operator - Water Treatment for water related functions. Receives assignments, work direction, and training from supervisory and lead personnel. Works under the Washington State regulations and procedures for water and wastewater treatment plants as well as City, departmental and plant policies, procedures and safety rules. May provide training and instruction to plant personnel or seasonal extra help.

ESSENTIAL FUNCTIONS:

1. Monitors and controls operations on shift of the (1) water treatment plant; (2) water distribution system; (3) wastewater collection system; and (4) advanced secondary wastewater treatment plant using computer terminals. Responds to system operations, emergencies, and alarms by such methods as adjusting pumping rates, increasing production rates, backwashing filters, checking remote sites, or calling out help for assistance by phone or radio.
2. Performs operational duties required of assigned shift such as (1) operating a variety of advanced secondary treatment systems; (2) visual inspection of direct water filtration, solids handling, air scrubbing, oxygen generating, and other complex equipment; (3) performing process control tests to optimize operations; (4) hooking up chlorine; (5) adjusting chemical feed rates and controls; or (6) transferring waste activated sludge (TWAS) to primary sludge storage.

3. Diagnoses process and equipment problems and takes corrective action or contacts appropriate personnel.

4. Performs a variety of handwritten, E-mail, and PC related record keeping functions: logs and completes reports, etc. Also responsible for shift change communications and reports.

5. Performs swing, weekend, graveyard, and after hours public works dispatch duties such as receiving and responding to after-hours emergency calls for the Public Works Department. Assesses situation and contacts appropriate individuals for response and/or call out.

6. Regulates a variety of chemicals in the treatment process such as soda ash, alum, polymers, activated carbon, chlorine, sodium bisulfite, liquid oxygen, hydrogen peroxide, sulfuric acid, and sodium hydroxide.

ADDITIONAL WORK PERFORMED:

1. Maintains facility by applying protective coatings, performing general janitorial duties, and assisting on maintenance projects when time permits. Also operates automotive equipment as assigned.

2. Performs designated incinerator startup and monitoring functions.

3. Completes on-the-job training, education, and certification related assignments; and assists supervisors or other operators on projects and day-to-day activities.

4. Performs other duties and responsibilities as assigned.

PERFORMANCE REQUIREMENTS (knowledge, skills, and abilities):

- Ability to maintain a current working knowledge of the technical standards and procedures required for the production and distribution of potable water, and the collection and treatment of wastewater.
- Ability to add, subtract, multiply, divide, and perform basic algebraic calculations.
- Problem solving, decision making, and contingency operations skills.
- Knowledge of and ability to effectively use computerized and automated process control water and wastewater systems.
- Ability to monitor multiple activities, interpret operating data, prioritize tasks, do operations simultaneously, and conduct quality and other control checks.
- Ability to interpret lab data and make adjustments to primary, advanced secondary, and other complex processes.
- Ability to identify and resolve problems on a variety of mechanical and electrical equipment.
- Ability to read and follow technical written and oral instructions.
- Ability to communicate orally in English, to spell and write legibly on forms, log books, and other documents.
- Ability to maintain concentration while performing routine, repetitive tasks.
- Ability to work independently with minimal supervision in carrying out assigned tasks.
- Ability to establish and maintain effective working relationships with diverse groups including employees, personnel from other City departments, and the general public.
- Ability to courteously and tactfully receive and respond to emergency calls from citizens.
- Ability to operate a variety of hand and power tools.
- Ability and willingness to apply safe working procedures to handle toxic materials.
- Willingness to work a flexible schedule involving shift rotation, call-back for relief shifts, overtime and emergency situations which may include evenings, weekends, or holidays.
- Willingness to work outdoors in all types of weather.

Physical ability to perform essential functions:
- Correctable vision suitable for color comparisons, fine detail work and viewing computer monitors for extended periods of time.
- Hearing adequate for phone and radio communication in an extremely noisy environment.
- Manual dexterity and eye/hand coordination suitable for computer use and operating tasks.
- Ability to both walk and sit for extended periods on shift.
- Ability to infrequently stoop, bend, climb ladders, work from heights and in confined spaces.
- Ability to lift and carry bulky, heavy objects of approximately 50 pounds. Heavier objects are lifted with mechanical or other assistance.
- Ability to use respirator and self-contained breathing apparatus.

WORKING ENVIRONMENT:

Work is performed both indoors and outdoors in all weather conditions in an industrial plant environment at the water and wastewater plants. The work is in a high risk environment which requires special safety precautions, i.e., working near heavy operating equipment, toxic or volatile chemicals, noxious gases, and with exposure to raw sewage. Employees may be required to wear protective clothing such as coveralls, rain gear, masks, boots, goggles, gloves, or shields, and use respirator and self-contained breathing apparatus when appropriate.

EXPERIENCE AND TRAINING REQUIREMENTS:

Must meet all requirements of the class below.

Two years of plant operating experience and achievement of the certifications outlined in the plant operator-in-training classification is required.
Valid Washington State drivers license and a good driving record. A three year driving abstract must be submitted.

Must pass job related physical capacities evaluation at time of hire.

NECESSARY SPECIAL REQUIREMENTS:

Must maintain the following certifications during length of employment:
   Washington State Department of Health certification as a Water Treatment Plant Operator III; and Department of Ecology certification as a Wastewater Treatment Plant Operator Group III.

Satisfactory completion of continuing education studies, workshops, and other training to keep up on procedures, methods, and operations.

PREPARED BY: McCourt/Mahaffey  
02/86

REVISED BY:  
Plant Staff  
Sellin/RA  
11/94

REVIEWED BY:  
Kenneth D. Thomas  
Asst Director of PW for Operations

REF: 0818S

COMMISSION

PW0112.CS

06/16/2008
City of Bellingham
Classification Specification - Civil Service or AFSCME

CLASS TITLE: PLANT OPERATOR-IN-TRAINING
DEPARTMENT: Public Works/Operations
UNION: 114
SG:
CS: Entry
FLSA: Y
EE04CODE: SC

NATURE OF WORK:

This classification completes and performs progressively responsible water and wastewater duties, computer console operations, process control, and trouble shooting functions to ensure proper operation of direct filtration water treatment, water distribution, wastewater collection, primary wastewater treatment, and advanced secondary wastewater treatment plant systems. Duties are performed on a rotating shift basis and include weekend, graveyard, swing shift, and after hours public works dispatch responsibilities. Error or negligence in performance could have serious consequences for the city's water supply and/or wastewater treatment system.

DISTINGUISHING CHARACTERISTICS:

The Plant Operator in Training is an entry level position designed to provide training and experience necessary to become a fully qualified Plant Operator I. The Operator in Training will be assigned progressively more responsible duties as he/she gains more knowledge and experience. This is a training position which requires advancement in job knowledge and State certification at specified intervals. Advancement to Plant Operator I (representing a fully qualified operator) occurs when an Operator in Training has satisfactorily completed on the job training and has met the State certification requirements for the position.

SUPERVISORY RELATIONSHIPS:

Reports to the Operations Supervisor - Wastewater for wastewater related functions and to the Chief Operator - Water Treatment for water related functions. Receives assignments, work direction, and training from supervisory and lead personnel. Works under the Washington State regulations and procedures for water and wastewater treatment plants as well as departmental and plant policies, procedures and safety rules. May provide training and instruction to other plant personnel or seasonal labor.

ESSENTIAL FUNCTIONS:

1. Monitors and controls operations on shift of the (1) water treatment plant; (2) water distribution system; (3) wastewater collection system; and (4) advanced secondary wastewater treatment plant using computer terminals. Responds to system operations, emergencies, and alarms by such methods as adjusting pumping rates, increasing production rates, backwashing filters, checking remote sites, or calling out help for
assistance by phone or radio.

2. Performs operational duties required of assigned shift such as (1) operating a variety of advanced secondary treatment systems; (2) visual inspection of direct water filtration, solids handling, air scrubbing, oxygen generating, and other complex equipment; (3) performing process control tests to optimize operations; (4) hooking up chlorine; (5) adjusting chemical feed rates and controls; or (6) transferring waste activated sludge (TWAS) to primary sludge storage.

3. Diagnoses process and equipment problems and takes corrective action or contacts appropriate personnel.

4. Performs a variety of handwritten, E-mail, and PC related record keeping functions: logs and completes reports, etc. Also responsible for shift change communications and reports.

5. Performs swing, weekend, graveyard, and after hours public works dispatch duties such as receiving and responding to after-hours emergency calls for the Public Works Department. Assesses situation and contacts appropriate individuals for response and/or call out.

6. Regulates a variety of chemicals in the treatment process such as soda ash, alum, polymers, activated carbon, chlorine, sodium bisulfite, liquid oxygen, hydrogen peroxide, sulfuric acid, and sodium hydroxide.

ADDITIONAL WORK PERFORMED:

1. Maintains facility by applying protective coatings, performing general janitorial duties, and assisting on maintenance projects when time permits. Also operates automotive equipment as assigned.

2. Performs designated incinerator startup and monitoring functions.

3. Completes on-the-job training, education, and certification related assignments; and assists supervisors or other operators on projects and day-to-day activities.

4. Performs other duties and responsibilities as assigned.

PERFORMANCE REQUIREMENTS (knowledge, skills, and abilities):

- Ability to maintain a current working knowledge of the technical standards and procedures required for the production and distribution of potable water, and the collection and treatment of wastewater.
- Ability to add, subtract, multiply, divide, and perform basic algebraic calculations.
- Problem solving, decision making, and contingency operations skills.
- Familiarity with basic computer operation.
- Ability to monitor multiple activities, interpret operating data, prioritize tasks, perform operations simultaneously, and conduct quality and other control checks.
- Ability to identify and resolve problems on a variety of mechanical and electrical equipment.
- Ability to read and follow technical written and oral instructions.
- Ability to communicate orally in English, to spell and write legibly on forms, log books, and other documents.
- Ability to work independently with minimal supervision in carrying out assigned tasks.
- Ability to maintain concentration while performing routine, repetitive tasks.
- Ability to establish and maintain effective working relationships with diverse groups including employees, personnel from other City departments, and the general public.
- Ability to courteously and tactfully receive and respond to emergency calls from citizens.
- Ability to operate a variety of hand and power tools and equipment.
- Ability and willingness to apply safe working procedures to handle toxic materials.
- Willingness to work a flexible schedule involving shift rotation, call-back for relief shifts, overtime and emergency situations which may include evenings, weekends, or holidays.
- Willingness to work outdoors in all types of weather.

Physical ability to perform essential functions:
- Correctable vision suitable for color comparisons, fine detail work and viewing computer monitors for extended periods of time.
- Hearing adequate for phone and radio communication in an extremely noisy environment.
- Manual dexterity and eye/hand coordination suitable for computer use and operating tasks.
- Ability to both walk and sit for extended periods on shift.
- Ability to infrequently stoop, bend, climb ladders, work from heights and in confined spaces.
- Ability to lift and carry bulky, heavy objects of approximately 50 pounds. Heavier objects are lifted with mechanical or other assistance.
- Ability to use respirator and self-contained breathing apparatus.

WORKING ENVIRONMENT:

Work is performed both indoors and outdoors in all weather conditions in an industrial plant environment at the water and wastewater plants. The work is performed in a high risk environment which requires special safety precautions, i.e., working near heavy operating equipment, toxic or volatile chemicals, noxious gases, and with exposure to raw sewage. Employees may be required to wear protective clothing such as coveralls, rain gear, masks, boots, goggles, gloves, or shields, and use respirator and self-contained breathing apparatus when appropriate.

EXPERIENCE AND TRAINING REQUIREMENTS:

Successful completion of two years of vocational or college level coursework required. Must include a combination of coursework in any of the sciences, engineering, mathematics, or a closely related area.

Successful completion of continuing education units related to certification in water and/or wastewater treatment may be substituted for equivalent formal education.
Preference will be given to applicants with college level coursework in related areas beyond the minimum requirement above.

Previous on-site operating experience at a water and/or wastewater treatment facility may be substituted for up to one year of education.

Credit will also be given to applicants who have achieved water and/or wastewater treatment certification at the I, II, and III level as confirmed by Washington State Department of Health and/or Department of Ecology.

Must be willing to participate in and be able to successfully complete a long-term structured training program.

Must pass job related physical capacities evaluation at time of hire.

Valid Washington State drivers license and a good driving record. A three year driving abstract must be submitted at time of hire.

NECESSARY SPECIAL REQUIREMENTS:

The Plant Operator in Training is approximately a two to four-year training program leading to a fully qualified Plant Operator I. Failure to meet the certifications or skill standards within the time limits established at the time of hire will result in dismissal.

Promotion to Plant Operator I is mandatory and requires achieving Washington State Department of Health certification as a Water Treatment Plant Operator I, II, III; and Department of Ecology certification as a Wastewater Treatment Plant Operator Group(s) I, II, and III.

Employee must also complete skill standards to demonstrate knowledge of techniques and processes used in the water treatment, water distribution, and wastewater treatment systems.

NOTE: Substitutions for education and training requirements are available as outlined in:
Water Certification - Washington Administrative Code 246.292.060, 2/27/90;

PREPARED BY: Hanowell
11/84

REVIEWED BY:

McCourt/Mahaffey
1/86
McCourt/Evans/Bateman
Sellin

Plant Staff
Sellin/RA 10/94

Kenneth D. Thomas
Asst Director of PW for Operations
11/92

McCourt/Mahaffey
1/86
McCourt/Evans/Bateman
Sellin

Plant Staff
Sellin/RA 10/94

John M. Garner
Director of Public Works

06/16/2008
Operator Certifications
<table>
<thead>
<tr>
<th>Operator Name</th>
<th>Operator ID #</th>
<th>Certifications</th>
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<tbody>
<tr>
<td>Ralph Alvarado</td>
<td>#9426</td>
<td>WDM 3</td>
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<tr>
<td>Harvey Berwick</td>
<td>#4121</td>
<td>CCS, WDM3, WDS</td>
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<tr>
<td>Fred Cruz</td>
<td>#10123</td>
<td>WDM2</td>
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<tr>
<td>Frank Cook</td>
<td>#11176</td>
<td>WDM1</td>
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<td>Terry Fahlstrom</td>
<td>#5105</td>
<td>CCS, WDM3, WDS</td>
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<tr>
<td>Marty Gray</td>
<td>#7215</td>
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<td>Jay Greenwood</td>
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<td>Brent Hays</td>
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<tr>
<td>Doug Jems</td>
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<td>Mike Lee</td>
<td>#7661</td>
<td>CCS, WDM2</td>
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<td>Shane Leighton</td>
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<td>Lynn Knutsen</td>
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<td>Joe McGirr</td>
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<td>Laeticia Perrin</td>
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<td>Bill Prichard</td>
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<td>Jerry Ramerman</td>
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<td>Dar Surratt</td>
<td>#11460</td>
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<tr>
<td>Scott Van Diest</td>
<td>#10075</td>
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<td>Peg Wendling</td>
<td>Lab Supervisor</td>
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<td>Michelle Evans</td>
<td>Lab Analyst</td>
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<tr>
<td>Bill Evans, Jr</td>
<td>WTP Chief Operator</td>
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<tr>
<td>Karl Lowry</td>
<td>WTP Operator 2</td>
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<td>Gary Gilfilen</td>
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<td>Gary Hess</td>
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<tr>
<td>Sally Pytel</td>
<td>WTP Operator</td>
<td>9483</td>
</tr>
<tr>
<td>Shayla Francis</td>
<td>WTP Operator</td>
<td>11077</td>
</tr>
<tr>
<td>Keith Fredrickson</td>
<td>WTP Operator</td>
<td>10469</td>
</tr>
</tbody>
</table>
Preventive Maintenance Program
Water Pump Stations and Water Filtration Plant Preventative Maintenance Schedule

38th street pump station and Padden reservoir
- pmp001 Bi weekly water pump run
- pmp602 Monthly pump station check
- pmp870 Annual Fire Extinguisher Inspection
- pmp778 Annual 38th st pump station check

40th Street Reservoir
- pmp001 Bi weekly water pump run
- pmp560 Monthly Reservoir check

Balsam Lane Pump Station & Dakin Reservoirs
- pmp001 Bi weekly water pump run
- pmp560 Monthly Reservoir check
- pmp504 Annual Pump Station check
- pmp514 Monthly Reservoir check
- pmp516 Semi Annual Reservoir valve exercise
- pmp518 Annual Reservoir check
- pmp807 Annual Fire Extinguisher Inspection

Birch Street Pump Station
- pmp001 Bi weekly water pump run
- pmp901 Monthly pump station check

Bonanza Pump Station
- pmp001 Bi weekly water pump run

College Way Pump Station/ Reservoir
- pmp001 Bi weekly water pump run
- pmp870 Annual Fire Extinguisher Inspection
- pmp594 Monthly Reservoir level check

Consolidation Pump Station/Reservoir
- pmp001 Bi weekly water pump run
- pmp508 Monthly Reservoir check

Geneva Gate House
- pmp001 Bi weekly water pump run
- pmp566 Monthly Gate house Check

Governor Road Pump Station
- pmp001 Bi weekly water pump run

Huntington Pump Station
- pmp001 Bi weekly water pump run

Industrial Pipeline
- pmp570 Monthly line cathodic protection check

James Street Pump Station
- pmp001 Bi weekly water pump run

Lake Whatcom Control Dam
- pmp830 Quarterly lube and inspection
- pmp832 Annual oil change and lube/inspection

Marietta Reservoir
- pmp001 Bi weekly water pump run
- pmp578 Monthly level check

Otis Street Pump Station
- pmp001 Bi weekly water pump run
- pmp870 Annual Fire Extinguisher Inspection

Pacific Highway PRV
- pmp001 Bi weekly water pump run

Parkhurst Reservoir
- pmp001 Bi weekly water pump run
Water Filtration Plant

- pmp746 Quarterly Backwash Pump greasing
- pmp748 Annual backwash pump inspection
- pmp672 Annual Backwash level calibration
- pmp730 Annual Filter flow loop calibration(all 6 filters)
- pmp732 Annual filter headloss loop calibration
- pmp772 Annual filter valve oil check
- pmp766 Annual Dakin/Yew pump oil change
- pmp736 Annual Dakin/Yew Flow meter check
- pmp668 Annual Alum pressure transmitter calibrate
- pmp818 Annual Low vacuum switch industrial chlorinator cal
- pmp828 2 year industrial chlorinator rebuild
- pmp816 Annual low vacuum switch trim chlorinator cal
- pmp826 2 year #1 chlorinator rebuild
- pmp814 Annual low vacuum switch #2 trim chlorinator cal
- pmp824 2 year #2 chlorinator rebuild
- pmp812 Annual low vacuum switch cal, screenhouse
- pmp822 2 year screenhouse chlorinator rebuild
- pmp810 Annual low vacuum switch trim chlorinator cal
- pmp802 2 year vacuum regulator rebuild bank #1
- pmp804 2 year vacuum regulator rebuild bank #2
- pmp808 Annual vacuum switch/inspection/report
- pmp001 bi weekly water pump run
- pmp664 Monthly emergency generator run
- pmp734 Annual Raw water flow loop cal
- pmp736 Annual Dakin /Yew flow calibration
- pmp738 Annual clearwell level calibration
In order to obtain water service from the City, the property in question must abut a City-owned water main located within the right-of-way or an approved easement. The main must have adequate flow to meet both domestic and fire suppression requirements.

If the required abutting main does not exist or the abutting main does not have sufficient flow to meet either domestic or fire needs, the developer must construct a water main extension prior to obtaining water service. Extensions shall be constructed to the far property line of the subject property. (Exceptions may be granted by the Director of Public Works in cases where future extension of the main is deemed unnecessary.) The first step in the process is for the developer to retain the services of a licensed civil engineer to design the main extension. The engineer will submit the proposed design to the City Engineer. (See Section 6 for details on Water Design Standards.) The developer will enter into a contract with the City for the construction of said main extension. (See Section 3 for details on Public Facilities Contracts.) Upon completion of the contract requirements, the developer may then apply for a water service and be granted same upon payment of applicable connection fees.
**2-5.04 Water and Sewer Connection Fees**

Date Composed: 09/12/2001   Revision Date: 08/01/95

1. Fire Flow Charge of $0.16/s.f. of new floor space.
2. Latecomers Fees, as applicable
3. Connection Fees:

<table>
<thead>
<tr>
<th>WATER SERVICE SIZE</th>
<th>SERVICE COST</th>
<th>METER ONLY COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾&quot; RESIDENTIAL</td>
<td>$525.00**</td>
<td>N/A</td>
</tr>
<tr>
<td>¾&quot;</td>
<td>$380.00</td>
<td>$275.00</td>
</tr>
<tr>
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<td>$460.00</td>
<td>$350.00</td>
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<tr>
<td>1½&quot;</td>
<td>$2,000.00 (T&amp;M)</td>
<td>$1,500.00 (T&amp;M)</td>
</tr>
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<td>$1,700.00 (T&amp;M)</td>
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<td>3&quot;</td>
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<tr>
<td>4&quot;</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SERVICE &amp; METER</th>
<th>WATER</th>
<th>SEWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾&quot; METER</td>
<td>$500.00</td>
<td>$500.00</td>
</tr>
<tr>
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<td>6&quot; METER</td>
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<td>$16,667.00</td>
</tr>
<tr>
<td>8&quot; METER</td>
<td>$26,667.00</td>
<td>$26,667.00</td>
</tr>
</tbody>
</table>

** ¾" Residential service includes the placement of a $145.00 water meter box to facilitate future water meter installation.

For all demand charges for services outside the City Limits, multiply the above demand charges by 1.5.

Fireflow charges for services outside the City Limits, multiply $0.24/square foot of floor space of buildings and garages.

Surface and storm water utility charge: $400.00/3,000 square feet of impervious surface.

Traffic impact fee calculated separately for each building permit. The fees range from $100.00 to $550.00 for a single-family residence.

Water turn on charge is $15.00 for each new water service.
The City of Bellingham requires water distribution system construction plan submittal for development projects when improvements are proposed within public right-of-way or in easements.

The following chapter has been developed to assist in preparation of water distribution system construction plans. It includes items pertinent for the City's review and reflects established professional civil engineering practice for preparation of construction plans.

Three sets of plans must be submitted to the Department of Public Works for initial review.
Development Guidelines & Improvement Standards
SECTION 6. WATER DISTRIBUTION SYSTEM
6-2 Water Distribution System Design Requirements

**Implemented:** 10/04/2001  **Revised:** 01/01/90

When adding to or extending the City's water distribution system, the policies outlined in this section will apply. These are minimum standards, however, and larger mains or other additions may be required where deemed necessary by the Director of Public Works.
6-2.01 MINIMUM SIZE WATER MAIN

Date Composed: 10/04/2001                  Revision Date: 01/01/90
Development Guidelines & Improvement Standards

Subsection: 6-2.01 Minimum Size Water Main

6-2.01.1 Residential Zones

Date Composed: 11/16/2001  Revision Date: 01/01/90

The minimum size water main shall be 6 inches in diameter with an average gridded spacing not to exceed 600 feet. An 8-inch diameter main shall be used where an average grid of 600 feet is not possible, however, the maximum ungridded length may not exceed 1,500 feet. Four-inch diameter pipes may be allowed by the Department when future extension is not anticipated, such as in a cul-de-sac, provided the main does not serve a fire hydrant.
Subsection: 6-2.01 Minimum Size Water Main

6-2.01.2 Commercial, Industrial, and Institutional Zones

Date Composed: 11/16/2001  Revision Date: 01/01/90

The minimum size water main shall be 8 inches in diameter with an average gridded spacing not to exceed 600 feet. A 10-inch diameter water main shall be used when the system is not gridded. The maximum ungridded length and size of the water main may be determined by site conditions and requirements for fire flow.
Where required, the minimum size supply main shall be 12 inches in diameter and shall be spaced on approximately 3,000 foot centers. The actual size of the supply main shall be determined by its ability to deliver water based on the peak-daily demand, plus designated fire flow.
Valves shall be placed on each main at a junction point (node) and should be spaced along the water main at intervals not to exceed 500 feet for pipe sizes 10 inches in diameter and above, and not to exceed 800 feet for pipe sizes less than 10 inches in diameter. Gate valves shall be used on pipes 10 inches in diameter and smaller, and butterfly valves used on pipes 14 inches in diameter and larger.
6-2.03 FIRE HYDRANT SPACING

Date Composed: 10/04/2001   Revision Date: 03/01/93

Fire hydrants shall be spaced as follows:

1. One- and two-family unit developments: no greater than 500-foot intervals along public streets or approved fire routes.

2. All other developments: not greater than 300-foot intervals along public streets or approved fire access routes.
6-2.04 FIRE FLOW RATES

Date Composed: 10/04/2001  Revision Date: 03/01/93

All water main construction and reconstruction shall be done pursuant to a design that, when fully implemented, will provide the fire flow requirements of the Bellingham Fire Department's fire protection standards.

In any circumstance, when improvements which increase the fire flow requirements are made, the water system must be upgraded to support the changes.
6-2.05 Fire Mains and Hydrants Located on Private Property

All fire hydrants and water mains serving hydrants will be publicly owned and maintained. A minimum 20-foot maintenance easement shall be granted to the City and recorded for any public water main on private property. Construction must meet City standards. (See Section 2-6 for easement description.)

Water mains on private property serving building sprinkler systems will be privately owned and maintained as long as the main serves only one property and no hydrants are required. In this case, the following requirements apply:

1. An approved backflow device must be installed.
2. No domestic or other water service allowed on fire main.
3. Disinfection procedures per AWWA Section C-6-51 following Fire Department pressure test.
4. No maintenance easement is necessary.
Development Guidelines & Improvement Standards
SECTION 6. WATER DISTRIBUTION SYSTEM
6-3 Construction of Water Main Extension

The petitioner shall contract with a contractor licensed to perform the construction in the State of Washington to install a main extension as approved by the Department of Public Works.

The Department of Public Works shall inspect the installation of the water main to ensure compliance with the specifications. The charges for such inspection, including administrative and overhead charges, shall be withdrawn from the construction/inspection fee deposited with the Finance Director. At such time as the Director of Public Works determines the remaining funds are not adequate to provide necessary inspection for the project, the petitioner shall be notified and an estimate of additional inspection fees required will be provided. The additional fees shall be deposited with the Finance Director prior to the depletion of the funds on deposit. The City reserves the right to reject any installation not inspected and approved by the Department of Public Works. Any monies unexpended from the inspection fee upon completion of the project shall be returned to the petitioner.

Upon satisfactory completion of all required tests and acceptance of the main extension, the Department of Public Works shall cause the extension to be connected to the City system. All costs incurred in the connection, including overhead and administrative charges, shall be paid by the petitioner. Any adjustment of the actual cost of installation because of a variance between the estimate and the actual costs shall be refunded upon completion of the job to the petitioner or by payment by the petitioner to the City for any additional expense above the estimate.

When a new extension is to serve a new single-family residential area, individual services shall be installed by the developer to supply each proposed building site. These services shall be installed to City standards. All fees and charges for installation of the services shall be paid at the time a plumbing permit is obtained.

All extensions of water mains shall be subject to the payment of a hydrant fee. Whenever the installation of a hydrant is required by the Director of Public Works during the course of a water main extension, the established value thereof may be applied to reduce any hydrant fees due for that extension.
RECORD DRAWING POLICY

The following is intended to provide necessary guidelines for development of required construction record drawings:

1. Certified record drawings are to be provided by the owner and shall accurately reflect all field revisions made during the construction process. Record drawings shall be submitted on the same number of sheets as the original approved drawings.

2. The owner shall retain a licensed professional engineer to track all relevant field changes to the approved construction drawings. Changes shall be clearly identified in a comprehensive manner on one set of City-approved Xerox black-line.

3. At the time the record drawings are transmitted to the City, each sheet shall include a signature block similar to that shown below located in the bottom right-hand corner of the sheet, when possible:

   Recording Drawing Certification

   This drawing reflects the work as constructed and all modifications meet the performance standards of the original design.

   By: ___________________________ Date: ___________________________

4. The record drawings shall identify all existing or abandoned utilities that were encountered or installed during construction that were not shown on the approved construction drawings.

5. All sanitary sewer, storm sewer, and water service stub locations shall be identified and marked in accordance with City Standard specifications, SS-730 and WA-897. Stationing for sanitary sewer and water mains shall be independent from the roadway centerline.

6. Substantial changes made to storm drainage shall be reflected in a modified storm drainage report and shall be certified by the professional engineer that the modifications made during construction meet the performance standards of the original design.

7. The final project approval shall not be processed until the City has received and approved the certified record drawings. The City Engineer may accept a deposit of 100% of the cost of preparation of record drawings in lieu of performance. A deposit will require no commitment from the owner to (A) complete the record drawings within 90 days; (B) hold the City harmless from any damages caused by the delay in performance, and (C) require the engineer of record to provide free and timely information to the City and Public.

8. All underground facilities shall be shown on the record drawings to the nearest 1-foot horizontal and the nearest 0.1-foot vertical unless otherwise noted by the engineer. Water services shall be shown to the nearest 5-foot horizontal and the nearest 1-foot vertical. Sewer services shall be shown to the nearest 2-foot horizontal and the nearest 0.1-foot vertical.
RECORD DRAWINGS (SEWER AND WATER)

The purpose of this letter is to inform you that the City of Edmonton will now require the developer’s engineer to supply us with a full set of certified record drawings upon completion of the Public Facilities Contract. These as-built drawings will reflect the exact location of all underground and aboveground utilities and will include, but not be limited to, the following:

1. The location of all vertical and horizontal bends in the water system.
2. The location of all water service taps into the water main.
3. The location of all water service boxes and meters with distances to the main tap and to the corresponding property corners.
4. The locations of all water valves, hydrants, hydrant valves, and blow-off as to distance from the centerline and distances to the nearest property lines or property corners.
5. The location of all utilities within easements. This will include distances to the utilities from the easement lines.
6. The location of all side sewer tees into the sewer main from the back-station manhole.
7. The location of all side sewer ends according to the attached drawings and with the additional stipulations:
   a. The ends must be tied out to the corresponding property corners.
   b. The depth of the end at the location board must be noted.
8. The location of all sanitary manholes, storm sewer manholes, storm sewer catch basins and back-of-wall drains. These locations must include distances from the centerline monuments, easement lines, or property corners.
9. All easements will be staked in advance of utility installations to ensure that the utilities fall within the proper boundaries. Construction offset staking will not fulfill this requirement.
No main extensions 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.
6-3.02 PAYMENT FOR WATER MAINS

Water mains placed in public rights-of-way or easements and connected to City mains may be paid for by:

1. The party benefiting from the installation;

2. The City;

3. A local improvement district, as provided by law; or

4. Latecomer Agreements. The City may, in accordance with state law, grant the party constructing a new water main the right to partial reimbursement from other abutting property owners benefited by the improvement. Such reimbursement shall be administered by the City and shall be subject to reasonable overhead and administrative charges by the City.
6-3.03 STANDARDS FOR WATER MAIN CONSTRUCTION

Date Composed: 10/04/2001  Revision Date: 01/01/90
All pipe shall be of AWWA Standards H3-71, C151-71 and cement lining C104-71, and shall be ductile cast-iron, standard thickness Class 50 push-on joints or M.J. joints. The pipe shall be of 150 psi working pressure, plus 100 psi surge pressure. No PVC or AC pipe will be allowed.

Pipe laying shall meet the requirements of Section 7-11 of the Standard Specifications. All pipe shall have minimum covering of 3.5 feet.
Material for fittings such as crosses, tees, bends, reducers and sleeves shall be ductile iron. Joints shall be M.J. or push-on joints and shall conform to AWWA Specification C-110-71 and C-104-71.
Concrete blocking shall be as specified in City of Bellingham Standard Plan No. WA-860, or as directed by the Project Engineer. Blocks shall be installed as specified in Section 7-11.3(13) of the Standard Specifications. No precast blocks are allowed.
6-3.03.4 Connection to Existing Water Mains

The Contractor must notify the Project Engineer of a proposed connection time at least four working days in advance.
This section shall replace Sections 7-11.3(11) and 7-11.3(12) of the Standard Specifications.

All pressure testing and leakage testing shall be conducted in accordance with Section 13 AWWA C-800-88 Standards, with the following exceptions.

All reference to the owner furnishing any equipment used in the testing procedure is hereby deleted. The necessary apparatus, including temporary plugs, required for testing shall be supplied by the Contractor and subject to the Engineer's approval.

The testing shall be conducted after the piping has been completely backfilled and all thrust blocks are in place and cured. The test sections shall be limited to sections between valves or as modified by the Engineer, but in any event no test section shall contain more than 3,500 linear feet of pipe. Several valve sections may be combined but these sections, when combined, shall not be greater than any length specified above. The temporary connection will be to City of Bellingham Standard Plan No. WA-A88 with the approved backflow devices. Devices shall be tested prior to activation as per WAC246-290-480.7.(b),(IV)

The pressure test and leakage test shall be combined as follows. The test pressure shall be 200 psi, measured at the highest elevation of the section being tested. This pressure plus 5 psi shall be maintained for a period of one hour and the amount of make-up water required to maintain this pressure shall be carefully measured. The allowable leakage shall not exceed the number of gallons per hour as determined by the formula:

\[ L = \frac{80 \sqrt{P}}{7,400} \]

in which  
\[ L \] = Allowable leakage, gallons/hour
\[ N \] = Number of joints in the length of pipeline tested
\[ D \] = Nominal diameter of the pipe in inches
\[ P \] = Average test pressure during the leakage test, psi

If the section of pipe being tested does not meet the above requirements, the Contractor shall, at his own expense, locate and repair the defects and resubmit the section as provided above.

All disinfection and bacteriological tests shall be conducted by the City's testing lab in accordance with AWWA Standard C651.

Chlorine powder or a solution of chlorine shall be continuously introduced into the pipe at the water source by means of an adjustable feeder. The initial dose shall indicate a minimum of 56 ppm and shall be measured at nearest bow-off or hydrant and the furthest location or locations from point of application. An approved backflow device per Standard Plan WA-A88 shall be installed by the Contractor on the City side of the chlorine-injection device to prevent the backflow of highly chlorinated water into the existing service system. Before placing the lines into service a satisfactory report shall be received from the City of Bellingham on samples collected from representative points in the new system. Samples will be collected and bacteriological tests obtained by the Engineer or his/her representative. The pipe will not be placed into service until a zero atypical and coiform bacteria count is obtained for two
consecutive tests 24 hours apart.

All other provisions of Section 7-11.3 of the Standard Specifications not in conflict with the above shall remain in effect.

The lump sum bid for hydrostatic testing and disinfection of water main shall be full compensation for furnishing the necessary chlorine feeder and chlorine, making the necessary main taps and all labor and other additional materials that may be required to chlorinate the main as indicated above. No additional and/or extra compensation will be allowed in performing the hydrostatic tests and for disinfection of water mains.
Development Guidelines & Improvement Standards
Subsection: 6-3.0 Standards for Water Main Construction

6-3.03.6 Water Service Transfers

Date Composed: 11/16/2001    Revision Date: 01/27/2006

Tap installations shall meet the requirements of City of Bellingham Standard Plan No. WA-524.

I WATER SERVICE INSTALLATION - Standard 3/4" or 1" Water Services:

1. Both direct tap or tapping with tapping clamp and saddle must use C-C-Threaded corporations.
   If the dry-tap method is used, a minimum of 3/4" hole on a 3/4" tap and a 1" hole on a 1"
   tap must be made. Caution, care and prudence is necessary in aligning the clamp and
   saddle to assure full-flow capability. Single-strap saddles are not acceptable. Double-strap saddles must be used.

2. Corporation taps shall make an angle of 45 degrees to the vertical center line of the main. No tap is to be made on the top of a water main.

3. Type "K" copper shall be used on water services within the public right-of-way.

4. Curb stops shall be flared by female type and rotated no closer than three (3) feet or
   farther than five (5) feet from the property line. Any other location requires specific written
   approval of the Project Engineer. Stop-and-waste curb stops are not allowed. Curb stops
   shall be Ford brass or equal, flared by female type. Teel, ball type curb stops are not
   allowed. WA824, WA826.

5. Cast iron curb boxes shall be required on all services unless the City requires a meter,
   then see meter box requirements.

6. All underground fittings shall be flared within the public right-of-way. No sweat or
   compression connections are to be used. The use of Teel type as a seaiant is
   acceptable, the use of pipe dope is not acceptable.

7. The water service pipe shall have a minimum of 24" depth and a minimum of 36" depth,
   including under ditch sections. To facilitate water meter installations, there shall be 24" by
   3" cover to finished grade at the curb stop location. All meters will be purchased from the
   City and will be installed by the City Water Division.

8. No service is to be covered until the City Project Inspector has inspected the initial
   installation. Note that all corporations must be in an ON position and all curb stops must
   be in the OFF position.

9. Service testing shall be done in conjunction with water main testing. Any air relief and
   flushing shall be the responsibility of the developer. City crews will operate existing
   valves to aid the developer.

10. An acceptance inspection will be made by the City upon completion of all project work.
    During the inspection, every service shall be turned on to its full capacity to check flow
    and guarantee that each service line has been flushed. In no case shall the acceptance
    inspection be made until all project work is complete. Damage incurred during other
construction work on the project shall be corrected by the developer or its agent prior to acceptance by the City.

11. The bond release inspection shall be made prior to the end of the 1-year maintenance period. Any problems noted at this time shall be corrected by the developer and/or bonding company prior to releasing the bond.

12. Staking of lots and/or property lines to assure correct water service locations is the responsibility of the developer. Locations are to be as shown on the approved drawings. Errors due to failure to provide a property survey or due to changing lot locations during final plat approval shall be corrected by the developer at the time of such change or when the error is detected by the City. If utilities have been accepted by the City will correct and the costs shall be the responsibility of the developer.

13. Tools, materials and work area shall be maintained in a sanitary condition at all times.

II WATER METER BOX INSTALLATION - Requirement for Type "K" Copper Standard Sixed 3/4" and 1" Water Services will be installed by the City:

1. A minimum of 24" x maximum of 36" cover from finished grade to the service pipe shall be maintained, except where a variance is approved by the City Engineer. There shall be 24" 3' cover from finish grade in the meter installation area. Note that the top of the box shall be flush with the finished grade and that this includes the expansion material when required.

2. The curb stop shall be located within the meter box.
   a. Minimum clearance of 1" from inside surface.
   b. Maximum clearance of 2" from inside surface shall be maintained from the stop.
   c. Stops shall be a minimum of 3' or a maximum of 6' from the property line within the public right-of-way or as approved by the City, except when this places the stop in the sidewalk - in this case the stop will be located in the planting strip. Stops shall be located outside of back of walk drain.

3. Concrete meter box shall be standard or better. See attached standard plan. P.V.C. boxes are not to be used.

4. Location of meter box:
   a. If a meter box for a 3/4" or 1" service is to be located within the street or sidewalk area, a #3 skagelmeter traffic-type box must be used with a heavy-duty 1/4" deck plate lid or better.
   b. An expansion material must be used around the lid section to enable removal for maintenance. The material shall be flush with the lid section to avoid any cracks or protrusions.
   c. For 1 1/2" and 2" services a #2 concrete box with a steel lid must be used.

5. Caution must be exercised when setting the bottom section of a meter box to ensure that the copper has clearance in the notch area. The weight of the meter box must not be on the service pipe.

III PROJECT REQUIREMENTS
1. The City of Bellingham shall make the final connection of all water mains to the existing system.

2. A deposit to cover the cost of connection by the City shall be made to the City Finance Director. The Operations Division shall supply the necessary estimate upon request by the developer or his agent.

3. All costs, fees, or deposits relative to the total project must be paid prior to water system acceptance. Proof of payment shall be by copies of receipts from the Finance Director specifying for what payment was received.

4. Final cost accounting must be supplied for the entire project including separate costs for:
   a. Water main and appurtenances;
   b. Fire hydrant assembly - including the tee at the main;
   c. Water services, including curb box and/or meter box when required;
   d. Sewer main branches;
   e. Side sewer connection; and/or
   f. Street construction.

5. The final project shall not be accepted until all requirements are met.

6. The Operations Division shall determine that the project has been accepted by the City prior to connection of the water main to the City system.
Gate valves shall be installed with cast-iron valve boxes. Short-body valves suitable for a nonshock shut-off pressure of 130 psi rubber seated or double-disc parallel seat valves and suitable for direct burial are specified.

Valves 8 inches and smaller shall be iron-body, full-bronze mounted, double-disc, parallel-seat valves and suitable for installation with the type and class of pipe used.

All valves shall have nonrising stems and shall open counterclockwise and shall be equipped with a 2-inch square operating nut. Valves will be flange or M.J. joints.
Butterfly valves shall be rubber seated and shall meet or exceed AWWA C504, Class 150B. Butterfly valves shall be suitable for direct burial. Shaft seals shall be standard O-ring seals. The size of the butterfly valves shall be the same as that of the line on which they are located.

The valve operator shall be of the traveling-nut or worm-gear type, sealed, gasketed, and permanently lubricated for underground service. The valve operator shall be constructed to the standard of the valve manufacturer to withstand all anticipated operating torques and designed to resist submergence in groundwater.
Hydrants shall be supplied and installed according to City of Bellingham Standard Plan No. WA-402 and as of January 1, 1998, shall include a Stanay-type fire hose adapter fitting.

CITY OF BELLINGHAM HYDRANT SPECIFICATIONS

1. Fire hydrants shall be for common Bellingham water works service and shall be in compliance with the latest edition of AWWA C 502 “Standard for Dry-Barrel Fire Hydrants.”

2. Each hydrant shall be 5-1/4” main valve opening with “O” ring seals and traffic-type breakaway design.

3. Hydrant operating nut shall open counter-clockwise with the direction of “open” clearly marked at top of hydrant. Operating and cap nuts shall be pentagon in shape and the dimensions shall be 1-1/4” point to flat (National Standard).

4. Hydrant shall be 6” inlet mechanical joint (with accessories) or as specified. Hydrant shall have two hose and fire pumper nozzle. Hydrant to be acceptable for a 3-1/2” depth of bury. Hydrant to have rust-proof automatic drain.

5. Hydrant to be capable of rotating through 360 degrees.

6. Thread Specifications: Hose nozzles to be 2-1/2” inside diameter with National Standard Threads. Pumper nozzle to be 4” inside diameter with threaded as follows: 60 degree - 8 threads per inch, pitch diameter - 4.708”, outside diameter - 4.817”.

7. Each hydrant pumper port shall be equipped with a non-locking Snap-Tite Storz #FSAF#MF, 5” fitting and blind cap (Short or equal). The blind cap shall be attached to the fitting with a section of aircraft cable.

8. Hydrant to be painted red with white dome and caps. Paint shall be Rustoleum #2786 for white and #1210 for red or equal.

9. Only hydrants of the “Corey Type” or center-stem hydrants with APWA approved rating of 200 psi working pressure will be accepted.

10. Acceptance of any hydrant, other than a type currently in service on the City system, will be allowed only if all necessary special repair tools and a training session for maintenance and repair is provided at no cost to the City. Any hydrant that deviates from the specifications must be approved by the operations engineer and/or the water superintendent.
Development Guidelines & Improvement Standards
SECTION 7. PLAN PREPARATION
7-1 General Requirements

Implemented: 10/05/2001 Revised: 01/01/90

1. All work shall be in accordance with the current Standard Specifications for Road, Bridge, and Municipal Construction.

2. Plans must be drawn on mylar plan sheets or plan and profile sheets 24 inches vertical by 36 inches horizontal.

3. Each sheet must have a title block located in the lower right-hand corner of the working area of the sheet placed adjacent to the marginal lines.

4. The project title, as renamed by the City's project engineer, shall appear in the title block along with the City's project number.

5. The elevation datum shall be "City" on all construction plans.

6. All storm sewer pipe shall have a minimum of 2 feet of cover.

7. All storm sewer pipe slopes shall be 2% or greater unless otherwise shown on the plans.

8. All trench backfill below the street, sidewalk, or driveways shall be bank-run gravel.
Development Guidelines & Improvement Standards
SECTION 7. PLAN PREPARATION
7-2 Plan and Profile Sheets - Profile Layout

Implemented: 10/05/2001  Revised: 01/01/90

1. The profile grid must be at the bottom of the sheet.

2. Scales must be as follows:
   A. The horizontal scale must be 1 inch = 20 feet or larger.
   B. Where there is 10 feet or less of vertical differential in the street design profile on any sheet, the vertical scale must be 1 inch = 2 feet.
   C. Where there is more than 20 feet of vertical differential in the street design profile on any sheet, the vertical scale must be 1 inch = 5 feet.

3. Stationing must advance from left to right on the sheet, regardless of compass direction, or where north points in reference to the sheet top.

4. Stations in the profile must line up vertically with the same stations in the plan as closely as practical.

5. Show profiles of the existing ground lines along the center line of construction.

6. Provide profile of the design crown line of the new street.

7. Provide grades at 25-foot intervals and at vertical P.I.’s and at angle points.

8. The lengths of vertical curves and the gradients of each tangent should be clearly labeled.

9. A profile of each storm drain, catch basin, manhole, or culvert must be shown in its entirety.

10. Sanitary sewer profiles may be shown.

11. Water main profiles may be shown.
Development Guidelines & Improvement Standards
SECTION 7. PLAN PREPARATION
7-3 Plan and Profile Sheets - Plan Layout

The following data must be included in the plan section of the plan and profile sheets:

1. North arrow.
2. Centerline of construction as the major line in the plans.
3. Tics for each even 100-foot station along the centerline of construction with the adjacent stations enumerated.
4. Stationing must:
   A. Increase in magnitude from left to right on the sheet, regardless of where north points in relation to the top of the sheet.
   B. Increase from west to east and from south to north, except where stationing has previously been established contrary to this rule.
5. Name or names of all streets shown on sheet.
6. Right-of-way and improvement widths.
7. Curb return data (radius and elevations at quarter points).
8. Centerline horizontal curve data.
9. Show lot lines and numbers.
10. Show improvements to be constructed with solid lines.
11. Show future improvements with dotted lines.
12. Show existing improvements with dashed lines.
13. Show locations of all existing underground and surface installations in relation to the centerline of construction stationing and its offsets.
14. Show storm drain installations, including all structures and types.
15. Show the street section to be constructed and the location.
16. Show streetlight, conduit, junction boxes, and location of streetlight service.
17. Show all street signs and pavement markings normally required by MUTCD.
NOTES:
1. FOR CLOSE COUPLED HYDRANTS USE ALL FLANGE TYPE CONNECTIONS.
2. IF HYDRANT PASSES THROUGH CONCRETE USE EXPANSION STRIP AROUND HYDRANT BARREL.

CAST IRON VALVE BOX

ALT. TYPE FOOT

CAST IRON HYDRANT TEE.
(M.J.xFLANGE)
(M.J.xM.J.)
(FLANGE)
(TYTON)
(TYTON)

SEE INSERT
(M.J.xFLANGE GATE VALVE)
(M.J.xM.J. GATE VALVE)

M.J. AT MAIN TEE

INSERT

NOT TO SCALE

18"x18"x4" CONCRETE BLOCK

SLIP JOINT AT MAIN TEE

HYD. CONNECTION NIPPLE

2- ¾" TE RODS, NUT, & WASHERS
GALV. OR COATED. USE STAR BOLTS TO SECURE RODS.

2½"

VERTICAL LINE

NON-LOCKING STORZ OR EQUAL FITTING, BLINDCAP
AND AIRCRAFT CABLE.

VALVE BOX SHALL BE SCREW-TYPE ADJUSTMENT.

BACKFILL WITH 1"-1½" DRAIN ROCK TO ALLOW HYDRANT TO DRAIN.

SEE NOTE #2

CURB OR SIDEWALK

2" ABOVE CURB OR SIDEWALK

SET HYDRANT WITH ¾" RAKE PER FOOT

CITY OF BELLINGHAM

HYDRANT INSTALLATION

DRAWING

WA-802

APPROVED

City Engineer

12/23/84
Date
1. BOLLARDS SHALL BE 4" DIAMETER DUCTILE IRON POSTS SET IN 36" OF CONCRETE AT LEAST 18" IN DIAMETER. THE INSIDE OF POSTS SHALL ALSO BE FILLED WITH CONCRETE WITH SMOOTH MOUND AS TOP CAP.

2. BOLLARDS SHALL BE LOCATED AT LEAST 2' IN FRONT OF HYDRANT, 5' APART.

3. BOLLARDS SHALL EXTEND ABOVE GROUND TO A MINIMUM OF 4'.

4. BOLLARDS SHALL BE OF SUFFICIENT NUMBER TO PROTECT THE HYDRANT, MINIMUM OF 2.

5. PAINT BOLLARDS RED WITH TOP 8" PAINTED WHITE.

EMBED D.I. PIPE 30" INTO 18" D CONCRETE BASE WITH 6" PUNCH PAD

FILL PIPE SOLID WITH CONCRETE, MOUND TOP CAP

INSTALL 4" DUCTILE IRON STEEL PIPE BOLLARD OR BETTER, FILL WITH CONCRETE.

**NOTES:**

APPROVED

City Engineer

CITY OF BELLEWICH

FIRE HYDRANT PROTECTION

BOLLARD DETAIL

DRAWING

WA-804
CAST-IRON VALVE BOX
VALVE BOX SHALL HAVE
SCREW-TYPE ADJUSTMENT

USE ADEQUATE ROD ASSEMBLIES AS REQUIRED
BY THE CITY ENGINEER.
(MIN. 3/8" GALV. RODS)

D.I. WATER MAIN

3' MIN

2" GALV. STEEL PIPE AND ELBOW

MECHANICAL JOINT PLUG

D.I. WATER MAIN

VALVE SIZE DETERMINED
BY SIZE OF WATER MAIN.

CONCRETE THRUST BLOCK
MIN. 3,000 psi CONCRETE BLOCK SIZE DEPENDS
UPON SIZE OF MAIN AND EXISTING GROUND
CONDITIONS. PLACE INTO UNDISTURBED GROUND
AS PER CITY ENGINEER'S REQUIREMENTS.

EXISTING UNDISTURBED GROUND

FULL SIZE VALVE TO BE USED WHERE THE MAIN WILL BE EXTENDED IN THE FUTURE.

APPROVED

City Engineer

12/24/4

Date

CITY OF BELLINGHAM
BLow OFF FOR FUTURE
WATER MAIN EXTENSIONS

DRAWING
WA-810
NOTES:
1. NUMBER AND SIZE OF GALVANIZED RODS AS PER CITY ENGINEER'S REQUIREMENTS.
2. VALVE BOXES SHALL BE CAST IRON, WITH SCREW-TYPE ADJUSTMENT.

CONCRETE THRUST BLOCK
MIN. 3,000 psi CONCRETE. BLOCK SIZE DEPENDS UPON SIZE OF MAIN AND EXISTING GROUND CONDITIONS. PLACE INTO UNDISTURBED GROUND AS PER CITY ENGINEER'S REQUIREMENTS.

EXISTING UNDISTURBED GROUND

APPROVED
City Engineer

CITY OF BELLINGHAM

2" BLOW-OFF
NO FURTHER EXTENSION

DRAWING
WA-814
NOTES:
1. MAINTAIN CONSTANT RISE IN PIPING.
NOTE:
BOTH DIRECT TAP OR
TAPPING CLAMP WITH
SADDLE MUST USE COPPER
THREADED CORPORATION

PROFILE VIEW
NTS

NOTE:
WATER SERVICE TRENCH TO
BE BACKFILLED WITH 24" MIN.
DEPTH OF CLEAN SANDY FILL

CITY R/W
PRIVATE
PROPERTY

PRIVATE
PROPERTY

CITY R/W

STAINLESS STEEL WIDE BAND OR
STAINLESS STEEL DOUBLE STRAP
SADDLE WITH CC THREAD

CORPORATION STOP WITH CC THREAD

MALE FITTING

WATER MAIN

BRASS SHUT OFF
Curb Box

CITY R/W
OR EASEMENT

PROPERTY CORNER

COPPER

WATER MAIN

2" X 4" PAINTED BLUE
MARKED "WATER"

ALL RISERS TO BE CAST IRON

200 psi
POLYETHYLENE PIPE

EXPOSE 6" ABOVE GRADE TO ENABLE FLUSHING AND LOCATING

FINISHED GROUND

22"±2" DEPTH
2' BEFORE STOP

CAST IRON Curb Box

FEMALE CURB STOP

SOLID SURFACE

3' MIN.
5' MAX.
**NOTE:**
- Both direct tap or tapping clamp with saddle must use copper threaded corporations.
- Water service trench to be backfilled with 24" min. depth of clean sandy fill.

**Profile View**

- WATER MAIN
- 1" COPPER
- 1" TO 3/4" "Y"
- 3/4" COPPER

**City R/W Line**

- 3/4" MALE FITTING
- 3/4" SHUT OFF CURB BOX
- 3/4" SHUT OFF CURB BOX
- 3/4" COPPER
- WATER MAIN
- 1" CORPORATION STOP
- 1" TO 3/4" "Y"

**City of Bellingham**

- Optional Dual Water Service
- WA-826

**Private Property**

- EXPOSE 3' ABOVE GRADE TO ENABLE FLUSHING AND LOCATING.
- ALL RISERS TO BE CAST IRON
- 3/4" COPPER

**Finished Ground**

- 24"±3" DEPTH WITHIN 2' OF WYE/STOP

**Cast Iron Curb Box**

- 2"x4" PAINTED BLUE MARKED "WATER"
NOTES:

1. SHUT OFF REQUIRED BEFORE FIRST BRANCH OF PIPING.

2. ALL ELECTRICAL AND TELECOMMUNICATION LINES IN SEPARATE TRENCH A MINIMUM OF 5' CLEARANCE.

3. WATER SERVICE TRENCH TO BE BACKFILLED WITH CLEAN SANDY FILL.

4. FOUNDATION MUST BE 3' BEYOND PROPERTY LINE.

5. PIPE PROTECTOR MUST BE 5'.

6. CONNECTIONS TO PROPERTY LINE MATERIAL SHOULD BE COPPER, BRASS OR PLASTIC WITH STAINLESS STEEL BANDS. CONNECTIONS ARE NOT ALLOWED.

7. INSTALLATION PER UPc SEC. (603.2).

8. WATER SERVICE ON UNDERSIDE OF BUILDING, IF LESS THAN 24' VERTICAL, MUST BE 5'.
FLAME CUT THIS LINE

STEP #1
LID AND LID INSERT THICKNESS = ½"

STEP #2
1½" STRAP WELDED FOUR LOCATIONS ON BOTTOM OF PLATE. STRAP EXTENDS ½" INTO FLAME CUT HOLE TO FORM A LIP. STRAP TO BE WELDED ON OUTSIDE EDGE (NOT IN HOLE). FLAME CUT PIECE WILL REST ON LIP FORMED BY THIS PIECE.
DIAMOND PLATE LID

3/4" DRILLED HOLE OR PUNCHED 3" FROM EDGE, ON CENTER

3/4" THICK ANGLE IRON WELDED TO LID 2 1/2" FROM EDGE AND 1" IN DEPTH

KNOCKOUT DETAIL

2"
3/4"

BASE

3" DIA.
3" KNOCKOUT EACH END

RECESS DETAIL

NOTE:
FOR USE WITH A 3/4" OR 1" SERVICE OR BLOWOFF IN SIDEWALK OR DRIVEWAY AREA.

APPROVED
City Engineer

CITY OF BELLINGHAM
NUMBER 3 FLAT TOP METER BOX
DRAWING
WA-850

NO SCALE

3/17/66
Date
**Note:**

Minimum 3000 PSI concrete to be used on thrust blocks to bear against firm undisturbed ground.

---

**Thrust Block Dimension Table**

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<th>Pipe Diameter (In)</th>
<th>Test Pressure (Psi)</th>
<th>Bend Angle</th>
<th>Concrete Volume (Cu Ft)</th>
<th>Curved Rod Size (In)</th>
<th>Tie Rod Diameter (In)</th>
<th>Tie Rod Embedment</th>
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---

**Approved:**

动力工程师

**Date:**

1986

**City of Bellingham:**

**Drawing:**

WA-858

**Pressure Test Manifold:**
NOTE

- ALL DIMENSIONS APPLY TO STABLE TRENCH WALLS, UNDER VARIABLE CONDITIONS, SIZE OF THRUST BLOCK SHALL BE DETERMINED BY THE CITY ENGINEER.

- WRAP ALL FITTINGS WITH VISQLINE MIN. 8" PAST FLANGES, PRIOR TO POURING CONCRETE THRUST BLOCK.

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100 P.S.I. OPERATING PRESSURE

APPROVED

City Engineer

CITY OF BELLINGHAM

THrust BLOCK-Elbow

DRAWING

WA--860

11/05

Date
NOTE

- ALL DIMENSIONS APPLY TO STABLE TRENCH WALLS, UNDER VARIABLE CONDITIONS, SIZE OF THRUST BLOCK SHALL BE DETERMINED BY THE CITY ENGINEER.
- WRAP ALL FITTINGS WITH VISQUEINE MIN. 6" PAST FLANGES, PRIOR TO POURING CONCRETE THRUST BLOCK.

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</table>
| 24"  | 7'-0" | 5'-0"

APPROVED
City Engineer

CITY OF BELLENGHAM
THRUSS BLOCK-TEE

DRAWING
WA-862
NOTE

• ALL DIMENSIONS APPLY TO STABLE TRENCH WALLS. UNDER VARIABLE CONDITIONS, SIZE OF THRUST BLOCK SHALL BE DETERMINED BY THE CITY ENGINEER.

• WRAP ALL FITTINGS WITH VISQUE IN MIN. 6" PAST FLANGES, PRIOR TO FLEETING CONCRETE THRUST BLOCK.

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100 P.S.I. OPERATING PRESSURE
LONG SIDE TRANSFER

FLARE AND ATTACH TO NEW MAIN
CUT
STAINLESS STEEL DOUBLE STRAP SADDLE WITH CC THREAD

NEW WATERMAIN

OLD WATERMAIN

SHORT SIDE TRANSFER

TYPE 'K' COPPER JUMPER
APPROPRIATE FLARED FITTING FOR CONNECTION

NEW SERVICE CORP.

NEW WATER MAIN

EXISTING WATER SERVICE

City Engineer
8/1/07

City of Bellingham
Existing Water Service Transfer Detail

Drawing WA-870
NOTES:

1. EXISTING VALVES AND/OR EXISTING MAIN= BEGINNING STATIONING= 0+00 -- BEGIN NEW STATIONING AT ALL HYDRANT TEES, NEW MAIN TEES AND BLOW-OFFS.

2. NOTE TAP STATIONING AND END STATIONING IS FROM THE NEAREST TEE OR VALVE BACK.

3. MEASURE DISTANCE FROM MAIN TO SHUT OFF AND SHUT OFF (PROPERTY STOP) TO END OF ¾".

4. MEASURE DISTANCE FROM TAP TO A POINT OPPOSITE (AT 90°) THE PROPERTY STOP, AND STATION THIS POINT. (EXAMPLE 2+10).

5. MEASURE DISTANCE FROM THIS POINT (ITEM #4) TO THE PROPERTY STOP (DISTANCE OUT AT 90°).

6. MEASURE DEPTH OF ALL SERVICES AND MAINS.

CITY OF BELLINGHAM
TYPICAL WATER MAIN DRAWING
OF RECORD
(INCLUDING SERVICES)

APPROVED
City Engineer

DRAWING
WA-897
APPENDIX U

Cost Estimates
City of Bellingham  
PL-1 - 870 Upper Yew Reservoir - West Connection  
Conceptual Level Cost Estimate

<table>
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<tr>
<th>Item No.</th>
<th>Description</th>
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<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
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<td>$203,997</td>
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<td>9</td>
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<td>$240,000</td>
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<td>LF</td>
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<td>$ -</td>
</tr>
<tr>
<td>11</td>
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<td>LF</td>
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<td>$50,000</td>
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<tr>
<td>12</td>
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</tr>
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</table>

Subtotal $718,575  
Contingency 30% $215,572  
**Construction Total** $934,147

Sales Tax 8.4% $78,468  
Eng., Const.Management & Administration 30% $280,244

Project Estimate $1,292,860  
**Total Rounded** $1,293,000

Assumptions:  
The attached cost opinion is in July 2008 dollars and does not include future escalation.  
Pipeline has 4 feet of cover over pipe  
Minimal dewatering required  
No rock excavation required  
Imported trench backfill required  
4 inch AC patch only, no overlay required  
AC patch and hydroseeding is only trench restoration required  
Trench box is adequate for trench safety  
Pipe is CLDI, mechanical joint  
Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.

The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
## Conceptual Level Cost Estimate

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization/General Conditions</td>
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<td>LS</td>
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<tr>
<td>2</td>
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<td>$20,000</td>
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<tr>
<td>3</td>
<td>Traffic Control</td>
<td>4,000</td>
<td>LF</td>
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<td>$40,000</td>
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<td>4</td>
<td>Sawcut Existing Pavement</td>
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<td>$16,800</td>
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<tr>
<td>7</td>
<td>Hydroseeding</td>
<td>8,667</td>
<td>SY</td>
<td>$1.00</td>
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<tr>
<td>8</td>
<td>Trench Exc., B&amp;Z, Imported Backfill &amp; Waste</td>
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<td>LF</td>
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<td>LF</td>
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<td>12</td>
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<td>LF</td>
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Subtotal $713,366  
Contingency 30% $214,010  
**Construction Total** $927,376  
Sales Tax 8.4% $77,900  
Eng., Const.Management & Administration 30% $278,213  
Project Estimate $1,283,489  
**Total Rounded** $1,283,000

### Assumptions:

- The attached cost opinion is in July 2008 dollars and does not include future escalation.
- Pipeline has 4 feet of cover over pipe
- Minimal dewatering required
- No rock excavation required
- Imported trench backfill required
- 4 inch AC patch only, no overlay required
- AC patch and hydroseeding is only trench restoration required
- Trench box is adequate for trench safety
- Pipe is CLDI, mechanical joint
- Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.

The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
## City of Bellingham

PL-3 - King Mountain Reservoir - West Connection
Conceptual Level Cost Estimate

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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<td>Mobilization/General Conditions</td>
<td>1</td>
<td>LS</td>
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<td>$69,000</td>
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<td>4</td>
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<td>LF</td>
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<td>$20,700</td>
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<td>$17,250</td>
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<tr>
<td>8</td>
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<td>LF</td>
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<tr>
<td>12</td>
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<td>6,900</td>
<td>LF</td>
<td>$3.00</td>
<td>$20,700</td>
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</tbody>
</table>

Subtotal: $1,204,813

Contingency: 30% $361,444

**Construction Total**: $1,566,257

Sales Tax: 8.4% $131,566

Eng., Const.Management & Administration: 30% $469,877

**Project Estimate**: $2,167,700

**Total Rounded**: $2,168,000

**Assumptions:**
The attached cost opinion is in July 2008 dollars and does not include future escalation.
Pipeline has 4 feet of cover over pipe
Minimal dewatering required
No rock excavation required
Imported trench backfill required
4 inch AC patch only, no overlay required
AC patch and hydroseeding is only trench restoration required
Trench box is adequate for trench safety
Pipe is CLDI, mechanical joint
Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.

The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
# Conceptual Level Cost Estimate

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization/General Conditions</td>
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<td>LS</td>
<td>$20,636</td>
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<td>$8,500</td>
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<tr>
<td>3</td>
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<td>$17,000</td>
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<td>7</td>
<td>Hydroseeding</td>
<td>3,400</td>
<td>SY</td>
<td>$1.00</td>
<td>$3,400</td>
</tr>
<tr>
<td>8</td>
<td>Trench Exc., B&amp;Z, Imported Backfill &amp; Waste</td>
<td>1,700</td>
<td>LF</td>
<td>$40.80</td>
<td>$69,359</td>
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<td>$61,200</td>
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<tr>
<td>10</td>
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<td>LF</td>
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</tr>
<tr>
<td>11</td>
<td>Trimming, Cleanup, Restoration</td>
<td>3,400</td>
<td>LF</td>
<td>$5.00</td>
<td>$17,000</td>
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<tr>
<td>12</td>
<td>Trench Safety System - Trench Box</td>
<td>1,700</td>
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Subtotal $226,992
Contingency 30% $68,098
**Construction Total** $295,089

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<tr>
<td>Eng., Const.Management &amp; Administration</td>
<td>30%</td>
<td>$88,527</td>
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</table>

Project Estimate $408,404

**Total Rounded** $408,000

Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.
Pipeline has 4 feet of cover over pipe
Minimal dewatering required
No rock excavation required
Imported trench backfill required
4 inch AC patch only, no overlay required
AC patch and hydroseeding is only trench restoration required
Trench box is adequate for trench safety
Pipe is CLDI, mechanical joint
Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
City of Bellingham  
20-Jun-08  
PL-5 - Yew Street Transmission Main Extension  
Conceptual Level Cost Estimate

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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<td>Mobilization/General Conditions</td>
<td>1</td>
<td>LS</td>
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<td>$79,054</td>
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<td>2</td>
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<td>$5.00</td>
<td>$28,000</td>
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<tr>
<td>3</td>
<td>Traffic Control</td>
<td>5,600</td>
<td>LF</td>
<td>$10.00</td>
<td>$56,000</td>
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<tr>
<td>4</td>
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<td>$53,760</td>
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<tr>
<td>5</td>
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<td>$7,467</td>
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<tr>
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<td>596</td>
<td>TN</td>
<td>$120.00</td>
<td>$71,501</td>
</tr>
<tr>
<td>7</td>
<td>Hydroteefding</td>
<td>3,733</td>
<td>SY</td>
<td>$1.00</td>
<td>$3,733</td>
</tr>
<tr>
<td>8</td>
<td>Trench Exc., B&amp;Z, Imported Backfill &amp; Waste</td>
<td>5,600</td>
<td>LF</td>
<td>$40.80</td>
<td>$228,476</td>
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<tr>
<td>9</td>
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<td>$268,800</td>
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<td>Water Main - Inch CLDI</td>
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<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>11</td>
<td>Trimming, Cleanup, Restoration</td>
<td>11,200</td>
<td>LF</td>
<td>$5.00</td>
<td>$56,000</td>
</tr>
<tr>
<td>12</td>
<td>Trench Safety System - Trench Box</td>
<td>5,600</td>
<td>LF</td>
<td>$3.00</td>
<td>$16,800</td>
</tr>
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</table>

Subtotal  $869,591  
Contingency 30% $260,877  
**Construction Total**  $1,130,468  
Sales Tax 8.4% $94,959  
Eng., Const.Management & Administration 30% $339,140  
Project Estimate $1,564,568  
**Total Rounded** $1,565,000

Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.  
Pipeline has 4 feet of cover over pipe  
Minimal dewatering required  
No rock excavation required  
Imported trench backfill required  
4 inch AC patch only, no overlay required  
AC patch and hydroteefding is only trench restoration required  
Trench box is adequate for trench safety  
Pipe is CLDI, mechanical joint  
Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.  
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
City of Bellingham
PS-1 - New 40th Street Pump Station
Conceptual Level Cost Estimate

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>LS</td>
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<td>$1,125,000</td>
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</tbody>
</table>

  Subtotal  $1,125,000
  Contingency 30%  $337,500

**Construction Total**  $1,462,500

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Tax</td>
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Project Estimate  $2,024,100

**Total Rounded**  $2,024,000

Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.
Minimal dewatering required
No rock excavation required
No special foundations are required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.
Minimal dewatering required
No rock excavation required
No special foundations are required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
City of Bellingham  
PS-3 - Consolidation Pump Station Upgrade  
Conceptual Level Cost Estimate  

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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Subtotal $720,000  
Contingency 30% $216,000  
**Construction Total** $936,000  
Sales Tax 8.4% $78,624  
Eng., Const.Management & Administration 30% $280,800  
Project Estimate $1,295,424  
**Total Rounded** $1,295,000  

Assumptions:  
The attached cost opinion is in July 2008 dollars and does not include future escalation.  
Minimal dewatering required  
No rock excavation required  
No special foundations are required  

In addition, it does not include any costs associated with the potential discovery of hazardous materials.  
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
## City of Bellingham
**PS-4 - Reveille Pump Station Upgrade**
**Conceptual Level Cost Estimate**

### Item Description

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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<td>LS</td>
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<td>$635,000</td>
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<td>Sales Tax 8.4%</td>
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<td></td>
<td>Eng., Const.Management &amp; Administration 30%</td>
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<td></td>
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</tbody>
</table>

**Assumptions:**
- The attached cost opinion is in July 2008 dollars and does not include future escalation.
- Minimal dewatering required
- No rock excavation required
- No special foundations are required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.

The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pump Station - 350gpm</td>
<td>1</td>
<td>LS</td>
<td>$720,000</td>
<td>$720,000</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td></td>
<td>$720,000</td>
</tr>
<tr>
<td></td>
<td><strong>Contingency</strong></td>
<td></td>
<td>30%</td>
<td></td>
<td>$216,000</td>
</tr>
<tr>
<td></td>
<td><strong>Construction Total</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td><strong>Sales Tax</strong></td>
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<td>8.4%</td>
<td></td>
<td>$78,624</td>
</tr>
<tr>
<td></td>
<td><strong>Eng., Const. Management &amp; Administration</strong></td>
<td></td>
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<td>$280,800</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>$1,295,424</td>
</tr>
<tr>
<td></td>
<td><strong>Total Rounded</strong></td>
<td></td>
<td></td>
<td></td>
<td>$1,295,000</td>
</tr>
</tbody>
</table>

Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.
Minimal dewatering required
No rock excavation required
No special foundations are required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
## Conceptual Level Cost Estimate

### Item No. | Description                               | Quantity | Unit | Unit Cost | Amount  |
<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pump Station - 1250gpm &amp; Demo Existing</td>
<td>1</td>
<td>LS</td>
<td>$1,650,000</td>
<td>$1,650,000</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1,650,000</td>
</tr>
<tr>
<td><strong>Contingency</strong></td>
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<td></td>
<td></td>
<td>$495,000</td>
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### Construction Total

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td><strong>Construction Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$2,145,000</td>
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<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Sales Tax</strong></td>
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<td></td>
<td></td>
<td>$180,180</td>
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<tr>
<td><strong>Eng., Const.Management &amp; Administration</strong></td>
<td>30%</td>
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<td></td>
<td></td>
<td>$643,500</td>
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</table>

### Project Estimate

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Estimate</strong></td>
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<td></td>
<td></td>
<td></td>
<td>$2,968,680</td>
</tr>
</tbody>
</table>

### Total Rounded

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Rounded</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$2,969,000</td>
</tr>
</tbody>
</table>

### Assumptions:
- The attached cost opinion is in July 2008 dollars and does not include future escalation.
- Minimal dewatering required
- No rock excavation required
- No special foundations are required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.

The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
## City of Bellingham

### ST-1 - 870 Upper Yew Reservoir

### Conceptual Level Cost Estimate

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reservoir - 1.35MG</td>
<td>1</td>
<td>LS</td>
<td>$2,500,000</td>
<td>$2,500,000</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td></td>
<td>$2,500,000</td>
</tr>
<tr>
<td></td>
<td>Contingency</td>
<td>30%</td>
<td></td>
<td></td>
<td>$750,000</td>
</tr>
<tr>
<td></td>
<td><strong>Construction Total</strong></td>
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<td></td>
<td></td>
<td>$3,250,000</td>
</tr>
<tr>
<td></td>
<td>Sales Tax</td>
<td>8.4%</td>
<td></td>
<td></td>
<td>$273,000</td>
</tr>
<tr>
<td></td>
<td>Eng., Const.Management &amp; Administration</td>
<td>30%</td>
<td></td>
<td>$975,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Project Estimate</strong></td>
<td></td>
<td></td>
<td></td>
<td>$4,498,000</td>
</tr>
<tr>
<td></td>
<td><strong>Total Rounded</strong></td>
<td></td>
<td></td>
<td></td>
<td>$4,498,000</td>
</tr>
</tbody>
</table>

### Assumptions:
- The attached cost opinion is in July 2008 dollars and does not include future escalation.
- Minimal cut and fill is required
- No rock excavation required
- No special foundations are required
- 4 inch AC patch only, no overlay required
- AC patch and hydroseeding is only trench restoration required
- Trench box is adequate for trench safety
- Pipe is CLDI, mechanical joint
- Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.

The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
### City of Bellingham  
**ST-2 - King Mountain Reservoir**  
**Conceptual Level Cost Estimate**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reservoir - 1.9MG</td>
<td>1</td>
<td>LS</td>
<td>$2,900,000</td>
<td>$2,900,000</td>
</tr>
</tbody>
</table>

Subtotal: $2,900,000  
Contingency: 30%  
**Construction Total**: $3,770,000  
Sales Tax: 8.4%  
Eng., Const. Management & Administration: 30%  
Project Estimate: $5,217,680  
**Total Rounded**: $5,218,000

**Assumptions:**
- The attached cost opinion is in July 2008 dollars and does not include future escalation.
- Minimal cut and fill is required.
- No rock excavation required.
- No special foundations are required.
- 4 inch AC patch only, no overlay required.
- AC patch and hydroseeding is only trench restoration required.
- Trench box is adequate for trench safety.
- Pipe is CLDI, mechanical joint.
- Poly bagging is only cathodic protection required.

In addition, it does not include any costs associated with the potential discovery of hazardous materials.

The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.
Minimal cut and fill is required
No rock excavation required
No special foundations are required
4 inch AC patch only, no overlay required
AC patch and hydroseeding is only trench restoration required
Trench box is adequate for trench safety
Pipe is CLDI, mechanical joint
Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
City of Bellingham  
ST-4 - 730 Alabama Hill Reservoir  
Conceptual Level Cost Estimate  

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reservoir - 1.5MG</td>
<td>1</td>
<td>LS</td>
<td>$2,700,000</td>
<td>$2,700,000</td>
</tr>
</tbody>
</table>

Subtotal $2,700,000  
Contingency 30% $810,000  
**Construction Total** $3,510,000

Sales Tax 8.4% $294,840  
Eng., Const.Management & Administration 30% $1,053,000

Project Estimate $4,857,840  
**Total Rounded** $4,858,000

Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.  
Minimal cut and fill is required  
No rock excavation required  
No special foundations are required  
4 inch AC patch only, no overlay required  
AC patch and hydroseeding is only trench restoration required  
Trench box is adequate for trench safety  
Pipe is CLDI, mechanical joint  
Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.  
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
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<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reservoir - 2.2MG</td>
<td>1</td>
<td>LS</td>
<td>$3,300,000</td>
<td>$3,300,000</td>
</tr>
<tr>
<td></td>
<td>Subtotal</td>
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<td></td>
<td></td>
<td>$3,300,000</td>
</tr>
<tr>
<td></td>
<td>Contingency</td>
<td></td>
<td>30%</td>
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<td>$990,000</td>
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<tr>
<td></td>
<td><strong>Construction Total</strong></td>
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<td></td>
<td><strong>$4,290,000</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sales Tax</td>
<td></td>
<td>8.4%</td>
<td>$360,360</td>
<td>$360,360</td>
</tr>
<tr>
<td></td>
<td>Eng., Const.Management &amp; Administration</td>
<td></td>
<td>30%</td>
<td>$1,287,000</td>
<td>$1,287,000</td>
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<tr>
<td></td>
<td>Project Estimate</td>
<td></td>
<td></td>
<td>$5,937,360</td>
<td>$5,937,360</td>
</tr>
<tr>
<td></td>
<td><strong>Total Rounded</strong></td>
<td></td>
<td></td>
<td><strong>$5,937,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

Assumptions:
The attached cost opinion is in July 2008 dollars and does not include future escalation.
Minimal cut and fill is required
No rock excavation required
No special foundations are required
4 inch AC patch only, no overlay required
AC patch and hydroseeding is only trench restoration required
Trench box is adequate for trench safety
Pipe is CLDI, mechanical joint
Poly bagging is only cathodic protection required

In addition, it does not include any costs associated with the potential discovery of hazardous materials.
The cost opinion shown has been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the cost presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
APPENDIX V

Ordinances
ORDINANCE NO. 2006-03-026

AN ORDINANCE OF THE CITY OF BELLINGHAM, WASHINGTON, REPEALING CERTAIN ASPECTS OF CITY OF BELLINGHAM ORDINANCE NO. 8728 REGARDING WATER AND SEWER SERVICE EXTENSION ZONES.

WHEREAS, the City of Bellingham enacted Ordinance No. 8728 in January 1979 relating to the extension of City water and sewerage systems outside the City's corporate limits; and,

WHEREAS, Ordinance 8728 was enacted prior to the Growth Management Act and is, in certain respects, inconsistent with that law; and,

WHEREAS, Ordinance 8728 is also inconsistent, in certain respects, with current City policy regarding utility service zone extensions; and,

WHEREAS, City Council finds that passing this Ordinance is in the best interests of the citizens of the City of Bellingham;

NOW, THEREFORE, THE CITY OF BELLINGHAM DOES ORDAIN:

Section 1: Findings and Intent.

A. The Growth Management Act ("GMA") provides that it is not appropriate for urban governmental services, which includes water and sewer services, to be extended to or expanded in rural areas except in very limited circumstances that are necessary to protect basic public health and safety and the environment and which do not permit urban development. Ordinance No. 8728 is inconsistent with the GMA to the extent it authorizes the extension of City water and sewer services into areas outside the City's Urban Growth Area ("UGA").

B. Ordinance No. 8728 is also inconsistent, in certain respects, with the City's utility service zone extension policy as defined by City Council on June 14, 2004, a copy of which is attached hereeto and incorporated herein by this reference.

C. The City's under no legal obligation to extend water and/or sewer service outside its corporate limits, absent a contractual duty. City Council finds that Ordinance No. 8728 was not intended to create any such contractual duty, express or implied. Rather, it was intended merely to create an opportunity to apply for an extension, which the City, in its discretion, could grant or deny based upon listed criteria.

D. The intent of this Ordinance is to repeal Ordinance No. 8728 to the extent it is inconsistent with the GMA, applicable law and regulation, and City Council policy regarding utility service extensions outside the City's corporate limits. By enacting this Ordinance, City

City of Bellingham
CITY ATTORNEY
310湖北省
Bellingham, Washington 98225
Telephone (360) 676-6903

Ordinance Repealing Ordinance No. 8728
in certain respects (1)
Council does not intend to reinstate the August 1978 water and sewer extension moratorium that was terminated by Ordinance No. 8728.

E. City Council does not intend to terminate any water or sewer service that is in existence as of this Ordinance's effective date. For purposes of this Ordinance, "in existence" means the property is currently receiving service and/or shall have a fully signed, valid, and recorded utility service zone agreement.

F. City Council does not intend to repeal any portion of Ordinance No. 8728 to the extent it is codified in Bellingham Municipal Code ("BMC") Chapter 15.35.

G. City Council finds that enacting this Ordinance is categorically exempt from a State Environmental Policy Act ("SEPA") threshold determination.

Section 2: Repealer.

A. Water and sewer service outside UGA. To the extent Ordinance No. 8728 creates any water and/or sewer utility service zones outside the City's UGA, all such zones are hereby repealed unless a utility service zone extension agreement is in existence, as defined in Section 1(E) above. The City will not extend or expand urban governmental services such as water and sewer outside the UGA unless authorized by law.

B. Water and sewer service within the UGA. To the extent Ordinance No. 8728 creates on its own accord any water and/or sewer utility service zones inside the City's UGA, all such zones are hereby repealed unless a utility service zone extension agreement is in existence, as defined in Section 1(E) above. All future water and sewer utility service zones within the UGA will only be created pursuant to applicable law, regulation, and policy, including BMC Chapter 15.35 (as currently enacted or hereafter modified) and City Council policy of June 14, 2004.

C. Current water and sewer utility services inside or outside the UGA. City Council does not intend for this Ordinance to terminate any water or sewer service that is in existence, as defined in Section 1(E), as of this Ordinance's effective date. However, City Council does not intend for the continuation of these existing services to be modified, expanded or extended.

PASSED by the Council this 5th day of March, 2006.

Council President

City of Bellingham
CITY ATTORNEY
215 Lottie Street
Bellingham, Washington 98225
Telephone (425) 598-5903
APPROVED by me this 10th day of March, 2008.

[Signature]
Mayor

Attest:
[Signature]
Finance Director

Approved as to form:

[Signature]
Office of the City Attorney

Published: March 10, 2006

Ordinance Repealing Ordinance No. 8728
In certain respects (3)
Utility Service Zone Extensions

The City Council hereby suspends review of applications for sewer and water extensions in the Bellingham Urban Growth Area (UGA). Therefore, the only method available to obtain city utility services for properties in Bellingham’s UGA is to annex to the city.

Section I. Annexation Option – UGA property owners that do not want to wait for items 1 – 3 listed below to be completed, or who do not wish to purchase or transfer TDRs, are encouraged to seek annexation using the 75% petition method to obtain city utility services.

Section II. Policy Review – The Council will review this policy again when items 1 – 3 listed below are completed. This constitutes a phased approach for the future of utility service zone extensions that addresses current issues and builds toward a superior system in the future.

1. An effective City/County Intergovernmental Agreement - The City, County (and other service providers if necessary) must work to make meaningful amendments to the 1997 interlocal agreement governing development in the UGAs. The amended agreement should address at a minimum:
   a. Development Standards - Creation of a system with one set of development standards and agreement on how those standards will be implemented.
   b. One Permitting Authority - One jurisdiction should be responsible for all land use, environmental and building permit review and issuance for all projects in Bellingham’s UGA. The intent is that permitting responsibility would be transferred to the city over time, even if areas do not annex.
   c. Services Planning - Resolving urban service and revenue sharing issues. The intent is that city provision of the full range of urban services would be phased into UGA areas, even if the areas are not annexed. Eventually, the city would provide the full range of urban services in the UGA and would receive the tax revenues from the areas.

2. An updated Urban Fringe Plan - The city and county must complete work and adopt the Urban Fringe Plan and urban growth area boundaries. This plan shall include zoning in Bellingham’s UGA that would eventually be annexed by the city.

3. A “Super Urban Service Zone Ordinance” - Staff would draft a proposal to create one urban service zone for the remainder of the UGA that requires new development to meet the density and development goals and standards of the City as expressed in the update to the Urban Fringe Plan, the city/county interlocal agreement, and other city development codes. This would specifically require any development to comply with any and all plans and rules in place at the time of the development. This would also likely require participation in the TDR program when applicable. This “super USZ ordinance” would repeal all other USZ ordinances currently in place but the developer/owner has not yet signed the agreement. This would create a better uniformity and reduce a significant amount of bureaucracy and tracking.
Exceptions: The Council will accept and review applications for utility service zone extensions in the following three exceptional circumstances. The Council will use the process established in BMC 15.36 to review applications meeting one or more of the exceptions. In order to approve utility extensions in these circumstances, the Council must find that the application meets the listed criteria and that approving the extension is in the city’s best interests.

Exception 1: The Council will review sewer and water extension requests in the Lake Whatcom Watershed portion of the Bellingham UGA in one or both of the following exceptional circumstances:

- Documented cases of septic system or well failure; or
- Instances where extending utilities would reduce the potential watershed dwelling unit densities and/or reliance on private septic systems.

In the case of developed property, the owner shall agree to the following conditions to receive city water and/or sanitary sewer:

a. Owner will connect all existing dwellings to city sewer;
b. Owner will cease further use of all existing septic systems;
c. Owner will agree to no further subdivision of the property beyond what is approved by the Council in the utility extension process by filling a permanent deed restriction for all contiguous property under their ownership;
d. Owner will agree to comply with the land use controls contained in ordinance 2001-01-001, including limits on permitted uses, impervious area, etc;
e. Other conditions deemed appropriate by the City Council or staff.

In the case of undeveloped property, the owner shall agree to the following conditions to receive city water and/or sanitary sewer:

a. Owner agrees to restrict development of all contiguous land to one single-family residence;
b. Owner agrees to no further subdivision of the property beyond what is approved by the Council in the utility extension process by filling a permanent deed restriction for all contiguous property under their ownership;
c. Owner will agree to comply with the land use controls contained in ordinance 2001-01-001, including limits on permitted uses, impervious area, etc;
d. Other conditions deemed appropriate by the City Council or staff.

Exception 2: The Council will review utility extension requests in designated Transfer of Development Rights (TDR) receiving zones. Such requests shall include proof of purchased or transferred TDRs, applied to the subject property to achieve maximum density practicable, and shall be processed in accordance with BMC 15.36.

Exception 3: The Council will review sewer and water extension requests for parcels in the UGA which are located outside of a utility service zone but have been or are being assessed telecomer’s fees or City utility connection fees and are accruing interest on these charges.

Section III. Previously Approved Utility Extensions - This policy does not apply to valid utility extensions applications approved by the city prior original establishment of this policy in June 2003.
EXHIBIT A

June 14, 2004 Adopted Revisions to City Council Policy
Regarding Utility Service Zone Extensions

Utility Service Zone Extensions
The City Council hereby suspends review of applications for sewer and water extensions in the Bellingham Urban Growth Area (UGA). Therefore the only method available to obtain city utility services for properties in Bellingham’s UGA is to annex to the city.

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Section II, Policy Review – The Council will review this policy again when items 1 – 3 listed below are completed. This constitutes a phased approach for the future of utility service zone extensions that addresses current issues and builds toward a superior system in the future.

1. An effective City/County Interlocal Agreement – The City, County (and other service providers if necessary) must work to make meaningful amendments to the 1997 interlocal agreement governing development in the UGAs. The amended agreement should address at a minimum:
   a. Development Standards – Creation of a system with one set of development standards and agreement on how those standards will be implemented.
   b. One Permitting Authority – One jurisdiction should be responsible for all land use, environmental and building permit review and issuance for all projects in Bellingham’s UGA. The intent is that permitting responsibility would be transferred to the city over time, even if areas do not annex.
   c. Services Planning – Resolving urban service and revenue sharing issues. The intent is that city provision of the full range of urban services would be phased into UGA areas, even if the areas are not annexed. Eventually the city would provide the full range of urban services in the UGA and would receive the tax revenues from the areas.

2. An updated Urban Fringe Plan – The city and county must complete work and adopt the Urban Fringe Plan and urban growth area boundaries. This plan shall include zoning in Bellingham’s UGA that would eventually be administered by the city.

3. A “Super Urban Service Zone Ordinance” – Staff would draft a proposal to create one urban service zone for the remainder of the UGA that requires new development to meet the density and development goals and standards of the City as expressed in the update to the Urban Fringe Plan, the city/country interlocal agreement, and other city development codes. This would specifically require any development to comply with all and any plans and rules in place at the time of the development. This would also likely require participation in the TDR program when applicable. This “super USZ ordinance” would repeal all other USZ ordinances currently in place but the developer/owner has not yet signed the agreement. This would create better uniformity and reduce a significant amount of bureaucracy and tracking.


1
Exceptions: The Council will accept and review applications for utility service zone extensions in the following three exceptional circumstances. The Council will use the process established in BMC 15.36 to review applications meeting one or more of the exceptions. In order to approve utility extensions in these circumstances, the Council must find that the application meets the listed criteria and that approving the extension is in the city's best interests.

Exception 1: The Council will review sewer and water extension requests in the Lake Whatcom Watershed portion of the Bellingham UGA in one or both of the following exceptional circumstances:

- Documented cases of septic system or well failures; or
- Instances where extending utilities would reduce the potential watershed dwelling unit densities and/or reliance on private septic systems.

In the case of developed property, the owner shall agree to the following conditions to receive city water and/or sanitary sewer:

a. Owner will connect all existing dwellings to city sewer;

b. Owner will cease further use of all existing septic systems;

c. Owner will agree to no further subdivision of the property beyond what is approved by the Council in the utility extension process by filing a permanent deed restriction for all contiguous property under their ownership;

d. Owner will agree to comply with the land use controls contained in ordinance 2001-01-001, including limits on permitted uses, impervious area, etc;

e. Other conditions deemed appropriate by the City Council or staff.

In the case of undeveloped property, the owner shall agree to the following conditions to receive city water and/or sanitary sewer:

a. Owner agrees to restrict development of all contiguous-owned land to one single-family residence;

b. Owner agrees to no further subdivision of the property beyond what is approved by the Council in the utility extension process by filing a permanent deed restriction for all contiguous property under their ownership;

c. Owner will agree to comply with the land use controls contained in ordinance 2001-01-001, including limits on permitted uses, impervious area, etc.

d. Other conditions deemed appropriate by the City Council or staff.

Exception 2: The Council will review utility extension requests in designated Transfer of Development Rights (TDR) receiving zones. Such requests shall include proof of purchased or transferred TDRs, applied to the subject property to achieve maximum density practical, and shall be processed in accordance with BMC 15.36.

Exception 3: The Council will review sewer and water extension requests for parcels in the UGA which are located outside of a utility service zone but have been or are being assessed landowner's fees or City utility connection fees and are accruing interest on these charges.

Section III. Previously Approved Utility Extensions – This policy does not apply to valid utility extensions applications approved by the city prior to original establishment of this policy in June 2003.
ORDINANCE NO. 2006-06-064

AN ORDINANCE OF THE CITY OF BELLINGHAM, WASHINGTON, AMENDING
ORDINANCE NO. 2006-03-026 REGARDING WATER AND SEWER SERVICE
EXTENSION ZONES.

WHEREAS, the City of Bellingham enacted Ordinance No. 2006-03-026 repealing
certain aspects of Ordinance 8728 relating to extending City water and sewerage systems
outside the City's corporate limits; and,

WHEREAS, this Ordinance is enacted to modify and clarify Ordinance No. 2006-03-
026 regarding service to areas outside the City limits; and,

WHEREAS, City Council finds that passing this Ordinance is in the best interests of
the citizens of the City of Bellingham;

NOW, THEREFORE, THE CITY OF BELLINGHAM DOES ORDAIN:

Section 1: Ordinance 2006-03-026 Section 1.E. is hereby amended as follows:

E. City Council does not intend to terminate any water or sewer service that is in
existence within a zone created by Ordinance 8728 as of the Ordinance's effective date.

i. For purposes of this Ordinance, "in existence" means one or more of
the following: (1) the property is currently receiving service; (2) the property owner shall have
a fully signed, valid, and recorded utility service zone agreement on or before March 21, 2006; (3)
the property owner has written documentation dated on or before March 21, 2008
demonstrating the City's intent to serve the property; or (4) the property proposed to be
served is in a water service zone created by Ordinance 8728 in the area commonly referred
to as "Chuckanut" and the property proposed to be served abuts a water main and at least
two neighboring properties were receiving water service on or before March 21, 2006.

ii. Those properties that meet the foregoing definition of "in existence" but do not have an executed utility service zone agreement shall enter into such a contract
and pay any applicable fees on or before one year after this Ordinance's effective date. If a
utility service zone agreement is not fully executed by the foregoing date, the property will no
longer be considered "in existence" for purposes of this Ordinance and service will not be
provided. For those properties proposed to be served under this Ordinance that are outside
the City's Urban Growth Area in the "Chuckanut" area, each property shall only receive one
water service connection unless: there was a short plat application for the property pending
on March 21, 2006; or there was a utility service zone agreement in existence on March 21,
2006 which specifically provides otherwise; or the property owner's written documentation
shows the City's intent to serve more than one water service connection.

City of Bellingham
CITY ATTORNEY
210 Larue Street
Bellingham, Washington 98225
Telephone (360) 676-6900

Ordinance Amending Ordinance No.
2006-03-026 (1)
PASSED by the Council this 12th day of June 2006.

[Signature]
Council President

APPROVED by me this 19th day of June 2006.

[Signature]
Mayor

Attest: [Signature]
Finance Director

Approved as to form:

[Signature]
Office of the City Attorney

Published: June 16, 2006

Ordinance Amending Ordinance No. 2006-03-028 (2)
APPENDIX W

Consistency Statement
Sixty days provided for Review of Water System Plan by Whatcom County. No comments received in 60 days.

Local Government Consistency Review Checklist

A consistency review between DOH planning and engineering documents and adopted comprehensive plans and development regulations is required in certain situations. This checklist may be used to document the consistency review as required in WAC 246-290-108. A consistency review is required for each local government with jurisdiction over the applicable service area.

Water System Name: City of Bellingham  PWS ID: 056000
Planning Document Title: Water System Plan  Plan Date: June 2009
Local Government with Jurisdiction: Whatcom County

<table>
<thead>
<tr>
<th>Consistency Statement</th>
<th>Page(s) in Planning Document</th>
<th>Yes – No – Not Applicable</th>
</tr>
</thead>
</table>
| The applicable service area is consistent with the land use and zoning in the adopted comprehensive plan and adopted development regulations. | 1-4 thru 1-7  
Fig. 1-1 thru 1-4 |                             |
| For Water System Plans: 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 was used, the alternative growth projection and methodology proposed is acceptable based on explanation given. | 2-9 thru 2-11  
Table 2-9 |                             |
| For Water System Plans: Provisions of water service for new service connections are consistent with the adopted comprehensive plan and adopted development regulations. | 1-8 thru 1-10  
1-17 thru 1-18 |                             |
| For city-owned systems only: All utility service extension ordinances regarding water service are included in the plan. These policies are consistent with the adopted comprehensive plan and adopted development regulations. | Appendix F |                             |
| Other relevant elements related to water supply (as determined by DOH) is consistent with the adopted comprehensive plan and adopted development regulations. |                             |                             |
| Where the local government with jurisdiction did not provide a Consistency Review: Provide documentation of efforts taken and amount of time provided. Include: name of contact, date, type of effort attempted, and response from local agency. |                             |                             |

I certify that the above statements are true to the best of my knowledge and that these statements support the conclusion that the subject-planning document is consistent with adopted comprehensive plans, development regulations, and other policies.

Signature
Date

Printed Name, Title, & Jurisdiction

**For any issues of inconsistency, please document the inconsistency, including the citation from the comprehensive plan or development regulation. Provide direction on how this inconsistency can be resolved.**
Consistency Review Guidance

This checklist may be used to meet the requirements of WAC 246-290-108.

For water system plans, a consistency review is required for the retail service area and any additional areas where a municipal water supplier wants to expand their 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 only required for areas where a municipal water supplier wants to expand its water right’s place of use. This is only allowed for non-community water systems.

Documenting consistency:

- Provide a copy of the adopted land use/zoning map that corresponds to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map.

- Include a copy of service area policies on how new water service will be provided to new customers. Cities and towns must include all service extension ordinances.

- Include a copy of the 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 projections chosen more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

- Include any other portions of comprehensive plans or development regulations which are related to water supply.

The Department of Health is an equal opportunity agency. 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).
Local Government Consistency Review Checklist

A consistency review between DOH planning and engineering documents and adopted comprehensive plans and development regulations is required in certain situations. This checklist may be used to document the consistency review as required in WAC 246-290-108. A consistency review is required for each local government with jurisdiction over the applicable service area.

Water System Name: City of Bellingham  PWS ID: 05600
Planning Document Title: Water System Plan  Plan Date: June 2009
Local Government with Jurisdiction: City of Bellingham

<table>
<thead>
<tr>
<th>Consistency Statement</th>
<th>Page(s) in Planning Document</th>
<th>Yes – No – Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>The applicable service area is consistent with the land use and zoning in the adopted comprehensive plan and adopted development regulations.</td>
<td>1-4 thru 1-7  Figs 1-11 and 1-14</td>
<td></td>
</tr>
<tr>
<td><strong>For Water System Plans:</strong> 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 was used, the alternative growth projection and methodology proposed is acceptable based on explanation given.</td>
<td>2-9 thru 2-11  Table 2-9</td>
<td></td>
</tr>
<tr>
<td><strong>For Water System Plans:</strong> Provisions of water service for new service connections are consistent with the adopted comprehensive plan and adopted development regulations.</td>
<td>1-8 thru 1-16  1-17 thru 1-18</td>
<td></td>
</tr>
<tr>
<td><strong>For city-owned systems only:</strong> All utility service extension ordinances regarding water service are included in the plan. These policies are consistent with the adopted comprehensive plan and adopted development regulations.</td>
<td>Appendix F</td>
<td></td>
</tr>
<tr>
<td>Other relevant elements related to water supply (as determined by DOH) is consistent with the adopted comprehensive plan and adopted development regulations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where the local government with jurisdiction did not provide a Consistency Review: Provide documentation of efforts taken and amount of time provided. Include: name of contact, date, type of effort attempted, and response from local agency.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I certify that the above statements are true to the best of my knowledge and that these statements support the conclusion that the subject-planning document is consistent with adopted comprehensive plans, development regulations, and other policies.

Signature: [Signature]  Date: 7/8/09
Printed Name, Title, & Jurisdiction: Brent Bablin  Development Manager City of Bellingham

**For any issues of inconsistency, please document the inconsistency, including the citation from the comprehensive plan or development regulation. Provide direction on how this inconsistency can be resolved.**
Consistency Review Guidance

This checklist may be used to meet the requirements of WAC 246-290-108.

For water system plans, a consistency review is required for the retail service area and any additional areas where a municipal water supplier wants to expand their 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 only required for areas where a municipal water supplier wants to expand its water right’s place of use. This is only allowed for non-community water systems.

Documenting consistency:

- Provide a copy of the adopted land use/zoning map that corresponds to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map.

- Include a copy of service area policies on how new water service will be provided to new customers. Cities and towns must include all service extension ordinances.

- Include a copy of the 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 projections chosen more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

- Include any other portions of comprehensive plans or development regulations which are related to water supply.
inconsistency information to the department.
(c) If the local government with jurisdiction documents in
writing an inconsistency exists with local plans and regulations,
the municipal water supplier shall address the inconsistency. The
local government with jurisdiction shall be provided sixty days to
review any revisions or responses that address the inconsistency.
(3) If the local government with jurisdiction does not provide
a consistency review, the municipal water supplier shall complete
the consistency review as described in subsection (1) of this
section. The municipal water supplier must also document:
(a) The amount of time provided to each local government with
jurisdiction to review the planning and engineering documents as
defined in subsection (2) of this section; and
(b) The efforts taken to request a consistency review from the
local government with jurisdiction.

AMENDATORY SECTION (Amending WSR 99-07-021, filed 3/9/99, effective
4/9/99)

WAC 246-290-110 Project report. (1) The project report is a
written document that describes why a project is being proposed and
includes engineering design calculations showing how the project
will meet its objectives.
(2) [The] Surveyors shall submit project reports to the
department and [receive] obtain written approval prior to
installation or construction of any new water system, water system
extension, or improvement. The department may require the
submittal of a project report for the purpose of resolving a system
operational problem. Exceptions to this requirement are listed in
WAC 246-290-125.
(3) Project reports submitted for approval by surveyors who
are required to have a water system plan will not be considered for
approval unless a current, approved water system plan that
adequately addresses the project is on file with the department.
In the event that a purveyor of an existing system does not have
such a water system plan, the department may enter into a
compliance agreement with the purveyor that grants a time extension
to complete the water system plan.
(4) Project reports shall be consistent with the standards
identified in Part 3 of this chapter. Depending on the complexity
and type of project or problem, the report shall include the
following elements (information contained in a current water system
plan or other engineering document previously approved by the
department need not be duplicated, but must be specifically
referenced):
(a) Project description, including:
(i) Why the project is being proposed, how problem(s) (if any)
are to be addressed, and the relationship of the project to other
system components;
and regulations.

(c) The alteration of the place of use is not inconsistent regarding an area added to the place of use with any watershed plan approved under chapter 90.82 RCW or a comprehensive watershed plan approved under RCW 90.54.040(1) after September 3, 2003, if such a watershed plan has been approved for the area.

(2) As part of the planning or engineering document, municipal water suppliers must:

(a) Identify the portions of the service area where the place of use will be expanded.

(b) Document that subsection (1)(a) and (c) of this section are met.

(c) Meet the requirements of WAC 246-290-108 for the portions of the service area where the place of use will be expanded.

NEW SECTION


(1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has considered consistency with local plans and regulations. This review must include elements of local plans and regulations, as they reasonably relate to water service to be provided by a municipal water supplier for any new connection, including:

(a) Land use and zoning within the applicable service area;

(b) Six-year growth projections used in the demand forecast;

(c) Utility service extension ordinances of a city or town when water service is provided by the water utility of the city or town;

(d) Provisions of water service for new service connections; and

(e) Other relevant elements related to water supply planning as determined by the department.

(2) Municipal water suppliers must request each local government with jurisdiction over the applicable service area to provide a consistency review.

(a) Municipal water suppliers shall provide each local government with jurisdiction sixty days to review the planning or engineering document unless another state statute or state regulation requires a different time frame. The municipal water supplier must provide the local government with jurisdiction an additional thirty days for review if requested.

(b) If an inconsistency is documented by the local government with jurisdiction within the time frame outlined in (a) of this subsection, the municipal water supplier must provide the
APPENDIX X

SEPA Compliance
MEMORANDUM

DATE: July 30, 2009
TO: Martin Kjelstad, PW Engineering
FROM: Kurt Nabbefeld, Senior Planner
PROJECT: Bellingham Water System Plan SEPA Review

The SEPA Responsible Official of the Planning and Community Development Department issued a Determination of Non-Significance (DNS) for the proposed Bellingham Water System Plan on July 7, 2009. This non-project threshold determination included a 14 day comment period, which concluded on July 14, 2009.

As of this date no written comments have been received in response to the comment period. Therefore, the SEPA Responsible Official has chosen to retain the DNS as described under threshold determination number SEP2009-00033.
Determination of Non-Significance

Description of Proposal: A non-project action review of the 2009 City of Bellingham Water System Plan update. The Plan is an element of the City of Bellingham Comprehensive Plan and documents the City’s strategy for providing safe and reliable potable water service. The Plan is prepared to comply with the requirements of the Washington State Department of Health as set forth in WAC 246-290-100. Specific construction plans and/or projects are not addressed in this document.

Proponent: City of Bellingham, Public Works Department, Contact Martin Kjelstad (360) 778-7900.

Location of Proposal: Within the City limits of Bellingham and its adopted Urban Growth Areas, lands within approved Service Area Agreements and as identified in the 2009 Water System Plan (Fig. 1-1).

Lead Agency: City of Bellingham Planning and Community Development Department.

Environmental Information Considered:
1) June 24, 2009 SEPA Checklist.
2) 2004 DEIS and FEIS, City of Bellingham Comprehensive Plan & Whatcom County Urban Fringe Subarea Plan.
3) 2006 City of Bellingham Comprehensive Plan.

The lead agency for this proposal has determined that the project does not have a probable adverse impact on the environment. An environmental impact statement is not required under RCW 43.21.C.030(2) c. This decision was made after review of a completed environmental checklist on file with the lead agency. This information is available to the public on request.

( X ) This DNS is issued under 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date of issuance.

Comments must be submitted by: July 21, 2009.

Responsible Official: Tim Stewart, AICP
Position: Director, Planning and Community Development Department
Address: 210 Lottie Street, Bellingham, WA 98225

Signature: 7-7-09

Date

Contact: Kurt Nabbefeld, Senior Planner, PCDD, 360-778-8351 or email: knabbefeld@cob.org

Appeal rights: This Determination of Non-Significance may be appealed to the Whatcom County Superior Court per RCW 43.21C.060. Please contact Whatcom County Superior Court @ 676-6777.