



# Water Use Efficiency Program

2020-2025 Work Plan

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## EXECUTIVE SUMMARY

Washington State Municipal Water Law (WAC 246-290-810) requires all water suppliers to fulfil responsibilities to safeguard drinking water sources from the growing demand on the limited supplies throughout the state. These responsibilities created the Water Use Efficiency (WUE) program, which is overseen by the Washington State Department of Health. The City of Bellingham has been complying with all State requirements since 2008, which include:

- Creating new goals and measures every 6 years
- Annual performance reporting
- Installing meters on source and customer meters
- Limited Distribution System Leakage to under 10%

This report details the results from the 2014-2019 WUE program period and describes the goals and program measures for the 2020-2025 program period. In addition, other required program elements are discussed.

For the 2014-2019 program period, two demand-side goals were met to keep the customer water demand below established thresholds for Average Daily Demand and for Peak Day Demand during summer months. Ten program measures were implemented to help meet these goals, including rebate programs for multiple customer classes, creation of Best Management Strategies for several customer classes, completion of a cost-benefit analysis, installation of a pre-treatment process at the Water Treatment Plant and targeted education programs. In total, the implemented measures saved an estimated total of over 70 million gallons per year, with the addition of the pre-treatment process accounting for the majority of the savings (66 million gal/year).

The results of the cost-benefit analysis and current system demand were considered to establish a new goal for the 2020-2025 program period. The goal to keep the average Peak Day Demand between June and August to 14 million gallons per day (mgd) or less between the 2020-2025 program period will require targeted efforts to decrease water demand during the dry summer months and nine program measures are planned to help reduce indoor and outdoor water use. These measures include new and existing rebate programs for indoor water conservation, a high-water use notification program to reduce customer leaks, targeted work with highest summer water consumers, switching to monthly billing, adjusting rates to promote conservation, and educational programs. Collectively, these measures are estimated to save at least 4.5 million gallons per year. When compared to no course of action, these conservation measures are estimated to reduce water supply demand by 5% in 2040 when accounting for population growth.

## 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<sup>1</sup> (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

Enacted January 22, 2007, water suppliers must fulfill certain responsibilities. Applicable requirements specific to the City of Bellingham are listed in Table 1.

**Table 1. Municipal Water Law requirements**

Requirements	Timeline
Water Use Efficiency Program <ul style="list-style-type: none"><li>• Goal Setting &amp; Performance Measures</li></ul>	Every 6 years
Performance Reporting	Annually
Metering Requirements	January 22, 2017
Distribution Leakage Standard	2020

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### 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 include 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.

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<sup>1</sup> WAC 246-290-810

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## GOAL SETTING AND PERFORMANCE MEASURES

The WUE requires municipal water suppliers to establish a water use efficiency goal and measures for a six-year period through a public process. Goals must be measurable, address water supply and demand forecasting, and include an implementation schedule.

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## PERFORMANCE REPORTING

A progress report on annual water system production total, update on adopted WUE goals and measure performance, and distribution system leakage information, when applicable, are required in the report by July 1 of each year. Performance reports are to be made available to the public via the website or as part of the annual Consumer Confidence Report.

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## METERING

Production and service meters are required on all new and existing connections served water. Purveyors had to have meters installed by January 22, 2017 to be in compliance with WAC 246-290.

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## DISTRIBUTION LEAKAGE STANDARD

Municipal water suppliers are required to meet a 10% or less distribution system leakage rate to comply with the state standard. Leakage must be presented both as a percentage and as leakage volume and based on a rolling three-year average. If water supplier is unable to meet this standard, the supplier must develop and implement a Water Loss Control Action Plan that outlines the steps and timelines to achieve the desired leakage rate.

## CITY OF BELLINGHAM WATER SUPPLY CHARACTERISTICS

### SOURCE

The City of Bellingham's (hereafter "the City") water supply originates as rain and snow in the Lake Whatcom and the Middle Fork Nooksack River watersheds. Water from the Middle Fork can be diverted via a dam through an underground tunnel in Bowman Mountain. From there, the water travels to Mirror Lake, where fine sediment settles out, and then on to Anderson Creek and its final destination of Lake Whatcom. Lake Whatcom is the principal supply reservoir for the system. Water withdrawn from Lake Whatcom is screened then treated at the water treatment plant, located near Whatcom Falls Park.

### PRODUCTION AND DELIVERY SYSTEM

The current average production from the Water Treatment Plant (WTP) is about 8.5 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 system is comprised of six main pressure zones with storage and seven constant pressure neighborhood zones that do not contain water storage.

The largest number of service connections in the City is comprised of single-family residential water customers, which also happen to be the largest water consumer class. This customer class consumes approximately 34% of the total water produced.

Figure 1 summarizes consumption in 2019 by customer class. After single-family residential, multi-unit residential and commercial are the second and third largest water consumers by customer class.

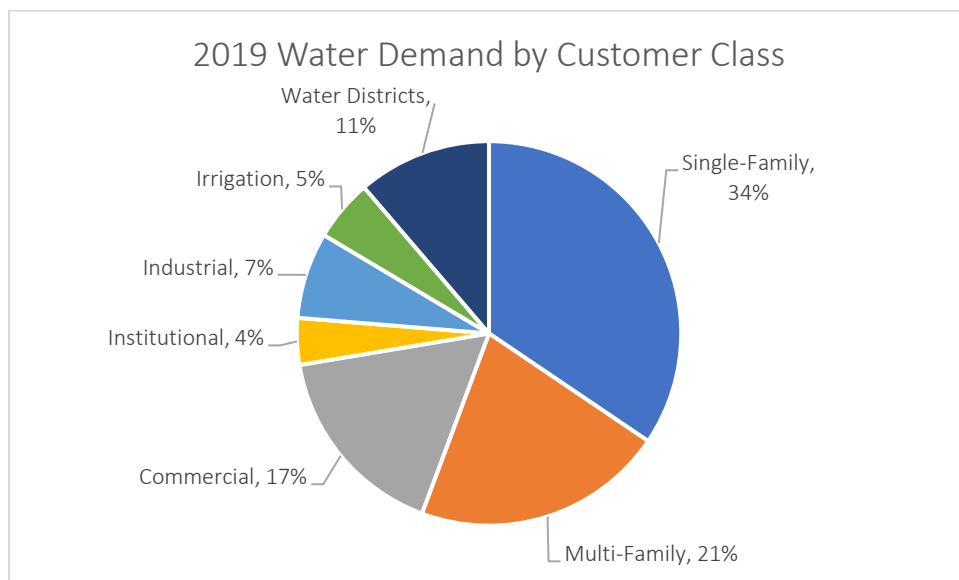


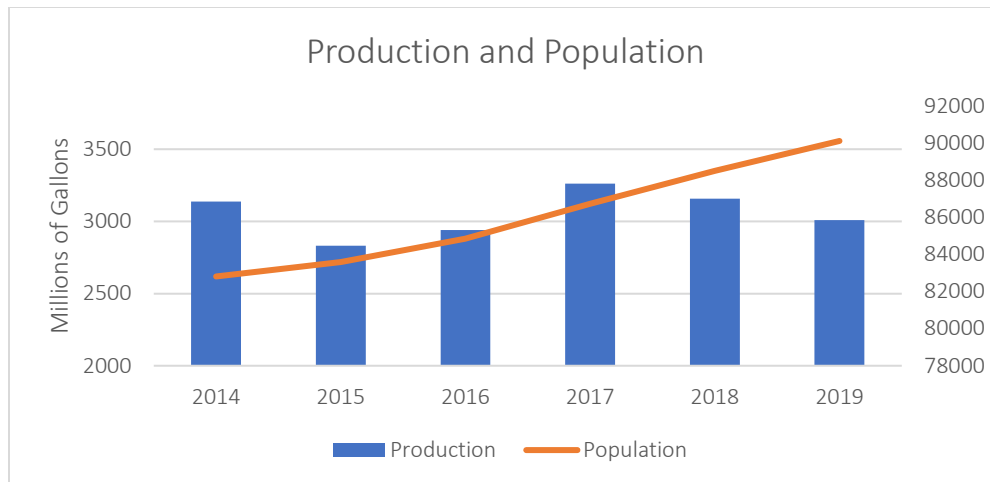
Figure 1. City of Bellingham water demand by customer class for 2019

## 2014-2019 WATER USE EFFICIENCY PROGRAM SUMMARY

### ACCOMPLISHMENTS

The 2014-2019 Water Use Efficiency program was very successful. With the coordinated efforts across multiple city departments and dozens of staff, all requirements were accomplished, and all established goals met.

Annual production volume over the last six years has fluctuated and varied between 2.8 and 3.3 billion gallons, but with a 9% population growth over the same timeframe, demand per connection continues to decrease.



**Figure 2. Annual water production and population growth between 2014-2019**

#### FINISHED METERING PROJECT

Between June 1, 2012 and April 2017 approximately 14,299 residential flat-rate customers were converted to metered accounts to complete the metering requirements under the Municipal Water Law. The work to complete this project included installation and assembly of 7,311 meter boxes and a total of 60,596 total staff hours.

#### MET GOALS

The City Council approved two goals for the 2014-2019 program:

- Goal 1: Maintain city-wide Average Daily Demand at under 10 million gallons per day (mgd) between the 2014-2019 program period.
- Goal 2: Keep average peak day demand between June and August to 14 mgd or less between the 2014-2019 program period.

Both of these goals were met during the 2014-2019 program period. The Average Day Demand (ADD) over program period was 8.355 mgd, significantly less than the goal to keep it below 10 mgd (see Figure 3). The highest ADD during the program period was only 8.93 mgd, in 2017. Additionally, the average Peak Day Demand (PDD) between June and August over the six-year program period was 13.77 mgd, slightly under the goal of 14 mgd or less (see Figure 4). However, the last three years of the program period show a possible trend of increasing PDD, all slightly above the 14 mgd goal. This indicates that there are opportunities for improved summer conservation measures during the next program period, namely a focus on outdoor water conservation during the drier summer months.

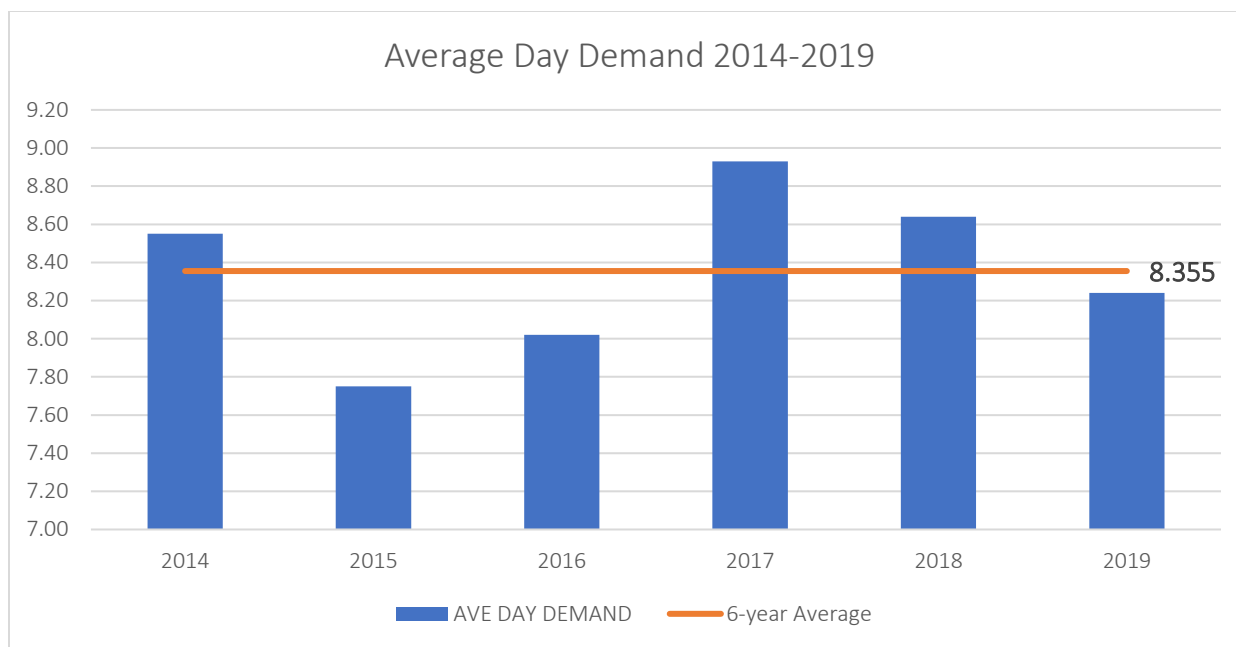


Figure 3. Average Day Demand between 2014-2019 with 6-year average

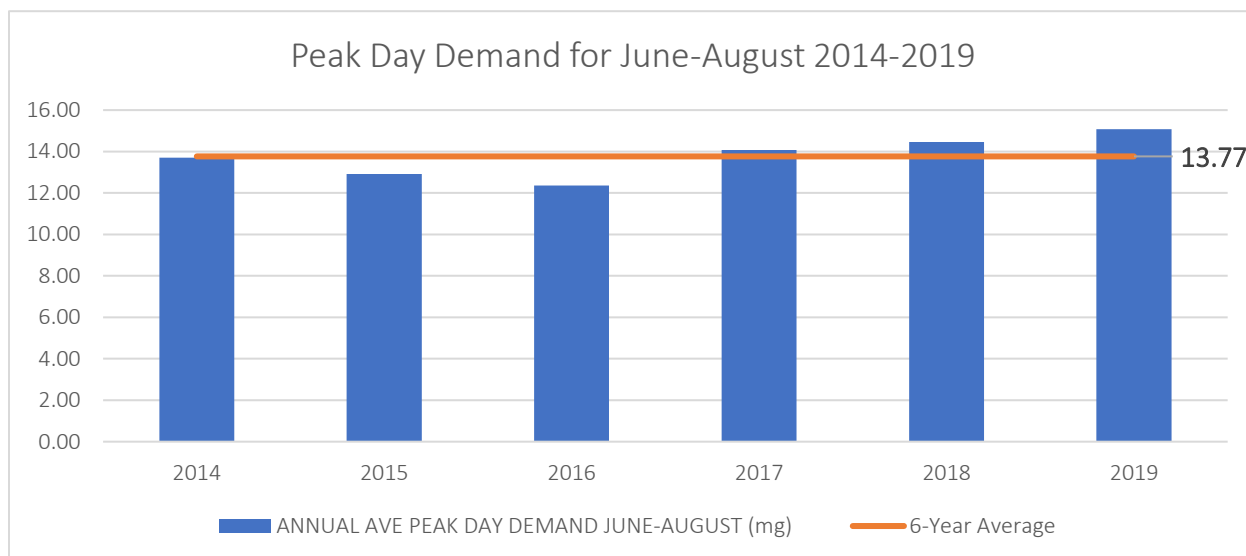


Figure 4. Peak Day Demand during summer months between 2014-2019 with 6-year average.

## COMPLETED MEASURES

Over the 2014-2019 program period, the Water Use Efficiency program created opportunities for over 70 million gallons of water to be saved each year (see Table 2 for summary). These opportunities primarily targeted indoor water conservation opportunities through fixture replacement programs, plus the substantial savings from installing



a new pre-treatment system at the Water Treatment Plant. Additional measures, as described below, provided education for community members and explored opportunities to provide more technical support for other customer classes through the development of Best Management Practices.

In addition to the ten measures outlined below, supplementary customer education included conservation messaging in the annual [Water Quality report](#) mailed to all customers, advertising in local newspapers and on buses and social media. Additionally, an online [outdoor water conservation pledge](#) was initiated to promote best practices for residential water customers. This pledge was promoted at in-person events and on social media.

**Table 2. Total estimated water saving for 2014-2019 program period**

Measure	Estimated total annual savings (2014-2019) - gallons
Single-family residential rebates	1,017,942
Commercial rebates + direct installs	2,505,341
Multi-family residential rebates (2017-2019 only)	700,000
Dissolved Air Floatation installation at WTP	66,526,667
<b>Total estimated annual water savings</b>	<b>70,749,950</b>

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#### MEASURE 1. CONTINUE WATER EFFICIENCY REBATES FOR SINGLE-FAMILY RESIDENTIAL WATER CUSTOMERS

Single-family residential utility customers represent the largest water users by customer class, using approximately 34% of the water. Offering rebates to this customer class for high consumption fixtures provides long-term water conservation without any additional changes to the household behaviors, making rebates one of the most measurable ways to decrease household water use. The U.S. Environmental Protection Agency estimates that replacing an older high-volume flush toilet with an efficient, low-flow toilet saves an average of 10,000 gallons per year, and this savings is continued for the life of the new fixture. Similarly, replacing inefficient clothes washers is estimated to save 7,000 gallons per year for the life of the fixture. During the six-year program period, 149 households participated in the toilet and/or clothes washer rebate program, with over \$30,000 of rebates distributed for a total annual water savings of over 1 million gallons (see Table 3). In addition to the rebate program, all participating households received a home water audit from the Opportunity Council's Community Energy Challenge and were given educational materials and an indoor water conservation kit that includes a kitchen and bathroom low-flow faucet aerator, low-flow showerhead and leak detection dye-tabs. It is known that these additions provide increased benefit, but it is too challenging to capture verifiable quantitative savings.

Table 3. Single-family Residential rebate summary for 2014-2019 program period.

Year	Total Households	Total Toilet Rebates	Total Toilet Rebates Value	Estimated Water Savings (gallons per year)	Total Clothes Washer Rebates	Total Clothes Washer Rebates Value	Estimated Water Savings (gallons per year)	Community Energy Challenge Rebate	Total Rebates	Total Water Savings (gallons per year)
2014	11	4	\$ 448.00	40,000	7	\$ 1,050.00	49,000	\$ -	\$ 1,498.00	89,000
2015	53	69	\$ 6,803.92	276,000	14	\$ 1,400.00	98,000	\$ 3,400.00	\$ 11,603.92	374,000
2016	26	30	\$ 2,996.00	120,000	6	\$ 500.00	42,000	\$ 2,200.00	\$ 5,696.00	162,000
2017	21	26	\$ 2,569.00	104,000	5	\$ 500.00	35,000	\$ 2,000.00	\$ 5,069.00	139,000
2018	16	16	\$ 1,348.00	49,836	12	\$ 1,200.00	84,000	\$ 1,000.00	\$ 3,548.00	133,836
2019	22	32	\$ 2,424.00	85,106	5	\$ 500.00	35,000	\$ 1,495.00	\$ 4,419.00	120,106
Totals	149	177	\$ 16,588.92	674,942	49	\$ 5,150.00	343,000	\$ 10,095.00	\$ 31,833.92	1,017,942

## MEASURE 2. CONTINUE WATER EFFICIENCY REBATES FOR COMMERCIAL WATER CUSTOMERS

A similar rebate program was established for commercial water customers, with a variety of rebates for replacing fixtures and appliances that use water inefficiently. The program also includes an assessment from the Community Energy Challenge and offers rebates for eligible toilets, urinals, pre-rinse spray valves, clothes washers and commercial kitchen equipment such as food steamers, dishwashers and ice machines. However, during the program period, only toilet, clothes washer and ice machine rebates were distributed, for a total of 155 rebates totaling \$21,844 with an annual water saving estimate of just over 1 million gallons (see Table 4). One substantial difference between the residential and commercial rebate programs is that during the water assessment, the contractor complete direct installs of low-flow faucets aerators and showerheads, allowing for additional measurable water savings. When adding in the savings from directly installed fixtures, the commercial rebate program had a total annual savings of 2.5 million gallons.

Table 4. Commercial and Institutional program summary for 2014-2019 program period.

Year	Assessments	Total Rebates	Rebates – est. water savings (gallons/year)	Total Rebate	Direct Installs- est. water savings (gallons/year)	Total Estimated Water Savings (gallons/year)
2014		8	68,900	\$ 1,498	85,200	155,598
2015	6	92	874,400	\$ 12,846	151,200	1,038,446
2016	26	10	62,000	\$ 3,000	-	65,000
2017	25	0	-	-	317,086	317,086
2018	17	0	-	-	137,093	137,093
2019	15	45	180,000	\$ 4,500	607,619	792,119
Totals	89	155	1,185,300	\$ 21,844	1,298,197	2,505,341

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### MEASURE 3. EXTEND REBATES TO MULTI-UNIT WATER CUSTOMERS

Starting in 2017, a rebate program and assessment process was established for multi-unit customers. The assessments are administered by the Opportunity Council's Community Energy Challenge by reaching out to property owners and management companies with 3 or greater units. The variability of this program is similar to the commercial customer program, with large projects coming at irregular intervals, but overall the first three years were successful, working with a total of 4 properties, with over 500 total units, that resulted in 70 toilet rebates for just under \$6,000 and an estimated annual water savings of 700,000 gallons per year (see Table 5).

**Table 5. Multi-family residential rebate summary for 2014-2019**

Year	Total Properties	Total Toilet Rebates	Total Toilet Rebates Value	Estimated Water Savings (gallons/year)	Total Clothes Washer Rebates	Total Rebates	Total Water Savings (gallons/year)
<b>2017</b>	1	7	\$ 658.42	70,000	0	\$ 658.42	70,000
<b>2018</b>	2	39	\$ 3,013.99	390,000	0	\$ 3,013.99	390,000
<b>2019</b>	1	24	\$ 2,261.11	240,000	0	\$ 2,261.11	240,000
<b>Totals</b>	<b>4</b>	<b>70</b>	<b>\$ 5,933.52</b>	<b>700,000</b>	<b>0</b>	<b>\$ 5,933.52</b>	<b>700,000</b>

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### MEASURE 4. ESTABLISH BEST MANAGEMENT PRACTICES FOR IRRIGATION WATER CUSTOMERS

In Bellingham, with our wet environment and largely residential customer base, there are a relatively small percentage of irrigation customers, but these accounts still use approximately 5% of produced water. In order to identify opportunities for these customers to improve their efficiency, Best Management Practices (BMPs) were established and put together in a guidebook that is available for customers on the City's website:

<https://cob.org/wp-content/uploads/best-mgmt-practices-irrigation-systems.pdf>

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### MEASURE 5. ESTABLISH BEST MANAGEMENT PRACTICES FOR INDUSTRIAL WATER CUSTOMERS

Industrial water customers account for another 7% of water and have a large variety of uses for water compared to other customer classes. In order to help this customer class with better conservation practices, Best Management Practices were established and a guidebook was developed. The guidebook is available on the City's website:

<https://cob.org/wp-content/uploads/best-practices-industrial-water-conservation.pdf>

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### MEASURE 6. ESTABLISH BEST MANAGEMENT PRACTICES FOR INSTITUTIONAL WATER CUSTOMERS

Upon close examination of the institutional customer class, it became clear that the current Best Management Practices offered for the commercial customer class through the water assessments completed with a qualified consultant are the same BMPs for institutional customers. This assessment program was already available to institutional customers and rebates continued to be offered to this customer class as well.

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## MEASURE 7. ENGAGE PARTNERS TO PROVIDE WATER USE EFFICIENCY RESOURCES TO TARGETED CUSTOMER CLASSES

This measure provides a multitude of educational opportunities throughout our community, with an emphasis on targeting specific customer classes as well as educating youth by providing funds to local organizations.

a. Sustainable Connections Community Energy Challenge

The Community Energy Challenge is a partnership between the Opportunity Council, Sustainable Connections, and the City of Bellingham to provide energy and water audits to residential, commercial and institutional customers. Providing additional funding for Sustainable Connections' Community Energy Challenge allowed for targeted water assessment for commercial and institutional water customers. As mentioned in the discussion of Measure 2, this program works with businesses and can provide direct installs of faucet aerators and showerheads when applicable, increasing the impact of the water assessment.

b. Opportunity Council Community Energy Challenge

The Opportunity Council implements the residential elements of the Community Energy Challenge program and the City provides additional funding to add water assessments for both single- and multi-family project in the City of Bellingham. The partnership is reflected in the effectiveness of Measure 1 and Measure 3 as described above for targeting residential fixture and appliance upgrades.

c. RE Sources Sustainable Schools

RE Sources is a local non-profit organization that focuses on education and action to promote sustainable communities. Partnering and providing funding for RE Sources' Sustainable Schools program over the last 6 years grew the program from only offering water conservation education to elementary students to offering K-12 water conservation education. During the 2014-2019 program period, over 3,000 students were educated about basic to advanced water conservation concepts and action projects were implemented to apply the learning.

d. Washington State University (WSU) Whatcom County Extension Sustainable Landscaping- Gardening Green

For over a decade, WSU Whatcom County Extension program offered a sustainable landscaping course called Gardening Green. The City of Bellingham provided funding for this program to integrate water conservation best practices into the curriculum in order to get targeted water conservation education to those invested in sustainable landscaping practices. The six-week course covered in-depth information and was widely praised by participants. Between 2014-2018, 75 City of Bellingham water customers participated in the program. Unfortunately, the staff that previously taught this course retired, so the course was not offered in 2019 and beyond.

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#### MEASURE 8. DEVELOP SYSTEM-WIDE WATER USE EFFICIENCY COST-BENEFIT ANALYSIS

In 2019, a system-wide cost-benefit analysis was initiated using the Alliance for Water Efficiency's [Conservation Tracking Tool](#). This tool provides many benefits beyond cost-benefit tracking, so can continued to be used to track water efficiency implementation over the years. The results of the analysis are available on the [City's website](#) ([www.cob.org/conserve](http://www.cob.org/conserve)) and are reflected in the 2020-2025 work plan proposed below.

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#### MEASURE 9. REDUCE WATER TREATMENT PLANT OPERATIONAL WATER USE VIA IMPLEMENTATION OF GREATER WATER EFFICIENT TECHNOLOGY

In 2018, the Dissolved Air Flootation pre-treatment process came online at the Water Treatment Plant. This pre-treatment process sends millions of tiny air bubbles into the raw lake water to float debris to the top so as much material as possible can be skimmed off before it enters this existing filtration system. The pretreatment reduces the frequency of filter backwashes, reducing the volume of treated water used within the water treatment process. During the first 12 months of pre-treatment an estimated 66 million gallons of treated water was saved due to less frequent filter backwashes.

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#### MEASURE 10. CONDUCT SUSTAINABLE WATER MANAGEMENT DEMONSTRATION PROJECTS WITH COMMUNITY PARTNERS

Outdoor water conservation is more challenging to address than indoor use because outdoor use is variable and many best practices are recurring behaviors, as opposed to the one-time behavior of installing more efficient indoor appliances and fixtures. Therefore, providing sustainable outdoor water management demonstration projects with community partners is a great opportunity to demonstrate best practices for outdoor water conservation while also educating the community. During the 2014-2019 program period, four demonstration projects were installed at community or school gardens, all water catchment cistern projects (see Table 6 for summary).

**Table 6. Sustainable water management demonstration projects completed during 2014-2019 program period**

Year	Rainwater Catchment Project	Type of system	Total Material Costs	
<b>2015</b>	Center for Local Self-Reliance	2,500 gallon cistern	\$	1,706.70
<b>2015</b>	Whatcom Middle School	2,500 gallon cistern	\$	1,627.77
<b>2016</b>	Kulshan Middle School	2,500 gallon cistern	\$	1,606.51
<b>2018</b>	Fairhaven Community Garden	1,500 gallon cistern	\$	931.56

## 2020-2025 WORK PLAN

Staff reviewed the outcomes from the 2014-2019 program to determine the goal and measures for the 2020-2025 program. As outlined above, the previous Average Daily Demand goal was easily met, however, there was an upward trend seen in the last three years for the summer Peak Day Demand goal. Since the summer fluctuation in water demand is one of the bigger challenges for water distribution and more costly to manage, the focus of the 2020-2025 program period will be targeted at keeping the Peak Day Demand below the 14 mgd target. In order to do this, outdoor water conservation efforts will need to increase. In addition, lowering the average indoor baseline will help provide more room for the summer influx to stay below the targeted threshold, and most indoor conservation measures have better long-term water savings, so there will still be a large focus on fixture replacement programs and general water conservation education.

On Monday, September 28, 2020, staff presented a summary of the 2020-2025 WUE program work plan to the City Council and held a public hearing. This meeting was open to the public with meeting materials and information available on the City's website in advance. No public comments were received at this hearing, however a few comments were received by staff via email. The responses to these comments can be found in Appendix 1. The City Council formally adopted by resolution the following water use efficiency goal and nine measures on October 12, 2020.

## 2020-2025 GOAL

Maintain average Peak Day Demand (PDD) between June 1 and August 31 of each year to below 14 mgd during the 2020-2025 program period.

Supplying peak water demand is one of the most challenging and costly segments of a water utility's demand curve; therefore, it is appropriate to introduce a goal aimed at reducing peak water use. The City's summertime peak day water demand has averaged around 14 mgd during the 2014-2019 period. Continuing this goal targets improving the increasing trend seen over the last 3 years while also accounting for population growth over the next six years.

## 2020-2025 MEASURES

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### MEASURE 1. CONTINUE SINGLE-FAMILY RESIDENTIAL REBATE PROGRAM

Based on the results of the [cost-benefit analysis](#), the single-family residential rebate program will continue. Water assessments will continue to be provided by a reputable local contractor to verify eligibility for rebates.

Estimated savings: 750,000 gallons per year

Estimated budget: \$30,000

Implementation schedule: On-going

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#### MEASURE 2. CONTINUE MULTI-FAMILY RESIDENTIAL REBATE PROGRAM

Based on the results of the [cost-benefit analysis](#), the multi-family residential rebate program will continue. Water assessments will continue to be provided by a reputable local contractor to verify eligibility for rebates.

Estimated savings: 750,000 gallons per year

Estimated budget: \$30,000

Implementation schedule: On-going

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#### MEASURE 3. CONTINUE COMMERCIAL AND INSTITUTIONAL REBATE PROGRAM

Based on the results of the [cost-benefit analysis](#), the commercial and institutional rebate program will continue. Water assessments will continue to be provided by a reputable local contractor to verify eligibility for rebates and complete direct installs of faucet aerators, shower heads and spray nozzles.

Estimated savings: 2,000,000 gallons per year

Estimated budget: \$30,000

Implementation schedule: On-going

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#### MEASURE 4. INITIATE INDUSTRIAL REBATE PROGRAM

Based on the results of the [cost-benefit analysis](#), an industrial rebate program will be initiated, primarily targeting cooling towers, but also offering the other commercial and institutional rebates. Each upgraded cooling tower averages over 200,000 gallons of water savings each year, so even with a limited number of cooling towers in the community, initiating this rebate program has substantial community benefits in terms of long-term water savings.

Estimated savings: 1,000,000 gallons per year

Estimated budget: \$20,000

Implementation schedule: 2022-2025

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#### MEASURE 5. HIGH WATER USE NOTIFICATION PROGRAM

With the installation of smart meters, the City's water department was able to initiate a high-water use notification program. The remotely read meters report constant data points and are therefore able to quickly detect higher than normal water consumption, which usually indicates a leak.

During the 2020-2025 program period, the water department will develop a tracking system in order to estimate the amount of water savings incurred annually through the high-water use notification program

Estimated savings: unknown

Estimated budget: none

Implementation schedule: Tracking and reporting in place by 2023

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#### MEASURE 6. CREATE A PLAN TO WORK WITH HIGHEST SUMMER WATER USERS TO REDUCE CONSUMPTION

Working with the highest outdoor water users in the summer months is an ideal practice for reducing the summer Peak Day Demand. Irrigation and single-family residential customers see the biggest increase in consumption during summer months. Identifying the top users and creating a plan to reduce their consumption is more effective than broadly educating all customers.

Estimated savings: unknown

Estimated budget: \$20,000

Implementation schedule: starting in 2021

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#### MEASURE 7. EVALUATE THE OPTION OF SWITCHING TO MONTHLY BILLING

Current City of Bellingham water customers receive bills once every two month, a practice that was once widely practiced by utilities. In modern times, many utilities are switching to monthly billing in order to help their customers conserve water. Increasing the frequency of bills allows for more regular and timely information about water use, increases customer's ability to detect leaks quickly and allows for more efficient household budgeting. It also allows for more regular communication with customers to communicate things such as conservation messages. Monthly billing is more likely to help customers realize the need to save water in the summer months.

Estimated savings: unknown

Estimated budget: unknown

Implementation schedule: starting in 2022

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#### MEASURE 8. ADJUST WATER BILLING RATES TO PROMOTE CONSERVATION

The City's current water rate structure is a uniform rate. Customers are charged a flat rate for service, plus a volume fee for each unit of water used. During the next Water System Plan update, which will occur in 2022 or 2023, this rate structure will be evaluated and adjustments will be made in order to promote water conservation.

Estimated savings: unknown

Estimated budget: none

Implementation schedule: starting in 2022 or 2023, upon completion of water system plan update

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#### MEASURE 9. CONTINUE COMMUNITY EDUCATION AND ENGAGEMENT PROGRAMS

To continue the focus on indoor and outdoor water conservation, current education programs will continue with some proposed additions to increase outdoor water conservation during summer months.

a. School-based education

Continue to work with local schools to provide water conservation education



- b. Distribute BMP guides to all Irrigation and Industrial customers.

Create a plan and distribute the BMP guides that were created in the 2014-2019 program period to all Irrigation and Industrial water customers, including follow up opportunities from trained professionals.

- c. Outdoor water conservation education

Continue to provide outdoor water conservation education to all customers during the dry summer months. This may include demonstration projects, general education, workshops or advertising.

- d. Initiate water efficiency training program for irrigation professionals

Work with local experts to provide training to irrigation professionals about installation and maintenance best practices for water efficiency.

- e. Additional customer education opportunities

Additional opportunities to educate customers will be used when they occur. Examples may include collaborative messaging with the Whatcom Water Alliance and conservation articles in the annual Water Quality reports mailed to all water customers.

Estimated savings: unknown

Estimated budget: \$70,000

Implementation schedule: On-going

## PROGRAM EVALUATION

Both formative (program improvement) and summative (proof the program worked as planned) evaluation will be on-going throughout the 6-year period at the macro and micro levels to determine if measures are proving to be cost-effective and meeting the short- and long-term outcomes. The Alliance for Water Efficiency's Conservation Tracking Tool will be used to evaluate program cost-effectiveness.

City staff recognizes that targeted messaging, barrier removal, and outreach to new audiences can assist in program participation. The communications framework below illustrates the types of strategies that can be employed with targeted messages to various audiences for existing and new water use efficiency program activities.



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## OUTREACH

Targeting unique outreach messages to selected water customer classes provides specific water use efficiency solutions for each group. Additionally, staff can evaluate which neighborhoods have the greatest participation in water use efficiency measures to date and where outreach efforts can be maximized where participation has been lower to raise awareness about available measures.

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## EDUCATION

Research shows that people are more likely to take action on something they understand. Messaging on water and associated money savings is more likely to be effective when people understand their water use, can identify the largest water-using appliances, and understand the payback timeline when implementing retrofits. Staff will continue to take this approach to education in outreach messaging.

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## COMMUNITY ENGAGEMENT

Some segments of the population are aware of and understand services available from the water use efficiency program, but still have a financial or lack-of-interest barrier to participation. Staff will continue to obtain and review needs and attitudes of these differing segments to determine how best to assist in uptake of water conservation measures.

## MEMBERSHIPS AND AFFILIATIONS

The City is a member of the following organizations that promote water conservation:

- Alliance for Water Efficiency (<http://www.allianceforwaterefficiency.org/>)
- WaterSense (<http://www.epa.gov/watersense/>)

- Whatcom Water Alliance
- Whatcom Watersheds Info Network (<https://www.whatcomwin.org/>)
- Lake Whatcom Management Team (<https://www.lakewhatcom.whatcomcounty.org/>)

## DISTRIBUTION SYSTEM LEAKAGE

The fully metered distribution system has been operating for two years and is ready to be evaluated for distribution system leakage (DSL). DSL is reported annually to the Department of Health in the annual Water Use Efficiency report (find all past reports here: <https://cob.org/services/environment/conservation/goals-measures>).

The DSL is calculated by subtracting the Total Authorized Consumption from the Total Water Produced and the Municipal Water Law allows for a maximum leakage of 10%. In 2018 and 2019, the DSL was found to be -2.5% and -5.8% respectively. Upon close inspection, it has been concluded that the source meter at the Water Treatment Plant must be under-measuring the outflow, causing the negative loss number. The source meter needs to be evaluated for calibration or possible replacement in order to accurately report the Total Water Produced for future years.

With that said, the City operates a robust customer notification program that addresses unusually high consumption for possible leaks and also prioritizes response to any known or potential leaks or main breaks, so precautions are already being taken to keep the actual DSL under 10% to comply with state law.

## DEMAND FORECAST

Predictions about how much water will be needed for delivery to customers at some point far in the future are notoriously difficult to pin down. Accuracy of these forecasts are influenced by population, weather, climate, water prices/rates, and our conservation programs. Table 7 below shows recent figures for population, number of water services, rainfall and average daily demand for Bellingham's water system. The Alliance for Water Efficiency Conservation Tracking Tool was used to calculate the future demand estimates, comparing two scenarios, one with no further conservation programs and one based on the proposed conservation programs outlined in this work plan. The projected water system demands for the required 6-year and 20-year planning periods are summarized in Table 7 and in Figure 5 below.

**Table 7. Trends in Population, Service, Rainfall and Average Daily Demand**

Year	Population	Change in Population	Service Connections	Change in Service Connections	Rainfall (in)	ADD (mgd)	% Change Consumption
<b>2014</b>	82,810		24,555		42.63	8.55	
<b>2015</b>	83,580	0.93%	24,776	0.90%	36.62	7.75	-9.36%
<b>2016</b>	84,850	1.52%	24,946	0.69%	41.37	8.02	3.48%
<b>2017</b>	86,720	2.20%	25,165	0.88%	40.5	8.93	11.35%
<b>2018</b>	88,500	2.05%	25,375	0.83%	36.75	8.64	-3.25%
<b>2019</b>	90,110	1.82%	25,589	0.84%	30.63	8.24	-4.63%

If recent trends continue and the City can meet its goal of maintaining its current per capita water use, then conservation measures will result in a 5% reduction in ADD for by 2040 when compared with projections without conservation measures.

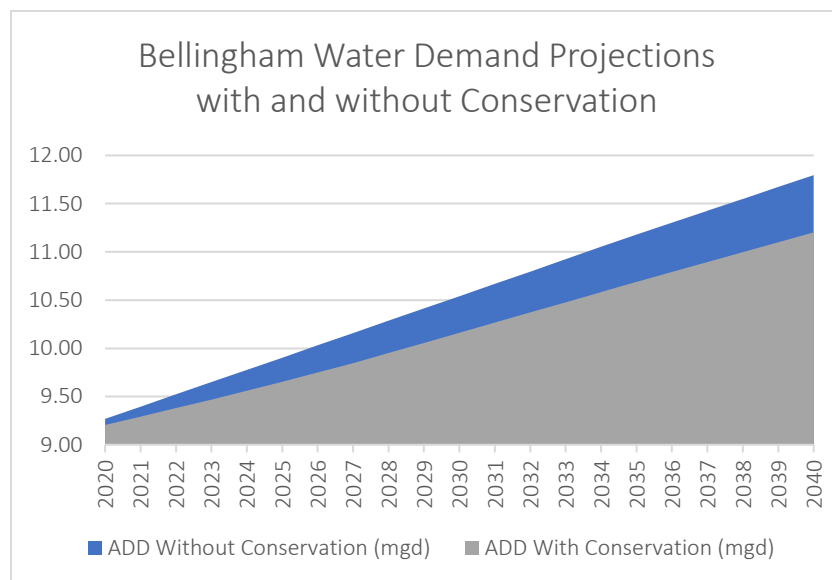


Figure 5. Average Day Demand projections with and without water conservation practices.

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## RECLAIMED WATER OPPORTUNITIES

Under the Municipal Water Law, water systems that serve over 1,000 connections are required to evaluate reclaimed water possibilities. The City has explored many reclamation possibilities for City facilities and other customers and has determined 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 is not viable for the City at this time and is not something that will be pursued during the 2020-2025 program period.

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## RATE STRUCTURE ANALYSIS

At present, the City uses a "cost-of-service" basis for its water rate structure that was adopted in 2012. The City of Bellingham provides water service to roughly 25,000 customers (approximately 100,000 people) inside and outside of the City limits. Customers pay water rates under a structure defined in the Bellingham Municipal Code ([BMC 15.08.250](#)). Beginning in January 2019, the water utility rates levied in 2018 will 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. The inflationary factor is calculated and rates are adjusted by the finance director in September of each year using 12 prior months of Consumer Price Index data.

Water rates and charges for services outside the city limits are 150 percent of the usage rates within the City limits and connection charges except those services that are part of a water district or association and served as part of a wholesale contract.

Now that the City has a fully metered water system, consumption data can be reviewed from this standpoint in order to determine the necessity and/or scale of a water conservation rate structure for new rates.

## APPENDIX 1. RESPONSES TO PUBLIC COMMENT

Public Comment	Staff Response	Action
<p>The city proposed two new programs: "high water notification" and "targeted work with highest summer water consumers." This seems like an excellent idea given that peak demand sometimes exceeds the city 14 mgd goal. Can you provide additional details on what these programs will do, with whom, and how they differ from each other? Will they include all customer classes and focus on outdoor water use?</p>	<p>Both of these programs will address all customer classes, but only the targeted work with highest summer consumers specifically targets outdoor water use. The high water bill notification program reaches out to customers any time of the year that they have substantially higher than normal water bills. This typically indicates that they have a leak. We actually already do this, but in the next year or so we'll figure out a way to quantify estimated savings from this program.</p> <p>The targeted work with the highest summer water consumer is a new program and we do not yet know what the end results will look like. The first step will be to identify and analyze the highest summer water consumers, then once we know more about who and what we're working with, we'll create a plan to help reduce the outdoor water use. Depending on what we find, this could include doing things like focus groups, creating a custom rebate program, offering technical assistance, targeted educational materials or any number of opportunities.</p>	<p>Information provided</p>
<p>Does the city know why peak summer demand is increasing?</p>	<p>We do not know a specific reason beyond the fact that our population is growing, but the proposed plan includes multiple ways to help reduce summer water demand and identify additional opportunities for summer water savings.</p>	<p>Information provided</p>

Public Comment	Staff Response	Action
<p>I think the work plan for 2020-25 should be much more aggressive on rate design: inclining block rate structure; seasonal rates (higher in summer, lower in winter); and possible shift to increasing volumetric charge and decrease fixed charges – all to encourage WUE.</p>	<p>Thank you for providing these comments. At this point in time we have committed to creating a rate structure that promotes water use efficiency and the specific financial mechanisms will be decided through a rate structure analysis that coincides with the Water System Plan update that is currently scheduled for 2022/2023.</p>	<p>Information provided about timeline and process for assessing rates that promote conservation</p>
<p>On distribution system leakage, why is replacement of the faulty source meter not done already or at least planned rather than considered “possible?” Is it difficult or expensive to replace this meter, which appears to provide crucial data on water intake for the city?</p>	<p>Replacement of the source meter is more of a technical/space issue. We know it is a issue, and we are committed to finding a solution, but at this point in time replacing the meter itself might not be the best fix to the issue. As I understand it, we need a certain length of straight pipe before and after the source meter in order to get an accurate read, and we do not have the space to accommodate that. Therefore, we will work with technical experts to figure out a solution that is financially and technically feasible with the space constraints we have.</p>	<p>Information provided</p>