

**CHAPTER 4 – WATER USE EFFICIENCY PROGRAM, WATER RIGHT ANALYSIS,
SYSTEM RELIABILITY AND INTERTIES**

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CHAPTER 4

WATER USE EFFICIENCY PROGRAM, WATER RIGHT ANALYSIS, SYSTEM RELIABILITY AND INTERTIES

This section of the Water System Plan (WSP) addresses a number of related topics. Section 4.1 describes WD 49's water use efficiency (WUE) program. Section 4.2 provides an analysis of the potential new sources of supply. Section 4.3 summarizes water rights held by WD 49. Section 4.4 provides an overview of system reliability. Lastly, Section 4.5 identifies interties that link WD 49 to SPU's and other purveyor's water systems.

4.1 WATER USE EFFICIENCY PROGRAM DEVELOPMENT AND IMPLEMENTATION

A WUE program should include components of long-term conservation measures and peak use management. Short-term emergency response plans, which are associated with drought and other emergency conditions of water shortage, are not considered WUE measures.

The Washington State Legislature adopted the Municipal Water Law (RCW 43.20.260) in 2003. This law amends and clarifies sections of the RCW pertaining to public water systems, including requirements for specific water conservation efforts. WAC 246-290 was amended effective January 22, 2007 to include the final rules developed from the Municipal Water Law. The new rules require development of a WUE program, including WUE planning requirements, WUE goal setting and performance reporting, and distribution system leakage monitoring and correction as required. More specific direction is presented in DOH Publication # 331-375, *Water Use Efficiency Guidebook*. The District's original WUE Program was adopted on December 12, 2007 and was updated in September 2008 to include 2007 data. An update of the 2008 WUE Plan was presented in the 2017 WSP. An update of that plan is presented in this Plan.

Since the early 1990s, the District has been active in a conservation program. Because of its primarily residential (single and multi-family) customer base, the District's conservation programs have been targeted mostly at both these customer classes. However, the District, thru SPU, has worked with commercial customers to promote and encourage WUE.

4.1.1 Current WUE Program

In 2000, SPU, the District and several other water utilities formed the Saving Water Partnership (SWP). The SWP consists of the SPU wholesale water customers, excluding municipalities and special purposes districts that belong to Cascade Water Alliance. Detailed information is presented at www.savingwater.org. The District contributes funding to the SWP as part of its rates for the development and implementation of the regional program.

The District’s water conservation program began in the early 1990s. Table 4.1 identifies the conservation measures that have been implemented by the District in the past several years.

**TABLE 4.1
EXISTING WUE PROGRAM MEASURES**

Conservation Measures	Classes			Years Implemented								Local or Regional
	SF	MF	COM	2008	2009	2010	2011	2012	2013	2014	2015-2018	
Indoor Program (Hardware)												
Clothes Washer Rebates	X	X	X	X	X	X	X					Regional
Toilet Rebates	X	X	X	X	X	X	X	X	X	X	X	Regional
Showerhead and Faucet Aerators		X	X	X	X	X	X					Regional
Outdoor Program (Hardware)												
ET Controller Rebate	X	X	X	X	X	X	X	X	X	X	X	Regional
Rain Sensor Rebates	X	X	X	X	X	X	X	X	X	X		Regional
Irrigation System Audits			X	X	X	X	X	X	X	X	X	Regional
Behavior Changes												
Leak Detection & Repair	X	X	X	X	X	X	X	X	X	X		Local & Regional
Education												
Consumer Confidence Report	X	X	X	X	X	X	X	X	X	X	X	Local
Water Conservation Messages on Billing Notes	X	X	X	X	X	X	X	X	X	X	X	Local
Youth Education	X	X		X	X	X	X	X	X	X	X	Regional
Fairs	X	X		X	X	X	X	X	X	X	X	Regional
Supply Side Activities												
Conservation Rates	X	X	X	X	X	X	X	X	X	X	X	Local

WD 49 is an active participant in the Saving Water Partnership’s regional water conservation program. The program offers a comprehensive set of services that helps residents and businesses use water wisely. The services include education, technical assistance, and financial incentives, as show below:

Customer financial incentives:

- Toilet rebates for single family, multifamily and commercial customers

- Irrigation system rebates for single family, multifamily and commercial customers
- Urinal rebates for commercial customers
- Dishwasher rebates for commercial customers
- Ice machine rebates for commercial customers
- Food steamer rebates for commercial customers
- Coin-operated clotheswasher rebates for multifamily and commercial customers
- Cooling tower improvement rebates for commercial customers
- Water Smart Technology program for commercial customers that provides rebates up to 50% of installed cost for water related equipment

Customer education and technical assistance:

- Classroom presentations for K-12 grade students
- Community festivals and events
- Water efficient gardening classes for residents
- Garden hotline to answer questions about water-efficient gardening and other topics
- Landscape professionals training
- Gardening brochures and fact sheets
- Technical assistance to residential and commercial customers on irrigation efficiency issues
- Technical assistance to commercial customers on indoor efficiency issues
- Regional website full of comprehensive information, tips, rebate information, etc (www.savingwater.org)
- Regional conservation hotline 206-684-SAVE

Clothes Washer Rebates

The District offered clothes washer rebates for the single family sector from 1997 through 2011 as part of the SWP. The rebates were intended to encourage customers to replace older, less efficient clothes washers with more efficient models.

Toilet Rebates

The District has offered toilet rebates since 2000 as part of the SWP. Toilets that flush at greater than 3.5 gallons/flush are eligible.

Showerhead and Faucet Aerators

The District made low-flow showerhead and faucet aerators available to customers for many years as part of the regional program.

ET Controller Rebates

As part of the regional program, the District provides rebates for Evapotranspiration (ET) based, WaterSense-labeled controllers which automatically adjust irrigation systems to real time weather data. Rebates are given to customers regardless of customer class.

Rain Sensor Rebates

As part of the regional program, the District provides rebates for rain sensors which turn off automatic irrigation systems when it is raining. Rebates were given to all customers with in-ground irrigation systems, regardless of customer class.

Irrigation System Audits

As part of the regional program, the District offers free irrigation audits to customers with more than one acre of irrigated area and high outdoor water usage to improve the efficiency of their irrigation system.

Leak Detection & Repair

The District's staff monitors customer water use for irregularities. The billing software notifies the office staff when a customer's usage is above average during any single billing period. At this point the field staff is sent out to reread the meter to ensure that an erroneous reading did not occur. Once usage is confirmed both written and verbal contact with the customer is attempted to discuss the abnormal water use.

While the office staff will attempt to help the customer with suggested possible sources of high usage, it occasionally requires members of the field crew to meet with the customer to discuss possible problems. Field personnel do not conduct repairs on private property but offer suggestions as what to look for or who to contact to perform on-site inspections of the customer's system. The District does allow for some reduction in customer billing for leaks under certain conditions. The District feels that customers are more encouraged to correct their leaks under this policy.

Consumer Confidence Report

The District publishes a semi-annual newsletter, informing customers of new projects, current water supply status, possible system maintenance, and ongoing water conservation measures. These are distributed biannually in conjunction with the required lead information letter, which goes out in the fall, and the Consumer Confidence Report which goes out in June of each year.

Water Conservation Messages on Billing Notes

The District also provides customers with their consumption history on each water bill. Consumption for the previous 12 months is shown on the bill to inform the customer of his usage over the past year. Messages are included on the bills to encourage water conservation.

Youth Education

As part of the regional program, the District provides in-classroom education programs and a range of youth-oriented educational materials aimed at conservation.

Fairs

As part of the regional program, the District sponsors a wide variety of events that residents of the District have an opportunity to participate in.

Conservation Rates

Rates can be used to encourage conservation action by customers. The District's stepped rate structure went into effect in October 2007. The rate structure includes a fixed or base rate which is applied regardless of the amount of water consumed and a variable rate charge which is applied based on the volume of water consumed. The increasing block rate is considered conservation pricing in that it will encourage customers to reduce usage.

4.1.2 Water Use Efficiency Goals

The regional WUE goal for the SWP is to reduce per capita water demand from current levels so that the total average annual retail water use of the SWP members is less than 105 million gallons per day from 2013 through 2018, despite forecasted population growth. The goal was met in 2013, with a total use of 93.1 mgd and again in 2014, with a total use of 93.8 mgd. The goal was met in 2015, 2016, and 2017 with 96.9, 94.4 and 96.6 mgd, respectively. A copy of the SWP strategies and action report and recent SWP annual reports are included in Appendix L.

The District plans to concurrently adopt the Saving Water Partnership regional WUE goal and participate in the next regional program, which will cover 2019-2028¹. The SWP WUE goal for that period is to "Keep the total average annual retail water use of SWP members under 110 mgd through 2028, despite forecasted population growth, by reducing per capita water use."

Additionally, the District renews its goal to maintain distribution system loss at less than 10 percent for its system.

With the public hearing and adoption process for this updated WSP, the District adopts both the SWP 2019-2028 and system loss goals as its WUE goals.

4.1.3 Water Use Efficiency Measure Evaluation

SWP completes an annual report including general evaluation of the regional program (see reports for the last few years in Appendix L).

4.1.4 Water Use Efficiency Measure Implementation Schedule

The District program for 2019-2028 will be largely a continuation of existing measures. The measures managed by the SWP are part of the District's program to achieve

¹ Details are presented in the SWP 2019-2028 Water Conservation Program Planning Document, December 2018.

additional savings. Table 4.2 identifies the program the District will be following during the next several years in order to meet the two goals identified above.

**TABLE 4.2
2019-2028 WUE PROGRAM**

Measures	Classes			Local or Regional
	SF	MF	COM	
Indoor Program – Hardware				
Toilet Rebates	X	X		Regional
Outdoor Program (Hardware)				
ET Controller Rebates	X			Regional
Irrigation System Audits			X	Regional
Behavior Changes				
Leak Detection & Repair	X	X	X	Local
Education				
Youth Education	X	X		Regional*
Website/Videos/Hotline	X	X	X	Regional
Conservation Giveaways	X	X	X	Regional
Customer newsletter	X	X	X	Local
Water conservation messages on billing notes	X	X	X	Local
Fairs	X	X		Regional*
Supply Side Activities				
Conservation Rates	X	X	X	Local

*Regional programs may sponsor youth education, fairs or regional events on a limited basis.

4.1.5 Customer Education

The District participates in school outreach, speakers' bureaus and program promotion. The District receives information from SPU, including conservation ideas and literature, then distributes it with customer billing and newsletters. In addition, the information is also available in the office for walk-in customers.

4.1.6 Projected Water Savings

The conservation goals discussed in this chapter were reflected in the water use forecast by assuming a 0.75% reduction in water use from 2016-2018 (effectively reducing ADD/ERU from 165 to 159), and a 0.25% reduction thereafter through 2022 (effectively reducing ADD/ERU from 159 to 157.4). The 0.74% reduction inversely generally corresponds to the anticipated population growth rate of 0.70%.

These conservation efforts are forecast to result in cumulative estimated savings of 0.65 MG of ADD and 1.16 MG of MDD from 2019 through 2028.

4.1.7 Water Use Efficiency Effectiveness Evaluation

SWP periodically evaluates the impact of regional programs and surveys customers on conservation attitudes and behaviors to ensure the message (from SPU and WD 49) are on track.

4.1.8 Distribution System Leakage Evaluation

The District has continued to maintain water leakage of less than 10 percent over the past 10 years, assuming potential source meter errors for 2011 and 2012. Fire hydrant flows and flushing volumes were estimated throughout the year beginning in 2007. By keeping track of these two activities, water loss volumes should be reduced.

4.1.9 Water Rate Structure Evaluation

The District completed a rate study in 2017 based on the February 2017 version of this Plan. The study did not modify the rate structure as established in 2008. The existing rate structure includes a block rate to encourage WUE. The block rate includes consumption charges in the following blocks: 0-10 ccf, 11-16 ccf, and 17+ ccf. As a result of the 2017 rate study, the District adopted five percent increases to all elements of the water rate structure effective August 1, 2017. An additional increase of five percent was adopted effective January 1, 2018. The District anticipates the needs for additional rate increases in the following years to support funding and implementation of the capital improvement plan presented in this Plan.

4.1.10 Reclaimed Water Opportunities Evaluation

The local wastewater management agency is Southwest Suburban Sewer District (SWSSD). At this time, SWSSD does not produce reclaimed water at either of its treatment plants. The SWSSD's 2014 *Comprehensive Sewer Plan* states that the costs to establish the required tertiary treatment, pumping systems, distribution systems and operation and management facilities are prohibitive. None of the District's top 20 customers (see Table 2.6) can reduce water use substantially by receiving reclaimed water. The complete King County Water Reclamation Evaluation form is included in Appendix L.

4.1.11 Water Supply Characteristics

The District purchases and receives surface water from SPU. The majority of the water is from the Cedar River watershed. The water is conveyed to the District principally through two interties with SPU, which are owned and operated by SPU. Lesser quantities of water enter the District's system through three other SPU interties. Seven interties exist between the District and WD 20 and Highline Water Districts. The District and SPU entered into a new long-term supply contract effective May 2011, through January 1, 2062. The contract includes commitment to deliver up to 2,500 gpm, as a

wholesale supply to the District. The contract, a letter clarifying some terms of the contract, and revisions to Exhibit I of the contract are included in Appendix D. The SPU commitment exceeds the MDD forecast for year 2038 (see Table 2.12).

4.2 SOURCE OF SUPPLY ANALYSIS

The Department of Ecology requires water purveyors to demonstrate consideration of opportunities to optimize or obtain the use of existing sources already developed. An evaluation of other innovative methods to meet water needs should also be included. The source of supply should include analysis of the feasibility and cost effectiveness of implementing the alternatives in lieu of new source development. These alternatives are discussed below.

4.2.1 Enhanced WUE Measures

As discussed in Section 4.1, the District has implemented multiple water use efficiency measures with the goals of reducing regional water use and having less than 10% water loss for the entire system.

4.2.2 Water Right Changes

The District purchases the water it distributes from SPU and has no water rights to any local aquifers or surface waters. SPU holds the water rights for the District's source of supply and is under contract to provide the District's water supply.

A water rights self-assessment form (see Table 4.3 at the end of this chapter) has been completed using the District's existing contract, recent actual water use (2017) and projected water use (2028 and 2038).

4.2.3 Interties

The District currently has five interties with Water District No. 20 and two interties with the Highline Water District. These connections are only used for emergency transfer of water. No normal daily water supplies pass through these interties.

4.2.4 Artificial Recharge

Artificial recharge is the injection or infiltration of available surface water, typically from winter flow or other available water into an aquifer and its subsequent withdrawal. This potential supply method is not used by the District.

4.2.5 Use of Reclaimed Water, Reuse and other Non-Potable Sources

Southwest Suburban Sewer District, which manages the closest treatment plant to the District, is not currently set up to distribute reclaimed water to the District. Detailed planning efforts regarding this operation have not been completed because of the initial

estimates of the cost of treatment and identification of potential users. Installation of a reclaimed water distribution system is a major cost and thus far, has exceeded the estimated benefit from the use of reclaimed water. None of the Districts top 20 customers (see Table 2.6) can reduce water use appreciably by receiving reclaimed water.

4.2.6 Treatment

The type and level of treatment will need to be determined by SPU at such times as additional sources are identified.

4.3 WATER RIGHT EVALUATION

The District's water is supplied from sources under the control of SPU. SPU owns the water rights and manages the watersheds and transmission system. Pursuant to the 2011 Full Requirements Contract with the District, SPU is obligated to deliver water to the District derived from their rights, permits and claims.

Review of SPU's *2019 Water System Plan Update* indicates SPU has adequate water rights to supply the needs of the District. Applications for additional water rights are on file with the Department of Ecology.

4.4 WATER SYSTEM RELIABILITY ANALYSIS

A water system reliability analysis is necessary and prudent to understand the issues that threaten the District's ability to provide an adequate quantity of high quality water to its customers at all times.

4.4.1 Summary of System Reliability Efforts

Source Reliability

The District purchases all of its water from SPU. The supply projections provided in SPU's current WSP indicate that SPU has adequate supply to meet the needs of the District. This amount of supply is adequate to meet the District's demand forecasts, with conservation benefits, for at least the next twenty years. See Chapters 2 and 3 for more information regarding source of supply.

As with source capacity, SPU maintains the water quality of the water distributed by the District. Per SPU's current WSP the reliability of SPU's water treatment facilities is considered extremely high, with multiple sources and means for wholesale supply.

Water Rights Adequacy

The District has no water rights.

Facility Reliability

Elements of Chapter 3 discuss each system component and the related reliability.

4.4.2 Water Shortage Response Planning

The District's emergency response plan is summarized in Section 6.4 of this Plan, and the water shortage response plan is summarized in Section 6.5.

4.4.3 Monitoring Water Levels

The District does not have any monitoring wells in its service area.

4.5 INTERTIES

4.5.1 Existing Interties

The District currently has five interties with Water District No. 20 and two interties with the Highline Water District in addition to the five connections with SPU's regional supply system. The connections to SPU's regional supply system provide water for all of the District's service area.

The interties with Water District No. 20 and Highline Water District are for emergency use only. Water is not normally bought, sold or transferred between districts through the emergency interties but are used only in the event of an emergency, fire demand, or planned and coordinated maintenance actions.

Three of the interties with Water District No. 20 consist of normally closed isolation valves. These are at SW 144th Street at Ambaum Blvd., at South 152nd Street at 4th Avenue South, and at SW 144th and 1st Ave South. The valves are always closed and must be opened manually to transfer water between Districts. Because the hydraulic gradient is the same in both Districts, water may flow both ways.

Two of the interties with Water District No. 20 consist of vaults with flow meters and control valves. These are at SW 153rd Street at 21st Avenue SW and at SW 152nd Street at 16th Avenue SW. The interties are normally open but the control valves are set low enough so that water is only transferred in the event of an emergency or locally high demand (e.g. fire flow situation). Operation is automatic and because the hydraulic gradients are the same in both Districts, flow may go either way through the intertie.

The two interties with the Highline Water District consist of vaults with flow meters and control valves. These interties are normally open but the control valves are set low enough so that water is transferred only in the event of a high demand or emergency. Because each District maintains a zone with a different hydraulic gradient at these two locations, flow through these interties is typically only one way. The intertie at South 177th Street and 10th Avenue South supplies water to Water District No. 49 from

Highline Water District. The intertie at SW 170th Street and 27th Avenue SW supplies water to Highline Water District from Water District No. 49. If the valves are manually adjusted, limited supply could be provided in the opposite direction at each site.

4.5.2 New Intertie Proposals

At this time there are no potential interties that the District is pursuing.

4.5.3 Intertie and Franchise Agreements

Existing intertie and franchise agreements are on file at the District's office and copies are included in Appendix D of this plan.

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Table 4.3 - Water Right Self-Assessment

Mouse-over any link for more information. Click on any link for more detailed instructions.

<u>Water Right Permit, Certificate, or Claim #</u> <small>*If water right is interruptible, identify limitation in yellow section below</small>	<u>WFI Source #</u> <small>If a source has multiple water rights, list each water right on separate line</small>	<u>Existing Water Rights</u> <small>Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold</small>				<u>Current Source Production – Most Recent Calendar Year</u> <small>Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold</small>				<u>10-Year Forecasted Source Production (determined from WSP)</u> <small>This includes wholesale water sold</small>				<u>20-Year Forecasted Source Production (determined from WSP)</u> <small>This includes wholesale water sold</small>			
		<u>Primary Qi</u> <small>Maximum Rate Allowed</small>	<u>Non-Additive Qi</u> <small>Maximum Rate Allowed</small>	<u>Primary Qa</u> <small>Maximum Volume Allowed</small>	<u>Non-Additive Qa</u> <small>Maximum Volume Allowed</small>	<u>Total Qi</u> <small>Maximum Instantaneous Flow Rate Withdrawn</small>	<u>Current Excess or (Deficiency) Qi</u>	<u>Total Qa</u> <small>Maximum Annual Volume Withdrawn</small>	<u>Current Excess or (Deficiency) Qa</u>	<u>Total Qi</u> <small>Maximum Instantaneous Flow Rate in 10 Years</small>	<u>10-Year Forecasted Excess or (Deficiency) Qi</u>	<u>Total Qa</u> <small>Maximum Annual Volume in 10 Years</small>	<u>10-Year Forecasted Excess or (Deficiency) Qa</u>	<u>Total Qi</u> <small>Maximum Instantaneous Flow Rate in 20 Years</small>	<u>20-Year Forecasted Excess or (Deficiency) Qi</u>	<u>Total Qa</u> <small>Maximum Annual Volume in 20 Years</small>	<u>20-Year Forecasted Excess or (Deficiency) Qa</u>
1																	
2																	
TOTALS =																	

Column Identifiers for Calculations: A B C =A-C D =B-D E = A-E F =B-F G =A-G H =B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.						
Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.															
Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased <small>Current quantity purchased through intertie</small>				10-Year Forecasted Purchase <small>Forecasted quantity purchased through intertie</small>				20-Year Forecasted Purchase <small>Forecasted quantity purchased through intertie</small>			
	<u>Maximum Qi</u> <small>Instantaneous Flow Rate</small>	<u>Maximum Qa</u> <small>Annual Volume</small>		<u>Maximum Qi</u> <small>Instantaneous Flow Rate</small>	<u>Current Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> <small>Annual Volume</small>	<u>Current Excess or (Deficiency) Qa</u>	<u>Maximum Qi</u> <small>10-Year Forecast</small>	<u>Future Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> <small>10-Year Forecast</small>	<u>Future Excess or (Deficiency) Qa</u>	<u>Maximum Qi</u> <small>20-Year Forecast</small>	<u>Future Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> <small>20-Year Forecast</small>	<u>Future Excess or (Deficiency) Qa</u>
1 Seattle Public Utilities	2,500 GPM	n/a	Jan. 1, 2062	1756 GPM	744 GPM	1,384 AF/YR	n/a	2,2,099 GPM	401 GPM	1,742 AF/YR	n/a	2,459 GPM	41 GPM	2,041 AF/YR	n/a
2 King County WD No. 20		n/a	Indefinite		n/a	0 AF/YR	n/a	0 GPM	n/a	0 AF/YR	n/a	0 GPM	n/a	0 AF/YR	n/a
3 Highline WD		n/a	Indefinite		n/a	0 AF/YR	n/a	0 GPM	n/a	0 AF/YR	n/a	0 GPM	n/a	0 AF/YR	n/a
TOTALS =	2,500 GPM	n/a		1756 GPM	744 GPM	1,384 AF/YR	n/a	2,099 GPM	401 GPM	1,742 AF/YR	n/a	2,459 GPM	41 GPM	2,041 AF/YR	n/a

Column Identifiers for Calculations: A B C =A-C D =B-D E =A-E F =B-F G =A-G H =B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.		
Water Right #	Conditions of Interruption	Time Period of Interruption
1		
2		
3		

ADDITIONAL COMMENTS:

1 – Interties with King County Water District No. 20 and Highline Water District are for infrequent needs such as local system maintenance or emergency supply to or from the District system. The term of the WD 20 intertie agreement is indefinite but subject to a five year notice of termination requirement. The Highline intertie agreements are for five year terms that renew automatically in the absence of thirty-days notice of termination prior to each anniversary date. The two Highline interties (one each way) are each subject to a 2,000 GPM limit.

2 – “Currently Purchased” data is for 2017. 10-year forecast is for 2028 and 20-year forecast is for 2038.

3 – The Seattle water supply contract is written as a Full Requirements Contract, under which SPU has agreed to supply all of the water needed by the District to meet the needs of its present and future water customers within its service area as shown in the District’s Water System Plan.