

Chapter 4 : Water Use Efficiency and Water Rights

4.1 Water Use Efficiency Program

One of the three elements of the water use efficiency rule is water use efficiency goal setting and performance reporting. Municipal water suppliers must set water use efficiency goals through a public process and report annually on their performance to customers and the Department of Health. Appendix H shows the results of the public hearing and the annual reports.

Water Use Efficiency Requirements WAC 246-290

The City Of Sumas has adopted the requirements of WAC 246-290 we are a fully meter system which allows us to identify any leaks or problems. In complying with the Water Use Efficiency Rule a public hearing was held at the July 27, 2009 City Council meeting to establish our Water Use Efficiently (WUE) goals no public comments were received. The City is filing the annual WSU report to Department of Health in the 2010 report we had a 2.1% unaccounted water loss well under the State required 10%. Copies of the 2009 and 2010 WUE reports can be found in Appendix (H). In section 4.1 the objectives are outlined for our conservation program.

Conservation objectives

The objectives of this conservation program are:

- *Decrease unaccounted water.* In 2008 78 acre-feet of water was pumped at the Sumas Wellfield and not billed to customers. This amounts to approximately 6 percent of supply, as compared to 6.3 percent in 1995. Sumas will seek to reduce unaccounted water to 5 percent or less.
- *No long-term increase in agricultural use.* The bulk of Sumas's potable water is used by dairy farms in the outlying agricultural areas. There is an ongoing trend toward consolidation of small dairy farms into larger operations, combined with an overall increase in the size of the herd. This trend implies an increasing demand for water by the dairy farms. This program will seek to ensure that future demand remains constant, despite the increasing size of herds.
- *Reuse of industrial water.* Heavy industries are using an increasing amount of nonpotable water for cooling purposes. By reusing water wherever possible, the available supply will support a greater number of users.

Evaluation and selection of conservation measures

Sumas is a "small" system according to WDOH guidelines and must therefore evaluate the following recommended conservation measures:

- *Source meters.* Sumas has had source meters in place for several years. This WSP establishes a maintenance schedule, ensuring accuracy of the meters over time.
- *Service meters.* Sumas has had service meters in place for man

- *Service meters.* Sumas has had service meters in place for many years. Virtually every residential service meter was replaced in the 1996 - 1997 biennium as part of an upgrade to wand-readable meters. This WSP establishes a maintenance schedule, ensuring accuracy of the meters over time. Starting in 1999 with the largest meters, (i.e., the meters at the interties to the neighboring rural associations), Sumas has replaced all intertie meters with compound meters to ensure accurate billings to large users.
- *Conservation pricing.* Sumas has had traditional “decreasing block” pricing in the past. An “increasing block” rate structure is a sensible means of achieving the goal of no long-term increase in dairy use. Such a structure could also help Sumas ensure that the two rural associations do not consume more water than allowed in their supply contracts. Conservation pricing can be instituted by Sumas, but also should be instituted by each association in order to ensure that the financial incentive is felt by the end-user customers. In CY 2000, Sumas will meet with each rural association to discuss its rate structure. Sumas will encourage use of conservation pricing if not already in place. Sumas will also adopt a new rate schedule that sets conservation rates designed to prevent wholesale customers from exceeding contractual limits.
- *Program promotion.* Each of the above program elements can be implemented by the city with no reliance upon end-user cooperation, so only a minimal promotional program is needed. As part of the annual Consumer Confidence Report, Sumas will inform customers of the meter maintenance and conservation pricing program elements.
- *Lawn watering.* Sumas has adopted a odd- even watering schedule that starts May 1st and ends October 1st the residents address numbers determines the odd-even day.
- *Appliance rebates.* The City has an Energy Star rebate program for Washing Machines and Dishwashers.
- *Energy code.* City of Sumas has adopted the State Energy Code that requires low flow toilets and faucets.

Target water savings projections

The conservation program is expected to achieve a minimum savings goal of 5 percent of the amount withdrawn at the Sumas Wellfield.

Regional conservation program

Because Sumas is a wholesale purveyor to neighboring rural water associations, a coordinated regional conservation program is required according to WDOH guidelines. Sumas will serve as lead agency for implementation of the following program, applicable to the Sumas service area as well as the service areas of all wholesale customers.

The program objective, as stated earlier, is to avoid any long-term increase in agricultural water use. The program will be implemented as follows:

- *Purveyor assistance - agricultural emphasis.* Sumas will collect information about best management practices for dairies with regard to water conservation. Information sources are expected to be the Ag. Extension service, the Conservation District, and the Natural Resource Conservation Service. Sumas will develop a brochure and/or informational packet that includes contacts at appropriate existing technical assistance agencies. The brochure will then be mailed to “large users” in the neighboring water associations. Preceding the mailing, Sumas will contact each large user by phone to alert them of the brochure and encourage their voluntary compliance with suggestions.
- *Conservation pricing.* As mentioned above, Sumas will institute conservation pricing.
- *Program promotion.* The direct phone contacts and mailings mentioned above constitute the program promotion.

4.2 Source of Supply Analysis

The demand projections in this WSP do not indicate the need for Sumas to pursue additional water rights within the coming 20-year period. This section of the WSP is therefore omitted.

4.3 Water Right Evaluation

The following narrative and tables describe the water right permits and certificates issued to Sumas. Permits and certificates are listed in order of priority date and are presented in two groups corresponding to the two wellfields. Chapter 10 contains copies of active water rights.

Sumas Wellfield. The final right listed, G1-25171C, supercedes all prior rights and expresses the combined instantaneous and annual quantities that may be withdrawn at this field.

- *3427-C.* $Q_i = 1.78$ cfs, no Q_a . This is a surface water permit for the springs located at the site of the present-day Sumas Wellfield. The purpose of use is identified as “domestic supply”, and the place of use is “Town of Sumas.” This site was also purchased from the Sumas Water Company in 1929. This spring was Sumas’s main water supply continuously from 1929 through at least 1959, when the first well was drilled at the Sumas Wellfield. Over time, subsequent supplemental ground water rights were issued with a point of withdrawal very close to this spring. In the report of examination for G1-25171C (see below), the Department of Ecology asserted that in accordance with RCW 90.14.180, surface water right 3427-C was effectively relinquished by the City due to lack of use. The City continues to maintain that the surface water right is available as an emergency water supply.
- *3485-C.* $Q_i = 2250$ gpm, $Q_a = 405$ af/yr. This is the first groundwater right issued at the Sumas Wellfield. The purpose of use is identified as “municipal supply”, and the place of use is “Town of Sumas, Town of Nooksack, Rural Nooksack, Rural Sumas, Whatcom

County, Washington.” Time of use is continuous. Well 1 (SO1) was drilled appurtenant to this right to a depth of 58 feet. Figure 7 shows the location of Well 1 within the wellfield. The report of examination recommends authorization of withdrawal of 405 acre-feet per year “less any quantity diverted to this town under the existing rights from the spring.”

- *G1-00063C*. $Q_i = 2250$ gpm, $Q_a = 672$ af/yr. This is a groundwater right issued at the Sumas Wellfield. The purpose of use is identified as “municipal supply”, and the place of use is “Area served by the City of Sumas.” The permit application includes a more detailed listing of place of use, including the following sections: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32 and 33 in T40N, R4E; 5, 6 and 7 in T40N, R5E; 33, 34, 35 and 36 in T41N, R4E; 31, 32 and 33 in T41N, R5E. Time of use is continuous. This right applies to Wells 2, 3, and 4 (SO2, SO3, and SO4, respectively). Wells 2 and 3 are completed to a depth of 57 feet, while Well 4 is completed to a depth of 68 feet. Figure 7 shows the location of the wells within the wellfield. At the time of issuance in 1971, Wells 2 and 3 were used to feed a pumphouse pressurizing the Nooksack Valley system, and Wells 1 and 4 flowed to a pumphouse that filled the Sumas reservoir. The report of examination mentions that the combined total withdrawals pursuant to this right in combination with 3485-C and 3427-C can not exceed 672 acre-feet per year.
- *G1-24025C*. $Q_i = 2250$ gpm, $Q_a = 598.8$ af/yr. This is a groundwater right issued at the Sumas Wellfield. The purpose of use is identified as “municipal supply and dairy farming”, and the place of use is “City of Sumas service area.” The report of examination includes a more detailed listing of place of use, including the following sections: 4 and 5 in T39N, R4E; 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32 and 33 in T40N, R4E; 6 and 7 in T40N, R5E; 33, 34, 35 and 36 in T41N, R4E; 31, 32 and 33 in T41N, R5E. Time of use is continuous. This right applies to Wells 1, 2, 3, and 4. Although the report of examination derives the permitted volume based upon calculations that account for Sumas’s pre-existing rights, this right is not issued as supplemental to those earlier rights. It is a new primary right.
- *G1-25171C*. $Q_i = 2250$ gpm, $Q_a = 1919$ af/yr. This is a groundwater right issued at the Sumas Wellfield. The purpose of use is identified as “municipal supply and dairy farming”, and the place of use is “City of Sumas service area.” The report of examination includes a more detailed listing of place of use, including the following sections: 24 and 25 in T40N, R3E; 4 and 5 in T39N, R4E; 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32 and 33 in T40N, R4E; 6 and 7 in T40N, R5E; 33, 34, 35 and 36 in T41N, R4E; 31, 32 and 33 in T41N, R5E. The service area includes all of the City of Everson service area north of the Nooksack River. Time of use is continuous. This right applies to Wells 1, 2, 3, and 4. The right is issued as supplemental to all other pre-existing surface and groundwater rights at the Sumas Wellfield and expresses combined maximum limits on instantaneous withdrawal and annual volume for the Sumas Wellfield as a whole. In 1992, Well 5 (SO5) was completed to a depth of 80 feet. A change application was submitted to the Department of Ecology and approved in February 2010 see Appendix (I) page 7 outlines the locations of points of withdraw which includes all the existing wells at the Kneuman Road wellfield.

May Road Wellfield

- *4592-P*. $Q_i = 1.34$ cfs, no Q_a . This is a surface water permit for the springs located at the site of the present-day May Road Wellfield. The purpose of use is identified as “domestic supply”, and the place of use is the “Town of Sumas”. In the early part of the century, a private association called the Sumas Water Company operated a hydraulic ram at May Road that pumped surface water east to town. The City of Sumas purchased the private water company, including the spring site, in 1929, and use of the water continued for many years thereafter. However, no use of surface water has been made at May Road since issuance of this permit in 1946.
- *G1-26398C*. $Q_i = 860$ gpm, $Q_a = 1376$ af/yr. This first was issued as a groundwater permit at the May Road Wellfield. The City applied in 2009 for a Ground Water Application for Change Certificate, the City was able to demonstrate the permit has been perfected by the instantaneous and annual quantity of water on an annual basis. The Certificate was granted in December of 2009 for the purpose of use as “municipal supply and industrial supply” and the place of use is “Within the City of Sumas’ 2011 Service Area Boundaries.” With the time of use as continuous. The Certificate applies to May Road Wells 1, 2, and 3. Wells 1 is completed to a depth of 64 feet and Well 3 is completed to a depth of 74 feet, Well 2 is completed to a depth of 70 feet and is located as shown on Figure 8. A stream-mitigation condition is associated with this certificate for each 100 gpm withdrawn at any May Road well pursuant to G1-23698 and G1-26398 an additional 18 gpm must be pumped to an adjacent unnamed creek. Although the mitigation duty imposed within this right is calculated relative to *both* May Road wells, the Q_i and Q_a volumes associated with this right are distinct from those described for G1-23698C, and the two sets of numbers must be combined to calculate the total withdrawal permitted at the wellfield. Water withdrawn pursuant to this Certificate has so far been delivered to a single industrial customer, the PSE co-generation facility, within a dedicated industrial pipeline and Well 1 has been connected to the City of Sumas Water system. The legal description of location of withdraw is SW1/4SW1/4 Section 33 Township N.41 Range 4E

Table 4-1. Existing Water Rights Status
(Equivalent to WDOH Table 3)

Id. #	Name	Date	Source	P/S	Existing Rights		Existing Use		Excess/Deficit	
					Qi (gpm)	Qa (af/yr)	Qi (gpm)	Qa (af/yr)	Qi (gpm)	Qa (af/yr)
Sumas Wellfield										
3427-C	Town of Sumas	3/14/46	Unnamed spring (at Sumas Wellfield)	P	1.78 cfs	-	0	-	0	-
3485-C	Town of Sumas	6/22/59	Sumas Wellfield SO1	P	2250	405	-	-	-	-
G1-00063C	City of Sumas	7/15/71	Sumas Wellfield SO1, SO2, SO3	S	2250	672	-	-	-	-
G1-24025C	City of Sumas	1/15/82	Sumas Wellfield SO1, SO2, SO3, SO4	P	2250	598.8	-	-	-	-
G1-25171C	City of Sumas	1/20/88	Sumas Wellfield SO1, SO2, SO3, SO4	S	2250	1919	2160	1149 ¹	90	770
					Combined max. withdrawal					
					2250	1919				
May Road Wellfield										
4592-P	Town of Sumas	3/14/46	Unnamed spring (at May Rd wellfield)	P	1.34 cfs	-	0	-	0	-
G1-26398C	City of Sumas	12/10/09	May Rd wells 1,2,3	S	860	1376	800	270.16 ²	1105.84	0
					Combined max. withdrawal					
					1860	1376				

¹ Maximum Qa measured at Sumas Wellfield in calendar year 1998.

² Maximum Qa measured at May Road Wellfield in calendar year 2009.

Table 4-2. Future Water Rights Status
(Equivalent to WDOH Table 4)

Id. #	Name	Date	Source	P/S	Existing Rights		Forecasted Use		Excess/Deficit	
					Qi (gpm)	Qa (af/yr)	Qi (gpm)	Qa (af/yr)	Qi (gpm)	Qa (af/yr)
Sumas Wellfield										
3427-C	Town of Sumas	3/14/46	Unnamed spring (at Sumas Wellfield)	P	1.78 cfs	-	0	-	0	-
3485-C	Town of Sumas	6/22/59	Sumas Wellfield SO1	P	2250	405	-	-	-	-
G1-00063C	City of Sumas	7/15/71	Sumas Wellfield SO1, SO2, SO3	S	2250	672	-	-	-	-
G1-24025C	City of Sumas	1/15/82	Sumas Wellfield SO1, SO2, SO3, SO4	P	2250	598.8	-	-	-	-
G1-25171C	City of Sumas	1/20/88	Sumas Wellfield SO1, SO2, SO3, SO4	S	2250	1919	2250	1872	0	47
					Combined max. withdrawal	1919				
May Road Wellfield										
4592-P	Town of Sumas	3/14/46	Unnamed spring (at May Rd wellfield)	P	1.34 cfs	-	0	-	0	-
G1-26398C	City of Sumas	12/10/09	May Rd wells 1,2,3	S	1860	1376	860	1376	0	0
					Combined max. withdrawal	1860			0	0

4.4 Reliability Analysis

Source reliability

- *Quality.* Section 3.2 describes water quality issues in detail. In general, water quality is excellent today, but a long-term trend of increasing nitrate concentration is a threat. If the trend is not reversed, Sumas will ultimately need to either institute water treatment for nitrate removal or develop an alternate source of low-nitrate water (e.g., by developing deeper wells). Chapter 5 describes overall susceptibility of the Abbotsford-Sumas aquifer from which Sumas's water is drawn. The aquifer is a shallow, unconfined aquifer and is very susceptible to contamination from overlying land uses. Agricultural use predominates today in the Sumas capture zone, with over-application of fertilizers being the cause of the nitrate contamination. Sumas is implementing its wellhead protection program, which includes public-education components designed to minimize the threat of contamination of the aquifer. City Of Sumas Wellhead Protection Plan was adopted in 1996 a list of Potential Contaminations were identified we reviewed the list in 2010 and found it still current.
- *Quantity.* The Abbotsford-Sumas aquifer is very prolific. Sumas has had no difficulty developing wells that yield large quantities of water. A brief analysis performed by EMCON for the City of Abbotsford in 1991 demonstrated that existing withdrawals from the aquifer are a relatively small proportion of available recharge (i.e., less than 30 percent). The City of Abbotsford's long term plan calls for *decreasing* reliance upon the aquifer for domestic supply. Abbotsford is developing a surface water supply from Harrison Lake in collaboration with several other Canadian municipalities. Given this decreasing reliance within Sumas's capture zone, the long-term availability of water from the aquifer is assured.

Water right adequacy

On the preceding page, Table 4-2 reveals that existing water right permits and certificates can meet system needs for the coming 20 years. There are three controlling water rights. G1-25171C is a municipal right at the Sumas Wellfield in the amount of 1,919 acre-feet per year. This right can support all anticipated domestic demand within the area served by the City of Sumas over the coming 20 years.

G1-23698P and G1-26398P are the two rights applicable to the May Road Wellfield, and they total 1,376 acre-feet per year. G1-23698P is in full use and application for certification was submitted to Ecology in 2001 and was granted. G1-26398P has a construction and development permit, the City has perfected the water right and applied for a certification in 2009, the certification was granted in December of 2009. G1-23698P and G1-26398P were two permits that were combined to become Certificate G1-26398C. The May Road water rights are adequate to support all currently identified existing and prospective customers of the City.

Facility reliability

Facilities within the Sumas water system are generally highly reliable. There are no unusual components in the system – all components are standard, proven technology. The only significant component that needs to be addressed is Well 2 (SO 6) over the past three years we have seen a drop in flow, the well was drilled in 1962 and we believe the screen is slowly corroding shut. Chapter 8 shows scheduled well replacement projects and pump upgrades

The system is also readily expandable. As demand outpaces the production capacity of Wells 4R and 5, the existing pumps can be upgraded to augment supply. When rated well capacity is approached, development of a new well is straightforward and low risk. Similarly, construction of an additional storage reservoir is easily accomplished when system demand exceeds the capacity of the existing reservoir. The improvement program in chapter 8 includes wellfield and storage projects designed to accommodate future system demand.

Water shortage response plan

When planning for water shortages, it is necessary to remember the overall pattern of consumption by the City's various customers: the vast majority of water is consumed not by people, but by dairy farms and industry. The following response plan is designed to deliver potable water to *people* as a top priority. Please refer to the contingency plans in chapter 6 for further discussion of the most likely failure modes leading to the need for curtailment of water. Following are the prioritized actions to be taken in the event of a shortage. These actions are established in sections 12.04.190 and 12.04.270 of City code, as well as section 5.2(a) of the utility agreement between the City and the SEI co-generation plant.

- *Voluntary curtailment.* Major industrial and wholesale customers are contacted and asked to reduce usage. The number of dairies is small (i.e., 75 total in SRWA and NVWA service areas), so individual dairy owners can be directly contacted by phone. A mailing to in-city customers can also be produced and delivered within three days, instituting odd-even watering days, black-out watering hours, and asking for best conservation efforts.
- *Industrial curtailment.* Industrial customers within Sumas are involuntarily curtailed. City crew can operate valves to reduce or stop delivery of water to these customers. At this point, operation of the emergency intertie with Everson should be explored. Provision of water into the south end of the NVWA system might eliminate the need for involuntary curtailment. The SEI co-generation facility is not contractually obligated to curtail at this point, but they should be asked to voluntarily curtail in advance of their legal obligation to do so.
- *Wholesale curtailment.* The three major wholesale customers are involuntarily curtailed. City crew can operate valves at the interties to reduce or stop delivery outside the City. Contracts with each customer contain provisions allowing such curtailment if inadequate water is available for in-city customers. Given the intertie between Everson and the NVWA system, curtailment of deliveries to the NVWA system should first be explored.

- *SEI co-generation curtailment.* The City's agreement with SEI states that SEI's water will only be curtailed after curtailment of wholesale outside deliveries.
- *Commercial curtailment.* Curtailment of in-city commercial establishments is next in order.
- *Domestic curtailment.* Curtailment of in-city residents is the final step.

As discussed in section 6.5, options are available to interconnect the three existing distribution zones (i.e., May Road nonpotable system, NVWA system, Sumas/SRWA system) and to connect with the nearby City of Abbotsford system.

4.5 Interties

Existing interties

The City of Sumas direct service area is a small portion of the overall place of use authorized within the City's water rights. The SRWA, the NVWA, and the City of Nooksack are the neighboring purveyors that accept delivery of wholesale water through five interties described below. The location of each intertie is shown on Figure 3.

- *Garrison's Corner.* Use of this intertie began about 40 years ago, when the City began service south to the NVWA and the City of Nooksack. It is an 8-inch intertie used for ordinary supply of NVWA and the City of Nooksack. Normally, source SO6 is pumped through pipe segment P-1 and then through a sequence of valve, strainer screen, 6-inch McCrometer turbine meter, and valve. A "bypass" intertie is also available, although normally closed. It is a 6-inch pipe connecting the Barbo Road 10-inch potable line (P-236) with the NVWA 8-inch line on Garrison Road (P-5). The bypass intertie contains a sequence of valve, 4-inch McCrometer forward/reverse meter, and valve.
- *Jones Road.* Use of this intertie began at some unknown date at least 70 years ago. It is a 8-inch line used for ordinary supply of SRWA customers east of city limits on Jones Road. Because of pipe looping, water passing through the intertie might ultimately reach any point within the SRWA service area. The intertie consists of a valve, a 6-inch compound turbine meter, and a second valve.
- *Rock Road.* Use of this intertie began at some unknown date at least 70 years ago. It is an 8-inch line used for ordinary supply of SRWA customers east of city limits on Rock Road. Because of pipe looping, water passing through the intertie might ultimately reach any point within the SRWA service area. The intertie consists of a valve, a strainer screen, a 6-inch Badger compound meter, a 2-inch saddle for meter calibration, and a valve.
- *Hovel Road.* Use of this intertie began at some unknown date at least 70 years ago. It is a 8-inch line used for ordinary supply of SRWA customers south of city limits on Hovel Road. Because of pipe looping, water passing through the intertie might ultimately reach any point within the SRWA service area. The intertie consists of a valve, a 6-inch compound meter, and a check-valve that prevents from the SRWA service area into the City.

- *Easterbrook Road.* Use of this intertie began at some unknown date at least 70 years ago. It is a 8-inch line used for ordinary supply of SRWA customers south of city limits on Easterbrook Road. Because of pipe looping, water passing through the intertie might ultimately reach any point within the SRWA service area. The intertie consists of a valve, a 6-inch compound turbine meter, a valve.

In addition, an emergency intertie exists at the boundary between the City of Everson and the City of Nooksack. The emergency intertie agreement with Everson is included in Chapter 10. The wholesale supply agreements with NVWA, SRWA, and the City of Nooksack are likewise included in that Appendix.