

Chapter 4: WATER RESOURCES ANALYSIS AND **WATER USE EFFICIENCY**

Introduction

This chapter describes the City's Water Use Efficiency program, documents their water rights, analyzes their sources and discusses future source alternatives.

4.1 METERING PROGRAM

The City documents all of the water produced and all of the authorized water by the use of meters which are maintained or replaced on a scheduled basis. Water used during the actual fire fighting is the only exception, and the water used is estimated and documented.

4.1.1 SOURCE METERS

All of the wells have rate of flow and totalizing meters that are either new (Wells 12 and 13), or have been calibrated or replaced within the last three years. The meters are connected to the SCADA system and which continually transmits the readings to the Water Division. Daily SCADA information from each well is transferred to an Excel spreadsheet to facilitate necessary recordkeeping and analysis. Source meters are tested and if necessary, calibrated every year.

4.1.2 SERVICE METERS

All service connections are metered and equipped with radio transmitters to allow for mobile (drive-by) reading. The data is downloaded at the Water Division office, and then transferred to the Finance Division for billing. Unusually high or low meter readings are flagged for follow-up. The City plans on converting the data collection method to "fixed base radio read" in order to save staff time, and to be able to monitor water use more closely. All meters are inspected once a year to verify their accessibility and condition. The 3" and 4" meters are tested and calibrated yearly, if necessary. The 1 ½" and 2" meters are tested and calibrated on a three-year rotating schedule, if necessary. Because of the large volume of water used by several of the commercial customers, maintaining the accuracy of their large meters is essential.

4.1.3 BULK WATER USES

All bulk water uses are also metered, including fire hydrant testing, main flushing and water used by other City Divisions (street, and sewer). The City also provides a metered, coin-operated fill spout at 409 E. Lincoln for those not renting a short term bulk meter.

4.1.4 WATER RATE STRUCTURE EVALUATION

The City has maintained its historical declining block rate structure. A 2013 Water and Sewer Rate Analysis was conducted primarily to ensure that water and sewer rates were adequate to meet city needs, including debt service for current and future projects. The future projects information was based on the HDR draft water system plan, the majority of which are included in this water system plan update. The second objective of the Rate Analysis was to identify inequities in the existing rater structure with respect to single family residences, mobile home parts and commercial users (including large industrial users). The recommendations of the report, which were adopted by the City, included annual rate increases on 1.5% TO 2.5% through 2018, and to modify monthly base charges.

The City currently charges their customers based on meter size. The minimum monthly fee (service charge) includes the first 300 cubic feet (cu.ft./month. Consumption greater than 300 CF/M is rounded up to the next 100 cu. ft. and charges on a declining rate as shown on Table 9.3. In other words, the price per 100 cu.ft. (748 gallons) becomes less expensive the more water used. There is not rate incentive to use water efficiently as shown below (based on 2016 rates):

First Block	\$1.73/100 cu.ft.	=	\$0.0023/gallon
Second Block	\$1.26/100 cu.ft.	=	\$0.0017/gallon
Third Block	\$0.86/100 cu.ft.	=	\$0.0011/gallon
Fourth Block	\$0.63/100 cu.ft.	=	\$0.0008/gallon

WAC 246-290-100(4) requires evaluation of a rate structure that encourages water use efficiency. The pros and cons of an inclining block rate structure include:

Advantages (pros):

- Decrease in water use in each meter size class
- Increase in system capacity for growth in all meter classes
- Delay in the need for additional source, pumping capacity and storage
- Encourages more thoughtful use of water including more careful irrigations practices.

Disadvantages (cons):

- Increased water bills, especially in summer high use months
- Increased operational costs for high water using industrial users
- May discourage new industrial customers

There are many possibilities that can be considered when evaluating water rates including:

- The same Increasing block rates for all meter sizes
- Set the first overage block rate at the average winter time usage volume, and then increase the rate/100 cu.ft.
- Uniform block (one rater) rate for all meter sizes regardless of how much water is used
- Different increasing block rates for different meter sizes (potentially decreasing the impact on large industrial users, or users with a 3" meter or larger)
- Establishing an industrial use class regardless of meter size
- Decreasing the number of overage blocks (making the water bill easier to read and understand)
- Establishing a summer time overage rate

The planning portion of the CIP identifies another rate study for 2018. That study will consider in detail modifications of the consumption rates that will include uniform block rates for each user classification and either a season rate or inclining block rate. The issue of equity of rates between customer classes may again be a matter of concern. As can be seen on Figure 4.1 (base on Table 2-3 figures) both the single family and commercial groups have large summer time flows. While the residential increase can be attributed to summer lawn and garden irrigation, the commercial increases reflect seasonal food processing which is the economic base of the City, and major employers.

4.2 WATER USE EFFICIENCY (WUE) PROGRAM

The City had adopted a revised Water Use Efficiency Program in 2013 that included five measures to reduce residential ERU/connection by December 2020. Due to population changes, an additional measure was required for this WSP update. Upon review of the entire WUE in the summer of 2017, it was decided to revise the entire WUE Program. A public Forum was held on October 26, 2017 to obtain input on the proposed revised goal and measures. The City utilized their normal public notice procedures; including posting notices in all of the City's public buildings. No one attended the forum besides City staff and consultants. The revised program will be presented to the City Council for approval along with the complete updated Water System Plan.

4.2.1 WUE GOAL

The proposed WUE goal is to reduce single-family, multi-family residential and commercial/industrial connections by 25 gallons per day per connection by December 31, 2020 as measured by annual average demand for each classification. This goal extends the 2013 goal to include commercial/industrial users. The following measures will be carried out by the City to achieve this goal.

4.2.2 WUE MEASURES

Proposed WUE Measures

1. The City will continue an outreach program to local public schools. City representatives will deliver interactive presentations to elementary school students, distribute age- appropriate educational material and engage students in fun activities that encourage water conservation. The City will target third grade classrooms at every public elementary school annually, thereby ensuring that public school students know and understand the importance of conserving water. The City hopes that by engaging the children in fun educational activities, the presentations will have both an immediate and long-term impact on their water-use practices. The posters and materials will also be posted in City Hall and other City owned public facilities.
2. The City will include a brochure addressing consumer leak detection with water bills at least once a year, and include WUE information in the annual Consumer Confidence Report. The purpose of the brochure is to increase awareness of at-home leak detection and to educate water customers by providing leak-detection techniques as well as some solutions and resources for fixing leaks. People often underestimate the amount of water wasted by a leak and delay in fixing small leaks. The City hopes that the annual mailing will encourage water customers to take the time to survey their home for leaks at least once a year.
3. Starting in the 2017-18 school year, the City will work with the Sunnyside School District to create an annual flyer which will be included in the weekly take-home packets of (at a minimum) first and second grade students. The flyers will provide water efficiency and conservation hints for around the home.
4. The City will continue to run two articles per year on water conservation information and tips in the local newspapers, starting in 2018. The spring article will focus on outdoor conservation tips and the fall article on indoor conservation. The City feels that by providing water customers with season-appropriate water conservation tips, they will be more likely to use them and change their water usage habits.

5. There are certain dwelling units that use City water but do not receive individual-use water bills, such as apartments and retirement homes. By working with building owners and managers, the City will provide these residents with all of the conservation material to be included in the water bills, including conservation tips and leak detection brochures. These materials will also be available at City Hall.
6. The City will initiate a commercial/industrial education program by providing these customers with information and checklists to help them reduce water consumption; including suggesting a water audit, and possible reduction in sewer fees with decreased flows.

In addition to these programs, the City also does their required customer general education regarding the importance of using water efficiently by including a message in their annual Consumer Confidence Report.

The costs of these measures are absorbed in the Water Division's annual budget. The next planned update of the WUE program is scheduled for 2023.

The estimated water savings from these measures and achieving the WUE goal are detailed on Table 2-10 and shown graphically on Figure 2-1. As noted in Section 3.3 (System Capacity Analysis) the effect of the projected savings is delaying the need for additional source and storage by one to five years.

The effectiveness of this program will be measured by comparing the annual average daily demand for single-family residences and comparing it to a previous benchmark. Unfortunately, historical information to determine the number of single-family homes and their annual consumption on an annual basis is unavailable at this time, so the 2015 value of 297.4 gallons / single family residence will be used as the benchmark. For the multi-family connections, a benchmark figure of 257.7 gallons /dwelling unit will be used (2015 multi-family annual consumption of 157.576 divided by 1675 residential units (WFI).

Success of previous measures can be judged by the HRD 2010 single family annual consumption of 316.4 g/day and our 2015 number of 297.4 to show a 6% reduction. Some of this reduction has resulted from the SVID expanding their residential irrigation program.

The City submits an Annual Performance Report to DOH providing data on total water produced, authorized usage, and distribution system leakage. The report also provides information on changes and progress in the City's WUE goals and measures. A copy of the 2016 report is provided in Appendix 4.

When the current goal and measures were adopted in 2013, the estimate population served called for 5 measures which are being phased in over a year period. Major revisions to the Water Facilities inventory since that time has increased the required measures to 6. The City plans to suggest an additional measure to the public as part of the Water System Plan consumer input program. Council approval of this Water System Plan will include approval of the additional measure. The City will suggest offering a water use audit to their largest industrial users as the sixth measure.

Figure 4-1 Consumption by Customer Class



4.3 DISTRIBUTION SYSTEM LEAKAGE (DSL)

As discussed in Chapters 3.2.7, the average DSL for the past three years is 2.3%. That is the same percentage for the average DSL since 2008. This is substantially less than the State goal of 10%. The City’s metering programs, monitoring of abnormal meter readings, tracking of unmetered but authorized water uses (i.e. fire fighting) and quick response to discovered leaks all contribute to this low number. Although the percentage is low, the total volume leaked in 2015 was 15.7 million gallons. The City is committed to reducing this volume.

4.4 WATER RIGHTS SELF-ASSESSMENT

The water rights obtained by the City of Sunnyside are summarized in this section as well as assessments their adequacy to meet projected future demands.

4.4.1 EXISTING WATER RIGHTS

Copies of the City’s existing seven ground water right certificates and one permit are included in Appendix 5 and are summarized on Table 4-1A, 4-1B and 4-1C. These tables also compare the water rights to the existing water demand and the six year, and 20 year forecasts. The assessment demonstrates that the City’s total water rights are adequate not only for current demands, but also for the projected 20 year demands. It should be noted that the future consumption values used on these tables are based on the total water produced projections, and not the total billing plus DSL projections used for Table 2-11.

There is a difference of opinion regarding the interpretation of annual volume of some of the certificates being primary or supplemental. A primary right is one that provides additional pumping capacity and

additional annual quantity, typically to serve future growth demands. A supplemental right is one that authorizes an additional well or wells and instantaneous pumping capacity, but does not increase the total annual quantity of water rights. The different opinions do not affect the total annual quantity of the City's water right, which is mutually agreed upon. The only practical difference is the priority date of a portion of the City's water rights.

An extension request for permit G4-31581P has been submitted and approved by Ecology. The associated development schedule for this right has been extended to February 1, 2022. The City must request an additional extension if construction is not completed by this date.

4.4.2 SURFACE WATER OPTION

The City possesses surface water rights for irrigation purposes ("Surface Rights") from the Snipes Mountain Lateral of the Sunnyside Valley Irrigation District that have been confirmed in the Yakima River water rights adjudication. The City's Surface Rights are part of a collection of water rights to be certified to the Sunnyside Division Board of Control (the "Division") under Claim No. 1752, pursuant to a settlement agreement and conditional final order. The diversion and maintenance of the Surface Rights is managed by Sunnyside Valley Irrigation District ("SVID"), and the City pays maintenance assessments to SVID in the range of \$50,000 per year to maintain the validity of the Surface Rights. These annual fees are payable whether or not the City diverts and uses the water it is entitled to. The quantity of the Surface Rights is enough to irrigate 578 acres. The precise quantity was described in a settlement agreement with the Yakama Indian Nation (described below) at 4.3 c.f.s., 1734 afy. That quantity may be reduced over time depending on the irrigation requirement for lawn watering using reasonably efficient methods.

The City has two primary options for future direct utilization of its Surface Rights. First, it could use surface water from the Snipes Mountain Lateral to irrigate properties within the City's water service area, which will save water from the City's drinking water system to serve domestic, commercial and industrial customers. Second, the City could file a water right change application to change the purpose of use to municipal and the point of diversion of the Surface Rights, most likely to increase the City's allowed withdrawal at an existing well or a new well. A third option would be to change the purpose of use to municipal provide surface water treatment of the lateral water and pump directly into the drinking water system. As long as the utilization of the groundwater resource is available, this third option would not be practical due to the seasonal nature of the lateral water availability and the higher construction and operations costs of a surface water treatment facility. Aquifer storage and recovery may also be an option to enhance ground water availability in the future.

**Table 4-1A
WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – EXISTING STATUS**

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		EXISTING CONSUMPTION		CURRENT WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/Certificates										
1. 33-D	City of Sunnyside	1-1-1909	Well #8 (S08) ^a	Primary	420 gpm	347 afy				
2. 34-D	City of Sunnyside	9-1-1929	Well #8 (S08) ^a	Primary	230 gpm	62 afy				
3. 35-D	City of Sunnyside	6-1-1942	Well #3	Primary	420 gpm	347 afy				
4. 49-A	City of Sunnyside	12-12-1945	Well #10 (S10) ^b	Primary	1,000 gpm	1,000 afy				
5. 2553-A	City of Sunnyside	7-10-1953	Well #11, #12, #13 (S11, S12, S13, S14) ^c	Primary	1,500 gpm	720 afy				
6. 4795-A	City of Sunnyside	9-14-1962	Well #6 (S06)	Supplemental ^d	1,570 gpm	1,600 afy				
7. G3-21323C	City of Sunnyside	6-28-1973	Well #7 (S07)	Supplemental ^d	950 gpm	1,500 afy				
8. G4-31581P	City of Sunnyside	12-21-1992	Well #3, #6, #7, #9 (S06, S07, S09)	Primary/ Supplemental ^e	2,000 gpm	3,230 afy ^e				
TOTAL	*****	*****	*****	*****	8,090 gpm	5,044 afy	3,884 gpm^f (5.59 MGD)	3,133 afy^f (1,020.8 MG)	4,206 gpm	1,911 afy
9. Surface Water Adjudication Claim 1752	SVID	Numerous, from 1878 to 1905	Snipes Mountain Lateral	Primary, for irrigation	4.3 cfs	1734 afy	--	--	--	--

^a Certificate #33-D and #34-D sources were formerly Well #1 and Well #2, respectively. Well #8 (S08) was added in 1994 and utilizes these water right authorizations.
^b Certificate #49-D source was formerly Well #4. Well #4 was decommissioned in 1998 and replaced by Well #10 (previously designated as Well #4A).
^c Certificate #2553-A source was formerly Well #5. This water right was transferred to Well #11 (S11), Well #12 (S12), and Well #13 (S13) through change applications CG4-GWC2553-A@1 (YAKI-04-14) and CG4-GWC2553-A (YAKI-07-21).
^d Annual volumes of Certificate #4795-A and #G3-21323C are non-additive (supplemental) to previously authorized annual volumes for Well #1 through Well #5.
^e Permit #G4-31581P authorizes up to 3,230 afy of primary (additive) annual volume to existing rights, but the total annual volume of all authorizations shall not exceed 5,044 afy. The final primary and supplemental portions of this right will be determined in the future when the City's project is complete and their ground water rights are adjudicated.
^f Total existing instantaneous consumption is based upon calculated maximum day demand (MDD) for 2015. The existing combined total maximum well pump capacity (including emergency sources) is 6,500 gpm. Existing annual consumption is based upon the combined 2015 total annual volume pumped from the source wells (total well production).

**Table 4-1B
WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 6 YEAR FORECAST**

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (6-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/Certificates										
1. 33-D	City of Sunnyside	1-1-1909	Well #8 (S08) ^a	Primary	420 gpm	347 afy				
2. 34-D	City of Sunnyside	9-1-1929	Well #8 (S08) ^a	Primary	230 gpm	62 afy				
3. 35-D	City of Sunnyside	6-1-1942	Well #3	Primary	420 gpm	347 afy				
4. 49-A	City of Sunnyside	12-12-1945	Well #10 (S10) ^b	Primary	1,000 gpm	1,000 afy				
5. 2553-A	City of Sunnyside	7-10-1953	Well #11, #12, #13 (S11, S12, S13, S14) ^c	Primary	1,500 gpm	720 afy				
6. 4795-A	City of Sunnyside	9-14-1962	Well #6 (S06)	Supplemental ^d	1,570 gpm	1,600 afy				
7. G3-21323C	City of Sunnyside	6-28-1973	Well #7 (S07)	Supplemental ^d	950 gpm	1,500 afy				
8. G4-31581P	City of Sunnyside	12-21-1992	Well #3, #6, #7, #9 (S06, S07, S09)	Primary/ Supplemental ^e	2,000 gpm	3,230 afy ^e				
TOTAL	*****	*****	*****	*****	8,090 gpm	5,044 afy	4,374 gpm^f (6.30 MGD)	3,528 afy^f (1,149.6 MG)	3,716 gpm	1,516 afy
9. Surface Water Adjudication Claim 1752	SVID	Numerous, from 1878 to 1905	Snipes Mountain Lateral	Primary, for irrigation	4.3 cfs	1734 afy	--	--	--	--

^a Certificate #33-D and #34-D sources were formerly Well #1 and Well #2, respectively. Well #8 (S08) was added in 1994 and utilizes these water right authorizations.
^b Certificate #49-D source was formerly Well #4. Well #4 was decommissioned in 1998 and replaced by Well #10 (previously designated as Well #4A).
^c Certificate #2553-A source was formerly Well #5. This water right was transferred to Well #11 (S11), Well #12 (S12), and Well #13 (S13) through change applications CG4-GWC2553-A@1 (YAKI-04-14) and CG4-GWC2553-A (YAKI-07-21).
^d Annual volumes of Certificate #4795-A and #G3-21323C are non-additive (supplemental) to previously authorized annual volumes for Well #1 through Well #5.
^e Permit #G4-31581P authorizes up to 3,230 afy of primary (additive) annual volume to existing rights, but the total annual volume of all authorizations shall not exceed 5,044 afy. The final primary and supplemental portions of this right will be determined in the future when the City's project is complete and their ground water rights are adjudicated.
^f Total future instantaneous withdrawal rate and annual volume values are from projected maximum day and annual demand provided in Section 3. The City will continue to track withdrawals from each of its source wells to ensure that future instantaneous and annual withdrawals do not exceed authorized quantities.

**Table 4-1C
WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 20 YEAR FORECAST**

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (20-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/Certificates										
1. 33-D	City of Sunnyside	1-1-1909	Well #8 (S08) ^a	Primary	420 gpm	347 afy				
2. 34-D	City of Sunnyside	9-1-1929	Well #8 (S08) ^a	Primary	230 gpm	62 afy				
3. 35-D	City of Sunnyside	6-1-1942	Well #3	Primary	420 gpm	347 afy				
4. 49-A	City of Sunnyside	12-12-1945	Well #10 (S10) ^b	Primary	1,000 gpm	1,000 afy				
5. 2553-A	City of Sunnyside	7-10-1953	Well #11, #12, #13 (S11, S12, S13, S14) ^c	Primary	1,500 gpm	720 afy				
6. 4795-A	City of Sunnyside	9-14-1962	Well #6 (S06)	Supplemental ^d	1,570 gpm	1,600 afy				
7. G3-21323C	City of Sunnyside	6-28-1973	Well #7 (S07)	Supplemental ^d	950 gpm	1,500 afy				
8. G4-31581P	City of Sunnyside	12-21-1992	Well #3, #6, #7, #9 (S06, S07, S09)	Primary/ Supplemental ^e	2,000 gpm	3,230 afy ^e				
TOTAL	*****	*****	*****	*****	8,090 gpm	5,044 afy	5,772 gpm^f (8.31 MGD)	4,656 afy^f (1,516.9 MG)	2,318 gpm	388 afy
9. Surface Water Adjudication Claim 1752	SVID	Numerous, from 1878 to 1905	Snipes Mountain Lateral	Primary, for irrigation	4.3 cfs	1734 afy	--	--	--	--

^a Certificate #33-D and #34-D sources were formerly Well #1 and Well #2, respectively. Well #8 (S08) was added in 1994 and utilizes these water right authorizations.
^b Certificate #49-D source was formerly Well #4. Well #4 was decommissioned in 1998 and replaced by Well #10 (previously designated as Well #4A).
^c Certificate #2553-A source was formerly Well #5. This water right was transferred to Well #11 (S11), Well #12 (S12), and Well #13 (S13) through change applications CG4-GWC2553-A@1 (YAKI-04-14) and CG4-GWC2553-A (YAKI-07-21).
^d Annual volumes of Certificate #4795-A and #G3-21323C are non-additive (supplemental) to previously authorized annual volumes for Well #1 through Well #5.
^e Permit #G4-31581P authorizes up to 3,230 afy of primary (additive) annual volume to existing rights, but the total annual volume of all authorizations shall not exceed 5,044 afy. The final primary and supplemental portions of this right will be determined in the future when the City's project is complete and their ground water rights are adjudicated.
^f Total future instantaneous withdrawal rate and annual volume values are from projected maximum day and annual demand provided in Section 3. The City will continue to track withdrawals from each of its source wells to ensure that future instantaneous and annual withdrawals do not exceed authorized quantities.

4.5 SOURCE OF SUPPLY ANALYSIS

This section will utilize the basic water supply information provided in Sections 3.2 and 3.6.1 to consider source reliability and further describe future water supply alternatives.

4.5.1 WATER SUPPLY RELIABILITY

This section considers the reliability of the City's sources. Prior to the addition of Wells 12 and 13, the City relied on Well 9 for an average of about 50% of the annual water produced, followed by Wells 8 and then 7. In 2015, Well 9 still provided the largest volume of water to the system, but its percentage dropped to just over 26%. Well 13 was the second largest contributor with almost 24%, and the other wells producing between 11 and 16%. The exception was Well 6 which delivered less than 1%. With the addition of Wells 12 and 13, Well 6 will only be used to handle high demands due to a higher iron and manganese levels.

Although Well 6 is listed as a permanent source on the City's Water Facilities Inventory (WFI) (Appendix 11) since it is available for use at any time year round, but it is usually the last well in the call order due to a slightly elevated iron levels. Current staff does not know the reason the existing pumping equipment is limited to 650 gpm rather than closer to the original developed capacity of 1380 gpm. Drawdown levels during pumping have been consistent over the recent years. Well 6 and all the other wells (except for Well 7) are equipped with probes connected to the SCADA system. Low level alarms and automatic pump shut off provides protection against over pumping. Well 6 does not show major water level drawdown when pumping.

As shown in table 4.2, the annual production is now fairly well divided between the unconsolidated aquifer and the Saddle Mountain Basalt flow. Wells 8 and 11 can be run simultaneously, but they do affect each other's drawdown. Wells 6 and 7 also affect each other, and cannot be run together for extended periods of time. There are no indications that water levels are declining in the area in either the unconsolidated aquifer or the basalt aquifers.

Table 4-2 2015 Source Pumping Distribution

Aquifer / Basalt Flow	Well Number	Depth	2015 Volume	% of Total
Unconsolidated	8	440	750	11.0
	11	435	500	11.5
	12	397	350	10.9
	13	431	650	23.8
		Subtotal	2,250	57.2%
Saddle Mt. Basalt	6	769	650	0.3
	7	1,057	1,100	16.3
	9	919	1,500	26.2
		Sub-total	3,250	42.8%
Wanapum Basalt	10	1701	0.0	0.0*
		Sub-total	0	0%
		Total	5,500	100%

* 2005 Water System Plan reported original capacity of 1000 gpm and 750 gpm current pumping rate

The primary water supply reliability concerns include:

- Electrical, pump or control system failure would cause a temporary condition until the failure is corrected. If the failure occurred during a high use time of the year, temporary water restrictions may be required.
- Chemical spills or other sources of contamination from existing land uses could contaminate groundwater for those wells utilizing the unconsolidated aquifers (Wells 8, 11, 12 and 13). Well is probably most vulnerable since 11, 12 and 13 have a number of clay layers above the water bearing zone. The probability of a chemical spill contaminating the Saddle Mountain and Wanapum Basalt aquifers is low in the vicinity of the City.
- Geologic materials may be drawn into the wells due to screen failure and cause temporary or permanent shutdown of the wells. The City has had to make modifications on wells in the past because of this problem.
- Due to its location, the City does not have existing interties with neighboring systems and has few opportunities for interties with the nearest larger public water system being Grandview located 2.5 miles to the Southeast.

4.5.2 WATER SUPPLY ALTERNATIVES

In addition to the three general alternatives available to the City for additional sources of supply as noted in Section 3.7.1, there are two additional options that would reduce the non-domestic use of the water system, especially irrigation applications. The five water supply alternatives discussed include:

1. Providing treatment for Well No. 10
2. Obtaining an existing well (and water rights) and converting it to an approved public water supply source. A sub-option may be to enter into an intertie agreement allowing use of the well, or at least part of the discharge of the well, if it can be approved by DOH as public water system source. Having an intertie agreement, for at least emergency source of supply, would provide added reliability for the City.
3. Drilling a new well. The primary decision in drilling a new well is which formation to tap for additional water. Other factors to include in considering the various options would be locations with respect to other City wells, potential sources of contamination in the area of the new well, location with respect to distribution system hydraulics, and anticipated volume available.
4. As noted above 4.4.2, increasing the use of irrigation water from SVID for city irrigation uses. This option would reduce the summertime use of water when the largest maximum day demands are experienced.
5. Another potential source of water may be to use reclaimed water for some customers to reduce the demand on the drinking water system. The only current use of reclaimed water is at the City's wastewater treatment plant for sewer cleaning and maintenance activities. The City does not maintain formal accounting of the quantity of reclaimed water use, but estimates that approximately one million gallons of reclaimed water is used for this purpose on an annual basis. The City's largest water users are food product related, and would not be able to use reclaimed water in their processes. Another large use of water is for City parks and school ball fields and playgrounds, but they are scattered throughout the City and would require an extensive distribution system. The SVID currently supplies irrigation water to the Sunnyview Park, and may be available to other parks and schools.

Expanding the range of the sources of supply beyond the existing operating source aquifers would provide improved reliability with added redundancy. A source in Wanapum basalt aquifer would benefit the City by tapping into a hydraulically separate aquifer from their other operational wells. This could be accomplished by installing treatment facilities at Well 10, or development on a new well. Either option