CHAPTER 4

Water Resource Analysis & Water Use Efficiency (WUE)

4.1 Water Use Efficiency (WUE)

Municipal Water Law Requirements

In 2003, the Washington State Legislature passed the Municipal Water Law ("MWL") to address increasing demands on the state's water resources. In support of this measure and in accordance with WAC 246-290-810, the Department of Health ("DOH") is directed to oversee the Water Use Efficiency ("WUE") Program with the goal of ensuring a safe and reliable drinking water supply.

Water Use Efficiency (WUE) Goals and Measures

The Spokane City Council first addressed water conservation in a significant way with the adoption of Resolution 2006-0049 on May 10, 2006. This resolution adopted the City of Spokane Water Stewardship Program, which outlined goals and reporting requirements which were intended to meet WAC 246-290-840.

Since that time, in order to maintain compliance with the WUE Goal Setting requirements outlined in WAC 256-290-830, the City of Spokane Water Department evaluated and re-established demand side WUE goals as part of this Water System Plan approval under WAC 246-290-100.

The City of Spokane City Council approved Resolution 2014-0043 on April 21, 2014, adopting revised WUE goals following a public hearing and a public comment period. **Exhibit 4.1.1** is a copy of the City of Spokane Council Memorandum concerning the revised WUE goals and Resolution 2014-0043. The goals, provided below, are revised to meet the WUE Goal Settings requirements in WAC 246-290-830 as part of the water system plan approval.

Washington state law provides that the City is required to integrate operational and conservation efforts and to set and achieve water conservation goals.[1] Washington law also mandates that the City must:

- estimate the amount of water saved through implementation of the water use efficiency program over the last six years;
- describe the water use efficiency goals chosen;
- evaluate whether the City's water use efficiency measures are cost-effective;

[1] RCW 70.119A.180(4)(c)(i).

- describe all water use efficiency measures to be implemented within the next six years including a schedule and a budget that demonstrates how the water use efficiency measures will be funded;
- describe how consumers will be educated on water use efficiency practices;
- estimate projected water savings from selected water use efficiency measures;
- describe how the water use efficiency program will be evaluated for effectiveness; and
- evaluate water distribution system leakage.

Accordingly, staff will develop specific strategies for the City to meet its goals and present the strategies for meeting the goals, as well as the measurable outcomes connected with the goals, to the City Council annually.

Resolution 2014-0043 Water Use Efficiency ("WUE") Goals

1. Continue the reduction of indoor residential use by one half percent (0.5%) on average for residential connections annually, over the next six (6) years.
2. Reduce outdoor residential use by two percent (2%) on average for residential connections annually, over the next six (6) years.
3. Reduce metered outdoor irrigation commercial/industrial use by two percent (2%) for Commercial/Industrial connections annually, over the next six (6) years.
4. Reduce outdoor metered governmental use by two percent (2%) for governmental connections annually, over the next six (6) years.

Measures including but not limited to those listed in the following **Table 4.1.1** will be evaluated and implemented to meet the revised WUE goals and separated into indoor and outdoor measures. A brief summary of the proposed measures is presented in the Conservation Program following the table divided into indoor and outdoor measures.

Table 4.1.1

Water Use Efficiency Measures

Measure	Indoor	Outdoor	Total
Water Use Audits	X	X	2
Retrofit Campaign	X	X	2
Rebates & Credits	X	X	2
Education (schools)	X	X	2
Education (website)	X	X	2
Informational Bill Inserts	X	X	2
Consumption History on Bill	X	X	2
Metering	X	X	2

Inclining Block Water Rate	X	X	2
Government Partnerships		X	1
Total	9	10	**19**

Conservation Program

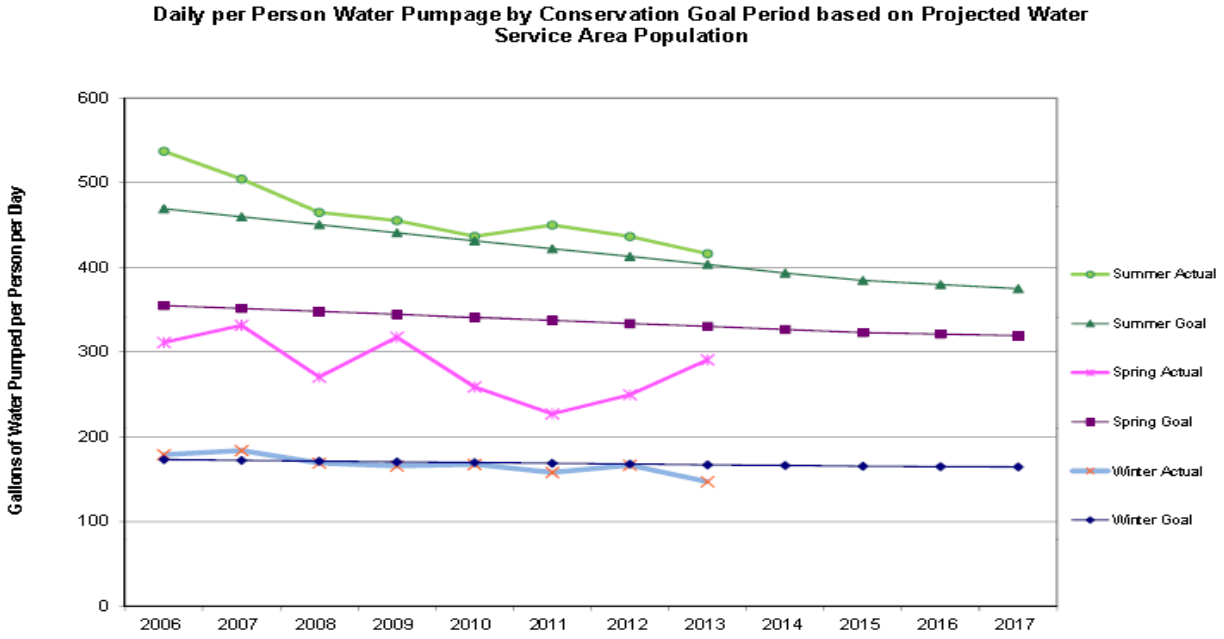
The City encourages its water customers to "Slow the Flow" of water and promote water stewardship. Protecting and preserving our water resources is a long-term goal of the City and is part of our sustainability efforts. Of course, the City must meet water conservation goals as part of state and federal requirements, but using less water also translates into savings on citizens' utility bills and helps ease the need for projects to expand the capacity of the City's water and wastewater systems.

Previous Results

Prior to the adoption of new Water Use Efficiency goals in the April 2014 that clearly focus on changing behavior on the demand side, the City tracked progress toward per capita water use reduction goals laid out in its 2006 Water Stewardship Plan. Those goals tracked total water pumped by season, rather than metered use.

The goals were as follows:

- October through March – 0.5% reduction per year
- April through June – 1.0% reduction per year
- July through September – 2.0% reduction per year



The City consistently met its goals for the winter and spring seasons, but had not achieved its summertime use goals.

From 2006 through 2013, the City used a variety of tools to help meet these goals, including educational and outreach efforts and different rebate programs. Educational and outreach activities have included a TV and radio marketing campaign aimed at reducing summer usage, utility bill inserts, attendance at local events, outreach to local school children, outreach to high users of water, and sharing of information through media, social media, and the web. Additionally, at different times, the City provided customers with rebates for installing water-saving toilets and appliances, adding smart controllers onto outdoor irrigation systems, and replacing traditional grass turf with xeriscaping. At times, the City partnered with other agencies on these outreach and rebate programs to extend their reach.

The City also adopted a block rate structure for water consumption that charges customers more when they use more water. In collaboration with the City's Wastewater Department, pilot projects on the use of reclaimed water also were carried out during this time, including tests at the City-owned Downriver and Creek at Qualchan golf courses.

And, as detailed in other chapters, the Water Department has promoted conservation through programs to detect and repair leaks, improve metering at well sources and other locations within the distribution system, and to properly account for water used for non-metered activities, like fire suppression and construction needs.

Future Conservation Program Plans

The City is working to improve and expand its water conservation program for the next six years to meet with the intent of Water Use Efficiency Rules and to benefit the Water Department, the Wastewater Department, and the region. The City completed a survey of water customers in early 2014 that also will be used to inform this program.

The 2014 budget for community outreach and education activities was $80,000 in addition to City staff time. A new wastewater credit program, which will encourage lower water use, will cost an additional $700,000. Budgets for these activities in future years will be determined annually and are expected to increase over time. The City Water Wastewater Fund will pay all costs for the water conservation programs.

Here's a look at the Measures the City will use to encourage conservation both for indoor and outdoor uses:

Water Use Audits:Water use audits can help customers understand how they can reduce water consumption in their homes and outside of them. Audits allow homeowners the opportunity to assess how efficiently water is being used and identify opportunities to lower water use. Indoor household water audits can result in savings of 20 to 30 gallons a day, while audits of outdoor irrigation systems can result in even greater water savings. The City is evaluating the option of providing audit kits to allow homeowners or renters to identify savings opportunities themselves.

Retrofit Campaigns:

The City has partnered with SustainableWorks, a non-profit organization that promotes energy efficiency, to help City utility customers save water. City water customers who participate in SustainableWorks' "Save Energy Today" audit program will receive a water

conservation kit, provided by the City of Spokane, along with the energy-saving products and recommendations provided through the audit. The water kit includes aerators and low-flow shower heads. SustainableWorks expects to visit about 300 homes within the Department's service area annually. The City is considering expanding this partnership to include water audits with this program.

The City is evaluating the possibility of adding a retrofit campaign for outdoor use, providing property owners with hose timers, rain sensors, or similar products at the conclusion of an outdoor water audit or as part of an outdoor water use audit kit.

Rebates for Indoor Appliances:

The City is considering a program that would provide rebates to consumers who purchase water-efficient appliances, including toilets, washing machines, and dishwashers. An evaluation needs to be completed that compares the cost of such a program with the potential long-term water conservation benefit.

Education:

Public education and outreach is critical for any water conservation program to promote long-term changes in water use habits. The City will use multiple communications tools to reach its audience with educational information, including:

- A School Education Program, which includes presentations to youth and related materials to teach about saving water. Tours of the City's Upriver Facility also will be part of this program.
- Information on the City's web site and social media sites. The City actively maintains information on its web site, encouraging citizens to "Slow the Flow" through many easy-to-use tips. Information also is shared through the City's Facebook, Twitter, and Instagram pages on water-saving ideas. The City also is launching an email newsletter on this topic.
- Development of news releases with water-saving information that are sent periodically to local news media. The City identifies news-worthy timing to provide information on water conservation.
- Participation in Community Events. The City will set up informational displays and tables at community events to have direct educational opportunities with citizens. New displays are under development that would be more interactive and thought-provoking.
- Advertising, sponsorships, partnerships and marketing. The City will continue to look for paid opportunities or partnerships with other agencies that have the potential to reach many citizens with information on water conservation. Particular emphasis on the interrelationship between the Spokane River and the Spokane Valley-Rathdrum Prairie Aquifer, which is the City's sole source aquifer.

Information provided through bills:

Since customers receive City utility bills monthly, bills provide a great opportunity for educational information. The Water Department annually develops bill inserts with water conservation tips, checklists, and related information. Additionally, each customer's bill

includes information on their water use history. A customer can use this information to determine whether his or her water use is typical or unusual for a certain time period and also to track changes in use.

The Department will provide education, tools and incentives for all residential water users to reduce their consumption, including their consumption rates on their bill.

Metering:

As discussed in other chapters, the City has a robust source and service metering program that provides staff with data to identify leaks in the distribution system and within domestic services.

Water Rates:

The City continues to have an inclined block water rate structure. That means customers who use more water pay more, providing a financial incentive to conserve water. This is especially true during the summer irrigation season.

Wastewater Conservation Credit:

Starting in 2015, the City will implement a wastewater bill discount for single-family residential customers who use less water. The credit program is designed to introduce equity in wastewater billing and allow customers to make choices that could lead to lower monthly bills. Under the program, the lowest 20 percent of indoor water users receive credits totaling $60 a year, distributed in $5 monthly amounts. The lowest 20 percent of indoor water users is determined annually based on water use during the winter. Although a credit toward the wastewater portion of the bill, this program will help the City achieve its water use efficiency goals by encouraging lower indoor residential water use. The annual cost of this program is about $700,000.

Special Projects:

The City will continue to seek out special projects to reduce water use. For example, the Water Department is beginning to work with the City's Parks Department to find ways to update wasteful and aged irrigation systems in City parks. Schools are another

4.2 Distribution System Leakage (DSL)

Water Loss Control Action Plan (WLCAP)

The Water Department is diligently working to reduce our Distribution System Loss (DSL). The DLS for the water system in 2013 stands at 17.9%, with a three-year running average of 19.2%. Pumping and accounted water totals for the past 7 years are tabulated in Chapter 2. In 2009, an increase in DSL was reported because of the discovery of an accounting error within the City of Spokane billing system when consumption data was extracted from the billing data. Some extracted readings were double counted, resulting in erroneously high metered consumption and corresponding accounted water number which, when corrected, increased unaccounted water use and increased DSL.

Following the conclusion of the water use audit, the city will create a water loss control action plan in accordance with WAC 246-290-820(4).

The following programs are ongoing programs to help identify apparent losses within our system. These programs center on data collection and data accuracy so we may better asses and address real losses. Data collection and accuracy is the first step forward to reducing our DSL.

- Source Meter Replacement Program:

  Beginning with Fiscal Year 1998, the City began replacing the source meters at all of the water sources. The supply meter replacement program was completed in 2002 and all well sources are metered. However the accuracy of some source meters is in question due to location of the meters. Currently, the Source Meter Replacement Program is active with the thought of replacing older meters and meters with questionable accuracy. Calibration of the meters and testing accuracy is part of this program.

- Booster Station Metering Program:

  Starting in 2012, the Water Department started this program to meter booster stations that serve different pressure zones and move water from one zone to the next. By metering booster stations, it will be possible to better account for water traveling though pressure zones and identifying potential leaks and losses by better water accounting in a pressure zone.

- Meter Data:

  In order to accurately tabulate meter data recording use, the Water Department is beginning to use raw data collected prior to its conversion in the City's Customer Star program to billing data. The use of raw data directly from the meter readings requires additional manipulation and indexing that is done by the billing software but eliminates the manipulation process that is causing inaccurate consumption numbers.

- Residential Meter Replacement Program:

  The City has had a residential meter replacement program in place since approximately 2004. In the last two years, approximately 100 residential meters were replaced every month. The priority for meter replacement is based on a combination of age and total flow through the meter. Also, during the monthly billing cycle, if low flows are observed, the suspect meter is also replaced.

- Commercial Meter Replacement Program:

  Between 1999 and 2005, the City replaced or tested, repaired, and recalibrated all commercial meters 1 ½" and larger. There is an ongoing program to recalibrate or replace 1 ½" and two inch meters every four years and three inch and above annually.

Concurrently with data collection and data accuracy in assessing apparent losses, the City is continuing to make progress in reducing the amount of real losses includes the following ongoing programs:

- Dedicated Leak Detection Program:

  The City has maintains at least one full time leak detection crew working within the City on a continual basis. Service connections are included within the monitoring program.

- Pipe Replacement:

  12" Cast Iron pipe with Leadite joints.

  In 2004, the Water Department began replacing 12" Cast Iron pipe that has leadite joints, as it has proven to fail in a spiral fracture that causes catastrophic damage and is prone to joint leakage upon any disturbance due to the brittle aged joint material.

In addition the following factors can be shown to have a significant effect to the amount of non-metered non-revenue water volume affecting DSL:

- Pipeline leakage.
- Unauthorized use such as illegal connections.
- Authorized and unauthorized use from hydrants .
- Unmetered uses such as system operational needs, construction use, street cleaning, line flushing, water main testing, main breaks, reservoir flushing, and fighting fire.

The Water Department is working to more accurately capture non-metered water use with the following programs:

- Fire Suppression Use:

  Currently, we receive an annual estimated use from the Spokane Fire Department on the amount of water used in fire suppression activities. Numbers received to date for accounting purposes appear low. Working with the Fire Department, we would like to implement a better accounting system for water used possibly by incident/training exercise to ensure estimated water use reported is accurate.

- Construction Use/ Hydrant Permits:

  The Water Department currently issues hundreds of non-metered hydrant use permits to contractors and businesses. The use ranges from construction use to use by landscape companies and other small businesses. In 2012-2013, we received meter data from a construction use of a hydrant permit and determined that the current estimates for use under hydrant permits for construction were grossly underestimated. In order to provide a more accurate accounting for these uses, the Water Department is exploring the possibility of metering some of these hydrant uses to provide an accurate baseline for similar hydrant permit uses.

- Street Cleaning/Sewer work/Other Utility Work with Water:

  Continuing the Water Department's ongoing discussion and dialog to receive estimated consumption numbers with other utilities that use City Water in their daily/weekly/monthly operations from an un-metered water source.

The City is working to decrease the Distribution System Loss (DSL) to 10% or less according to State DOH rules. The first step is the evaluation process that is currently ongoing that includes assessing data accuracies and defining real and apparent losses. This includes the metering and data assessment and will have capital programs of $180,000/year until 2016 dedicated to source and booster station metering. Following the assessment in 2015-2016, the City will perform a water audit following the initial assessment.

4.3 Source of Supply Analysis

A source of supply analysis is required of all systems that will be pursuing water rights within 20 years. The City does not plan to pursue additional water rights within the next 20 years.

The City has not studied the question of depletion within the aquifer due to pumping. Seasonal fluctuations due to snowpack and recharge have been seen at City wells. The City is actively monitoring well levels in the event of sustsained low precipitation years that may affect aquifer recharge.

Regional Hydro-Geologic Setting and History

Spokane is located within the Rathdrum Prairie/Spokane groundwater basin. The aquifer has been described as one of the most prolific in the nation. The aquifer travels east to west through the Spokane Valley, then turns north and northwest after it passes the east City Limits of Spokane. This places the aquifer under the City and affords the City the opportunity to tap this resource at well sites located throughout the City.

The aquifer was formed during the Pleistocene Era when the Glacial Lake Missoula breached the ice dam that formed the lake. As the lake breached the dam, an estimated 750 million cubic feet per second (484 trillion gallons per day) of water rushed out of the lake into the Pend Oreille, Coeur d'Alene and Spokane areas leaving behind great quantities of sediments of all sizes transported by the ensuing flood. Geologic evidence now points to as many as 40 floods of similar magnitude. The coarser materials were deposited along the main valley floor (today's Rathdrum Prairie in Idaho and Spokane Valley/City of Spokane area in Washington) in the line of greatest flow during the flood, while the smaller sediments were carried as far away as Portland, Oregon. The larger, coarser materials formed the medium through which the aquifer now travels.

Recharge and Discharge

The groundwater system in the aquifer area is recharged by infiltration of precipitation and subsurface flow, infiltration from rivers and lakes, and regional groundwater under-flow. Groundwater is discharged by seepage to the Spokane River, Little Spokane River, and pumping from wells.

It is estimated that within the aquifer between 300 and 600 mgd flows into the Spokane Valley across the Washington-Idaho border. These estimates of groundwater flow are based on past studies of the aquifer that have been limited in scope. Currently, a more comprehensive Interstate Aquifer Study is being finalized by the United States Geologic Survey (USGS), State of Washington, and State of Idaho. This study provides an improved scientific estimate of the quantity of flow found in the aquifer, as well as a model of its flow characteristics. According to the Watershed Management Plan for WRIA 55&57,[2] the City's groundwater extraction can have the impact of depleting flow in the Spokane River. Modeling of ground and surface water connections conducted as a part of the Watershed Management Plan process revealed that the aquifer and river are an integrated resource. Full extraction of the City's inchoate (paper) water rights would result in an additional 150-250 cubic feet per second (cfs) decrease in Spokane River volume. This decrease is noteable given that low flows in the river have been below 600 cfs in 8 of of the last 28 years.

[2] See page 31 (6-6-2006 draft, later adopted 1-31-2006).

Historically, prior to 1940, the lowest flows measured in the river each year were above 1,200 cfs.

Effective February 27, 2015, the Department of Ecology implemented an in-stream flow rule. The City is committed to maintaining the river volumes mandated by the in-stream flow rule. Accordingly, the City has developed conservation measures, including the consideration of water rates and the overall water rate structure, toward the goals of preserving the natural resource river flow volumes.

4.4 Service Reliability

Source Reliability

The reliability over the past 100 years of the Spokane Valley-Rathdrum Prairie Aquifer has not been a concern. However a comprehensive study of the aquifer is progressing to better address long-term quantity issues. Also over the past few years the City has been engaged in the Wellhead Protection Program, which has provided a better understanding of the aquifer system and water quality issues.

Water Right Adequacy

The existing water rights will allow the City to grow as planned within the 20 year planning horizon and beyond. While the City has ample water rights, being good stewards and conserving water is very much a high priority.

Facility Reliability

Facility Reliability of the water system is quite high. Much of the power supply is provided through the Avista Corporation's electrical grid. Avista's electrical grid is very reliable and any outages that have occurred have been very short term. Also the City water system is very high on Avista's restore power list when outages do occur.

In addition, the Water Department owns its own hydroelectric power generating facilities at the Upriver Dam Complex. Much of this power is used directly to power the Departments Well Electric and Parkwater Well Stations, as these stations are located near the Upriver Dam Complex. These well stations provide about half of the City's water supply so in the event of a long-term shutdown of Avista's system, the Water Department can still supply water to the Low Pressure Zone, North Hill Pressure Zone, and the Intermediate Pressure Zone which represent about half of the City's present retail water service area. Low river flows in July and August will limit this ability, but nevertheless various amounts of water can still be pumped depending on the amount of flow in the river. In addition, the Water Department has a large diesel generator mounted on a trailer that can be moved from booster station to booster station to refill reservoirs in higher pressure zones. A diesel motor driven pump at the Lincoln Heights Booster Station can pump water from the Intermediate Pressure Zone to the High Pressure Zone serving a large area on the City's South Hill. The Department also has a small natural gas driven generator which can supply power for some of the smaller pumps.

In addition to the above electrical power backups, the Water Department's storage reservoir capacity is such that the City could supply water for non-irrigation purposes for 2 or 3 days and longer if water were rationed to just the very basic needs. Also the department has

taken great pains to provide as much redundancy as practical in both piping and pumping so that, should a portion of the system fail, service can continue.

When addressing reliability, besides worrying about water quantity, water quality is important too. The Water Department diligently monitors the water quality in the system so that a reliable product can be delivered to the Department's customers.

Shortage Response Plan

In the event the City is unable to provide the water quantity desired by the residents of Spokane, a shortage response plan has been developed. For details of this plan, refer to the Phase I report of the Wellhead Protection Program.

Monitoring Water Levels

Water levels at each of the seven Well Stations are monitored through the SCADA system. In the event a low water level is observed by the SCADA system, an alarm will alert the water system operators. In addition, the Water Department continuously monitors and records the water level of the aquifer at nine additional monitoring well sites, both inside and outside of the City to observe aquifer level trends. The City has never experienced a problem with aquifer levels.

4.5 Water Rights Evaluation

This section discusses the City's water sources, existing and future supply needs, water quality and water rights claims.

Source Type

The City of Spokane currently taps the aquifer with seven well stations. The water rights for specific sites date back to 1948 with the year of priority dating to 1907.

At present, the pumping capacity at all the listed well stations is 195,570 gpm. The permitted capacity is 241,100 gpm. On an annual basis, the historical maximum water quantity distributed over the service area has been about 70,000 acre-feet per year. The permitted quantity is 147,570 acre-feet per year.

Source Location

All well stations are located in a narrow corridor in the central and eastern parts of the City that conform to the main body of the aquifer. **Figure 1.3.2** maps the Well Station locations.

The Legal description of each Well Station is as follows:

Central Avenue:	One well in Lot 17 and the other in Lot 20, both in Block 4 of Byrne Addition, within the NE 1/4, Section 31, T. 26, R. 43 E.W.M
Grace Avenue:	One well in Lot 8, Block 37 of Wolverton & Conlan Addition, within the NE 1/4, Sec. 8, T. 25, R. 43 E.W.M.
Nevada Street:	One well in Lot 7, Block 37 of Wolverton & Conlan Addition, within the NE 1/4, Sec. 8, T. 25, R. 43 E.W.M.
Hoffman Avenue:	Two wells in Lots 27, 28, 29, & 30, Block 4 of Arlington Heights, within the NE 1/4, Sec. 4, T. 25, R. 43 E.W.M.

Parkwater:	Four wells in Lots 1, 2, 3, & 4, Block 33 of Parkwater Addition, within the SE 1/4, Sec. 11, T. 25, R. 43 E.W.M.
Well Electric:	Two wells, within the NE 1/4 , Sec. 11, T. 25, R. 43 E.W.M.
Ray Street:	Two wells, in south half of Block 1, 3rd Addition to Eureka, within the NW 1/4, Sec. 22, T. 25, R. 43 E.W.M.

The Well Station Inventory and Pumping Capacities are summarized in **Table 4.5.1**.

TABLE 4.5.1

Well Stations

DOH Source No.	Source Name	Source Category	Use	Well Depth (feet)	Pumping Capacity (gpm)
S01	Nevada Street	Well	All Year Long	122	25,000
S02	Well Electric	Well	All Year Long	50	39,300
S03	Parkwater	Well	All Year Long	126	63,000
S04	Ray Street	Well	All Year Long	75	21,550
S05	Hoffman Avenue	Well	Seasonal	235	10,920
S06	Grace Avenue	Well	Seasonal	124	19,000
S08	Central Avenue	Well	All Year Long	272	16,800

In addition to the existing well stations listed the City of Spokane is actively investigating and perusing an additional well station location. During the winter of 2014 the City submitted a change application to the Department of Ecology for a change in the points of withdrawal on some if its water rights to existing well stations and for the additional well station. The Reports of Examination for Water Right Change for Water Rights Numbers 548-A and 504-D were received from the Department of Ecology dated Febuary 24, 2015. This consolidation allows the transfer of these rights in the application to existing well stations listed as the other points of withdrawl in the application.

Water Rights Self Evaluation

Table 4.5.2 shows the six year history of the annual quantities of water withdrawn from the aquifer versus water rights at the various Well Stations. Spokane lies within the "rain shadow" of the Cascade Mountains, resulting in an arid climate. As is typical with most areas, weather plays a major role in water consumption. Hot and dry weather is the key to above average water consumption, which is used primarily for lawn and garden irrigation during the summer months.

TABLE 4.5.2

Annual Supply Versus Water Rights

Acre-Feet/Year

Station	Annual Withdrawal Water Rights	Annual Withdrawals						
		2007	2008	2009	2010	2011	2012	2013
Nevada Street	20,000	6,017	7,352	6,375	7,910	9,629	5,176	9,387
Well Electric	36,000	17,712	12,496	14,230	17,773	13,363	14,880	18,825
Parkwater	51,240	21,500	28,172	29,784	19,968	17,349	24,363	21,590
Ray Street	4,740	5,027	5,480	5,021	6,454	8,780	7,071	4,416
Hoffman Avenue	1,280	1,202	313	1,083	620	116	513	953
Grace Avenue	5,080	3,847	3,758	2,967	5,351	11,533	8,782	5,344
Central Avenue	29,230	10,700	7,607	9,455	5,174	2,763	3,735	4,563
Total	147,570	66,005	65,178	68,915	63,250	63,533	64,520	65,078
Note:								

Table 4.5.3 identifies the existing water rights and compares with existing water usage. **Table 4.5.4** lists the 20-year forecasted need. Currently, the City does not need to request additional water rights within the planning horizon of this water plan.

Purpose of Use

The City of Spokane, by owning water rights, has the ability to supply the needs of residential, commercial/industrial and government customers. This includes supplying adequate quantity, combined with reliability, to maintain the City's high Fire Industry rating for water systems. The City currently has a Class 3 Fire Insurance Rating, a good score translating into lower hazard insurance premiums for the customers.

Place of Use

The place of use listed on all City of Spokane water rights is, "The area served by the City of Spokane, all within Spokane County." This, of course, includes the City's water service area as defined in the Spokane County Coordinated Water System Plan plus other purveyors that have interties with the City's Water System.

Time of Use

The pumping and storage operations run 24 hours a day, 365 days a year. However, as delineated in **Table 4.3.1** Hoffman Avenue and Grace Avenue Well Stations are operated on a seasonal basis during peak demand days of the months May through September.

Provisions or Limiting Conditions

All the studies that have been undertaken on the Spokane Valley-Rathdrum Prairie Aquifer, indicate a good supply of excellent quality water for the near future. However, long term demands on this resource are a concern. Also, a major threat is contamination due to septic tanks, petroleum storage, pipeline spills, or commercial/industrial activities. The Wellhead Protection program, described in Chapter 5, addresses possible contamination of the Aquifer near the wells. In addition, the possible impacts of climate change on the Aquifer and river flows have not been adequately studied and are currently unknown.

The Water Department works to build redundancy into key areas of the water system. This redundancy provides operating flexibilities in operating pump stations and storage reservoirs, limiting the exposure of the water system to severe area wide emergencies, but also allows for maximum efficiency in pumping strategies.

The Well Electric Well Station because of its close proximity to the Spokane River has under gone significant testing to determine if there is surface water influence. Results of these tests indicate there is no surface water influence. As a precaution, the Well Electric Well Station is not operated during time of rapid river rise and flooding. The Upriver Complex that houses the Well Electric Well Station also contains the Department's Water Quality Testing Laboratory which allows for continued monitoring of this well.

The City of Spokane should also consider the possibility of placing some of its water rights into trust status in order to preserve river flows.

Hydropower Water Rights

All water rights discussed to this point have been for potable water use. The Water Department also has surface water rights from the Spokane River needed for the operation of Upriver Dam. These rights are as follows:

- Surface Water Certificate No. 1014
  400 cubic feet per second, Spokane River, Priority date of June 12, 1935
- Surface Water Certificate No. S3-26064C
  7,600 cubic feet per second, Spokane River, Priority date of September 11, 1978
- Reservoir Permit No. R3-28402P
  4,000 acre-feet of storage, Spokane River, Priority date of October 9, 1987

TABLE 4.5.3: Existing Water Right(s) Status

Permit Certificate of Claim #	Name of Right-holder or claimant	Priority Date	Source Name/ Number	Primary or Supplemental	Existing Water Rights		Existing Pumping Capacity & Annual Consumption		Current Water Right Status (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Q_i) gpm	Maximum Annual Volume (Q_a) Acre-ft	Maximum* Instantaneous Flow Rate (Q_i) gpm	Maximum Annual Volume (Q_a) Acre-ft	Maximum Instantaneous Flow Rate (Q_i) gpm	Maximum Annual Volume (Q_a) Acre-ft
3199-A	CITY	1956	S 01 NEVADA ST	Primary	25,000	20,000	25,000	12,615	0	7,385
504-D	CÍTY	1926 1907	S 02 WELL ELECTRIC	Primary	54,750	36,000	39,300	20,519	15,450	15,481
548-A	CITY	1946	S 03 PARKWATER	Primary	63,000	51,240	63,000	24,791	0	26,449
505-D 593-D 504-D 507-D	CITY	1937 1907 1926 1945	S 04 RAY STREET	Primary	14,000 7,000 1,250 2,600**	1,870 350 2,000 520**	21,550	6,057	3,300	(1,317)
506-D	CITY	1938	S 05 HOFFMAN AVE	Primary	11,600	1,280	10,920	1,418	680	(138)
728-A 593-D	CITY	1950 1907	S 06 GRACE AVE	Primary	11,000 20,000	4,080 1,000	19,000	4,026	12,000	1,054
3903-A 593-D 4503 728-A	CITY	1959 1907 1961 1950	S 08 CENTRAL AVE	Primary	7,000 7,000 7,900 9,000	11,480 350 12,640 4,760	16,800	12,084	14,100	17,146
TOTAL FOR PRIMARY WELLS					241,100	147,570	195,570	70,374***	45,530	77,196***
G3-27181	CITY		SIA	Not presently used	200****	526****			200	526
508-D	CITY (PARKS)		S 09 INDIAN CANYON	Golf Course Irrigation	728	265	750	250	(22)	15

PENDING WATER RIGHT APPLICATION	NAME ON PERMIT	DATE SUBMITTED	PRIMARY or SUPPLEMENTAL	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Q_i) Requested gpm	Maximum Annual Volume (Q_a) Requested Acre-ft
None					

* Based on water right or maximum installed pumping capacity, whichever is the lesser amount. Nevada Street Well Station is only one based on water right. Maximum pumping capacity of Nevada Street is 31,000 gpm.

** These are Baxter Well water rights which was officially decommissioned in 2003 with water rights transferred to the Ray Street Well as shown. Priority date is January 12, 1945.

*** Based on maximum total from **Table 4.3.2**. Individual well volumes based on maximum year for that well in **Table 4.3.2**. Well use can vary from year to year based on energy costs, pump maintenance, etc. Therefore, sum of individual numbers will not equal total numbers.

**** 250 gpm and 89 acre feet were sold and transferred to Goodrich Corporation in 2005 for $350 per acre-foot, processed through the Washington State Department of Ecology. The City is looking for a beneficial use of the remaining water right.

TABLE 4.5.4: 20-Year Forecasted Water Right(s) Status with Conservation

Permit Certificate of Claim #	Name of Right-holder or claimant	Priority Date	Source Name/ Number	Primary or Supplemental	Existing Water Rights		Forecasted Pumping Capacity & Annual Consumption		Forecasted Water Right Status	
					Maximum Instantaneous Flow Rate (Q_i) gpm	Maximum Annual Volume (Q_a) Acre-ft	Maximum* Instantaneous Flow Rate (Q_i) gpm	Maximum Annual Volume (Q_a) Acre-ft	Maximum Instantaneous Flow Rate (Q_i) gpm	Maximum Annual Volume (Q_a) Acre-ft
3199-A	CITY	1956	S 01 NEVADA ST	Primary	25,000	20,000	25,000	14,500	0	5,500
504-D	CÍTY	1926 1907	S 02 WELL ELECTRIC	Primary	54,750	36,000	49,000	23,500	5,750	12,500
548-A	CITY	1946	S 03 PARKWATER	Primary	63,000	51,240	63,000	29,300	0	21,940
505-D 593-D 504-D 507-D	CITY	1937 1907 1926 1945	S 04 RAY STREET	Primary	14,000 7,000 1,250 2,600	1,870 350 2,000 520	24,850	4,700	0	40
506-D	CITY	1938	S 05 HOFFMAN AVE	Primary	11,600	1,280	11,600	1,200	0	80
728-A 593-D	CITY	1950 1907	S 06 GRACE AVE	Primary	11,000 20,000	4,080 1,000	19,000	4,700	12,000	380
3903-A 593-D 4503 728-A	CITY	1959 1907 1961 1950	S 08 CENTRAL AVE	Primary	7,000 7,000 7,900 9,000	11,480 350 12,640 4,760	19,000	14,100	11,900	15,130
TOTAL FOR PRIMARY WELLS					241,100	147,570	211,450	80,500**	29,650	67,070**

PENDING WATER RIGHT APPLICATION	NAME ON PERMIT	DATE SUBMITTED	PRIMARY or SUPPLEMENTAL	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Q_i) Requested gpm	Maximum Annual Volume (Q_a) Requested Acre-ft
None					

* Based on water right or maximum installed pumping capacity, whichever is the lesser amount.

** Based on projected use as presented in **Table 2.2.3.** Individual well volumes based on maximum potential use on a year to year basis subject to which wells are used as determined by energy costs, pump maintenance, etc. Therefore, sum of individual numbers will not equal total numbers.

4.6 Water Rates

Water rates are approved by the City Council and addressed in the Spokane Municipal Code Title 13, Chapter 13.04, Section 13.04.2002 through Section 13.04.2042. The Municipal Code is available at: www.spokanecity.org. The City has committed to limiting utility rate increases to the average cost of inflation to maintain affordability and predictability for customers. In November 2014, the City Council approved increases of 2.9 percent annually for 2015, 2016, and 2017. This is the first time the City has approved multi-year rate changes.

For water, the City's rates include a base charge and a water consumption component. The consumption portion of the rate is based on an increasing block rate structure which charges more per unit as increased amounts of water are used. The City also charges a monthly integrated capital fee for capital replacement projects for water and wastewater. The integrated capital fee and the base fee are flat rates for residential customers. For commercial/industrial/governmental customers, the fees are based on the amount of water used.

The City provides its customers with a single bill for all utility services, including water, wastewater, stormwater, and solid waste charges. The City applies partial payments to the water utility last and has the authority to shut off water for non-payment.

4.7 Interties

Existing Interties

The City has established a number of interties with five of its adjacent purveyors. It has one intertie with the City of Airway Heights; four with Spokane County Water District #3; one with Whitworth Water District; one with Fairchild Air Force Base; and one with Velview Water District. All of these interties are metered, and supply water on an as-needed basis. Section 1.3 provides additional discussion regarding these interties. **Table 4.8.1** lists the locations, capacity, purpose, and installation date for each existing intertie.

TABLE 4.8.1
City of Spokane Water Department Interties

Purveyor	#	Intertie Location	Size	Purpose	Date installed
Airway Heights, City of	1	10800 West U.S. Highway 2	12 inch	I	7/15/86
Spokane County Water District #3	1	1500 N. Theirman Road	10 inch	I	10/28/74
	2	2000 South Carnahan Road	6 inches	I, F	2/1/78
	3	5400 South Perry Street	8 inches	F, C	6/2/60
	4	5221 East Desmet Avenue	12 inces.	I	9/16/60
Whitworth Water District #2	1	Hawthorne & Nevada	12 inch	E, F	8/90
Fairchild Air Force Base	1	2108 W. Spotted Road.	10 inch	E	3/13/02
Velview Water District	1	3609 West Velview Dr		I	

TABLE 4.8.1

City of Spokane Water Department Interties

Purveyor	#	Intertie Location	Size	Purpose	Date installed
North Spokane Irrigation Dist #8	1	6400 North Freya Street	8	I,F	5/8/07

Note:
E—Emergency,
F—Fire Flow,
I—Intermittent Retail;
C—Continuous Retail

New Intertie Proposals

Any future intertie proposals must be approved by the City Council.

Intertie Agreements

The City has established formal agreements for all interties. All agreements are based on the capacity of the City's water system and the amount of water required by the purveyor. In the event water supplies are in jeopardy, water service to the City will take precedence over any and all intertie agreements. Copies of the intertie agreements are included in **Exhibit 1.3.2**.