

# 6 | WATER SOURCE AND QUALITY

## INTRODUCTION

The two basic objectives of a water system are to provide a sufficient quantity of water to meet customer usage demands and to provide high quality water. **Chapter 7** discusses the City of Woodland's (City) ability to supply a sufficient quantity of water and identifies future source requirements. This chapter discusses the City's existing water source, its water rights, water quality regulations, and water quality monitoring results.

## EXISTING WATER SOURCES AND TREATMENT

### Water Sources

The City obtains its municipal water supply from its Ranney Well, located on the bank of the Lewis River. Additional information on the City's source is presented in **Chapter 2**.

### Water Treatment

The City's water treatment plant (WTP) is located at 130 Scott Hill Road and was put into service in 1999. The primary purposes of the WTP are to reduce turbidity, pathogens, and high levels of iron that exist in the source water pumped from the Ranney Well. The presence of iron in the source water indicates that the source is more typical of groundwater characteristics most of the time. However, turbidity breakthrough during extreme past events has been experienced. The WTP is available to operate 24 hours a day, 7 days a week, year round. The WTP originally was designed for a capacity of 1,400 gallons per minute (gpm) (2 million gallons per day (MGD)), with a 700 gpm capacity for each of the two filtration trains. In 2007, the capacity was expanded to 2,100 gpm (3 MGD) by adding a third filtration train.

Raw water is pumped to the WTP from the Ranney Well, which is located south of the plant along the west bank of the Lewis River. At the WTP the raw water is pre-treated, filtered, and then further treated prior to being pumped to the City's distribution system. Pre-treatment includes pH adjustment and chlorine addition to oxidize iron that is present in the water. The other pre-treatment processes are polymer addition for primary coagulation, aluminum sulfate addition for secondary coagulation, and non-ionic polymer addition as a filter aid. The filtration system consists of three Microfloc® filtration units with upflow clarifiers to remove both turbidity and oxidized iron. Filtration is followed by chlorine addition for disinfection, fluoridation, and pH adjustment with soda ash for distribution system corrosion control. Finished water flows by gravity into a 169,000-gallon clear well. The clear well is baffled and designed to maintain a minimum of 155,000 gallons for adequate chlorine contact time to achieve the required Giardia and virus reductions through filtration and inactivation.

## WATER RIGHTS AND INTERTIES

### Overview

A water right is a legal authorization to use a specified amount of public water for specific beneficial purposes. The water right amount is expressed in terms of instantaneous withdrawal rate and annual withdrawal volume. Washington State law requires users of public water to receive approval from the Washington State Department of Ecology (Ecology) prior to actual use of the water. This approval is granted in the form of a water right permit, which is developed into a certificate. However, a water right is not required for certain purposes (typically individual residences) that use 5,000 gallons per day (gpd) or less of groundwater from a well.

The process of obtaining a water right involves submitting a water right application that is reviewed by Ecology. If the request is approved, a water right is issued to allow for water use to commence. A water right permit provides permission to construct the necessary wells or diversions, pumps, and pipes to start using water. The water right permit remains in effect until the permit holder determines that its project is complete and they have used as much water as they will under the water right. At that time, the permit holder files a proof of appropriation form, which attests to the rate and volume of water used under the water right. A water right certificate is issued by Ecology following a proof of examination and determination that the amount of water put to beneficial use is consistent with the amount and conditions indicated on the water right permit.

A water right permit can only be issued by Ecology if the proposed use meets the following requirements:

- Water will be put to beneficial use.
- There will be no impairment to existing or senior rights.
- Water is physically and legally available for appropriation.
- Issuance of the requested water right will not be detrimental to the public interest.

During preparation of the report of examination, Ecology considers existing basin management plans, stream closures, minimum instream flows, hydraulic continuity (surface water interconnected to groundwater), utilization of existing water sources, water conservation, and availability of alternative water supplies, among other things. The water right decision process is increasingly becoming more complex and time consuming, due to the many competing interests for water, environmental issues, and regulatory requirements.

### Existing Water Rights and interties

The City currently holds one surface water certificate (SWC), one groundwater certificate (GWC), and one groundwater permit. The surface water right was for diversion directly from the Lewis River, while the groundwater rights are for withdrawal from a Ranney Well located

adjacent to the Lewis River. The City's water rights total 2,800 gpm and 2,186 acre-feet per year (afy) (**Table 6-1**).

The City no longer diverts water directly from the Lewis River, but instead pumps water exclusively from the Ranney Well.

The Ranney Well is located on the right bank of the Lewis River in the SW  $\frac{1}{4}$  SW  $\frac{1}{4}$  of Section 18, Township 5 North, Range 1 East W.M., approximately 1.4 miles upstream of the Interstate 5 bridge over the Lewis River. A summary of the water right information follows and is shown in **Table 6-1**. The water right documents are contained in **Appendix I**.

**Table 6-1**  
**Existing Water Rights**

Water Right	Priority Date	Document	Source Name	Instantaneous Rate (gpm)		Annual Volume (afy)	
				Additive	Non-Additive	Additive	Non-Additive
SWC 9985	8/5/1966	Certificate	Lewis River	1,248	0	756	0
GWC 6595-A	11/8/1967	Certificate	Ranney Well	152	1,248	0	756
G2-29241P	6/17/1995	Permit	Ranney Well	1,400	0	1,430	0
<b>Total</b>				<b>2,800</b>	<b>gpm</b>	<b>2,186</b>	<b>afy</b>

Notes:

SWC 9985 authorizes 2.78 cubic feet per second, which is equal to 1,248 gpm, as shown in this table.

The annual volume under SWC 9985 and GWC 6595-A is limited to 756 acre-feet per year (afy).

The instantaneous rate under all three water rights is identified as 2,800 gpm under G2-29241P report of examination.

Development schedule under G2-29241P has been extended and requires completion of construction by January 1, 2021.

The purpose of use of each water right held by the City is municipal water supply purposes based on the definition provided in Revised Code of Washington (RCW) 90.03.015. The place of use for each water right held by the City is the service area as defined in the most recent, approved, Water System Plan.

The City's water rights are all for sources located in Water Resource Inventory Area (WRIA) 27 – Lewis. Each water right is discussed in more detail in the following sections.

### Surface Water Certificate 9985

The Lewis River water right certificate was issued on June 16, 1967, with a priority date of August 5, 1966. This water right certificate was granted to the Town of Woodland for the maximum use of 2.78 cubic feet per second (cfs) and 756 afy to supply a population of 3,000 in 1999. The place of use on the water right certificate is defined as the "Town of Woodland." No changes to this water right have been made since it was originally issued.

### Groundwater Certificate 6595-A

The Ranney Well water right certificate was issued on September 29, 1969, with a priority date of November 8, 1967. This water right certificate was granted for the maximum use of 1,400 gpm and 756 afy (non-additive to the annual volume authorized under the older SWC 9985), for municipal supply for an estimated population of 3,000 in 1999. The place of use on

the water right certificate is defined as the “Town of Woodland.” No changes to this water right have been made since it was originally issued.

### Groundwater Permit G2-29241P

The Ranney Well water right permit was issued on August 11, 2006, with a priority date of June 17, 1995. This water right permit was granted for the maximum use of 1,400 gpm and 1,430 afy for municipal supply. The instantaneous rate and annual volume were identified as being additive to the existing two water rights. The place of use on the water right permit is defined as the “service area as described in the City’s most recent water system plan.” A provision on this water right requires the City to meter water pumped from the Ranney Well on a daily basis and report that water use to Ecology on an annual basis, by January 31<sup>st</sup> of the following year. The report of examination identified the instantaneous rate under the existing water right GWC 6595-A as being partially additive (152 gpm) and partially non-additive (1,248 gpm), such that the total instantaneous rate authorized under SWC 9985 and GWC 6595-A was 1,400 gpm. When issued, this permit contained a due date for completion of construction (December 31, 2010) and for putting the water to full beneficial use (December 31, 2026). Multiple extensions have been requested and approved by Ecology, such that the current due date for completion of construction has been moved back to January 1, 2021. No changes to this water right have been made since it was originally issued.

### Pending Water Right Application

The City currently has one pending new water right application.

### Groundwater Application G2-29998

Groundwater application G2-29998, with a priority date of May 18, 2001, requests that the City be able to withdraw an additional 2,100 gpm and 1,470 afy from the existing Ranney Well. This application remains pending in Ecology’s water right application processing queue.

## WATER SUPPLY EVALUATION

An evaluation of the City’s existing water rights that can be withdrawn from the Ranney Well (2,800 gpm and 2,186 afy) was performed to determine the sufficiency of the water rights to meet both existing and future water demands. **Table 6-2** compares the combined maximum instantaneous water right amounts with the maximum day demand of the system, and the combined maximum annual water right volumes with the average day demand of the system. As shown in **Table 6-2**, the City has sufficient water rights to meet existing demand.

**Table 6-2**  
**Existing Water Rights Evaluation**

Description	Instantaneous Rights/ Maximum Day Demand	Annual Rights/ Average Day Demand	
	(gpm)	(afy)	(gpm)
Total Water Rights	2,800	2,186	1,355
Existing (2018) Water Demand	1,167	887	550
<b>Surplus (or Deficient) Rights</b>	<b>1,633</b>	<b>1,299</b>	<b>805</b>

**Table 6-3** summarizes the results of the future water rights evaluation, which compares the City's water rights with the system's future 10-year and 20-year demand projections. The analyses consider future demand projections with and without water use reductions from the City's planned water use efficiency efforts, as shown in the table. All future demands include the maximum allowable flow rate of 50 gpm through the Bridge Road Water System intertie. The results of the future water rights evaluation indicate the City has sufficient water rights to meet the demands through the year 2040.

**Table 6-3**  
**Future Water Rights Evaluation**

Description	Instantaneous Rights/ Maximum Day Demand	Annual Rights/ Average Day Demand	
	(gpm)	(afy)	(gpm)
<b>Year 2030 (+ 10 years) Without Water Use Efficiency</b>			
Total Water Rights	2,800	2,186	1,355
Projected (2030) Water Demand	1,551	1,222	757
<b>Surplus (or Deficient) Rights</b>	<b>1,249</b>	<b>964</b>	<b>598</b>
<b>Year 2040 (+ 20 years) Without Water Use Efficiency</b>			
Total Water Rights	2,800	2,186	1,355
Projected (2040) Water Demand	1,943	1,519	942
<b>Surplus (or Deficient) Rights</b>	<b>857</b>	<b>667</b>	<b>413</b>
<b>Year 2030 (+ 10 years) With Water Use Efficiency</b>			
Total Water Rights	2,800	2,186	1,355
Projected (2030) Water Demand	1,508	1,186	735
<b>Surplus (or Deficient) Rights</b>	<b>1,292</b>	<b>1,000</b>	<b>620</b>
<b>Year 2040 (+ 20 years) With Water Use Efficiency</b>			
Total Water Rights	2,800	2,186	1,355
Projected (2040) Water Demand	1,833	1,431	887
<b>Surplus (or Deficient) Rights</b>	<b>967</b>	<b>755</b>	<b>468</b>

## WATER SUPPLY PLANNING

### Existing Water Supply

The City's water system is currently fully supplied by water from the City's Ranney Well.

## LONG-TERM WATER SUPPLY PLANNING

### Feasibility of Obtaining New Water Rights

Any new water rights obtained for the Ranney Well will be subject to the rules specified under Chapter 173-527 Washington Administrative Code (WAC). This rule became effective on January 19, 2009, which was after the City obtained groundwater permit G2-29241P for its Ranney Well. Under this rule, any future requests to obtain additional water rights from the Ranney Well will necessitate meeting additional requirements, as specified in WAC 173-527-110, associated with alternatives analysis, water-related offset, habitat-related offset, and impact analysis. Chapter 173-527 WAC has made it much more difficult to obtain a new water right for the Ranney Well than it has been in the past.

However, WAC 173-527-090 identifies a geographic area, referred to as the "Regional Supply Area" where groundwater is potentially available for future water rights. The Regional Supply Area is recognized in the watershed plan and supported by the public interest as preferred locations for developing future water supply. Near the City, this area includes all lands west of Interstate 5, east of the Columbia River, north of the East Fork Lewis River, and north of the Mainstem Lewis River downstream of its confluence with the East Fork Lewis River (**Figure 6-1**). This area is locally referred to as the Woodland Bottoms. While Ecology and the watershed planning group identified this area as the preferred location for future groundwater withdrawals, applicants must still show that they will not create a significant impact to surface water bodies located in that area, with significant impact defined as a noticeable reduction in lake level or flow in local streams.

If the City will require additional water rights in the future, it is recommended that it consider the feasibility of producing water from a new City-owned well or wellfield located within the Regional Supply Area.

### Feasibility of Transferring Existing Water Rights

The City is located in the Lower Lewis River watershed. Since the City's Ranney Well takes water from the Lewis River, any water right located upstream that either takes water directly from the Lewis River, or that captures groundwater that originates from or is flowing toward the Lewis River, would have a high likelihood of being successfully transferred to the City's Ranney Well.

The largest issue with acquisition of an existing water right from a third party is to carefully review and confirm the extent and validity of the water right so that it is known with confidence before the City considers pursuing the water right. In many situations, a water right might have been forfeited (relinquished) due to a continuous 5-year period of non-use without sufficient

cause, as defined in RWC 90.14.140. As with all water right acquisitions, it is recommended that the City negotiate a price per acre-foot and only agree to pay for the water that is successfully carried through the water right change application process and transferred to the City.

## DRINKING WATER REGULATIONS

### Overview

The quality of drinking water in the United States is regulated by the Environmental Protection Agency (EPA). Under provisions of the Safe Drinking Water Act (SDWA), the EPA is allowed to delegate primary enforcement responsibility for water quality control to each state. In the State of Washington, the Department of Health (DOH) is the agency responsible for implementing and enforcing drinking water regulations. For the State of Washington to maintain primacy (delegated authority to implement requirements) under the SDWA, the State must adopt drinking water regulations that are at least as stringent as the federal regulations. In meeting these requirements, the State, in cooperation with the EPA, has published drinking water regulations that are contained in Chapter 246-290 WAC.

### Existing Regulations

The Federal SDWA was enacted in 1974, as a result of public concern about water quality. The SDWA sets standards for the quality of drinking water and requires water treatment if these standards are not met. The SDWA also sets water testing schedules and methods that water systems must follow. In 1986, the SDWA was amended as a result of additional public concern and frequent contamination of groundwater from industrial solvents and pesticides. The 1986 Amendments require water systems to monitor and treat for a continuously increasing number of water contaminants identified in the new federal regulations. The SDWA was amended again and re-authorized in August of 1996.

In response to the 1986 SDWA Amendments, EPA established six rules, known as the Phase I Rule, Phase II and IIb Rules, Phase V Rule, Surface Water Treatment Rule, Total Coliform Rule, and Lead and Copper Rule. The EPA regulates most chemical contaminants through the Phase I, II, IIb, and V Rules. The City's active source is affected by many of these rules.

The EPA set two limits for each contaminant that is regulated under the rules. The first limit is a health goal, referred to as the Maximum Contaminant Level Goal (MCLG). The MCLG is zero for many contaminants, especially known cancer-causing agents (carcinogens). The second limit is a legal limit, referred to as the Maximum Contaminant Level (MCL). MCLs are equal to or higher than the MCLGs; however, most MCLs and MCLGs are the same, except for contaminants that are regulated as carcinogens. The health goals (MCLGs) for carcinogens are typically zero, because they cause cancer and it is assumed that any amount of exposure may pose some risk of cancer. A summary of each rule follows.

To fully understand the discussion that follows, a brief definition of several key terms is provided below.



- Organic Chemicals – Animal or plant produced substances containing carbon and other elements such as hydrogen and oxygen.
- Synthetic Organic Chemicals (SOCs) – Man-made organic substances, including herbicides, pesticides, and various industrial chemicals and solvents.
- Volatile Organic Chemicals (VOCs) – Chemicals, as liquids, that evaporate easily into the air.
- Inorganic Chemicals (IOCs) – Chemicals of mineral origin that are naturally occurring elements. These include metals such as lead and cadmium.

### Phase I Rule

The Phase I Rule, which was the EPA's first response to the 1986 Amendments, provided limits for eight VOCs that may be present in drinking water. VOCs are used by industries in the manufacturing of rubber, pesticides, deodorants, solvents, plastics, and other chemicals. VOCs are found in everyday items such as gasoline, paints, thinners, lighter fluid, mothballs, and glue, and typically are encountered at dry cleaners, automotive service stations, and elsewhere in industrial processes. The City currently complies with all contaminant monitoring requirements under this rule.

### Phase II and IIb Rules

The Phase II and IIb Rules update and create limits for 38 contaminants (organics and inorganics). Some of the contaminants are frequently applied agricultural chemicals (nitrate), while others are more obscure industrial chemicals. The City currently complies with all contaminant monitoring requirements under these rules.

### Phase V Rule

The Phase V Rule sets standards for 23 additional contaminants, of which 18 are organic chemicals (mostly pesticides and herbicides) and 5 are IOCs (such as cyanide). The City currently complies with all contaminant monitoring requirements under this rule.

### Surface Water Treatment Rule

The Surface Water Treatment Rule (SWTR) governs surface water sources, such as rivers, lakes, and reservoirs (which are open to the atmosphere and subject to surface runoff), and groundwater sources under the influence of surface water (GWI). The SWTR seeks to prevent waterborne diseases caused by the microbes *Cryptosporidium*, *Legionella*, and *Giardia lamblia*, which are present in most surface waters. The rule requires disinfection of all surface water and GWI sources. All surface water and GWI sources also must be filtered, unless a filtration waiver is granted. A filtration waiver may be granted to systems with pristine sources that continuously meet stringent source water quality and protection requirements. The City's Ranney Well is considered a surface water source and the City currently complies with all contaminant monitoring requirements under this rule.



## Interim Enhanced Surface Water Treatment Rule

The Interim Enhanced Surface Water Treatment Rule (IESWTR) became effective concurrent with the Stage 1 Disinfectants/Disinfection Byproducts Rule. The rule primarily applies to public water systems that serve 10,000 or more people and use surface water or GWI sources. The rule also requires primary agencies (i.e., DOH in Washington State) to conduct sanitary surveys of all surface water and GWI systems, regardless of size. The rule is the first to directly regulate the protozoan *Cryptosporidium* and has set the MCLG for *Cryptosporidium* at zero. The City water system serves fewer than 10,000 people; therefore, this rule is not applicable.

## Long Term 1 Enhanced Surface Water Treatment Rule

This Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) addresses water systems using surface water or GWI sources serving fewer than 10,000 people. The rule extends protections against *Cryptosporidium* for smaller water systems. The City's Ranney Well is considered a surface water source and the City currently complies with all contaminant monitoring requirements under this rule.

## Revised Total Coliform Rule

The Revised Total Coliform Rule (RTCR) sets an MCL for *Escherichia coli* (*E. coli*) and specifies the frequency and timing of coliform testing based on population served, public water system type, and source water type. When total coliform is detected, a treatment technique is triggered. The water system must assess its water system facilities and operations and fix any sanitary defects. For confirmed *E. coli* incidents, known as an *E. coli* MCL violation, the water system must perform a Level 2 assessment and provide public notice within 24 hours. If a positive sample is collected on a consecutive system, the City also will need to collect source samples.

Coliform is a group of bacteria, some of which live in the digestive tract of humans and many animals and are excreted in large numbers with feces. Coliform can be found in sewage, soils, surface waters, and vegetation. The presence of any coliform in drinking water indicates a potential health risk and potential waterborne disease outbreak, which may include gastroenteric infections, dysentery, hepatitis, typhoid fever, cholera, and other infectious diseases. *E. coli* is a member of the coliform group that is almost exclusively of fecal origin, and their presence can lead to increased health risks.

The City's current water quality monitoring schedule dictates that ten routine samples be collected each month. To comply with the legal limit, systems must not find coliform in more than 5 percent of the samples taken each month. For smaller systems like the City's that take fewer than 20 samples per month, 1 sample that contains coliform would exceed the legal limit and trigger the follow-up sampling requirements. A copy of the City's Water Quality Monitoring Plan, including the coliform monitoring program and *E. coli* response plan, is contained in **Appendix J**. Within the past 6 years, the City detected the presence of coliform in its distribution system once (October 2014).

## Lead and Copper Rule

The Lead and Copper Rule identifies action levels for both lead and copper. An action level is different than an MCL. An MCL is a legal limit for a contaminant, and an action level is a trigger for additional prevention or removal steps. The action level for lead is greater than 0.015 milligrams per liter (mg/L). The action level for copper is greater than 1.3 mg/L. If the 90<sup>th</sup> percentile concentration of either lead or copper from the group of samples exceeds these action levels, a corrosion control study must be undertaken to evaluate strategies and make recommendations for reducing the lead or copper concentration below the action levels. The rule requires systems that exceed the lead level to educate the affected public about reducing its lead intake. Systems that continue to exceed the lead action level after implementing corrosion control and source water treatment may be required to replace piping in the system that contains lead sources. Corrosion control is typically accomplished by increasing the pH of the water to make it less corrosive, which reduces its ability to break down water pipes and absorb lead or copper.

Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery, porcelain, pewter, brass, and water. Lead can pose a significant health risk if too much of it enters the body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells, and kidneys. The greatest risk is to young children and pregnant women. Lead can slow normal mental and physical development of growing bodies. The City is on a standard 3-year testing schedule for lead and copper. The last sample date was August 2, 2018 (with no violation); therefore, the next sample date is August 2021.

Copper is a common, natural, and useful metal found in our environment. It is also a trace element needed in most human diets. The primary impact of elevated copper levels in water systems is stained plumbing fixtures. At certain levels (well above the action levels), copper may cause nausea, vomiting, and diarrhea. It also can lead to serious health problems in people with Wilson's disease. Long-term exposure to elevated levels of copper in drinking water also could increase the risk of liver and kidney damage. The City currently complies with all contaminant monitoring and treatment requirements under this rule.

## Radionuclides Rule

The Radionuclides Rule establishes an MCLG of zero for alpha, beta, and photon emitters and radium 226/228, and MCLs of 5 picocuries per liter (pCi/L) for combined radium-226 and radium-228, 15 pCi/L for gross alpha (excluding radon and uranium), 4 millirems per year (mrem/year) for beta particle and photon radioactivity, and 30 micrograms per liter (µg/L) for uranium. The City currently complies with all contaminant monitoring requirements under this rule.

## Watershed Control Program

The Washington State mandate for watershed protection and the required elements of a watershed control program are contained in WAC 246-290-135, Source Protection. A watershed

control program is a proactive and ongoing effort of a water purveyor to exercise surveillance over the conditions and activities within the watershed affecting source water quality to protect the health of its customers, as outlined in WAC 246-290-668, Watershed Control. Group A public water systems that use surface water or groundwater under the influence of surface water as their source are required to develop and implement a watershed control program. All required elements of a watershed control program must be documented and included in the purveyor's Water System Plan (applicable to the City) or Small Water System Management Program (not applicable to the City). The City's Ranney Well is considered a surface water source and the City currently complies with this program. A copy of the City's Watershed Control Program is contained in **Appendix K**.

### Wellhead Protection Program

The Washington State mandate for wellhead protection, and the required elements of a wellhead protection program, is contained in WAC 246-290-135, Source Protection. A wellhead protection program is a proactive and ongoing effort of a water purveyor to protect the health of its customers by preventing contamination of the groundwater that it supplies for drinking water. Group A public water systems that use groundwater as their source are required to develop and implement a wellhead protection program. All required elements of a local wellhead protection program must be documented and included in either the Water System Plan (applicable to the City) or a Small Water System Management Program document (not applicable to the City). The City's water source is considered surface water; therefore, the Wellhead Protection Program does not apply.

### Consumer Confidence Report

The Consumer Confidence Report (CCR) is the centerpiece of the right-to-know provisions of the 1996 Amendments to the SDWA. The annual report must be updated and re-issued to all customers by July 1<sup>st</sup> of each year thereafter.

The CCR is a report on the quality of water that was delivered to the water users during the previous calendar year. The report must contain certain specific elements, but also may contain other information that the purveyor deems appropriate for public education. Some, but not all, of the information that is required in the report includes the source and type of the drinking water, type of treatment, contaminants that have been detected in the water, potential health effects of the contaminants, identification of the likely source of contamination, violations of monitoring and reporting, and variances or exemptions to the drinking water regulations. A copy of the City's most recent CCR is contained in **Appendix L**.

### Stage 1 Disinfectants/Disinfection Byproducts Rule

Disinfection byproducts (DBPs) are formed when free chlorine reacts with organic substances, most of which occur naturally. These organic substances (called precursors) are a complex and variable mixture of compounds. The DBPs themselves may pose health risks.

The rule applies to the City and most other water systems, including systems serving fewer than 10,000 people that add a chemical disinfectant to the drinking water during any part of the treatment process. The rule reduced the MCL for total trihalomethanes (TTHMs), which are a composite measure of four individual trihalomethanes, from the previous interim level of 0.10 mg/L to 0.08 mg/L. The rule establishes MCLs and requires monitoring of three additional categories of DBPs (0.06 mg/L for five haloacetic acids (HAA5), 0.01 mg/L for bromate, and 1.0 mg/L for chlorite). The rule establishes maximum residual disinfectant levels for chlorine (4.0 mg/L), chloramines (4.0 mg/L), and chlorine dioxide (0.8 mg/L). The rule also requires systems using surface water or groundwater directly influenced by surface water to implement enhanced coagulation or softening to remove DBP precursors, unless alternative criteria are met. The City currently complies with all contaminant monitoring requirements under this rule.

### Unregulated Contaminant Monitoring Rule

The EPA established the Unregulated Contaminant Monitoring Rule (UCMR) to generate data on contaminants that are being considered for inclusion in new drinking water standards. The information collected by select public water systems will ensure that future regulations established by the EPA are based on sound science.

Three separate lists of unregulated contaminants are maintained under the UCMR: List 1; List 2; and List 3. Contaminants are organized on the tiered lists based on the availability of standard testing procedures and the known occurrence of each contaminant, with List 1 containing contaminants that have established standard testing procedures and some, but insufficient, information on their occurrence in drinking water. Monitoring for contaminants on the three lists is limited to a maximum of 30 contaminants within a 5-year monitoring cycle, and the EPA is required to publish new contaminant monitoring lists every 5 years. As new lists are published, contaminants will be moved up in the lists if adequate information is found to support additional monitoring. All public water systems serving more than 10,000 people and a randomly selected group of smaller water systems are required to monitor for contaminants. The City currently monitors for some unregulated contaminants.

### Arsenic

Arsenic is highly toxic, affects the skin and nervous system, and may cause cancer. The Arsenic Rule sets the MCLG of arsenic at zero and the MCL to 0.01 mg/L. Arsenic's monitoring requirements are consistent with the existing requirements for other inorganic contaminants. The City has no recorded exceedances of arsenic in its history of sampling. The City is currently in compliance with the contaminant monitoring requirements under this rule.

### Filter Backwash Recycling Rule

Public water systems using surface water or groundwater under the direct influence of surface water that utilize filtration processes and recycling must comply with the Filter Backwash Recycling Rule. The rule aims to reduce risks associated with recycling contaminants removed during filtration.

The rule requires filter backwash water to be returned to a location that allows complete treatment. In addition, filtration systems must provide detailed information regarding the treatment and recycling process to the state. The City's Water Treatment Plant is compliant with this rule.

### Stage 2 Disinfectants/Disinfection Byproducts Rule

The EPA implemented the Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 D/DBPR) simultaneously with the Long Term 2 Enhanced Surface Water Treatment Rule.

Similar to the Stage 1 D/DBPR, this rule applies to most water systems that add a disinfectant to the drinking water other than ultraviolet light or those systems that deliver such water. The Stage 2 D/DBPR changes the calculation procedure requirement of the MCLs for two groups of disinfection byproducts, TTHM and HAA5. The rule requires each sampling location to determine compliance with MCLs based on their individual annual average DBP levels (termed the Locational Running Annual Average), rather than utilizing a system-wide annual average. The rule also proposes new MCLGs for chloroform (0.07 mg/L), trichloroacetic acid (0.02 mg/L), and monochloroacetic acid (0.03 mg/L).

Additionally, the rule requires systems to document peak DBP levels and prepare an Initial Distribution System Evaluation (IDSE) to identify Stage 2 D/DBPR compliance monitoring sites. IDSEs require each water system to prepare a separate IDSE plan and report, with the exception of those systems who obtain a 40/30 Certification or a Very Small System Waiver. In order to qualify for the 40/30 Certification, all samples collected during Stage 1 monitoring must have TTHM and HAA5 levels less than or equal to 0.040 mg/L and 0.030 mg/L, respectively. The City currently complies with all contaminant monitoring requirements under this rule. In addition, the City has completed its IDSE plan and it was approved in 2010.

### Long Term 2 Enhanced Surface Water Treatment Rule

Following the publishing of the IESWTR, the EPA introduced the LT1ESWTR to supplement the preceding regulations. The second part of the regulations of the LT1ESWTR are mandated in the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The final rule was implemented simultaneously with the Stage 2 D/DBPR described in the previous section. This rule applies to all systems that use surface water or GWI sources.

This rule establishes treatment technique requirements for filtered systems based on their risk level for contamination, calculated from the system's average *Cryptosporidium* concentration. Requirements include up to 2.5-log *Cryptosporidium* treatment, in addition to existing requirements under the IESWTR and LT1ESWTR. Filtered systems that demonstrate low levels of risk will not be required to provide additional treatment. Unfiltered systems under this rule must achieve at least a 2-log inactivation of *Cryptosporidium* if the mean level in the source water remains below 0.01 oocysts/L. If an unfiltered system's mean level of *Cryptosporidium* exceeds 0.01 oocysts/L, the LT2ESWTR requires the system to provide a minimum 3-log inactivation of *Cryptosporidium*. All unfiltered systems also are required to utilize a minimum of two disinfectants in their treatment process.

The LT2ESWTR also addresses systems with unfinished water storage facilities. Under this rule, systems must either cover their storage facilities or achieve inactivation and/or removal of 4-log virus, 3-log *Giardia lamblia*, and 2-log *Cryptosporidium* on a state-approved schedule. Lastly, the rule extends the requirement of the disinfection profiles mandated under the LT1ESWTR to the proposed Stage 2 D/DBPR. The City's Ranney Well is considered a surface water source and the City currently complies with this rule.

### Groundwater Rule

The EPA promulgated the Groundwater Rule (GWR) to reduce the risk of exposure to fecal contamination that may be present in public water systems that use groundwater sources. The GWR also specifies when corrective action (which may include disinfection) is required to protect consumers who receive water from groundwater systems from bacteria and viruses. The GWR applies to public water systems that use groundwater and to any system that mixes surface and ground waters if the groundwater is added directly to the distribution system and provided to consumers without treatment equivalent to surface water treatment.

The rule targets risk through an approach that relies on the following four major components:

1. Periodic sanitary surveys of groundwater systems that require the evaluation of eight critical elements and the identification of significant deficiencies (such as a well located near a leaking septic system). DOH conducted its most recent sanitary survey of the City's water system on September 21, 2017.
2. Source water monitoring to test for the presence of *E. coli*, enterococci, or coliphage in the sample. There are two monitoring provisions.
  - Triggered monitoring for systems that do not already provide treatment that achieves at least 99.99-percent (4-log) inactivation or removal of viruses and that have a total coliform positive routine sample under the Revised Total Coliform Rule sampling in the distribution system.
  - Assessment monitoring is a complement to triggered monitoring. A state has the option to require systems to conduct source water assessment monitoring at any time to help identify high risk systems.
3. Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following corrective action options: correct all significant deficiencies; eliminate the source of contamination; provide an alternate source of water; or provide treatment that reliably achieves 99.99-percent inactivation or removal of viruses.
4. Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99-percent inactivation or removal of viruses.

The City has completed addressing minor deficiencies identified in its most recent sanitary survey and complies with all other requirements of the rule.



## Future Regulations

Drinking water regulations are continuously changing in an effort to provide higher quality and safer drinking water. Modifications to the existing rules described previously and implementation of new rules are planned for the near future. A summary of upcoming drinking water regulations that will most likely affect the City is presented in the following sections.

### Per- and Polyfluoroalkyl Substances

In 2016, the US EPA established a health advisory level for per- and polyfluoroalkyl substances (PFAS) at 70 parts per trillion (ppt). DOH proposed draft rule language in 2019 for PFAS that is currently in the comment period and is anticipated for adoption in summer 2021.

PFAS has been used since the 1950s to manufacture stain-resistant, water-resistant, and non-stick products. It is widely used as coatings in common consumer products such as food packaging, outdoor clothing, carpets, leather goods, ski and snowboard waxes, and more. PFAS contamination in water sources has been linked to the historical use of PFAS-based firefighting foam used by the US military, local fire departments, and airports. Since the final PFAS rule requirements are uncertain, the impact of this rule on the City is unknown at this time.

### Radon

In July of 1991, the EPA proposed a regulation for radon, as well as three other radionuclides. The 1996 SDWA Amendments required the EPA to withdraw the 1991 proposal due to several concerns that were raised during the comment period. A new proposed regulation was published in the Federal Register on November 2, 1999. Final federal requirements for addressing radon were delayed until 2008 but have not yet been published. The rule proposes a 300 pCi/L MCL for community water systems that use groundwater or an alternative, less stringent MCL of 4,000 pCi/L for water systems where their state implements an EPA-approved program to reduce radon risks in household indoor air and tap water. It is not currently known when or what a radon regulation may require as adopted by the EPA or what the implementation schedule for the rule will be. Because the final radon rule requirements are uncertain, the impact of this rule on the City is unknown at this time.

### Unregulated Contaminant Monitoring Rule Revisions

In accordance with the original UCMR and the SDWA, once every 5 years the EPA will issue a new list of no more than 30 unregulated contaminants to be monitored by public water systems. The fourth UCMR was proposed on December 11, 2015, includes a list of 30 chemicals that will be monitored during the 2017 through 2021 monitoring cycle, and approves several new testing methods to conduct the monitoring. For this upcoming cycle, all systems serving more than 10,000 people and a larger representative sample of smaller water systems will be required to monitor for contaminants. The rule also requires additional water system data to be reported with the monitoring results, establishes a procedure for determining minimum



reporting levels, and proposes several revisions to the implementation of the monitoring program.

## SOURCE WATER QUALITY

This section presents the current source water quality standards and the results of the City's recent source water quality monitoring efforts. A discussion of the water quality requirements and monitoring results for the City's distribution system is presented in the section that follows.

### Drinking Water Standards

Drinking water quality is regulated at the federal level by the EPA and at the state level by DOH. Drinking water standards have been established to maintain high-quality drinking water by limiting the levels of specific contaminants (i.e., regulated contaminants) that can adversely affect public health and are known or likely to occur in public water systems. Non-regulated contaminants do not have established water quality standards and are generally monitored at the discretion of the water purveyor and in the interest of customers.

The regulated contaminants are grouped into two categories of standards – primary and secondary. Primary standards are drinking water standards for contaminants that could affect health. Water purveyors are required by law to monitor and comply with these standards and notify the public if water quality does not meet any one of the standards. Secondary standards are drinking water standards for contaminants that have aesthetic effects, such as unpleasant taste, odor, or color (staining). The national secondary standards are unenforceable federal guidelines or goals where federal law does not require water systems to comply with them. However, states may adopt their own enforceable regulations governing these contaminants. The State of Washington has adopted regulations that require compliance with some of the secondary standards. Water purveyors are not required to notify the public if their water quality does not meet the secondary standards.

### Source Monitoring Requirements and Waivers

The City is required to perform water quality monitoring at its active source for inorganic chemical and physical substances, organic chemicals, and radionuclides. The monitoring requirements that the City must comply with are specified in WAC 246-290-300. A description of the source water quality monitoring requirements and procedures for each group of substances is contained in the City's Water Quality Monitoring Plan, which is included as **Appendix J**.

DOH has developed the Surface Water Checklist Form for water purveyors to complete for use in determining a drinking water source's potential for contamination. The results of the assessment may provide monitoring waivers that allow reduced source water quality monitoring. Based on the results of the susceptibility assessment survey, DOH assigns High Susceptibility rating to all surface water sources, including the Lewis River source water.

## Source Monitoring Results

The City's Ranney Well maintains a high level of water quality and has met or exceeded all drinking water standards within the last 6 years.

The Ranney Well was last monitored for IOCs in October 2016, with a waiver valid through October 2025. VOCs were last monitored in June 2020, with a frequency of 1 year. SOCs were last monitored in 2015 and 2016 with a 9-year waiver. Radionuclides were last monitored in June 2016. Nitrates are tested yearly, and manganese is tested every 3 years. Manganese was last tested in March 2020. Although the City's water source contains both iron and manganese, which have been detected above the secondary standard levels in the past, the secondary standard has not been exceeded within the last 10 years.

The results of inorganic chemical (including nitrate) and VOC monitoring for the City's sources indicate that all primary and secondary standards were met.

## DISTRIBUTION SYSTEM WATER QUALITY

### Monitoring Requirements and Results

The City is required to perform water quality monitoring within the distribution system for coliform bacteria, disinfectant (chlorine) residual concentration, DBPs, lead and copper, and asbestos in accordance with Chapter 246-290 WAC. A description of the distribution system water quality monitoring requirements and procedures is contained in the City's Water Quality Monitoring Plan that is included in **Appendix J**.

#### Coliform Monitoring

The City is required to collect a minimum of eight to ten coliform samples per month from different locations throughout the system. The results of coliform testing from the past 6 years were all satisfactory, with the exception of a single positive total coliform sample taken in October 2014.

#### Disinfectant Residual Concentration Monitoring

Disinfection requirements applicable to the City are contained in WAC 246-290-310, which states that a disinfectant residual concentration shall be detectable in all active parts of the distribution system, and the maximum residual disinfectant level shall be 4.0 mg/L for chlorine and chloramines. The City targets a free chlorine residual around 1.0 mg/L, leaving its chlorination facilities to ensure a detectable residual throughout the distribution system.

#### Disinfectants/Disinfection Byproducts Monitoring

Total Trihalomethanes (TTHM) and HAA5 are DBPs that are formed when free chlorine reacts with organic substances (i.e., precursors), most of which occur naturally. Formation of TTHM and HAA5 are dependent on such factors as the amount and type of chlorine used, water temperature, concentration of precursors, pH, and chlorine contact time. TTHM have been

found to cause cancer in laboratory animals and are suspected to be human carcinogens. The City must collect and report a minimum of four TTHM and four HAA5 samples on a quarterly basis. No exceedances of the TTHM or HAA5 MCL were recorded in the last 6 years.

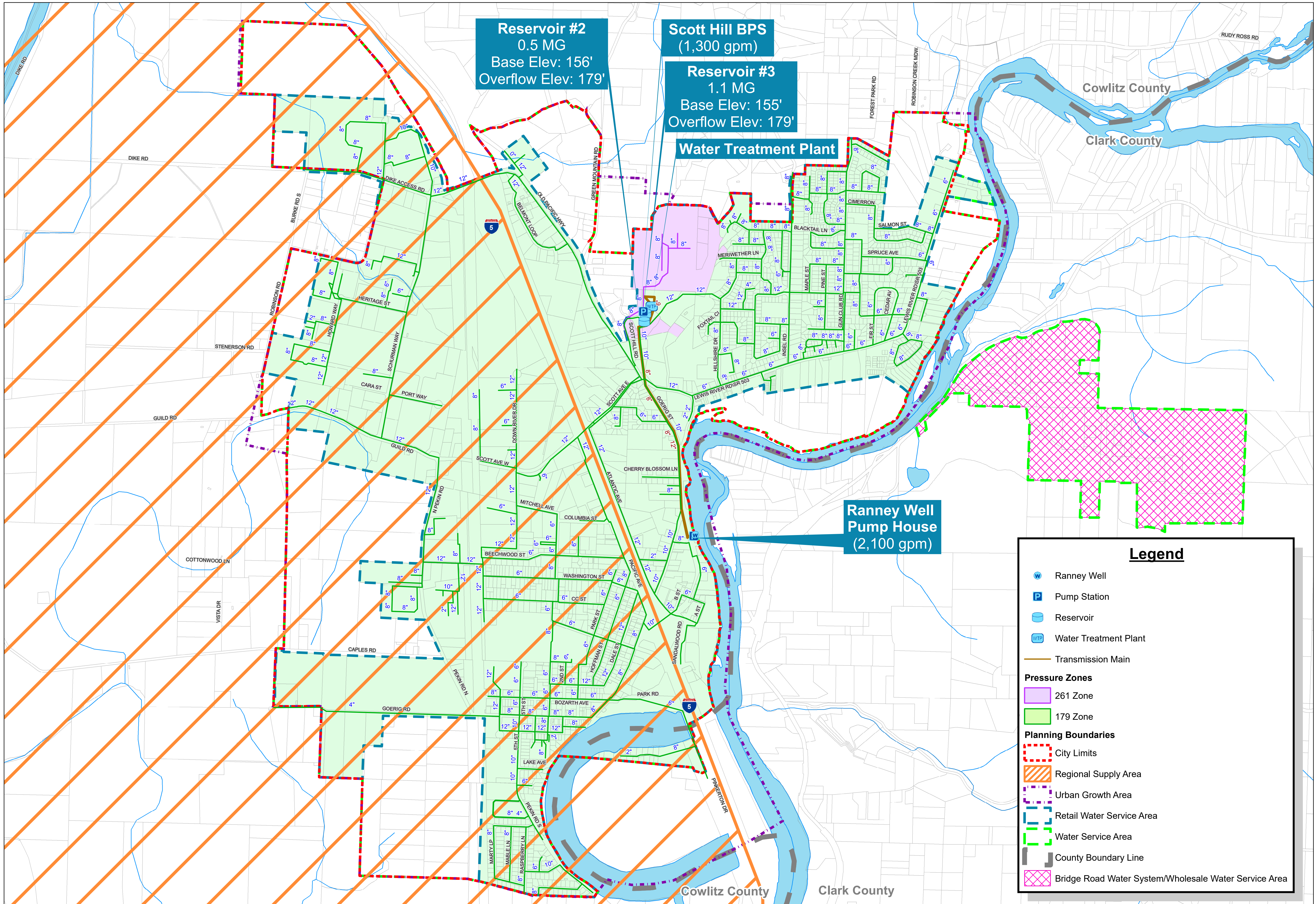
### Lead and Copper Monitoring

The Lead and Copper Rule identifies the action level for lead as being greater than 0.015 mg/L, and the action level for copper as being greater than 1.3 mg/L. Every 3 years, the City must collect and report a minimum of 30 samples. The City last sampled for lead and copper in August 2018. All previous samples indicate the City is in compliance with these regulations.

### Asbestos

Asbestos monitoring is required if the sources are vulnerable to asbestos contamination or if the distribution system contains more than 10 percent of asbestos cement pipe. The City currently monitors for asbestos. The current MCL for asbestos is 7 million fibers per liter (MFL) and greater than 10 microns in length. Monitoring must be accomplished during the first 3-year compliance period of each 9-year compliance cycle. The water sample must be taken at a tap where asbestos contamination is most likely to occur. The last sample for asbestos was recorded in 2013, which had a concentration of 1.4 MFL. Therefore, the City is in compliance with the asbestos MCL. Currently, the City has a 9-year standard waiver for asbestos sampling that lasts through 2022.





**Reservoir #2**  
0.5 MG  
Base Elev: 156'  
Overflow Elev: 179'

**Scott Hill BPS**  
(1,300 gpm)

**Reservoir #3**  
1.1 MG  
Base Elev: 155'  
Overflow Elev: 179'

**Water Treatment Plant**

**Ranney Well Pump House**  
(2,100 gpm)

Cowlitz County

Clark County

Cowlitz County

Clark County

**Legend**

- Ranney Well
- Pump Station
- Reservoir
- Water Treatment Plant
- Transmission Main
- Pressure Zones**
- 261 Zone
- 179 Zone
- Planning Boundaries**
- City Limits
- Regional Supply Area
- Urban Growth Area
- Retail Water Service Area
- Water Service Area
- County Boundary Line
- Bridge Road Water System/Wholesale Water Service Area

This map is a graphic representation derived from the City of Woodland Geographic Information System. It was designed and intended for City of Woodland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Woodland.

This material is owned and copyrighted by the City of Woodland.

**Vicinity Map**



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

**Figure 6-1**  
**Regional Supply Area**  
**City of Woodland**  
**Water System Plan**

J:\DATA\WOOD\119-141\GIS\WSP-FIG\_6-1\_REGIONAL\_SUPPLY\_AREA.MXD BY: DBRIGHT PLOT DATE: OCT 9, 2020 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET



1 inch = 800 feet  
0 400 800 1,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"





**THIS PAGE INTENTIONALLY LEFT BLANK**