

E | EXECUTIVE SUMMARY

PURPOSE OF THE WATER SYSTEM PLAN

The City of Woodland's (City) water system is a major infrastructure, much of which is invisible to the customers that receive its water. The water system requires qualified staff to operate and maintain an ongoing capital improvement program to replace old components to meet the requirements mandated by federal and state laws. The primary purpose of the City of Woodland Water System Plan (WSP) is to identify and schedule water system improvements that correct existing system deficiencies and ensure a safe and reliable supply of water to current and future customers. This WSP complies with Washington State Department of Health (DOH) regulations under Chapter 246-290 Washington Administrative Code (WAC), which requires water purveyors to update their water system plans every 10 years.

The City's previous WSP was prepared in November 2012. This updated 2020 WSP reflects the City's *2016-2036 Woodland Comprehensive Plan* population allocation to the City and the City's current Urban Growth Area (UGA). The WSP also reflects improvements and changes to the water system since the completion of the 2012 WSP.

SUMMARY OF KEY ELEMENTS

This WSP presents a description of the existing water system and service area, a forecast of future water demands, policies and design criteria for water system operation and improvements, the operations and maintenance program, staffing requirements, a schedule of improvements, and a financial plan to accomplish the improvements. The WSP also includes several ancillary elements that include a water use efficiency program, a water quality monitoring plan, a watershed control program, and a cross-connection control program. A summary of the key issues related to these elements is provided in the following sections.

Water Service Area

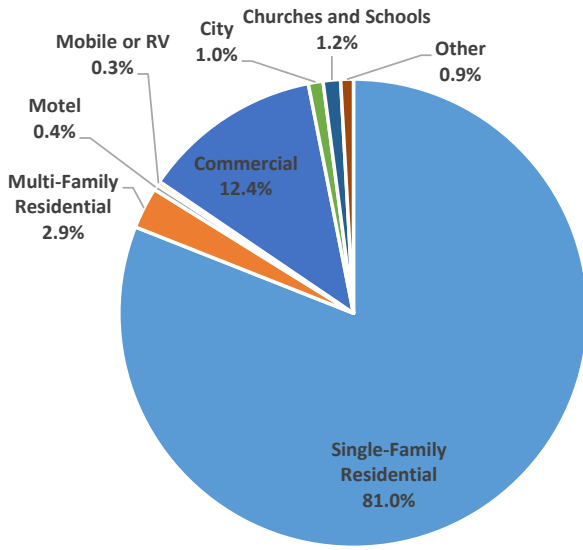
The City provides water service to approximately 6,308 people, mostly residing in the City Limits. The City is responsible for providing public water service, utility management, and water system development within this area. The City will strive to provide water service to all people within the City limits and designated retail water service area if the following conditions can be met:

- The City has sufficient capacity to serve water in a safe and reliable manner.
- The service request is consistent with local plans and development regulations.
- The City has sufficient water rights to provide service.
- The City can provide service in a timely and reasonable manner.

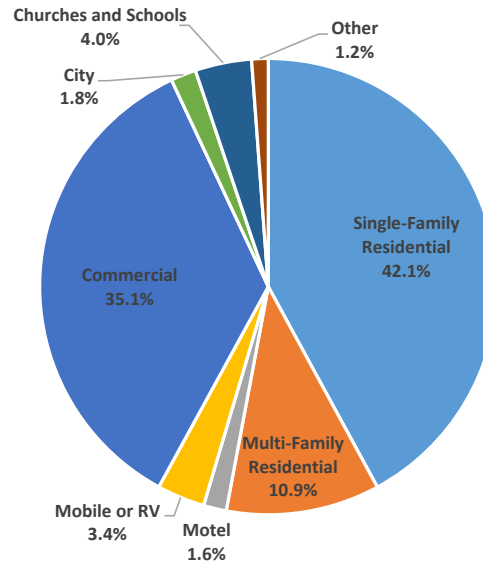
Requests for new water service outside the City limits, but within the UGA where there are no existing water mains fronting the property, will only be granted upon extension of water service

and completion of an annexation agreement (provided that the property is not already served or showing a bona fide public health emergency).

In 2018, the City provided water service to an average of 2,169 customer connections, which were mainly comprised of single-family connections. Single-family connections represent approximately 81 percent of all accounts, but the single-family class only consumed 42.1 percent of all water supplied to the system in 2018.



2018 Water Connections



2018 Water Consumption

Existing Water System

The City’s water system was initially established in the early 1900s. The City’s first water system included wooden pipes that lasted many years. Since then, the water system has been expanded and updated to what is presently the City of Woodland. Currently, water in the City’s system is supplied by a single source, the Ranney Collector Well. A summary of the source is shown in **Table ES-1**.

Table ES-1
Supply Facilities Summary

Facility	Pressure Zone	Year Installed	Existing Capacity (gpm)	Pump Type	Pump Motor Size (hp)	Water Treatment
Ranney Collector Well	179 Zone	1968	2,100	(3) Vertical Turbine	(3) 100	Oxidation, Filtration, Fluoridation, Corrosion Control, pH Adjustment, Disinfection

The City’s water system currently has two storage facilities that provide storage directly to the 179 Zone. Details on the City’s storage facilities are shown in **Table ES-2**.

Table ES-2
Storage Facilities Summary

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Diameter (feet)	Base Elev. (feet)	Overflow Elev. (feet)
Reservoir No. 2	Scott Hill Road	179 Zone	1962	Concrete	0.5	65	156	179
Reservoir No. 3	Scott Hill Road	179 Zone	2005	Steel	1.1	90	155	179

The City's water system currently has one booster pump station that provides supply to the 261 Zone from the 179 Zone, as shown in **Table ES-3**.

Table ES-3
Booster Pump Station Facilities Summary

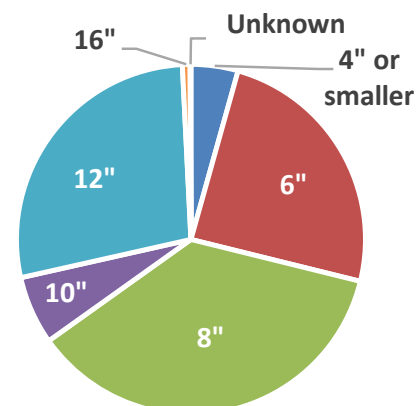
Pump Station	Suction Pressure Zone	Discharge Pressure Zone	Year Constructed	Existing Pumping Capacity (gpm)	Number of Pumps	Pump Type	Pump Motor Size (HP)	Generator ¹
Scott Hill BPS	179 Zone	261 Zone	2020	1,300	4	(4) single-stage end-suction centrifugal pumps	(3) 5 hp (1) 25 hp	Yes

¹ = The Scott Hill BPS is located on the City's WTP site, which has a redundant power supply.

The City's water system contains approximately 41 miles of water main ranging in size from less than 4 inches to 16 inches. As shown in **Table ES-4**, most of the water main (approximately 71 percent) within the system is 10 inches in diameter or less. The remaining 28 percent of the water main is 12 inches in diameter or larger.

Table ES-4
Water Main Diameter Inventory

Diameter (Inches)	Length (Feet)	% of Total
4 or smaller	9,323	4.4%
6	52,413	24.5%
8	77,744	36.3%
10	13,541	6.3%
12	59,325	27.7%
16	1,523	0.7%
Unknown	163	0.1%
Total	214,032	100%



Water main in the City's system is mainly composed of polyvinyl chloride (PVC) pipe, but also includes some asbestos cement, cast iron, ductile, iron, and galvanized steel pipes.

Past Water Usage

In general, the amount of water consumed by the City's customers and other authorized users remained relatively steady from 2015 to 2018. **Table ES-5** shows the City's annual water supply from 2013 to 2018, including the average day demand (ADD) for each year.

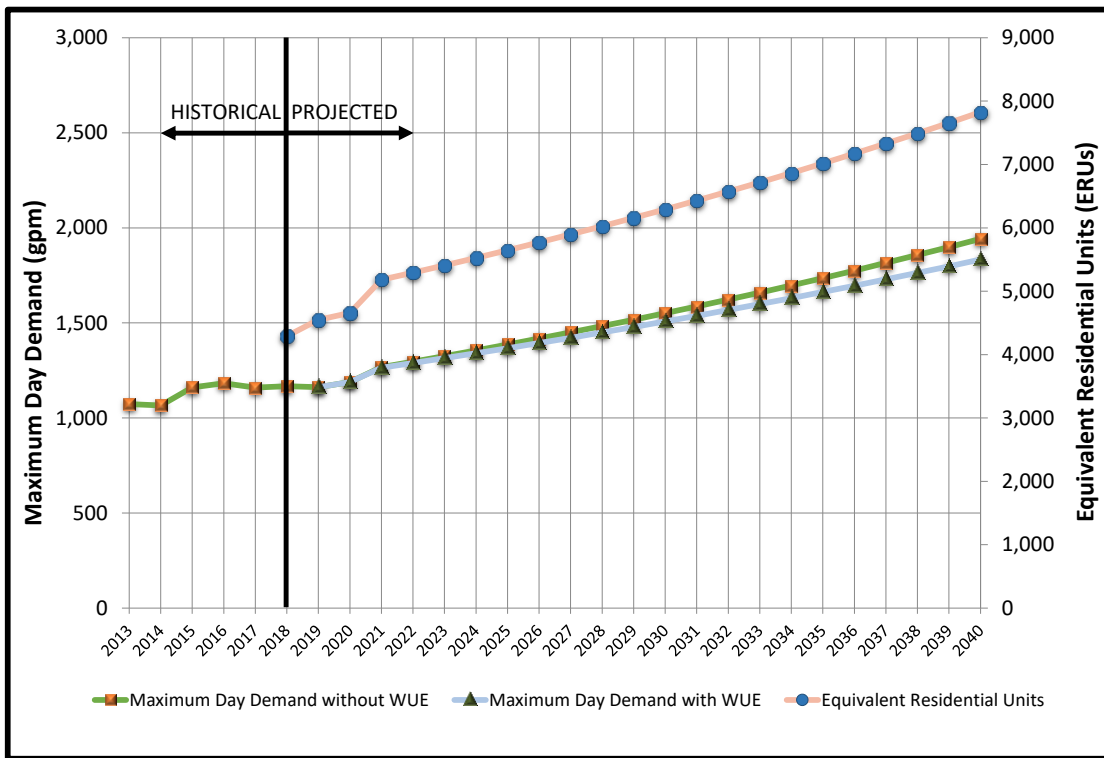
**Table ES-5
Historical Water Supply and System Demand**

Year	Annual Supply (gallons)	Average Day Demand (gpm)	Average Day Demand (gpd)
2013	265,716,000	506	727,989
2014	264,055,000	502	723,438
2015	287,612,000	547	787,978
2016	293,724,000	557	802,525
2017	287,195,000	546	786,836
2018	289,003,000	550	791,789

Future Water Demands and Water Supply

The City’s water system ADD is expected to increase by approximately 161 percent of 2018 demand by the end of the 20-year planning period with savings from water use efficiency measures. The historical and projected water demands and equivalent residential units (ERUs) for the City’s water system through 2040 are shown in **Chart ES-1**.

**Chart ES-1
Maximum Day Demand and ERU Projections**



Water Source and Quality

The City obtains its municipal water supply from the Ranney Collector Well, located on the west bank of the Lewis River, and supplies the distribution system via the water treatment plant. The Ranney Collector Well was constructed in 1968 and brought online in 1969. As of 2014, the overall capacity of the Ranney Collector well was increased to at least 2,100 gallons per minute (gpm) or 3 million gallons per day (MGD).

The City's water treatment plant (WTP) was put into service in 1999 to reduce turbidity, pathogens, and high levels of iron that exist in the source water. Raw water is pumped to the WTP from the Ranney Collector Well, where raw water is pre-treated, filtered, and then further treated before 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. Other pre-treatment processes include polymer addition, aluminum sulfate, and non-ionic polymer addition. After filtration, chlorine is added for disinfection, fluoridation, and pH adjustment with soda ash for distribution system corrosion control. Finished water flows by gravity to a 169,000-gallon clear well.

Operations and Maintenance

The City's operations and maintenance organization is staffed by well qualified, technically trained personnel. City staff regularly participate in safety and training programs to keep abreast of the latest changes in the water industry and ensure safe operation of the water system. The current staff of supervisory personnel and field crew, in which many are responsible for the water system and other utilities, have effectively operated and maintained the water system in the past. However, to optimize the preventative maintenance program and operations of the water system, additional personnel are recommended. As the water system expands in the future and continues to age, additional staff will also be required. The City plans to add staff to meet the increased requirements from system expansion as the budget allows.

Water System Evaluation

The existing water system was evaluated to determine its ability to meet the policies and design criteria of the City and those mandated by DOH. The results of the evaluation are summarized below.

- The City has sufficient water rights to meet the demands of existing and future customers until at least 2040.
- Additional storage will be required in the 179 Zone to resolve current storage deficiencies and provide sufficient capacity for future customers.
- The filter media in two of the existing filtration trains at the WTP are beyond their expected service life and need to be replaced.
- The filter media in the third existing filtration train in the WTP is nearing the end of its life expectancy. Replacement of the filter media in the third filtration train is recommended after the first two trains have been replaced.

- It is estimated that by 2026, all three filtration trains at the WTP will be needed to operate to meet the MDD of the system. A fourth filtration train is recommended for redundancy.
- Some of the major equipment at the WTP will reach its expected service life in the 20-year planning period. Replacement of the blowers, older chemical storage tanks, and water booster pump station is recommended with in-kind replacements.
- Several areas of the system require water main replacements to resolve deficiencies related to older, undersized water mains.

Proposed Water System Improvements and Financing Plan

Improvements to the water system are necessary, primarily to resolve existing system deficiencies, but also to accommodate the increase in water demands from future growth. Improvements identified for the first 10 years of the capital improvement program (2020 through 2029) are estimated to cost approximately \$17.5 million, with \$14.4 million of recommended improvements in the following 11 years (2030 through 2040).

The financial analysis is intended to illustrate the feasibility of funding the operation and maintenance and capital improvements recommended for the water system over the 10-year planning period.