

# 9 | WATER SYSTEM IMPROVEMENTS

## INTRODUCTION

This chapter presents proposed improvements to the City of Woodland's (City) water system that are necessary to resolve existing system deficiencies and accommodate the projected growth of water customers. The water system improvements were identified from an evaluation of the results of the water system analyses presented in **Chapter 7**. The water system improvements were sized to meet both the existing and future demand conditions of the system.

A Capital Improvement Program (CIP) number has been assigned to each proposed improvement. The CIP projects, along with their assigned numbers, are shown in plan view on **Figure 9-1**. The improvements also are illustrated in the hydraulic profile of the future water system (**Figure 9-2**). The improvements are organized and presented in this chapter according to the following categories.

- Recent Water System Improvements
- Water Main Improvements
- Facility Improvements
- Miscellaneous Improvements

The remainder of this chapter presents a brief description of each group of improvements, the criteria for prioritization, the basis for the cost estimates, and the schedule for implementation.

## DESCRIPTION OF IMPROVEMENTS

This section provides a general description of each group of improvements and an overview of the deficiencies they will resolve. Most of the improvements are necessary to resolve existing system deficiencies.

### Recent Water System Improvements

The water system has undergone several changes since 2012, when the City's Water System Plan (WSP) was last updated. The City has implemented many of the recommended projects as scheduled in its previous CIP, as well as several others. **Table 9-1** lists the projects that have been completed. In addition to these major projects, the City has implemented many smaller projects, including water main replacements and extensions.

**Table 9-1**  
**Improvements Completed Since 2012 WSP**

<b>Project Description</b>	<b>Year Completed</b>
Large Meter Replacement	2013
Large Scale Small Meter Replacement <sup>1</sup>	Ongoing
Leak Detection <sup>1</sup>	Ongoing
Ranney Well Source Project	2014
Ventilation Panels over the Treatment Units, Electrical Improvements	2020
Scott Avenue/SR 503	2015
Scott Hill Booster Pump Station	2020

<sup>1</sup> = These projects will be completed over the course of several years

## Water Main Improvements

The following water main improvements were identified from the results of the distribution and transmission system analyses discussed in **Chapter 7**. Most of the water main improvements will replace existing distribution water main and are grouped in the “Annual Water Main Replacement Program” project (CIP WM1). The individual water main improvement projects within this group are numbered 1 through 42, as shown in **Figure 9-1**. The other water main improvements, identified as individual projects (CIP WM2 through WM10) are mostly high-priority projects, larger diameter water mains, new alignments, projects included in the previous WSP that the City has already allocated budget to, or other unique projects that do not entail the replacement and/or upsizing of existing water main.

### CIP WM1: Annual Water Main Replacement Program

**Deficiency:** Most of the water main improvements shown in **Figure 9-1** are required to resolve existing system fire flow deficiencies primarily caused by older, undersized water mains.

**Improvements:** Replace existing water main with new water main in accordance with the City’s Construction Standards and Specifications, which are contained in **Appendix H**. The individual water main improvements grouped under this project are numbered 1, 2, 3, etc., as shown in **Figure 9-1**. The selection of specific projects will be accomplished during the City’s annual budget development process and will be guided by the prioritization presented later in this chapter. This provides the City with the flexibility to coordinate these projects with other projects that may occur within the same area. A variable allowance per year has been established for the annual replacement of the water mains based on the City’s available budget.

### CIP WM2: West Scott Connector (Down River Drive to Tracks)

**Deficiency:** There are only two existing points of connection between the east and west side of the railroad, one being near the south end of the system between North Pekin Road and Beechwood Street, and the other being on the northern most part of the system in the Old Pacific Highway.

**Improvements:** Install new 12-inch water main in West Scott Avenue from Down River Drive to the east side of the railroad.

### CIP WM3: West Scott Connector (Tracks to Guild Road)

**Deficiency:** There are only two existing points of connection between the east and west side of the railroad, one being near the south end of the system between North Pekin Road and Beechwood Street, and the other being on the northern most part of the system in the Old Pacific Highway.

**Improvements:** Install new 12-inch water main in West Scott Avenue from the east side of the railroad to Guild Road to connect the two existing alignments of 12-inch water main in West Scott Avenue. This project will include the bore beneath the railroad to connect the east and west parts of the system. This project improves the reliability and looping in the system.

### CIP WM4: SR 503 (Scott to Gun Club)

**Deficiency:** This project was included in the City's 2012 WSP as an improvement to meet the City's fire flow goals along Lewis River Road between West Scott Avenue and Gun Club Road.

**Improvements:** Replace approximately 2,300 feet of existing 6-inch water main in Lewis River Road between West Scott Avenue and Gun Club Road with 12-inch water main. This project improves the fire flow availability along Lewis River Road and provides more transmission capacity to the northeast side of the system.

### CIP WM5: Wastewater Plant

**Deficiency:** This project was included in the City's 2012 WSP as an improvement to meet the City's fire flow goals.

**Improvements:** This improvement requires the replacement of existing 6-inch water main in Sandalwood Road with 12-inch water main, from East CC Street south to the dead end of the existing water main.

### CIP WM6: 5<sup>th</sup> Street North of Bozarth

**Deficiency:** This project, which was identified from the City's 2012 WSP, is needed to meet the minimum planning-level fire flow requirements near the Columbia Elementary School.

**Improvements:** Replace approximately 650 feet of existing 6-inch water main with 8-inch water main to improve the fire flow availability near the Columbia Elementary School.

### CIP WM7: South Pekin Project

**Deficiency:** This project was identified in the City's 2012 WSP and is needed to improve the fire flow availability in the south Pekin area and to provide additional looping and redundancy.

**Improvements:** This improvement involves the installation of approximately 1,450 feet of 12-inch water main. Approximately 580 feet will be the replacement of existing 10-inch water main in South Pekin Road between Lake Avenue and Lilac Lane. The remaining 870 feet will involve the installation of new water main in South Pekin Road between Marty Loop and Windflower Drive.

### CIP WM8: Lakeshore and Island Aire Drives

**Deficiency:** This project was included in the City's 2012 WSP as an improvement to meet the City's fire flow goals.

**Improvements:** Replace approximately 2,060 feet of existing 6-inch water main in Park Road and Lakeshore Drive between Goerig Street and Island Aire Drive. Replace approximately 620 feet of existing 6-inch water main in Lakeshore Drive from Island Aire Drive south to the dead end of the water main.

### CIP WM9: Salmon to McCracken

**Deficiency:** This project was included in the City's 2012 WSP as an improvement to meet the City's fire flow goals.

**Improvements:** Replace approximately 1,210 feet of existing 6-inch water main in Lewis River Road from Salmon Street to McCracken Road with 12-inch water main to meet minimum planning-level fire flow requirements.

### CIP WM10: Scott Avenue/SR 503

**Deficiency:** This project was identified in the City's 2012 WSP to meet the minimum planning-level fire flow requirements and provide additional redundancy to the northeast portion of the water system. If the existing water main in West Scott Avenue were to fail, then the northeast portion of the system would only be supplied by a single 12-inch water main north of the City's water treatment plant (WTP).

**Improvements:** This improvement requires the replacement of approximately 475 feet of existing 2-inch water main with 12-inch water main in Lewis River Road from East Scott Avenue to the southeast corner of 1695 Lewis River Road, and then the installation of approximately 567 feet of new 12-inch water main from 1695 Lewis River Road to Goerig Street.

## Facility Improvements

The following water system facility improvements were identified from the results of the water system analyses that are discussed in **Chapter 7**. The improvements are primarily necessary to resolve existing system deficiencies, but also have been sized to accommodate projected growth.

### CIP F1: Additional Storage Reservoir

**Deficiency:** The system has an existing storage deficiency of 0.14 million gallons (MG) and is projected to have a storage deficiency of 0.89 MG by the end of the planning period (2040).

**Improvements:** In order to resolve this deficiency, the City plans to install a new 1.0 MG 179 Zone Reservoir. It is assumed that the new reservoir will be constructed at the existing WTP site and will have a base elevation of 155 feet and an overflow elevation of 179 feet.

### CIP F2, F3, and F4: Filter Restoration and Media Replacement

**Deficiency:** Two of the existing filtration trains are the original trains installed when the WTP was put into service in 1999. The third existing filtration train was installed in 2007 to increase the treatment capacity of the WTP. In general, the expected service life of filter media like the types at the WTP is 15 years. The filter media in the original two filters is beyond the expected service life and the filter media in the third filter is nearing it.

**Improvements:** Replace the full filter media profile in each of the three filters, prioritizing the original two filters first. Given the ages of the filters, perform restoration of the filter vessel and component where applicable.

### CIP F5: Scott Hill Booster Pump Station – Additional Fire Flow Pump

**Deficiency:** There is an existing fire flow deficiency in limited areas of the 261 Zone. The highest elevation hydrants, approximately 155 feet, in the Scott Hill Park and Sports Complex will only be able to supply approximately 95 percent of the required planning-level fire flow. The Scott Hill Booster Pump Station (BPS) is lacking a redundant high flow pump.

**Improvements:** Replace the existing high flow pump with a larger pump to meet existing and future planning-level fire flow requirements throughout the 261 Zone. Install an additional fire flow pump at the BPS for redundancy purposes.

### CIP F6: WTP Filtration Capacity Rating and Redundancy Evaluation

**Deficiency:** The existing WTP is rated for 2,100 gallons per minute (gpm) (3 million gallons per day (MGD)) with three filtration trains, each rated for 700 gpm (1 MGD). As identified in **Chapter 4**, it is projected that MDD will increase beyond 1,400 gpm in 2026 to nearly 2,000 gpm by 2040. Starting in 2026, all three filtration trains in operation may be required to meet MDD. When three filtration trains are in operation, there is no redundant filtration train. The filtration rate should be confirmed to determine if the rated capacity of each existing train can be increased to a maximum rating of 800 gpm.

**Improvements:** Perform and document an evaluation of the frequency of MDD occurring on an annual basis, along with the potential for two filtration trains to treat flows between 1,400 gpm and approximately 1,600 gpm. Facilitate discussions between the City and the Washington State Department of Health (DOH) regarding the WTP capacity rating with filtration redundancy (two filtration trains online and one redundant filtration train) up to 1,600 gpm and DOH's application of WAC 246-290-678, Reliability for Filtered Systems, for the City's WTP. Based on the requirements by DOH and the City's evaluation, identify timing between 2026 and 2040 for implementing filtration expansion to provide a fourth filtration train for redundancy when three filtration trains are required to be in operation. Develop conceptual WTP filter expansion improvements and associated planning-level costs.

### CIP F7: WTP Filtration Expansion

**Deficiency:** A fourth filtration train is needed prior to 2040 to provide filtration redundancy when meeting MDD per CIP F6.

**Improvements:** It is assumed the existing WTP expansion will consist of enlarging the existing building and other provisions for adding a fourth filtration train matching the existing three filtration trains. This project includes preliminary and final design and construction of the expansion. Timing and costs for the project will be refined as part of the work performed in CIP F6.

### CIP F8: WTP Major Equipment Replacements

**Deficiency:** Some of the major equipment at the WTP will reach its expected service life between 2030 and 2040. The WTP was put into service in 1999, and the original filtration backwash air scour blowers are still in use. Some of the chemical storage tanks were replaced in 2019; however, some older tanks remain. The WTP's water booster pump station also will reach its expected service life prior to 2040.

**Improvements:** Replace the blowers, older chemical storage tanks, and plant water booster pump station with in-kind equipment. It is assumed the City will directly purchase the equipment for installation by the City or an equipment supplier.

### Miscellaneous Improvements

The following improvements are planning efforts and program elements that are required to comply with various water regulations or are improvements that do not fit into one of the previous categories.

### CIP M1: Water Meter Upgrades

**Deficiency:** This project refers to the maintenance of small water meters in the system; several small meters in the system may be broken or in need of repair.

**Improvements:** Identify small meters that are broken or in need of repair, and replace or repair the small meters on an as-needed basis.

## ESTIMATING COSTS OF IMPROVEMENTS

Project costs for the proposed improvements were estimated based on costs of similar, recently constructed water projects in the City and around the Puget Sound area and are presented in 2020 dollars. The project cost estimates include the estimated construction cost of the improvement, sales tax of 7.9 percent, and a 20-percent contingency, as well as indirect costs estimated at 35 percent of the construction cost for engineering preliminary design, final design, and construction management services, permitting, legal, and administrative services.

Project cost estimates for water main projects were determined from the water main unit costs (i.e., cost per foot length) shown in **Table 9-2** and the proposed diameter and approximate length of each improvement.

**Table 9-2**  
**Water Main Unit Costs**

<b>Water Main Diameter (inches)</b>	<b>Project Cost Per Foot Length (2020 \$/LF)</b>
8	\$313
12	\$346
16	\$379
18	\$412

The unit costs for each water main size are based on estimates of all construction-related improvements, such as materials and labor for the water main installation, water services, fire hydrants, fittings, valves, connections to the existing system, trench restoration, asphalt surface restoration, other work necessary for a complete installation, indirect costs, contingency, and sales tax. Additional costs were added to some water main improvements to cover anticipated increased costs related to the project location and degree of difficulty.

## PRIORITIZING IMPROVEMENTS

The water system improvements were evaluated against established criteria to schedule projects that will correct the most deficiencies and meet the greatest need for improvement prior to projects correcting fewer deficiencies. A description of the criteria and method for prioritizing each category of improvements is provided in the sections that follow.

### Water Main Improvements

**Table 9-3** lists criteria that were established for prioritizing the water main improvements included in CIP WM1. The criteria are based on the underlying deficiencies of the existing water main that will be replaced by the proposed water main improvements. The criteria are arranged in three different categories with a weight factor assigned to each category. The criteria given the most weight are the Existing Water Main Fire Flow Capability and Existing Water Main Benefit Area categories.

**Table 9-3  
Water Main Improvements Priority Ranking Criteria**

<b>Points</b>	<b>Category</b>	<b>Weight Factor</b>	<b>Weighted Points</b>
<b>Existing Water Main Fire Flow Capability</b>			
3	Available Fire Flow is 74% or Less of Required Fire Flow	3	9
2	Available Fire Flow is 75 to 89% of Required Fire Flow	3	6
1	Available Fire Flow is 90% or Greater of Required Fire Flow	3	3
<b>Existing Water Main Benefit Area</b>			
3	Large Benefit Area (i.e. transmission main)	2	6
2	Medium Benefit Area	2	4
1	Small Benefit Area (i.e. localized area)	2	2
<b>Existing Water Main Material</b>			
3	Asbestos Cement or Unknown	1	3
2	Galvanized Iron, Steel, or Cast Iron	1	2
1	Ductile Iron or PVC	1	1

The Existing Water Main Benefit Area category ranks the water main improvements based on the size of the area that will benefit from the replacement. The Existing Water Main Material category ranks the water main improvements based on the material of the existing water main. The Existing Water Main Fire Flow Capability category ranks the water main improvements based on the ability of the existing water mains to provide the required fire flow, as determined from the results of the hydraulic analyses in **Chapter 7**.

The water main priority ranking criteria were applied to the annual water main replacement projects, which are grouped under CIP WM1. CIP WM1 Projects 1 through 42, as shown in **Figure 9-1**, are presented in **Table 9-4** and sorted by CIP number with their priority ranking. The CIP projects that received a ranking of “high” based on the criteria shown in **Table 9-3** are presented in **Table 9-5**.



**Table 9-4**  
**Prioritized Annual Water Main Replacement Projects (Sorted by Number)**

CIP No.	Priority		Estimated Cost	Size		In	Description		
	Rank	Points		Length (ft)	Diam (in)		From	To	
1	M	11	\$4,000	10	8	Easement	Cedar Avenue	Lewis River Road	
2	L	9	\$111,000	354	8	Valley Way	Lewis River Road	dead end	
3	L	9	\$41,000	130	8	Meadowood Loop	Near 1986 Meadowood Loop	dead end	
4	L	9	\$46,000	146	8	Meadowood Loop	Near 1964 Meadowood Loop	dead end	
5	L	9	\$31,000	97	8	Meadowood Loop	Near 1948 Meadowood Loop	dead end	
6	L	9	\$92,000	294	8	Hawthorne Court	Pine Street	dead end	
7	L	9	\$66,000	209	8	Ponderosa Court	Pine Street	dead end	
8	M	11	\$35,000	111	8	Unnamed road near Insel Road	York Street	dead end	
9	L	9	\$63,000	201	8	Redwood Court	Springwood Street	dead end	
10	L	9	\$60,000	191	8	Foxtail Circle	Hillshire Drive	dead end	
11	L	8	\$213,000	176	12	River Rock Lane	River Rock Drive	dead end	
				160	12	River Rock Drive	River Rock Lane	dead end	
				128	12	River Rock Lane	Left in River Rock Lane	River Rock Drive	
				150	12	River Rock Lane	Lewis River Road	Left in River Rock Lane	
12	L	9	\$210,000	671	8	Cherry-Blossom Lane	Goerig Street	dead end	
13	M	12	\$177,000	70	12	Columbia Street	Pacific Ave	end of water main	
				441	12				
14	H	16	\$248,000	404	8	Beechwood Street	Woodside Terrace	Glenwood Street	
				351	12	Woodside Terrace	Beechwood Street	dead end	
15	M	12	\$81,000	233	12	Park Street	Washington Street	dead end	
16	L	6	\$156,000	207	8	East CC Street	A Street	Sandalwood Road	
				291	8	East CC Street	Lewis River Road	A Street	
17	L	6	\$50,000	158	8	5th Street	2nd Street	dead end	
18	M	12	\$96,000	163	12	310 4th Street		Woodland Care Center	
				112	12				
19	M	11	\$379,000	677	12	5th Street	Dunham Avenue	Lake Avenue	
				461	8	Lake Avenue	5th Street	dead end	
20	L	9	\$87,000	275	8	Lilac Lane	S Pekin Road	dead end	
21	L	9	\$89,000	282	8	Tsugawa Court	Windflower Drive	dead end	
22	H	16	\$76,000	219	12	Bozarth Avenue	6th Street	dead end	
23	H	14	\$107,000	215	12	300 N Pekin Road		Columbia River Carbonates	
				92	12	300 N Pekin Road			
24	M	13	\$33,000	93	12	289 N Pekin Road		Columbia River Carbonates	
25	M	12	\$208,000	601	12	295 N Pekin Road		Hamilton Materials Northwest	
26	M	12	\$70,000	200	12	295 N Pekin Road		Hamilton Materials Northwest	
27	M	12	\$197,000	569	12	350 N Pekin Road		American Nutrition	
28	M	12	\$230,000	665	12	350 N Pekin Road		American Nutrition	
29	M	12	\$190,000	549	12	1395 Down River Drive		EDGE Rods / North Fork Composites	
30	M	12	\$43,000	123	12	1560 Down River Drive		Accel Plastics Inc.	
31	M	12	\$55,000	157	12	1625 Down River Drive		Lineage Logistics	
32	M	12	\$90,000	259	12	1635 Down River Drive		Pacific Seafood	
33	M	12	\$114,000	327	12	1635 Down River Drive		Pacific Seafood	
34	L	9	\$447,000	1085	12	1625 Down River Drive	West Scott Avenue	dead end	
				207	12				
35	L	9	\$187,000	538	12	1745 Schurman Way		Weekender Storage	
36	M	12	\$37,000	106	12	1795 Howard Way		LifePort Armor Technologies	
				365	12	1805 Howard Way			
37	M	12	\$241,000	32	12	1805 Howard Way		LifePort Armor Technologies	
				103	12	1805 Howard Way			
				195	12	1805 Howard Way			
				123	12	1660 Heritage Street			
38	M	12	\$755,000	377	12	1660 Heritage Street		LifePort Air Medical	
				119	12	1845 Howard Way			
				379	12	1845 Howard Way			
				542	12	1845 Howard Way			
				146	12	1845 Howard Way			
				418	12	1845 Howard Way			
				77	12	1845 Howard Way			
				210	12	1845 Schurman Way			
39	M	12	\$189,000	40	12	1845 Schurman Way		Trailer Sales LLC	
				294	12	1845 Schurman Way			
40	H	14	\$116,000	334	12	1855 Schurman Way		Trailer Sales LLC	
41	M	12	\$147,000	423	12	506 Robinson Road		Burriss Creek Mini Storage	
42	L	6	\$85,000	18	12	9428 Old Pacific Highway	Old Pacific Highway	dead end	
				227	12	9428 Old Pacific Highway			
<b>Total</b>			<b>\$5,952,000</b>						



**Table 9-5  
High Priority Annual Water Main Replacement Projects (Sorted by Number)**

CIP No.	Priority		Estimated Cost	Size		Description		
	Rank	Points		Length (ft)	Diam (in)	In	From	To
14	H	16	\$248,000	404	8	Beechwood Street	Woodside Terrace	Glenwood Street
				351	12	Woodside Terrace	Beechwood Street	dead end
22	H	16	\$76,000	219	12	Bozarth Avenue	6th Street	dead end
23	H	14	\$107,000	215	12	300 N Pekin Road	Columbia River Carbonates	
				92	12	300 N Pekin Road		
40	H	14	\$116,000	334	12	1855 Schurman Way	Trailer Sales LLC	
<b>Total</b>			<b>\$547,000</b>					

### Other Improvements

The additional water main and facility improvements were prioritized based on existing deficiencies, safety concerns, maintenance requirements, and capacity requirements. The miscellaneous improvements were prioritized based on regulatory requirements and an assessment of the water system needs. The priority order of these improvements is reflected in the schedule of improvements, which is presented in the next section.

### SCHEDULE OF IMPROVEMENTS

The improvement prioritization results were used to assist in establishing an implementation schedule that can be used by the City for preparing its 10-year CIP and yearly Water Department budget. The implementation schedule for the proposed improvements is shown in **Table 9-6**. A variable allowance per year has been established for the annual replacement of water mains based on the City’s available budget. The City will identify and schedule the replacement of these water mains during its annual budget process. This provides the City with the flexibility to coordinate these projects with road or other projects within the same area.

### Future Project Cost Adjustments

All cost estimates shown in the tables are presented in year 2020 dollars. These cost estimates will need to be adjusted to account for the effects of inflation and changing construction market conditions to determine future costs at the actual time of project implementation. Future costs can be estimated using the Engineering News Record Construction Cost Index for the Seattle area or by applying an estimated rate of inflation that reflects the current and anticipated future market conditions.

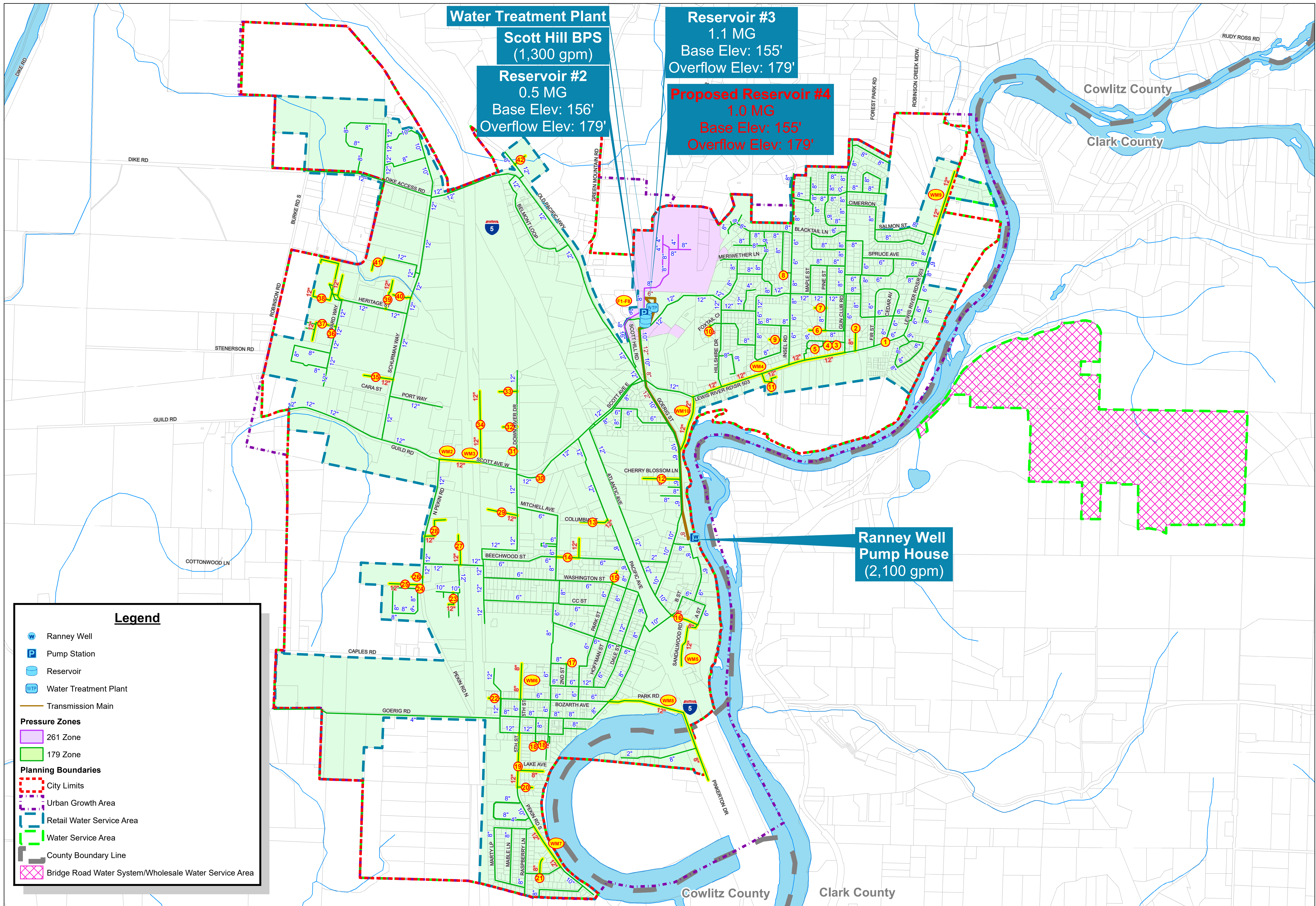
**Table 9-6  
Proposed Improvements Implementation Schedule**

No.	Description	Estimated Cost (2020 \$)	20-Year Schedule of Improvements										
			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030-2040
<b>Water Main Improvements</b>													
WM1	Annual Water Main Replacement Program	\$5,960,000									\$1,442K	\$1,442K	\$11,146K
WM2	West Scott Connector (Down River Drive to Tracks) <sup>1</sup>	\$1,010,000		\$505K	\$505K								
WM3	West Scott Connector (Tracks to Guild Road) <sup>1</sup>	\$1,100,000		\$550K	\$550K								
WM4	SR 503 (Scott to Gun Club) <sup>1</sup>	\$1,270,000			\$635K	\$635K							
WM5	Wastewater Plant <sup>1</sup>	\$550,000				\$550K							
WM6	5th Street North of Bozarth <sup>1</sup>	\$500,000				\$250K	\$250K						
WM7	South Pekin Project <sup>1</sup>	\$800,000					\$800K						
WM8	Lakeshore and Island Aire Drives <sup>1</sup>	\$1,330,000						\$1,330K					
WM9	Salmon to McCracken <sup>1</sup>	\$660,000							\$660K				
WM10	Scott Avenue/SR 503 <sup>1</sup>	\$1,320,000								\$1,320K			
<b>Facility Improvements</b>													
F1	Additional Storage Reservoir <sup>1</sup>	\$3,500,000		\$1,750K	\$1,750K								
F2	Filter Restoration and Media Replacement #1 <sup>1</sup>	\$380,000	\$380K										
F3	Filter Restoration and Media Replacement #2 <sup>1</sup>	\$380,000		\$380K									
F4	Filter Restoration and Media Replacement #3 <sup>1</sup>	\$380,000			\$380K								
F5	Scott Hill Booster Pump Station - Additional Fire Flow Pump	\$1,090,000											\$1,090K
F6	WTP Filtration Capacity Rating and Redundancy Evaluation	\$30,000				\$30K							
F7	WTP Filtration Expansion	\$2,000,000											\$2,000K
F8	WTP Major Equipment Replacements	\$180,000											\$180K
<b>Miscellaneous Improvements</b>													
M1	Water Meter Upgrades <sup>1</sup>	\$1,450,000						\$725K	\$725K				
<b>Total Estimated Costs of City Funded Improvements</b>		<b>\$23,890,000</b>	<b>\$380K</b>	<b>\$3,185K</b>	<b>\$3,820K</b>	<b>\$1,465K</b>	<b>\$1,050K</b>	<b>\$2,055K</b>	<b>\$1,385K</b>	<b>\$1,320K</b>	<b>\$1,442K</b>	<b>\$1,442K</b>	<b>\$14,416K</b>

<sup>1</sup> = Costs associated with the projects identified were estimated by the City.

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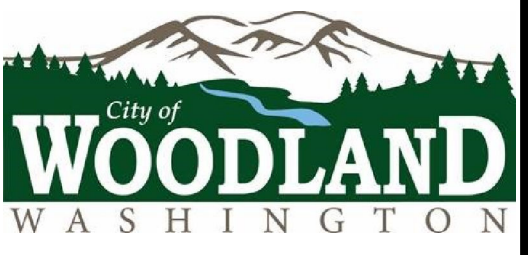
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**Vicinity Map**



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

**Figure 9-1  
Capital Improvement Projects  
City of Woodland  
Water System Plan**



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

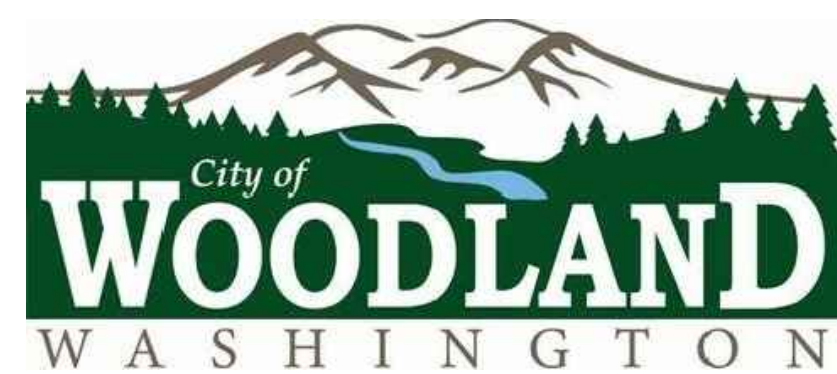
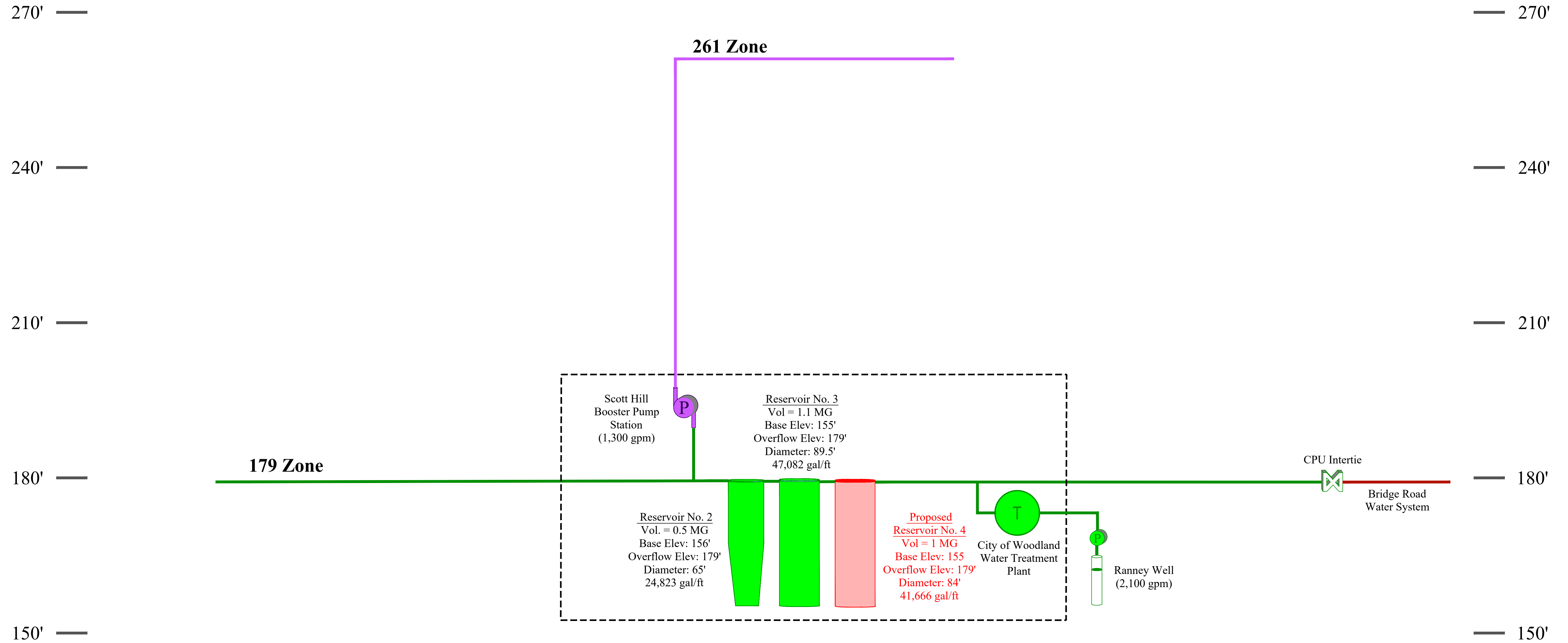
DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



J:\DATA\WOOD\119-141\GIS\WSP-FIG\_9-1.MXD BY: DBRIGHT PLOT DATE: OCT 9, 2020 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET



WEST ← → EAST



**Legend**

- 179 Zone
- 261 Zone
- Bridge Road Water System
- Booster Pump Station
- Intertie
- Well Source
- Facilities at Same Site

**Figure 9-2**  
**Proposed System Hydraulic Profile**  
*City of Woodland*  
*2020 Water System Plan*

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