

# 1 | INTRODUCTION

## WATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Woodland (City) is a municipal corporation that owns and operates a public water system within its City limits. Water system data on file at the Washington State Department of Health (DOH) for the City's system is shown in **Table 1-1**.

**Table 1-1**  
**Water System Ownership and Management**

Information Type	Description
System Type	Group A - Community - Public Water System
System Name	Woodland, City of
County	Cowlitz and Clark
DOH System ID Number	982002
Address	PO Box 9, 300 East Scott Ave, Woodland, WA 98674
Contact	Ms. Tracy Coleman, Public Works Director
Contact Phone Number	(360) 225-7999

## OVERVIEW OF EXISTING SYSTEM

In 2018, the City provided water service to an average of approximately 2,169 customer connections, or 4,292 equivalent residential units (ERUs), within the City's water service area. The City limits comprise an area of approximately 4.25 square miles, and the existing retail water service area is approximately 3.4 square miles. The 2018 population served by the water system was estimated to be approximately 6,308, mostly residing in the City Limits.

The City's water supply is provided by one horizontal Ranney collector well with six intake laterals on the Lewis River. A pump station at the well site supplies raw water to the City's water treatment plant. Two reservoirs are located at the City's water treatment plant that have a total capacity of 1.6 million gallons (MG). Construction of a new booster pump station will be completed in 2020 at the City's water treatment plant site that supplies a new closed zone on Scott Hill. The new Scott Hill BPS was assumed to be online for the purposes of the existing system analyses contained in this WSP. A summary of the 2018 water system data is shown in **Table 1-2**.

**Table 1-2  
2018 Water System Data**

<b>Description</b>	<b>Data</b>
Water Service Population	6,308
Retail Water Service Area	3.4 Square Miles
Total Connections	2,169
Total ERUs	4,292
ERU <sub>ADD</sub>	184 gallons per day
ERU <sub>MDD</sub>	391 gallons per day
Annual Supply	289,003,000 gallons
Average Day Demand	550 gallons per minute
Distribution System Leakage (3-year Rolling Average)	5.3%
Maximum Day/Average Day Demand Factor	2.12
Peak Hour/Maximum Day Demand Factor	1.67
Number of Pressure Zones	2
Number of Well Sources	1
Total Capacity of City Sources	2,100 gallons per minute
Number of Pump Stations and Total Capacity	1 (1,300 gpm)
Number of Reservoirs & Total Capacity	2 (1.6 MG)
Number of Pressure Reducing Stations	0
Total Length of Water Main	41 miles

## AUTHORIZATION AND PURPOSE

The City authorized RH2 Engineering, Inc., (RH2) to prepare this Water System Plan (WSP) as required by state law under Washington Administrative Code (WAC) 246-290-100. In accordance with WAC 246-290-100, the City's WSP shall be updated and submitted to DOH every 10 years. The previous WSP was prepared for the City in 2012. The purpose of this updated WSP is as follows:

- To evaluate existing water demand data and project future water demands.
- To analyze the existing water system to determine if it meets minimum requirements mandated by DOH and the City's own policies and design criteria.
- To identify water system improvements that resolve existing system deficiencies and accommodate the system's future needs for at least 20 years into the future.
- To prepare a schedule of improvements that meets the goals of the City's financial program.
- To evaluate past water quality and identify water quality improvements, as necessary.
- To document the City's operations and maintenance program.
- To prepare water use efficiency, cross-connection control, and water quality monitoring plans.
- To comply with all other WSP requirements of DOH.

## SUMMARY OF WSP CONTENTS

A brief summary of the content of the chapters in this WSP is as follows.

- The **Executive Summary** provides a brief summary of the key elements of this WSP.
- **Chapter 1** introduces the reader to the City's water system, the objectives of the WSP, and its organization.
- **Chapter 2** presents the water service area, describes the existing water system, and identifies adjacent water purveyors.
- **Chapter 3** presents related plans, land use, and population characteristics.
- **Chapter 4** identifies existing water demands and projected future demands.
- **Chapter 5** presents the City's policies and design criteria.
- **Chapter 6** discusses the City's water source and water quality monitoring program.
- **Chapter 7** discusses the water system analyses and existing system deficiencies.
- **Chapter 8** discusses the City's operations and maintenance program.
- **Chapter 9** presents the proposed water system improvements, their estimated costs, and their schedule for implementation.
- **Chapter 10** summarizes the financial status of the water system and presents a plan for funding the water system improvements.
- The **Appendices** contain additional information and plans that supplement the main chapters of the WSP.

## DEFINITION OF TERMS

The following terms are used throughout this WSP.

**Consumption:** The true volume of water used by the water system's customers. The volume is measured at each customer's connection to the distribution system.

**Connection Fee:** A one-time fee paid by a property owner when connecting to the City's system. This fee offsets the cost of providing water to new customers and recognizes that the existing water system was largely built and paid for by the existing customers.

**Cross-Connection:** A physical arrangement that connects a public water system, directly or indirectly, with facilities that could present the potential for contaminating the public water system.

**Demand:** The quantity of water required from a water supply source over a period of time necessary to meet the needs of domestic, commercial, industrial, and public uses, and to provide enough water to supply firefighting, system losses, and miscellaneous water uses. Demands are normally discussed in terms of flow rate, such as million gallons per day (MGD) or gallons per

minute (gpm), and are described in terms of a volume of water delivered during a certain time period. Flow rates pertinent to the analysis and design of water systems are:

- **Average Day Demand (ADD):** The total amount of water delivered to the system in a year divided by the number of days in the year;
- **Maximum Day Demand (MDD):** The maximum amount of water delivered to the system during a 24-hour time period of a given year; and
- **Peak Hour Demand (PHD):** The maximum amount of water delivered to the system, excluding fire flow, during a 1-hour time period of a given year. A system's PHD usually occurs during the same day as the MDD.

**Distribution System Leakage (DSL):** Water that is measured as going into the distribution system but not metered as going out of the system.

**Equivalent Residential Units (ERUs):** One ERU represents the amount of water used by one single-family residence for a specific water system. The demand of other customer classes can be expressed in terms of ERUs by dividing the demand of each of the other customer classes by the demand represented by one ERU.

**Fire Flow:** The rate of flow of water required during firefighting, which is usually expressed in terms of gpm.

**Head:** A measure of pressure or force exerted by water. Head is measured in feet and can be converted to pounds per square inch (psi) by dividing feet by 2.31.

**Head Loss:** Pressure reduction resulting from pipeline wall friction, bends, physical restrictions, or obstructions.

**Hydraulic Elevation:** The height of a free water surface above a defined datum; the height above the ground to which water in a pressure pipeline would rise in a vertical open-end pipe.

**Maximum Contaminant Level (MCL):** The maximum permissible level of contaminant in the water that the purveyor delivers to any public water system user, measured at the locations identified under WAC 246-290-300, Table 3.

**Meter Service Connection Charge:** The installation charge or hook-up fee that is paid by a property owner to reimburse the City for the cost incurred to make the physical connection to the water system. This cost includes both direct and indirect costs for installing the service line off the system's water main to the customer's water meter. The charge also includes the cost of the water meter and meter box.

**Potable:** Water suitable for human consumption.

**Pressure Zone:** A portion of the water system that operates from sources at a common hydraulic elevation.

**Purveyor:** An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

**Supply:** Water that is delivered to a water system by one or more supply facilities, which may consist of supply stations, booster pump stations, springs, and wells.

**Storage:** Water that is “stored” in a reservoir to supplement the supply facilities of a system and provide water supply for emergency conditions. Storage is broken down into the following five components, which are defined and discussed in more detail in **Chapter 7**: operational storage; equalizing storage; standby storage; fire flow storage; and dead storage.

## LIST OF ABBREVIATIONS

The abbreviations listed in **Table 1-3** are used throughout this WSP.

**Table 1-3**  
**Abbreviations**

<b>Abbreviation</b>	<b>Description</b>
ADD	Average Day Demand
afy	acre-feet per year
AWWA	American Water Works Association
BPS	Booster Pump Station
CCR	Consumer Confidence Report
CIP	Capital Improvement Program
City	City of Woodland
Clark	Clark County
Cowlitz	Cowlitz County
CPU	Clark Public Utilities
DBP	Disinfection Byproduct
DOH	Washington State Department of Health
DSL	Distribution System Leakage
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERU	Equivalent Residential Unit
fps	feet per second
HAA5	Haloacetic Acids
GMA	Growth Management Act
gpd	gallons per day
gpm	gallons per minute
IOC	Inorganic Chemicals
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
mg/L	milligrams per liter
OSHA	Occupational Safety & Health Administration
PHD	Peak Hour Demand
psi	pounds per square inch
PUD	Clark County Public Utility District
RCW	Revised Code of Washington
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemical
SWTR	Surface Water Treatment Rule
THM	Trihalomethane
UGA	Urban Growth Area
USGS	United States Geological Survey
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety & Health Act
WSP	Water System Plan
WTP	Water Treatment Plant
WUE	Water Use Efficiency