

# EXECUTIVE SUMMARY

## PURPOSE OF THE PLAN

The City of Kennewick'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's Water Comprehensive Plan (WCP) 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 WCP 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 6 years. In anticipation of proposed changes to the water system planning requirements to extend the planning horizon to 10 years, this WCP was prepared to serve as a 6-year and 10-year document.

## CHANGES SINCE THE LAST WCP UPDATE

The City's previous WCP was approved by DOH in 2010. The following changes have occurred since the last update and affect water system planning for the City.

- The DOH *Water System Design Manual* was updated in December 2009. The revisions primarily address water demand requirements and water system physical capacity analysis, both of which affect the City.
- The Benton County (County) *Comprehensive Plan* was updated in 2013. The update projected future growth for the City through 2034.
- Drinking water regulations are continually evolving to ensure that water purveyors are providing a safe and reliable water supply to their customers. Additional water quality monitoring requirements and revisions to existing regulations, such as the Groundwater Rule, Stages 1 and 2 Disinfectants/Disinfection Byproducts Rule, and the revised Coliform Rule have been implemented since the City's last WCP was completed.

## SUMMARY OF KEY ELEMENTS

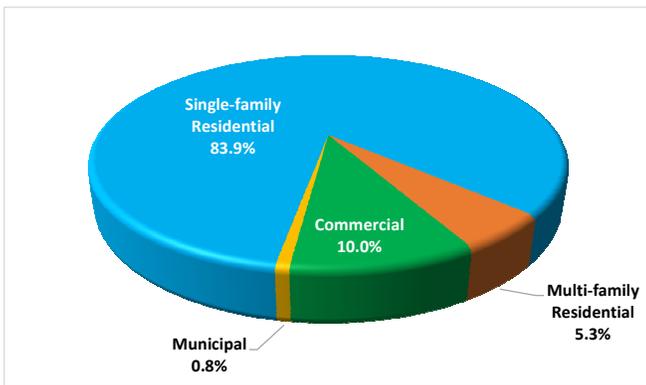
This WCP presents a description of the existing water system and service area, a forecast of future water demands, policies and design criteria for water system operation and improvements, the operations and maintenance program, staffing requirements, a schedule of improvements, and a financial plan to accomplish the improvements. The WCP also includes several ancillary elements that include a water use efficiency plan, a water quality monitoring plan, a wellhead protection plan, a watershed control plan, 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

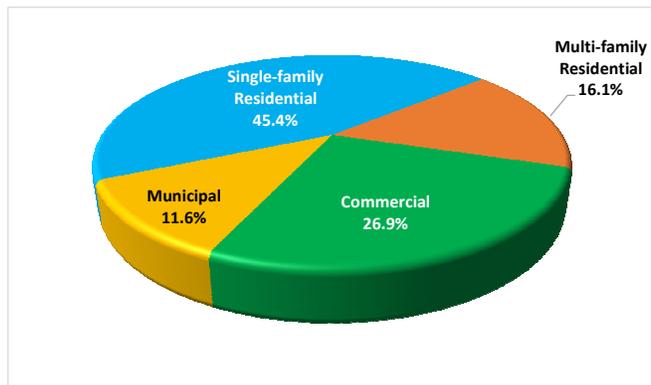
The City provides water service to approximately 80,986 people throughout its water service area boundary, which extends beyond the City's corporate limits. The City is responsible for providing

public water service, utility management, and water system development within this area. The City will provide new water service within the City limits and where there are existing water mains (i.e., the retail water service area). Requests for new water service outside of the City limits but within the Urban Growth Area (UGA), where there are no existing water mains fronting the property, will only be granted after the area is annexed to the City or upon completion of an annexation agreement.

In 2014, the City provided water service to an average of 23,801 connections, which were mainly comprised of single-family connections. Single-family connections represent approximately 84 percent of all accounts; however, the single-family class only consumed 45 percent of all water supplied to the system in 2014.



2014 Water Connections



2014 Water Consumption

## EXISTING WATER SYSTEM

The City’s water system was initially established in 1949 when the City acquired the Pacific Power and Light Company water system and the Kennewick Irrigation District (KID) water system. In 1949, the water system was supplied by Columbia River water pumped into the water system without filtration, and the Layton Park Wells. Between 1958 and 1960, the City installed five Ranney collector wells on Clover Island with an original combined capacity of 24.5 million gallons per day (MGD). Three of the Ranney wells have been removed from service, and the current capacity of the remaining Ranney wells is approximately 15 MGD. The City’s Columbia River Water Treatment Plant (WTP) was constructed in 1980 with an original capacity of 7.5 MGD. The facility’s capacity has been expanded to 15 MGD and has the infrastructure to be expanded to 30 MGD in the future. A summary of the City’s existing sources and their capacities is shown in **Table ES-1**.

**Table ES-1  
Supply Facilities Summary**

Name	Discharge Pressure Zone	Total Pumping and Treatment Capacity (gpm)	Physical Pumping Capacity (gpm)	Year Installed	Well Depth (feet)	Caisson Diameter (inches)	Pump Type	Pump Motor Size (hp)
Ranney Collector No. 4	Zone 1	1,042	1,042	1959	51.7	20	(2) Vertical Turbine	75 100
Ranney Collector No. 5	Zone 1	6,944	5,000	1960	41.4	20	(4) Vertical Turbine	(4) 350
WTP Intake (Low Lift BPS)	Clearwell	10,417	10,417	1980	---	---	(4) Vertical Turbine	(2) 25 (2) 50

The City's water system has ten booster pump station (BPS) facilities that provide supply throughout the water system. A summary of these pumping facilities is shown in **Table ES-2**.

**Table ES-2  
Booster Pump Station Facilities Summary**

Name	Suction Pressure Zone	Discharge Pressure Zone	Total Pumping Capacity (gpm)	Number of Pumps	Pump Motor Size (horsepower)
Water Treatment Plant BPS	Clearwell	Zone 1	10,417	4	(2) 250, (2) 400
Golf Course BPS	Zone 1	Zone 2	9,900	3	(3) 250
19th and Olympia BPS	Zone 1	Zone 2	10,000	5	(5) 150
47th and Olympia BPS	Zone 2	Zone 3	7,300	3	(1) 75, (2) 150
18th and Kellogg BPS	Zone 2	Zone 3	7,700	3	(1) 75, (2) 150
54th and Olympia BPS	Zone 3	Zone 4	4,400	3	(1) 40, (2) 100
28th and Irving BPS	Zone 3	Zone 4	3,400	3	(1) 40, (2) 100
Thompson Hill BPS	Zone 4	Zone 5	5,300	3	(1) 60, (2) 125
46th and Olson BPS <sup>1</sup>	Zone 4	Zone 5	2,555	3	(1) 15, (1) 40, (1) 100
Zone 6 BPS <sup>2</sup>	Zone 5	Zone 6	2,238	3	(1) 7.5, (2) 75

(1) Also referred to as the Canyon Lakes BPS.

(2) No water service connections are currently located within Zone 6, and therefore the Zone 6 BPS does not currently operate.

The City's water system has 13 storage facility sites that provide direct water storage to 6 pressure zones. A summary of the City's storage facilities is shown in **Table ES-3**.

**Table ES-3  
Storage Facilities Summary**

Name	Pressure Zone	Year Constructed	Material	Capacity (MG)	Diameter (feet)	Base Elevation (feet)	Overflow Elevation (feet)	Overall Height (feet)
WTP Clearwell	Clearwell	1980	Concrete	0.31	---	321	338.5	17.50
19th and Olympia E.	Zone 1	1949	Concrete	2.00	151	517	532	15.00
19th and Olympia W.	Zone 1	1949	Concrete	4.00	213	517	532	15.00
47th and Olympia	Zone 2	1972	Concrete	5.00	170	624	654	30.00
18th and Kellogg	Zone 2	Unknown	Concrete	10.00	250	624	652	28.00
18th and Kellogg	Zone 2	1960	Steel	0.50	54	625	654	29.00
54th and Olympia	Zone 3	1978	Concrete	1.00	95	760	780	20.00
28th and Irving	Zone 3	1978	Concrete	1.00	95	750	780	30.00
Kansas	Zone 3	2006	Concrete	4.00	153	750	780	30.00
Canyon Lakes	Zone 4	1980	Concrete	1.00	58.0 x 58.0 <sup>1</sup>	889	910	21.00
Thompson Hill	Zone 4	2015	Concrete	3.00	143	888	913	25.00
Zone 5 Reservoir	Zone 5	2010	Concrete	1.00	60.0 x 60.0 <sup>1</sup>	1,024	1,045	21.00

(1) Rectangular dimensions

The City's water system contains more than 409 miles of water main ranging in size from 2 inches in the distribution system to 48 inches at the City's supply facilities. As shown in **Table ES-4**, most of the water main (approximately 48 percent) within the service area is 8 inches in diameter.

**Table ES-4  
Water Main Diameter Inventory**

Diameter (inches)	Length (feet)	Percentage of Total
4 or smaller	98,753	4.6%
6	458,864	21.2%
8	1,046,234	48.4%
10	36,169	1.7%
12	224,160	10.4%
14	2,578	0.1%
16	177,946	8.2%
18	16,432	0.8%
20	4,985	0.2%
24	15,801	0.7%
30	6,495	0.3%
32	10	0.0%
36	10,210	0.5%
42	980	0.0%
48	1,618	0.1%
Unknown	59,257	2.7%
<b>Totals</b>	<b>2,160,492</b>	<b>100%</b>

## PAST WATER USAGE

The City has experienced a trend of decreasing per capita water demand since 2007, primarily due to water use efficiency practices, including new buildings with low flow plumbing fixtures, and the repair of water system leaks. Between 2007 and 2014, the City's water service area population increased by more than 19 percent, but the volume of water supplied to the system only increased by approximately 5 percent. **Table ES-5** presents the City's annual net water supply, the average day demand (ADD), water service area population, and average demand per capita from 2007 through 2014.

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

Year	Net Supply (MG)	Average Day Demand (gpm)	Water Service Area Population	Average Demand Per Capita (gal/day/capita)
2007	3,775.7	7,183.7	67,871	152
2008	3,727.5	7,091.9	68,128	150
2009	3,941.5	7,499.0	70,871	152
2010	3,666.6	6,976.1	72,940	138
2011	3,536.3	6,728.2	76,356	127
2012	3,748.2	7,131.3	77,078	133
2013	3,721.9	7,081.3	78,334	130
2014	3,976.9	7,566.4	80,986	135

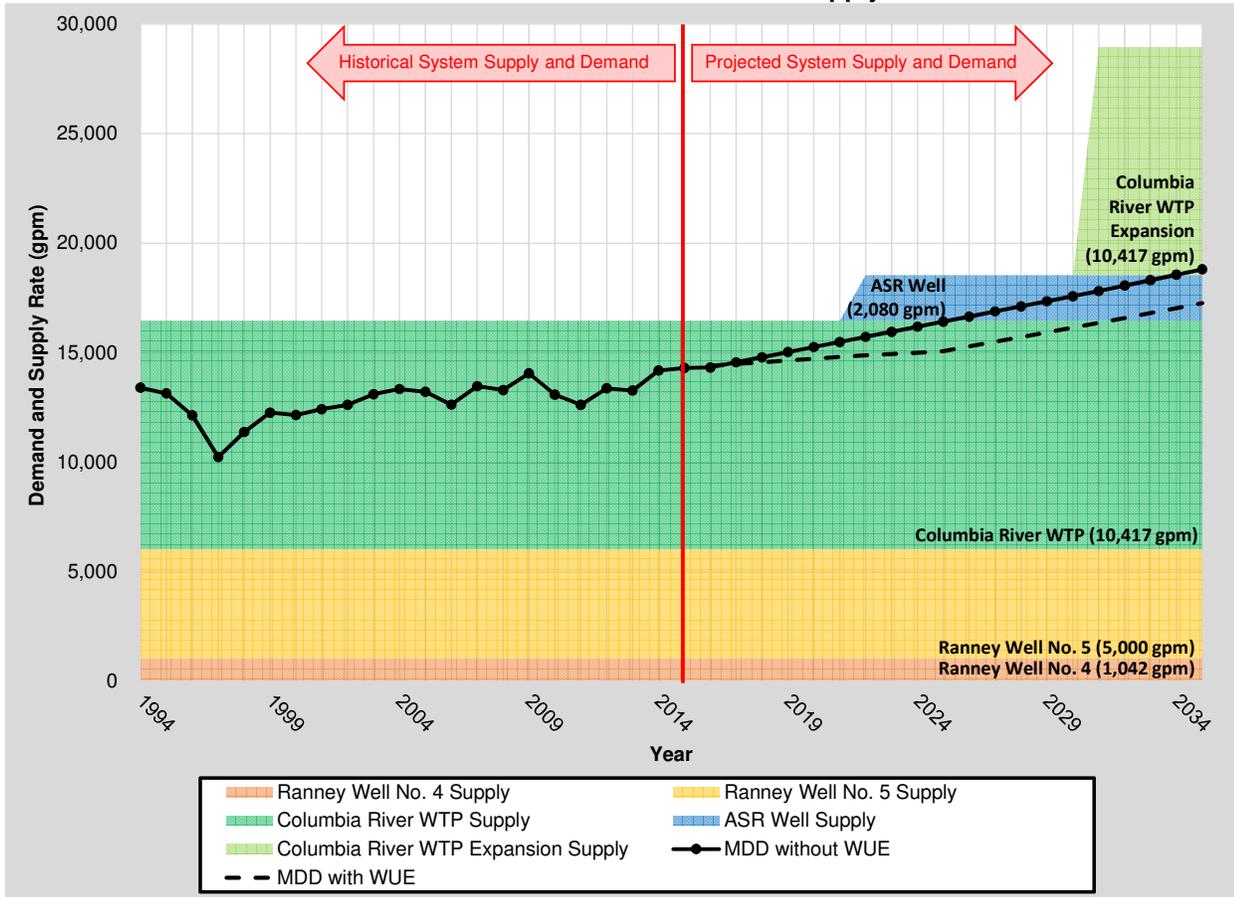
## FUTURE WATER DEMANDS AND WATER SUPPLY

Overall water demand within the City's system is estimated to increase by approximately 33 percent by the end of the 20-year planning period. The City's existing active sources are sufficient to meet the projected demands of the system through 2025, but additional source capacity is needed to meet the projected demands beyond 2025.

The City completed construction of an aquifer storage and recovery (ASR) well in 2014. Ongoing testing of the ASR Well and the aquifer storage capacity has been occurring since the well was constructed. If the ASR Well becomes fully developed and is granted source approval by regulatory agencies, a maximum of 2,080 gallons per minute (gpm) may be pumped from the well.

If the maximum ASR Well pumping rate of 2,080 gpm can be achieved, the City is projected to have a slight source capacity deficiency in 2035 based on the projected system maximum day demands (MDD) without reductions from water use efficiency (WUE) efforts, as shown in **Chart ES-1**. The City plans to evaluate an expansion of the Columbia River WTP to meet the projected source capacity requirements.

**Chart ES-1  
Future Water Demands and Water Supply**



### WATER SOURCE AND QUALITY

The City’s municipal water supply is provided by surface water diverted from the Columbia River, and groundwater pumped from Ranney Wells No. 4 and No. 5. Water from the Columbia River is treated by membrane filtration at the Columbia River WTP. Sodium hypochlorite is injected into the filtered water as the final disinfection process prior to the water entering the clearwell.

Water supplied by the Ranney Wells No. 4 and No. 5 is provided natural filtration by several hundred feet of porous media, and is subjected to ultraviolet light disinfection to treat for *Cryptosporidium* and *Giardia lamblia*. Sodium hypochlorite is injected into the water prior to it entering a chlorine contact pipeline and the distribution system. The Columbia River WTP and Ranney Wells provide a reliable and high-quality water supply for the City.

In addition to these existing supply facilities, ongoing testing of the ASR Well and the aquifer storage capacity has been occurring since 2014. During testing, the City is analyzing the aquifer’s ability to develop a cool water storage zone, establishing baseline and dynamic aquifer parameters, assessing aquifer response, and confirming the compatibility of the City’s treated water and groundwater from the ASR Well for long-term drinking water supply.

## OPERATIONS AND MAINTENANCE

The City's operations and maintenance organization is staffed by well-qualified, technically trained personnel. City staff regularly participates in safety and training programs to keep abreast of the latest changes in the water industry and to ensure smooth and safe operation of the water system. The current staff of supervisory and maintenance personnel have effectively operated and maintained the water system in the past. The City plans to add staff to properly maintain the system and keep up with system growth as the budget allows.

The City has taken several steps to prepare for emergency situations. The Emergency Response Plan (ERP) was prepared for the City in 2004 and provides information to prepare and assist the City in responding to emergency events. The ERP includes a vulnerability assessment, contingency procedures, and emergency response procedures in accordance with the requirements of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. Water system improvements completed by the City over the last several years, and proposed improvements identified in this WCP, will reduce the vulnerability of the water system during emergency situations.

## 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 as follows.

- The City's existing active sources are sufficient to meet the projected demands of the system through 2025, but additional source capacity is needed to meet the projected demands beyond 2025.
- If the maximum ASR Well pumping rate of 2,080 gpm can be achieved, the City is projected to have a slight source capacity deficiency in 2035 based on the projected MDD without reductions from water use efficiency efforts.
- The City's existing booster pump stations have adequate capacity for at least the next 10 years and may be sufficient to meet the projected 2035 demands, depending on the production rate and operational constraints of the ASR Well.
- The City's existing reservoirs have adequate capacity to meet the DOH minimum storage requirements for the next 20 years.
- Several pressure reducing valves are necessary to increase the level of service provided to customers within Zones 1 and 2.
- Several water mains need to be replaced with new water mains to increase fire flows and resolve deficiencies related to undesirable pipe material and aging water main.

## PROPOSED WATER SYSTEM IMPROVEMENTS AND FINANCING PLAN

Improvements to the system are primarily necessary to resolve existing system deficiencies, but they will also improve operations, replace older aging infrastructure, and accommodate future water customers. City-funded improvements identified for the first 6 years of the capital improvement program (2016 to 2021) are estimated to cost approximately \$12,844,000 (in 2016 dollars), which results in an average expenditure of approximately \$2,141,000 per year (in 2016 dollars). Scheduled City-funded improvements in the following 4 years (2022 to 2025) are estimated to cost

approximately \$6,327,000 (in 2016 dollars). Scheduled City-funded improvements within the City's 20-year capital improvement program (CIP) (2016 to 2035) are estimated to cost approximately \$48,614,000 (in 2016 dollars).

The financial analysis is intended to illustrate the feasibility of funding the operation, maintenance, and capital improvements planned for the water system for the next 6 years. The financial forecast projects that the City is capable of funding the CIP with rate-funded Capital Reserves, Capital Facilities Charges and minimal low interest loans. The revenue needs forecast provides for an approximate 1 percent rate increase each year through 2021.

The City has established rates that are affordable to its customers and has earned a reputation for providing high-quality customer service and outstanding water quality. The City's proven financial strength will ensure that customers will continue to receive the same high-quality level of service they have come to expect.