



FINAL

# Water Management and Conservation Plan

## City of Lowell



August 2023

Prepared by:

**GSI Water Solutions, Inc.**

1600 SW Western Boulevard, Suite 240, Corvallis, OR 97333

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# Oregon

Tina Kotek, Governor

## Water Resources Department

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Salem, OR 97301  
Phone 503 986-0900  
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August 24, 2023

City of Lowell  
Attn: Max Baker, Public Works Director  
PO Box 490  
Lowell, OR 97452

Subject: Water Management and Conservation Plan

Dear Max

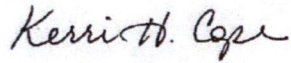
Enclosed; please find the final order approving your Water Management and Conservation Plan.

The attached final order specifies that the City of Lowell's plan shall remain in effect until **August 24, 2033**. Additionally, the City of Lowell is required to submit a progress report to the Department by **August 24, 2028**, detailing progress made toward the implementation of conservation benchmarks scheduled in the plan. Because the City's water loss was above ten (10) percent they are also required to submit an analysis identifying potential water loss factors and proposed corrective actions by **August 24, 2025**. Finally, the City of Lowell must submit an updated Water Management and Conservation Plan to the Department by **February 24, 2033**.

**NOTE:** *The deadline established in the attached final order for submittal of an updated water management and conservation plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Lowell from any existing or future requirement(s) for submittal of a water management and conservation plan at an earlier date as established through other final orders of the Department.*

We appreciate your cooperation in this effort. Please do not hesitate to contact me at 503-979-9544 or [Kerri.H.Cope@water.oregon.gov](mailto:Kerri.H.Cope@water.oregon.gov) if you have any questions.

Sincerely,



Kerri Cope  
Water Management and Conservation Analyst  
Water Right Services Division

Enclosure

cc: WMCP File  
District #2, Watermaster  
Tim Henkle, GSI (via email [thenkle@gsiws.com](mailto:thenkle@gsiws.com))



**BEFORE THE WATER RESOURCES DEPARTMENT  
OF THE  
STATE OF OREGON**

In the Matter of the Proposed Water	)	FINAL ORDER APPROVING A WATER
Management and Conservation Plan for	)	MANAGEMENT AND CONSERVATION
the City of Lowell, Lane County	)	PLAN

**Authority**

OAR Chapter 690, Division 086, establishes the process and criteria for approving water management and conservation plans required under the conditions of permits, permit extensions and other orders of the Department.

**Findings of Fact**

1. The City of Lowell submitted a Water Management and Conservation Plan (plan) and required statutory fee for review of the plan to the Water Resources Department (Department) on September 16, 2022. The plan was required by a condition set forth under the City's previously approved plan (Sp. Or. Vol. 62, Pgs. 446-447) issued on December 29, 2004.
2. The Department published notice of receipt of the plan on September 27, 2022, as required under OAR Chapter 690, Division 086. No comments were received.
3. The Department provided written comments on the plan to the City on December 14, 2022. In response, the City submitted a revised plan on March 9, 2023.
4. The Department reviewed the revised plan and finds that the revised plan is consistent with the relevant requirements under OAR Chapter 690, Division 086.

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080, you may petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

**Conclusion of Law**

The Water Management and Conservation Plan submitted by the City of Lowell is consistent with the criteria in OAR Chapter 690, Division 086.

**Now, therefore, it is ORDERED:**

**Duration of Plan Approval:**

- 1. The City of Lowell Water Management and Conservation Plan is approved and shall remain in effect until **August 24, 2033**, unless this approval is rescinded pursuant to OAR 690-086-0920.

**Plan Update Schedule:**

- 2. The City of Lowell shall submit an updated plan meeting the requirements of OAR Chapter 690, Division 086 (effective December 23, 2018) within **ten (10) years** and no later than **February 24, 2033**.

**Progress Report Schedule:**

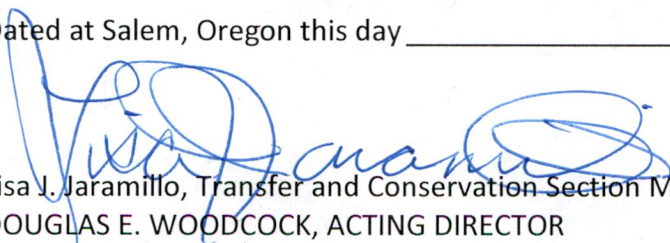
- 3. The City of Lowell shall submit an analysis of potential water loss factors and proposed corrective actions as required under OAR 690-086-0150(4) by **August 24, 2025**.
- 4. The City of Lowell shall submit a progress report containing the information required under OAR 690-086-0120(4) by **August 24, 2028**.

**Other Requirements for Plan Submittal:**

- 5. The deadline established herein for the submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Lowell from any existing or future requirement(s) for submittal of a Water Management and Conservation Plan at an earlier date as established through other final orders of the Department.

**AUG 23 2023**

Dated at Salem, Oregon this day \_\_\_\_\_



Lisa J. Jaramillo, Transfer and Conservation Section Manager for  
DOUGLAS E. WOODCOCK, ACTING DIRECTOR  
Oregon Water Resources

**AUG 24 2023**

Mailing date: \_\_\_\_\_

**Notice Regarding Servicemembers:** Active duty servicemembers have a right to stay proceedings under the federal Servicemembers Civil Relief Act. 50 U.S.C. App. §§501-597b. For more information contact the Oregon State Bar at 800-452-8260, the Oregon Military Department at 971-355-4127, or the nearest United States Armed Forces Legal Assistance Office through <http://legalassistance.law.af.mil>.

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- A Letter to Affected Local Government and Response
- B Population Projection, Excerpt from Draft 2022 Water System Master Plan



# 1. Municipal Water Supplier Plan Elements

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*This section satisfies the requirements of Oregon Administrative Rules (OAR) 690-086-0125.*

*This rule requires a list of affected local government to whom the plan was made available, and a proposed date for submittal of an updated plan.*

## 1.1 Introduction

The City of Lowell (City) is located on the north shore of Dexter Reservoir on the Middle Fork Willamette River in Lane County, Oregon. The City provides public utility services to residents and businesses including the provision of drinking water. The City's Public Water System Identification number is 41-00492.

The purpose of this Water Management and Conservation Plan (WMCP) is to describe the development and implementation of water management and conservation policies and programs that ensure sustainable water use. This Plan also discusses the City's future water needs.

## 1.2 Plan Requirement

This is the City's second WMCP. For the City's first WMCP, the Oregon Water Resources Department (OWRD) required the City to submit a work plan to fully meet the WMCP rule requirements. Following review of the work plan, OWRD issued a final order approving the City's WMCP and associated work plan on December 29, 2004. The final order included a requirement for the City to submit an updated WMCP by October 1, 2009, incorporating the results of the activities in the work plan. This WMCP fulfills the requirement for the City to submit an update of the City's 2004 WMCP.

## 1.3 Plan Organization

This WMCP describes water management, water conservation, and curtailment programs to guide the efficient development and use of the City's water supply to meet its customers' needs. The plan is organized into the following sections, each addressing specific sections of OAR Chapter 690, Division 86. Section 2 is an evaluation of the City's water supply, water use, water rights, and water system. The information developed and provided in Section 2 forms the foundation for the sections that follow. Section 3 discusses the City's current water conservation measures and presents benchmarks for future efforts. Section 4 describes the City's curtailment history and guides future actions when curtailment is necessary. Section 5 draws on information in the preceding sections to outline the City's future water supply needs and how it intends to use available water sources to meet future demand.

This WMCP was developed in tandem with the City's 2022 Water System Master Plan (WSMP) and draws relevant information from the WSMP, in addition to other sources provided or referenced by the City.

<b>Section</b>	<b>Requirement</b>
Section 1 – Municipal Water Supplier Plan Elements	<i>OAR 690-086-0125</i>
Section 2 – Municipal Water Suppliers Descriptions	<i>OAR 690-086-0140</i>
Section 3 – Municipal Water Conservation Element	<i>OAR 690-086-0150</i>
Section 4 – Municipal Water Curtailment Element	<i>OAR 690-086-0160</i>
Section 5 – Municipal Water Supply Element	<i>OAR 690-086-0170</i>

## **1.4 Affected Local Governments**

### ***OAR 690-086-0125(5)***

The following governmental agencies may be affected by this WMCP:

- Lane County

The letter requesting comments from the local government agency and any response is found in Appendix A.

## **1.5 Plan Update Schedule**

### ***OAR 690-086-1025(6)***

The City anticipates submitting an update of this WMCP within 10 years of OWRD’s final order approving the plan. As required by OAR Chapter 690, Division 86, a progress report will be submitted within 5 years of the final order.

## **1.6 Time Extension**

### ***OAR 690-086-0125(7)***

The City is not requesting an extension of time to implement metering or a benchmark established in a previously approved WMCP.

## 2. Municipal Water Supplier Description

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*This section satisfies the requirements of OAR 690-086-0140.*

*This rule requires descriptions of the water supplier's water sources, service area and population, water rights, and adequacy and reliability of the existing water supply. The rule also requires descriptions of the water supplier's customers and their water use, the water system, interconnections with other water suppliers, and quantification of water loss.*

### 2.1 Terminology

The following terminology is used in this WMCP.

*Consumption* is equal to metered water use and unmetered, authorized water uses (e.g. system flushing).

*Demand or System Demand* refers to the quantity of treated water produced at the City's water treatment plant (WTP). Production is equivalent to "demand". Demand includes the sum total of metered consumption (for example, residential, commercial, industrial, public, and irrigation customers), unmetered public uses (firefighting, hydrant flushing, other), and water lost to leakage, reservoir overflow, evaporation, and other factors.

Generally, production and consumption in municipal and quasi-municipal systems are expressed in units of mgd, but also may be expressed in cubic feet per second (cfs) or gallons per minute (gpm). One mgd is equivalent to 1.55 cfs or 694 gpm. For annual or monthly values, a quantity of water is typically reported in million gallons (MG). Water use per person (per capita use) is expressed in gallons per capita per day (gpcd).

The following terms are used to describe specific values of system demands:

- Average day demand (ADD) equals the total annual production divided by 365 days.
- Maximum day demand (MDD) equals the highest system demand that occurs on any single day during a calendar year. It is also called the one-day MDD or peak day demand.
- Peaking factors are the ratios of one demand value to another. The most common and important peaking factors are the ratio of the MDD to the ADD and the ratio of peak hour demand to MDD.

### 2.2 Water Sources

#### **OAR 690-086-0140(1)**

To meet demand, the City has historically relied on the use of groundwater and surface water. Following a multi-year period in which the City relied on its wells to meet demand, the City discontinued use of these wells in approximately 2008 due to water quality issues and transitioned to the use of surface water from the Middle Fork Willamette River to meet demands. The City has continued to utilize this source to present and the City's wells serve as emergency supply.

## 2.3 Interconnections with Other Systems

*OAR 690-086-0140(7)*

The City does not have any interconnections with other water systems.

## 2.4 Intergovernmental Agreements

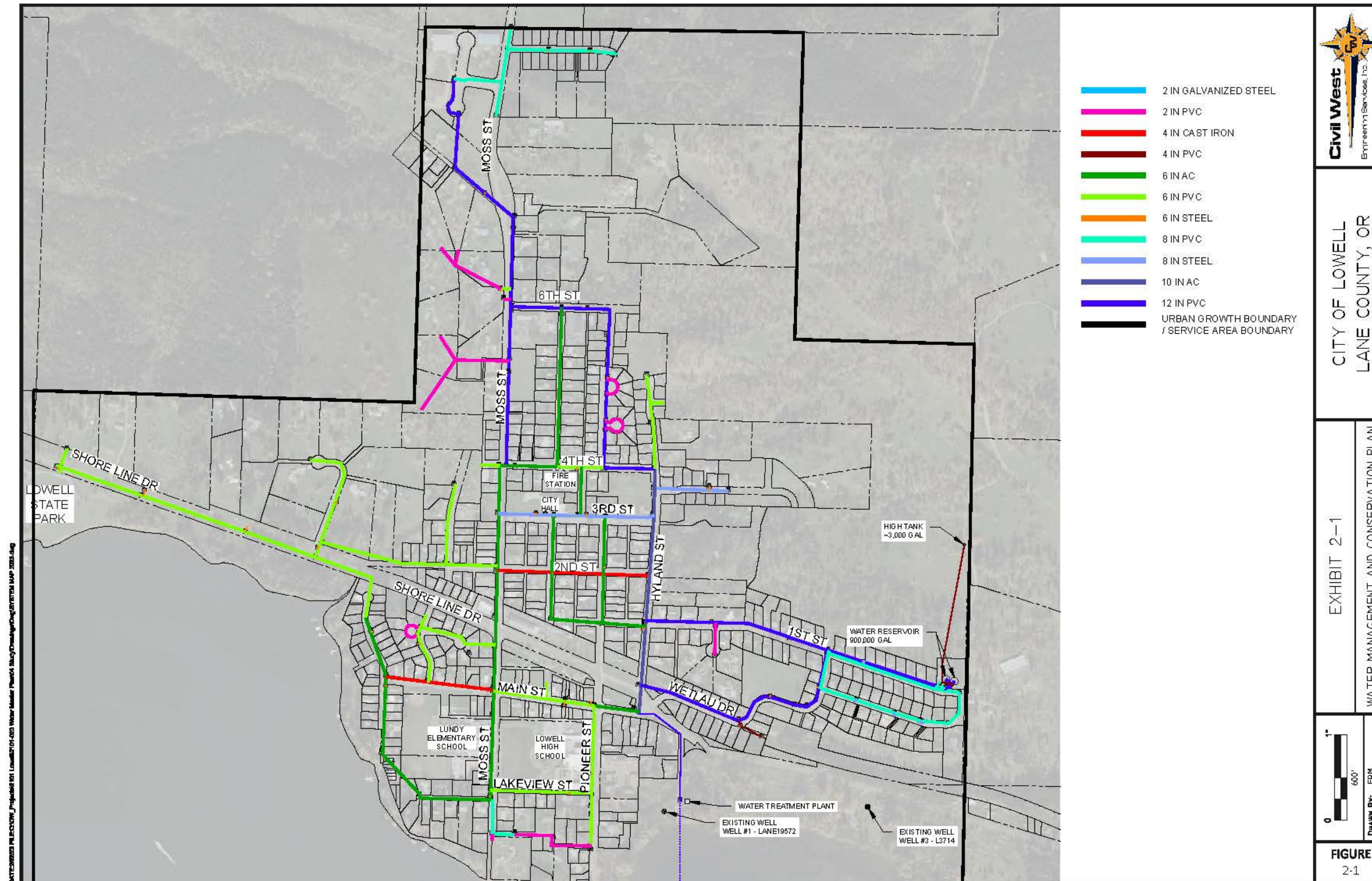
The City does not have any intergovernmental agreements for water supply, exchanges, or delivery.

## 2.5 Water Service Area and Population

Exhibit 2-1 shows the City's water service area. The service area is contiguous with the City's urban growth boundary (UGB). Density of development for residential and commercial customers is greatest in the south central portion of the City, generally surrounding Moss Street, which roughly bisects the City. In 2021, the City served 454 customer accounts and a population of approximately 1,211.



Exhibit 2-1. City of Lowell Service Area



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## 2.6 Historical Water Demand

*OAR 690-086-0140(4)*

### 2.6.1 Historical Demand

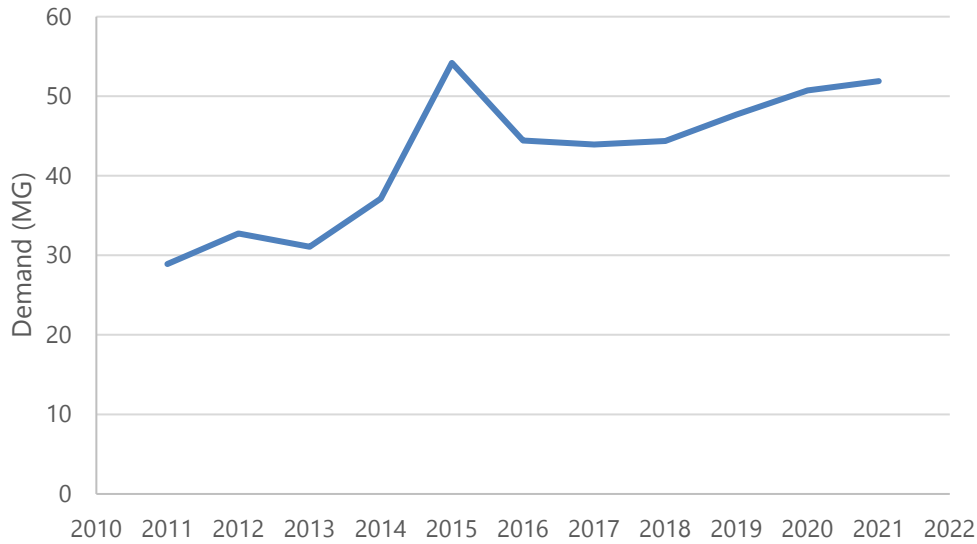
Historical water demand from 2011 through 2021 is presented in Exhibit 2-2. During this time period, demand was met entirely by the City’s surface water source, the Middle Fork Willamette River. Daily production volumes of water treated at the WTP were used to identify the following demand values.

**Exhibit 2-2. Historical Water Demand, Calendar Years 2011 to 2021**

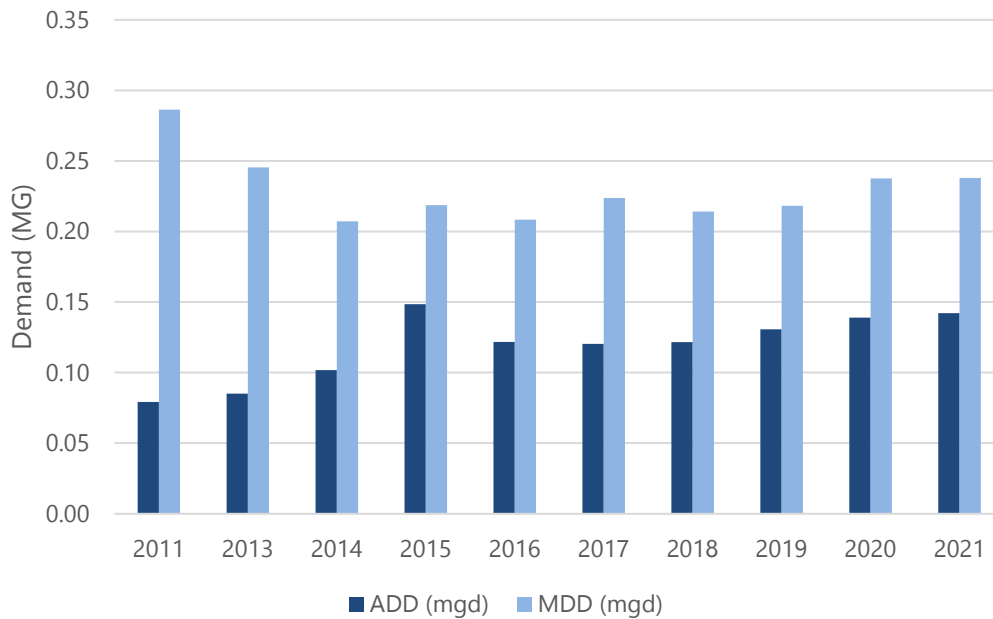
	Total Demand (MG)	ADD (mgd)	MDD (mgd)	MDD Day	Peaking Factor
<b>2011</b>	28.9	0.08	0.29	8/17/2011	3.62
<b>2012</b>	32.7	0.09	0.85	7/13/2012	9.54
<b>2013</b>	31.1	0.09	0.25	7/25/2013	2.88
<b>2014</b>	34.2	0.10	0.21	9/2/2014	2.21
<b>2015</b>	52.5	0.15	0.22	10/6/2016	1.52
<b>2016</b>	44.5	0.12	0.21	8/16/2016	1.71
<b>2017</b>	43.9	0.12	0.22	3/14/2017	1.86
<b>2018</b>	44.4	0.12	0.21	8/6/2018	1.76
<b>2019</b>	47.7	0.13	0.22	7/25/2019	1.67
<b>2020</b>	50.7	0.14	0.24	9/1/2020	1.71
<b>2021</b>	51.9	0.14	0.24	6/27/2021	1.67
<b>2017-21 Average</b>	<b>47.7</b>	<b>0.13</b>	<b>0.23</b>	-	<b>1.74</b>

Historical total demand for Lowell is characterized by an increasing trend, averaging 31 million gallons from 2011 to 2013 and reaching an average of 50 MG from 2019 to 2021, a 62 percent increase. Total demand and average and maximum day demands (ADD and MDD) are presented graphically in Exhibit 2-3 and 2-4, respectively.

**Exhibit 2-3. Total Demand, 2011-2021**



**Exhibit 2-4. ADD and MDD, 2011, 2013-2021<sup>1</sup>**



<sup>1</sup> Data for 2012 was removed because the 2012 MDD was a significant outlier, occurring in March and three to four times greater than any other MDD value, suggesting an error in measurement.

The City explored its demand data to identify potential reasons for the observed increase in annual demand of 62 percent over the ten year period. The City noticed a marked increase in demand starting in 2015, suggesting that one specific factor (versus the aggregation of multiple factors over time) may have elevated demand volumes at that time and helped keep them elevated to present. Population growth, and in turn consumption, will account for some of the increase in total demand, though



population increased approximately 4 percent over this period, and therefore was likely a minor contributor. A noticeable increase in water loss occurred starting in 2015 and continued through 2021. The increase in water loss is thought to be attributable to an improved method by which staff track demand.

## 2.7 Customer Characteristics and Use Patterns

### **OAR 690-086-0140(6)**

#### 2.7.1 Customer Types

As of December 2021, the City had 457 metered customer accounts. The City’s customer categories are residential, commercial, and industrial. The residential category includes single family and multi-family residences, and it accounts for approximately 93 percent of customer accounts. Most of the remaining accounts fall into the commercial category, serving business establishments, schools, churches, and public buildings and parks. The industrial category includes a small number of industrial customers served by City water connections. Exhibit 2-6 presents the number of accounts by customer category as of December 31, 2021.

**Exhibit 2-5. Number of Accounts by Customer Category, as of December 31, 2021**

<b>Customer Category</b>	<b>Number of Accounts</b>
Residential	423
Commercial	31
Industrial	3
<b>Total</b>	<b>457</b>

The City’s 2004 WMCP included only two customer categories, with residential customers accounting for 89 percent of total water demand and commercial customers comprising the remaining 11 percent. The 2004 WMCP did not list the number of customers in each category.

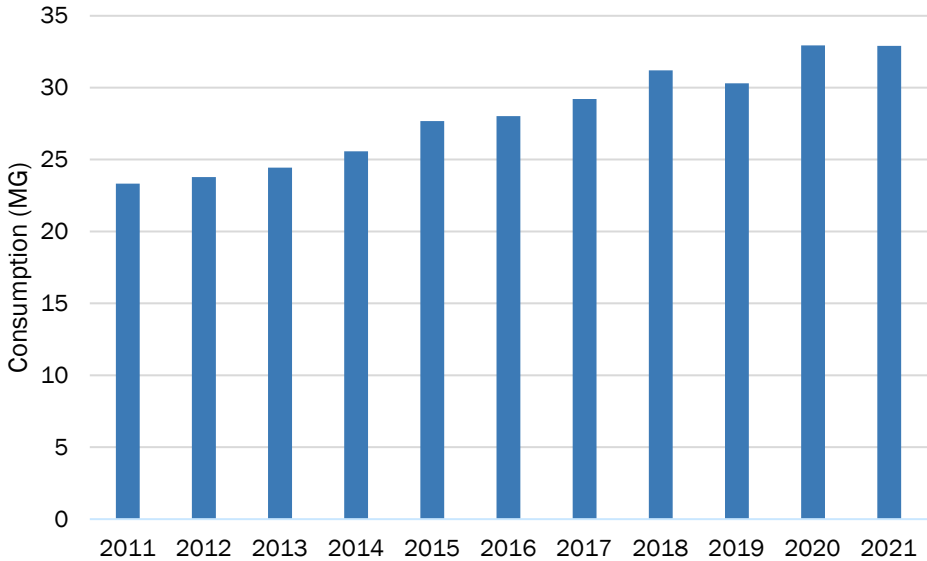
#### 2.7.2 Annual Consumption

Total annual billed consumption has gradually risen since 2011, as shown in tabular and graphical form in Exhibits 2-7 and 2-8. This increase coincides with the City’s expansion of its customer meter replacement project (which was referenced in the City’s 2004 WMCP) to increase the rate of replacement. By 2021, approximately half of the City’s customer meters had been replaced. The City estimates that most of these meters were over 20 years old and under-registering usage. As these older meters have been replaced with new meters that are accurately calibrated, the City’s observed annual consumption increases are likely explained by the progress made in replacing these meters.

**Exhibit 2-6. Annual Consumption, 2011-2021**

Consumption Total (MG)	
2011	23.3
2012	23.8
2013	24.4
2014	25.6
2015	27.7
2016	28.0
2017	29.2
2018	31.2
2019	30.3
2020	32.9
2021	32.9

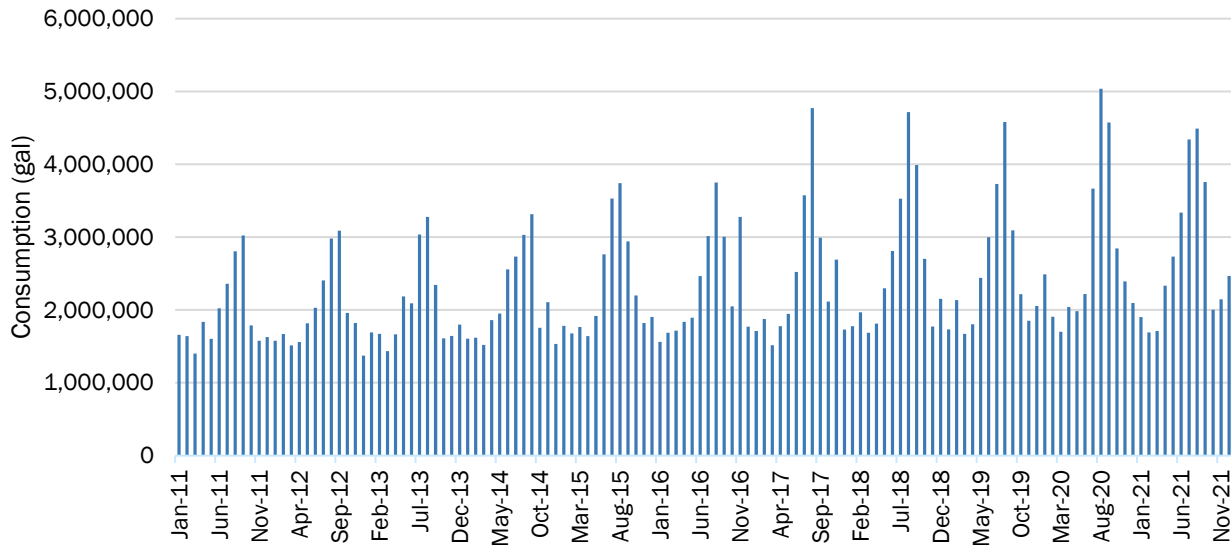
**Exhibit 2-7. Annual Consumption, 2011-2021**



**2.7.3 Monthly Consumption**

Consumption patterns over time show a pronounced seasonal pattern of increasing water use during the warm summer months, much of which may be attributed to increased outdoor use. As the population has grown over time, peak season water use has increased more than winter water use, as shown in Exhibit 2-9.

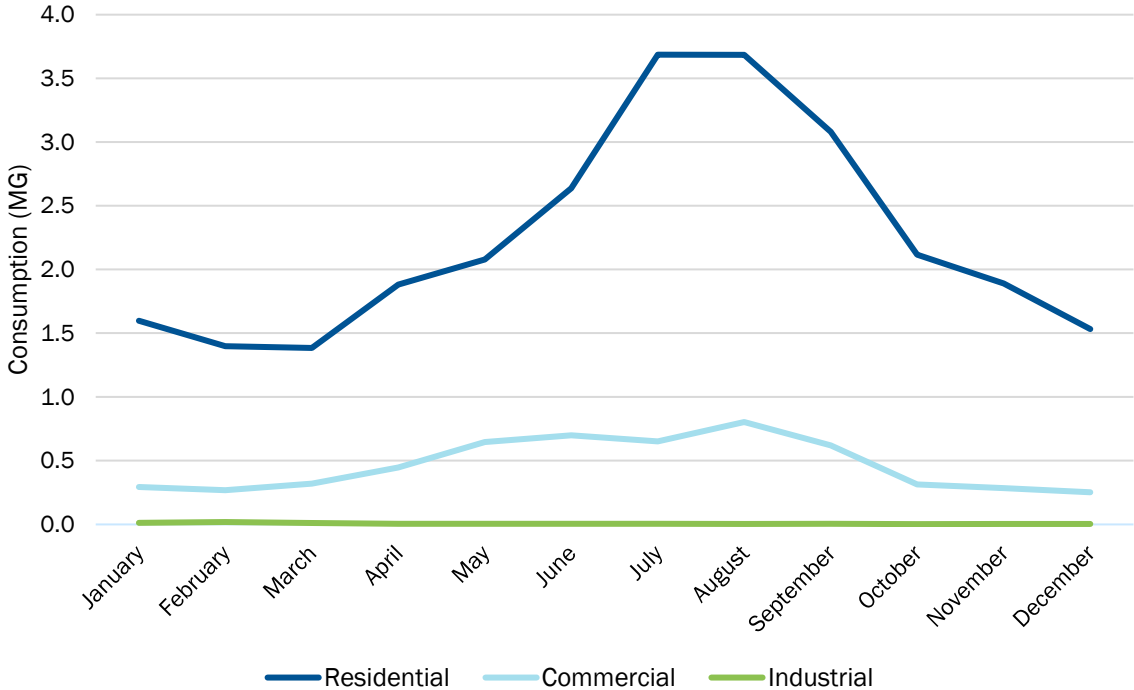
**Exhibit 2-8. Total Monthly Consumption, 2011-2021**



The City’s previous WMCP included a graph of water sold monthly from 1997 through 2000, ranging from roughly 1.5 MG per month to nearly 4 MG per month. From 2011 through 2014, monthly consumption fell within this range as well. Increases in consumption starting in 2017 are likely the result of the City’s meter replacement program mentioned above and in Section 3.

Monthly consumption by customer class is not available prior to May 2019 due to a change in billing software. Consumption by customer class for 2021 is presented in Exhibit 2-10 and shows increased summer water use for residential customers, with more moderate spring-summer increases for commercial customers. Water conservation programs aimed at reducing outdoor water use in the summer by residential customers could provide substantial reductions in peak day demands. Industrial customers account for a much smaller proportion of total consumption.

**Exhibit 2-9. Monthly Billed Consumption by Customer Category, 2021**



**2.7.4 Largest Customers**

The City identified the ten customers with the highest water consumption during fiscal year 2021, a 12 month period from July 2020 through June 2021. These water users are identified in Exhibit 2-11 by customer class. The City’s sewer plant uses significantly more water annually than other user types. As described further in Section 3, the City is evaluating the potential for using reuse water for equipment wash-down operations to reduce the use of treated potable water in this process.



**Exhibit 2-10. Annual Consumption, July 2020–June 2021**

<b>Customer Category</b>	<b>Annual Consumption, FY 2021 (Gal)</b>
Public (Sewer Plant)	3,352,635
Residential (Multifamily)	630,043
Public (School)	593,300
Public (School)	579,700
Residential (Single Family)	373,060
Residential (Multifamily)	356,400
Residential (Single Family)	332,392
Residential (Single Family)	273,158
Commercial	249,400
Public (Library/City Hall)	239,610
<b>Total</b>	<b>6,979,698</b>

Overall, the top water users accounted for 20.3 percent of total billed consumption throughout fiscal year 2021. Excluding the wastewater treatment plant, the remaining nine largest water users accounted for 10.6 percent of total billed consumption.

## 2.8 Water Loss

### ***OAR 690-086-0140(9)***

The City calculates water loss as the difference between total annual water demand and the combined value for metered, billed water consumption and other unbilled, authorized consumption. Unbilled authorized consumption includes metered backwash process water generated at the WTP, unmetered distribution system flushing, and estimates of unmetered use by the Lowell Rural Fire Protection District. The City estimates unmetered monthly quantities of water used by its crews for flushing. Exhibit 2-12 shows the City’s calculations of water loss from 2011 through 2021.

Loss averaged 29.3 percent of demand over the 11 year period, with the greatest loss occurring in 2015. Since 2015, the City’s water losses have remained more consistent year to year as compared to water loss estimates for 2011 through 2014. The City attributes the recent consistency in water loss estimates to the City’s improved methods by which demand is calculated. These new methods ensure a consistent approach in measuring the full volume of demand. In turn, the increased volumes of demand translated into higher water losses starting in 2015 since there was not a commensurate increase in water consumption.

**Exhibit 2-11. Water Loss, 2011-2021**

	Total Production (MG)	Consumption (MG)			Water Loss (MG)	Water Loss (%)
		Billed Consumption	Other Authorized Consumption	Total		
<b>2011</b>	28.9	23.3	0.8	24.1	4.8	16.5%
<b>2012</b>	32.7	23.8	1.2	25.0	7.8	23.7%
<b>2013</b>	31.1	24.4	0.9	25.3	5.7	18.4%
<b>2014</b>	34.2	25.6	1.5	27.1	7.1	20.7%
<b>2015</b>	52.5	27.7	2.0	29.7	22.8	43.5%
<b>2016</b>	44.5	28.0	1.9	29.9	14.6	32.8%
<b>2017</b>	43.9	29.2	2.3	31.5	12.5	28.3%
<b>2018</b>	44.4	31.2	1.7	32.9	11.5	25.9%
<b>2019</b>	47.7	30.3	1.4	31.7	16.0	33.5%
<b>2020</b>	50.7	32.9	1.4	34.3	16.4	32.4%
<b>2021</b>	51.9	32.9	2.2	35.1	16.8	32.3%
<b>Average</b>	<b>41.1</b>	<b>27.6</b>	<b>1.5</b>	<b>29.7</b>	<b>12.4</b>	<b>29.3%</b>

The City's 2004 WMCP indicated that water loss from October 1998 through December 2000 averaged approximately 42 percent, suggesting that the City's efforts to reduce water loss since that time has been successful.

The City's current water losses include both apparent and real losses. Apparent losses include meter inaccuracies and data entry errors. Real losses include system leakage from damaged pipes, valves, service connections, and other infrastructure. Details on the City's efforts to reduce apparent losses through its meter replacement program and real losses in the form of leak detection and line repair are provided in Section 3.

## 2.9 Water Rights

### OAR 690-086-0140(5)

#### 2.9.1 Summary of Water Rights

Lowell has two groundwater rights and one surface water right.<sup>1</sup> Groundwater Certificate 46884 authorizes up to 0.44 cfs appropriated from a well (Well No. 1) and groundwater Permit G-13499 authorizes the City to appropriate up to 0.45 cfs from a well (Well No. 3). Due to water quality concerns, these wells are held in reserve for emergency use. The City relies wholly on surface water Certificate

<sup>1</sup> The City had an additional water right permit G-8386 that was cancelled in 1983.

23721 to meet demand which authorizes diversions of up to 1.0 cfs from the Middle Fork Willamette River. The City's point of diversion is located within the City on the north shore of Dexter Reservoir. The City's water rights are detailed in Exhibit 2-13.

## 2.9.2 Aquatic Resource Concerns

OAR 690-086-140(5) requires the City to identify the following for each of these water sources: 1) any listing of the source as water quality limited (and the water quality parameters for which the source was listed); 2) any streamflow-dependent species listed by a state or federal agency as sensitive, threatened or endangered that are present in the source; and 3) any designation of the source as being in a critical groundwater area.

Lowell's surface water right authorize diversion from the Middle Fork Willamette River between miles 16 and 17 and groundwater rights authorize appropriation from two wells: Well No. 1, located within City limits and Well No. 3 which is located immediately outside of the City's northern boundary along the shore of Dexter Reservoir (see Exhibit 2-1). The river may support listed streamflow dependent fish species, however the presence of Dexter Dam creates a natural barrier and prevents fish passage above the dam. Note that the Hills Creek Dam is located 26 miles upstream of Dexter Dam and the Hills Creek reservoir (above Hills Creek Dam) was historically stocked with spring Chinook salmon, suggesting some federally-listed species of salmon and other listed fish species may be present in Dexter Reservoir.<sup>2</sup> The species generally thought to occur in the upper Willamette River and their state and federal listing statuses are provided in Exhibit 2-14.

As part of a federal and state effort to protect Oregon streams from pollutants, every two years the Clean Water Act requires Oregon Department of Environmental Quality's (DEQ) to assess or re-assess water quality and report to the Environmental Protection Agency on the condition of Oregon's waters. The Clean Water Act Section 303(d) requires the DEQ to identify waters that do not meet water quality standards and where a Total Maximum Daily Load (TMDL) pollutant load limit needs to be developed for additional regulation.

In 2010, Dexter Reservoir, Assessment Unit OR\_SR\_1709000107\_02\_100699, was placed on DEQ's 303(d) list as an impaired water body (for some water quality parameters). In DEQ's 2018/2020 Integrated Report, DEQ categorized this segment as a Category 5 water quality limited stream due to harmful algal blooms.<sup>3</sup>

The City's wells are not located in a critical groundwater area.

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<sup>2</sup> Letter from U.S. Department of the Army, Corps of Engineers, Engineering and Construction Division, to the National Marine Fisheries Service, Habitat Conservation Division (approx. September 21, 1999) regarding the City of Lowell's water treatment plant rehabilitation project.

<sup>3</sup> Source: Oregon Department of Environmental Quality's (DEQ) Assessment Database from DEQ's 2018/20 Integrated Report

**Exhibit 2-12. Listed Fish That May Be Present in Dexter Reservoir**

Listed Fish Species	State Status	Federal Status
Upper Willamette and Lower Columbia Rivers Fall Chinook salmon	Sensitive Critical	Threatened
Upper Willamette and Lower Columbia Rivers Spring Chinook salmon	Sensitive Critical	Threatened
Lower Columbia River Coho salmon	-	Threatened
Steelhead - Winter / Coastal Rainbow Trout	Sensitive Critical (Lower Columbia R.)/Sensitive (Willamette/ Upper Willamette)	-
Steelhead - Summer / Coastal Rainbow Trout	Sensitive Critical	-
Lower Columbia River Steelhead	-	Threatened
Pacific Brook Lamprey	Sensitive	-
Pacific Lamprey	Sensitive	-
Western Brook Lamprey	Sensitive	-
Western River Lamprey	Sensitive	-
Columbia River Chum Salmon	Sensitive Critical	Threatened
Coastal Cutthroat Trout	Sensitive	-
Bull Trout	Sensitive	-
Oregon Chub	Sensitive	-
White Sturgeon	Sensitive	-

**Exhibit 2-13. Water Rights**

Common Name	Source(s)	Appl./ Claim/ Limited License	Permit	Certificate	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Maximum Rate Diverted to Date (cfs)	Maximum Annual Quantity Diverted to Date (MG) <sup>2</sup>	Completion Date	Average Monthly Diversions 2021 (MG)	Average Daily Diversions 2021 (mgd)	Average Monthly Diversions 2017-2021 (MG)	Average Daily Diversions 2017-2021 (mgd)
Well 3	A well in Middle Fork Willamette R.	G-14204	G-13499	-	11/20/1995	Municipal	0.45	0.116 <sup>1</sup>	0 <sup>3</sup>	10/1/2003	0	0	0	0
Well 1	A well	G-5520	G-5408	46884	5/19/1971	Municipal	0.44	0.44	29.1	-	0	0	0	0
-	Middle Fork Willamette River	S-30077	S-23705	23721	6/20/1955	Municipal	1.0	1.0	54.2	-	4.32	0.14	3.98	0.13

<sup>1</sup> The City submitted a claim of beneficial use to OWRD in 2008 for 0.116 cfs; this claim is pending review.

<sup>2</sup> Based on a review of available water use reports on OWRD's website which start in 1988.

<sup>3</sup> The City was unable to find historical records of annual volume earlier than 1988.

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### 2.9.3 Assessment of Water Supply

#### **OAR 690-086-0140(3)**

Lowell performed an assessment of its water supplies, evaluating the adequacy and reliability of these supplies. The City has used its groundwater supplies to meet demand periodically. Currently, the City relies groundwater on surface water as its source of supply. The City's surface water has proven to be an adequate source of supply. Certificate 23721 authorizes diversions from the Middle Fork of the Willamette River of up to 1.0 cfs, exceeding the City's historical average MDD. With respect to the security of this water right during periods of low flow, the certificate is senior to instream water rights and, due to the abundant flow of the North Fork Willamette River and its tributaries upstream of the City's point of diversion, the City has not experienced and does not anticipate experiencing restrictions on the rate of diversion associated with this certificate.

Combined, the City's two groundwater rights, Permit G-13499 (0.45 cfs) and Certificate 46884 (0.44 cfs), authorize appropriation up to 0.89 cfs. These rights are adequate to meet the City's average MDD of 0.34 cfs (0.22 mgd), however, water quality issues currently prevent the City from utilizing this source. Concentrations of arsenic exceed the Environmental Protection Agency's maximum contaminant level allowable in drinking water. The City's WTP was not designed to treat for arsenic to meet this standard. Because of this constraint, the City has relied on its surface water source to meet demand. However, the City recently determined that blending of the surface and groundwater sources may reduce arsenic levels below maximum levels. The City would only consider this blending option if its surface water source was not able to fully meet demand.

## 2.10 System Description

#### **OAR 690-086-0140(8)**

The City's water system infrastructure includes a surface water intake structure transmission and distribution lines, a WTP, three inline reservoirs, and pump stations.

The City's diverts water from Middle Fork Willamette River via an intake located on the north shore of Dexter Reservoir. Diverted water is pumped to the City's WTP where water is treated prior to distribution. The WTP is located within a quarter mile of the intake and can currently treat up to 160 gallons per minute (gpm). The City uses three distribution system inline reservoirs to store a total of 902,500 gallons and also has a 35,000 clear well below the WTP. Treated water is pumped from the WTP into the distribution system via a distribution system pump station. The City also operates a booster pump used to serve customers located at higher elevations. The City has approximately 30,000 feet of distribution and transmission piping.

The City also has two operable wells, Wells 1 and 3 that are currently capable of producing approximately 100 gpm total.

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## 3. Water Conservation Element

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*This section addresses the requirements of OAR 690-086-0150(1) – (5). This rule requires a description of specific required conservation measures and benchmarks, and additional conservation measures implemented by the District.*

### 3.1 Progress Report

#### **OAR 690-086-0150(1)**

Following submission of the City's first WMCP in 2001, OWRD required the City to develop a work plan to complete the City's Water Conservation and Curtailment Elements. OWRD approved the WMCP and associated work plan in 2004. The work plan identified a date of October 1, 2009 for the City to submit a revised WMCP to OWRD. Intermediate milestones in the work plan included completing revisions to the Water Conservation Element by October 1, 2006 and completing revisions to the Water Curtailment Element by October 1, 2007.

Due to staff turnover and loss of institutional knowledge the City is unable to find records regarding work plan implementation. However, this WMCP fully meets the work plan requirements and latest administrative rule requirements and serves as a fresh start to the City's water management and conservation efforts. Exhibit 3-1 presents a progress report on the benchmarks included in the 2001 WMCP.

### 3.2 Use and Reporting Program

#### **OAR 690-086-0150(2)**

The City's water measurement and reporting program complies with the requirements in OAR Chapter 690, Division 85. Flow meters are installed immediately upstream and downstream of the WTP to measure diversions of raw water from Dexter Lake and finished water leaving the plant, respectively. Flow meters are also installed on the City's wells. Monthly water use measurements are compiled and submitted to OWRD on an annual basis. Reporting is for the previous water year (October 1 to September 30). The City's water use records can be found at [http://apps.wrd.state.or.us/apps/wr/wateruse\\_report/](http://apps.wrd.state.or.us/apps/wr/wateruse_report/).

### 3.3 Required Conservation Measures

#### **OAR 690-086-0150(4)(a-f)**

OAR 690-086-050(4) requires that all water suppliers establish 5-year benchmarks for implementing the following water management and conservation measures:

1. Annual water audit
2. System-wide metering
3. Meter testing and maintenance
4. Unit-based billing

5. Water loss analysis
6. Public education

**Exhibit 3-1. 2004 WMPC Conservation Measure Benchmarks Progress**

Conservation Measure	2004 WMCP Benchmarks <sup>1</sup>	Benchmark Progress
Annual water audit	During the annual reporting of consumption to the State, the City calculates the extent of system leakage.	This is completed each year in December.
System metering	The City is fully metered at the groundwater pumping sources and records the water use on a daily basis. All customers using City water are metered.	Although the City does not currently use the wells, the wells have functional flow meters. In addition, the City meters diversions from its surface water source at its water treatment plant (WTP). All customers are metered.
Meter testing and maintenance	The City hires a consultant to test a representative portion of the City's meters each year. Where required, the City replaces or maintains the meter. For the past four years, the City's ongoing maintenance program has included the replacement of old meters. According to staff, the city replaces an average of ten meters per month.	In 2014 the City moved to a meter replacement program. The City currently is changing out all meters at service connections; roughly 250 of the 454 of customers' meters have been replaced since 2014.
Rate structure	To encourage water conservation, the City implemented in 1998 a block water rate structure, which was used to encourage water conservation.	The City continues to use a block rate structure as a means to encourage water conservation.
Water loss	A significant increase in pump run time is a reliable indicator of a new leak in the system. When an increase is detected, the leak is located by using a sounding device on randomly selected points on the system. The City's goal is to reduce their leakage to the state's standard of 15% of total consumption through maintenance programs which identify old, leaking pipes and valves.	The City has adopted a more refined tool to identify leaks in the system. Specifically, the City performs system-wide periodic leak detection surveys. In 2015 and in 2021, the City hired a company to perform a leak survey of the entire distribution system. Minor leaks were discovered during these surveys and the City repaired those that more significantly contributed to water loss.
Public education	Citizens are notified of the City's water policies by including notices inserted into the monthly water bill.	New residents are given the utility policy when they sign up for service. In addition, the City includes water conservation information on its Consumer Confidence Report annually. Prior to the pandemic, the City provided outreach to third grade students.

Conservation Measure	2004 WMCP Benchmarks <sup>1</sup>	Benchmark Progress
Leak repair or line replacement	It is the City's goal to reduce the average leakage to less than 15% of the total water consumed from the source. This should be achieved by annually replacing old service lines, AC mains, meters, and valves, and discontinuing the City's regular use of the groundwater pumps and associated piping.	The City tested mains, valves, hydrants, lines, and service laterals for leaks in 2015 and 2021. In November 2021, the City fixed three significant leaks detected.
Supplier financed retrofit or replacement of fixtures	No benchmark was provided for supplier financed retrofit or replacement of fixtures.	The City is currently in the progress of a meter replacement CIP.
Programs that support and encourage water conservation	The City has implemented programs that encourage low water use landscaping by providing water troughs filled with non-potable water for landscaping as well as alternating allowable landscape-watering days.	The City has not continued these programs.
Water reuse, recycling, and non-potable water	Within the next five years, the City should review their opportunities to implement a water reuse plan. For example, the City may use untreated water to backwash their potable water filters and discontinue the use of potable water at the sewage treatment plant for equipment wash-down operations.	The City has not developed a water reuse plan.

<sup>1</sup> The City's previous WMCP was written in 2001 and received final approval from OWRD in 2004. The City did not provide benchmarks for all the conservation measures required in the current rule.



The following sub-sections describe the City's plans during the next five years to initiate, continue, or expand its conservation measures to meet these requirements.

### **3.3.1 Annual Water Audit**

OWRD defines a water audit as an analysis of the water system that includes a thorough accounting of all water entering and leaving the system. Section 2 describes the City's water loss methodology calculation and historical results. In summary, the City calculates water loss by comparing demand (treated water leaving the WTP) to consumption to determine water loss on a monthly and annual basis. The Lowell Rural Fire Protection District provides the Public Works Department with estimates of their monthly water use. As shown in Exhibit 2-8, the City's water loss in 2021 was 32.3 percent. The City attributes losses to real and apparent losses, that is, primarily a combination of losses due to distribution system leakage and meter errors, respectively.

#### ***Five-Year Benchmark***

- Continue to conduct an annual water audit using a systematic and documented methodology that includes estimating unmetered authorized use.

### **3.3.2 System-wide Metering**

The City's water system is fully metered, and new meters are installed at all new water service connections.

#### ***Five-Year Benchmark***

- Continue to require installation of meters on all new water connections.

### **3.3.3 Meter Testing and Maintenance**

Routine testing of customer meters and staff observations of meter inaccuracies have led the City to begin implementing a customer meter replacement program. In some cases, testing showed that meters that had been in place for over 20 years were under-registering use by up to 75 percent. This program has already resulted in more accurate data collection and billing, and the City anticipates that its water losses will decrease as the meter testing and replacement program continues. Currently, approximately 250 of the 454 customer meters have been replaced and the City will endeavor to replace the remainder over the next five years, averaging approximately 40 meter replacements per year. Following replacement of all targeted meters, the City intends to test a portion of customer meters annually to ensure that inaccuracies are quickly detected and addressed through maintenance or replacement.

In addition to its proactive approach to meter maintenance, the City is alerted to failed or potentially failed customer meters through its billing system or directly from customers. Upon alert, the City inspects these meters and replaces or repairs them immediately, as needed. Inspection may include a test for accuracy relative to the manufacturer's recommended specifications or the City may determine meter failure without a meter test through observation (i.e. the register does not measure any use).

The City has water system master meters at the Dexter Reservoir intake, at the WTP, and on each production well. The meters measuring volumes of untreated and treated water located at the WTP were installed in 2012 and the accuracy of these was verified by an outside contractor in 2016 and 2021.

### **Five-Year Benchmarks**

- Continue the meter replacement program, replacing any meters older than 20 years of age within the next five years.
- The City will test approximately 5 percent of customer meters for accuracy annually and replace or repair faulty meters following replacement of all meters over 20 years of age.
- Upon alert of a potentially failed meter, the City will inspect meters in question and repair or replace the meters if needed immediately.
- Every 5 years, the City will verify the accuracy of the master meters located at the WTP and repair or replace the meters as needed.

### **3.3.4 Water Rate Structure**

The City's water rate structure consists of a Basic Service Charge of \$26.87 per month assessed per equivalent dwelling unit (EDU), plus a variable rate based on the quantity of water used.

Single family homes, individual units of a duplex, and multi-family units with three or more bedrooms are considered single EDUs. In all other multi-family residential complexes, each unit is counted as two-thirds of an EDU, and the total EDUs for the complex are calculated by multiplying the number of units by 0.67 and rounding up to the next whole EDU. For commercial and industrial accounts with meters  $\frac{3}{4}$  inches or smaller, monthly water use over a 12-month period is averaged, and each 6,000 gallons of monthly use is considered one EDU. For commercial and industrial accounts with larger meters, the EDU calculations in Exhibit 3-2 apply.

#### **Exhibit 3-2. Calculation of Commercial and Industrial Equivalent Dwelling Units (EDUs)**

<b>Meter Size</b>	<b>EDUs</b>
<b>1 inch</b>	2.0
<b>1 ½ inch</b>	5.0
<b>2 inch</b>	8.0
<b>3 inch</b>	15.0
<b>4 inch</b>	25.0
<b>6 inch</b>	50.0

The quantity-based variable water rate for all customer classes is designed to encourage water conservation by using a tiered volume charge, as shown in Exhibit 3-3.

**Exhibit 3-3. Variable Water Rate Based on Volume Metered**

Quantity Metered	Charge
0-5,000 gallons per EDU	\$5.39 per 1,000 gallons
Over 5,000 gallons per EDU	\$6.79 per 1,000 gallons

Within the next two years, the City intends to conduct a rate study to assess whether current rates are appropriate and sufficient to meet the operational, maintenance, and repair costs of the water system.

***Five-Year Benchmarks***

- The City will continue to bill customers based, in part, on the volume of water consumed.
- Within the next two years, the City will conduct a water rate study.

**3.3.5 Water Loss Analysis**

As discussed in Section 2.8, the City’s water loss in 2021 was 32.3 percent. Because this water loss is greater than 10 percent, OAR 690-086-0150(4)(e)(A) requires the City to provide OWRD with an analysis of potential water loss factors and proposed corrective actions within two years of approval of this WMCP. (The City’s analysis and corrective actions are outlined below). If the designated actions do not reduce water loss to less than 10 percent within five years of WMCP approval, OWRD requires the City to develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the water supplier, a line replacement program listing the size and length of pipe to be replaced annually, or to develop and implement a water loss control program consistent with the American Water Works Association’s standards.

The City has determined that losses due to inaccurate customer meters and distribution system leakage are the primary contributors to water losses. In response, the City has an ongoing meter replacement program and performs periodic leak detection surveys followed by leak repair. The meter replacement program is described above. Leak detection surveys were conducted by a third party contractor in 2015 and 2021 in the entire distribution system using a sounding device. Based on the results of the surveys, the City has been actively working to repair and replace lines and valves with identified leaks and to upgrade older distribution infrastructure that is more prone to developing leaks over time. In November 2021, the City fixed three significant leaks that were detected during the most recent survey. The City will continue this program in the future, performing line leak detection and repairing leaks as they are discovered. The City’s meter replacement program in combination with the leak detection and repair program are anticipated to reduce water loss to 10 percent or less over the next five years. If these measures do not reduce loss to 10 percent or less within five years, the City will re-evaluate its program and adopt one of the three prescriptive measures required in the rule.

***Five-Year Benchmark***

- Continue the meter replacement program, replacing any meters older than 20 years of age over the next five years.
- Continue leak detection and repair program over the next five years

- Within 5 years of WMCP approval, if water loss still exceeds 10 percent the City will select and implement the required measures consistent with the OWRD rule requirements.

### 3.3.6 Public Education

OWRD requires the City to establish a public education program to encourage efficient indoor and outdoor water use that includes regular communication of the supplier's water conservation activities to its customers. As part of its conservation education program, the City includes information on its annual Consumer Confidence Report (CCR) describing the community's water source and the importance of conservation. The City intends to expand its outreach to include articles on indoor and outdoor water conservation topics in the City newsletter at least twice per year and to post water-saving tips and information on its website. Prior to the pandemic, the City Public Works Department conducted outreach about the water system and conservation to third grade students, including a guided field trip of the water treatment plant. When public health conditions allow, the City intends to continue providing this educational program once per year.

#### *Five-Year Benchmarks*

- The City will continue including water conservation information in its annual Consumer Confidence Report.
- When conditions allow, the City will conduct annual educational programs and field trips relating to the water system and water conservation for elementary school students.
- Within the next five years, the City will begin including up to two articles on indoor and outdoor water conservation topics in the City newsletter.
- Within the next five years, the City will add a page on its website providing information on efficient indoor and outdoor water uses.

## 3.4 Additional Conservation Measures

### **OAR 690-086-0150(6)**

OAR 690-086-0150(6) requires municipal water suppliers that either: (a) serve a population greater than 1,000 and propose to expand or initiate diversion of water under an extended permit for which resource issues have been identified, or (b) serve a population greater than 7,500, to provide a description of the specific activities, along with a five-year schedule to implement several additional conservation measures. This rule does not apply to the City given that it serves a population of less than 7,500 and is not requesting access to an extended permit within the 20-year planning period of this WMCP. However, the City intends to expand its conservation program to include the following measures as a means to help its customers and the City reduce use of water.

#### *Five-Year Benchmarks*

- Within the next five years, the City will begin providing leak detection dye tablets to customers upon request so customers can identify leaking toilet tanks.
- Within the next five years, the City will provide 25 low-flow showerheads and 25 faucet aerators annually to customers.

- Within the next five years, the City will explore the potential for using reclaimed water for equipment wash-down operations at the WTP.

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## 4. Water Curtailment Element

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*This section satisfies the requirements of OAR 690-086-0160. This rule requires a description of past supply deficiencies and current capacity limitation. It also requires inclusion of stages of alert and the associated triggers and curtailment actions for each stage.*

### 4.1 Introduction

Curtailment planning is the development of proactive measures to reduce demand during supply shortages as the result of prolonged drought, or partial or full system failure from unanticipated events including catastrophic events, mechanical or electrical equipment failure, or events not under control of the City.

### 4.2 History of System Curtailment Episodes

#### **OAR 690-086-0160(1)**

The City staff are not aware of any system curtailment episodes within the last 10 years.

### 4.3 Capability Assessment

Lowell evaluated its ability to continue to provide water during four emergency events that could cause a supply shortage: a drought, source contamination, power failure, and earthquake. Given the abundant flows of the Middle Fork Willamette River and its tributaries and the priority date of its surface water Certificate 46884 of June 20, 1955, the City does not anticipate a drought impacting the City's ability to divert surface water. Contamination of the river (or reservoir from which the City diverts water) could impair the City's ability to meet demand. The City's WTP can treat for some types of pollutants, however others, such as toxic algae blooms, would prevent the City from using this source. In the event of a power failure the City has the option to utilize auxiliary power from generators located at the WTP (and booster pump station) that will enable the City to operate key water system infrastructure, such as the WTP and pump used for diversion of surface water. Finally, an earthquake could limit the City's ability to meet demand, but the severity of the resulting damage to the City's infrastructure would dictate the City's need to implement curtailment.

During any of these events, the City's two distribution system reservoirs may be able to provide up to six days-worth of water to the City's customers based on historical ADD of 140,000 gpd, assuming the reservoirs are full. The City may also elect to blend surface and groundwater during events in which surface water is still available, but not in the quantities necessary to meet demand. Severe limitations to the City's ability to produce surface water could require the City to seek delivery of water in tanker trucks as a short-term measure to help meet the City's customers' health and safety needs.

If the City cannot produce enough water to meet demand, caused by any of these or other events, the City would rely on its water curtailment plan to stretch supply as long as possible while the City worked to restore normal supply capacities.

While the City does not have capacity constraints at this time to meet demand, the City recognizes that its WTP is at capacity and additional demands originating from growth could exceed WTP capacity. The City is actively studying options to address the future constraint, including expansion of the WTP.

## 4.4 Curtailment Stages and Initiating Conditions

### ***OAR 690-086-0160(2) and (3)***

The City’s water curtailment ordinance, Ordinance 172, describes three orders of restrictions to be invoked in the event of a water supply shortage. These restrictions are of increasing severity and could be initiated and implemented in progressive steps or a later stage could be implemented directly. The plan includes both voluntary and mandatory measures, depending upon the cause, severity, and anticipated duration of the shortage. This ordinance does not specify initiating conditions. Therefore, the City developed these for this WMCP. The City also added a voluntary stage to the City’s three orders of mandatory restrictions found in the ordinance.

Exhibit 4-1 presents the four curtailment stages, as well as their initiating conditions. While initiation of a curtailment stage is based on the specific circumstances of the actual event, the City has established initiating conditions based on demand relative to available system capacity. System capacity is defined as the sum of the capacities of the WTP of 200 gpm and distribution system reservoirs of 935,000 gallons.

The decision to implement curtailment will also consider the knowledge and judgment of City staff members familiar with the water system. Staff members may evaluate the extent of system damage or contamination, duration of repair, costs, fire hazards, and weather forecasts to make this determination.

### **Exhibit 4-1. Curtailment Stages of Alert and Initiating Conditions**

<b>Curtailment Stages</b>	<b>Potential Initiating Conditions</b>
Stage 1 (Voluntary)	System demand reaches or expected to reach 90 percent of available capacity.
Stage 2	System demand reaches or is expected to reach 91-100 percent of available capacity for 3 consecutive days.
Stage 3	System demand exceeds or is expected to exceed available capacity and the City anticipates a declining trend in available storage for no more than 3 days.
Stage 4	System demand exceeds or is expected to exceed available capacity and the City anticipates a declining trend in available storage for more than 3 consecutive days.

## 4.5 Authority and Enforcement

The City Administrator has the authority to order the first or second stages of restrictions of use, as described in Ordinance 172 and the City Council has the authority to declare enactment of any of the stages. The ordinance gives the City Administrator the authority to enforce the last stage by discontinuing use of those customers who do not meet the last stage's curtailment restrictions and Class B violations may be issued by the City.

## 4.6 Curtailment Plan Implementation

### ***OAR 690-086-0160(4)***

#### **4.6.1 Stage 1 (Voluntary)**

The City will issue a general request for a voluntary reduction in water use by all users. The request will include a summary of the current water situation, the reason for the requested reduction in use, suggestions for conserving water, and a warning that mandatory cutbacks will be required if the voluntary measures do not sufficiently reduce water usage. Examples of voluntary reductions include reductions to outdoor water use and/or limiting irrigation of landscape and lawns to specific night and early morning hours and implementation of water conservation measures promoted by the City's conservation program.

#### **4.6.2 Stage 2 (Mandatory)**

1. Allow irrigation of landscaping and lawns between the hours of 8 PM and 6 AM.
2. Prohibit the use of water for washing motorbikes, motor vehicles, boat trailers, or other vehicles except at a commercial washing facility that recycles wash water.
3. Limit City uses of water and discontinue hydrant flushing, reduce nonessential cleaning using water, and curtail temporary access (e.g., for construction-related activities) to water at hydrants.
4. Prohibit the use of water to wash sidewalks, walkways, driveways, parking lots, tennis court, and other hard-surfaced areas.
5. Prohibit the use of water to wash buildings and structures, except as needed for painting or construction.
6. Prohibit the use of water to fill or top-off a fountain or pond for aesthetic or scenic purposes, except for recirculating systems and where necessary to support fish life.
7. Prohibit the use of water to fill, refill, or add to any indoor or outdoor swimming pools or hot tubs, except if one of the following conditions is met: the pool is used for a neighborhood fire control supply, the pool has a recycling water system, the pool has an evaporative cover, or the pool's use is required by a medical doctor's prescription.
8. Prohibit the use of water for dust control unless absolutely necessary.

#### **4.6.3 Stage 3 (Mandatory)**

1. Continue activities initiated under Stage 2.

2. Prohibit all outdoor watering (exceptions include new lawn, grass or turf planted after March 1 of the calendar year in which restrictions are imposed, or park and recreation areas specifically designated by the City).
3. Prohibit the use of water from hydrants for construction-related activities (except on a case-by-case basis), fire drills, or any purpose other than firefighting.

#### **4.6.4 Stage 4 (Mandatory)**

1. Prohibit all outside water use. The only exceptions will be those specifically identified by the City.
2. Prohibit all nonessential water use that does not maintain the health and safety of the public.

Exceptions to these mandatory measures will be authorized by specific consent from the City.

### **4.7 Notifications of Curtailment**

The District has several communication channels that it can use to relay important information about a supply shortage, including voluntary or mandatory measures. The District may rely on local media, mailers, bill stuffers, door hangers, social media, strategically-located sandwich boards, and the web sites of the Property Owners' Association of Units 1 and 2 and the Wonderland Water Sanitary District to communicate with its customers on an ongoing basis about a supply shortage. Notices and other forms of communication may include a description of the current water situation, the reason for the requested conservation measures, and a warning that mandatory restrictions will be implemented if voluntary measures are not sufficient to achieve water use reduction goals.

### **4.8 Drought Declaration**

If a declaration of a severe drought in Lane County is declared by the Governor per ORS 536.720, the Oregon Water Resources Commission may order political subdivisions within any drainage basin or subbasin to implement a water conservation or curtailment plan or both, approved under ORS 536.780. The conservation and curtailment elements of this WMCP meet these requirements. If the City falls within a severe drought area declared by the Governor, such as Lane County, the City will consider whether curtailment measures are needed to meet system demands. Regardless of whether curtailment is needed, the City will continue to encourage customers to conserve water.

## 5. Municipal Water Supply Element

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*This section satisfies the requirements of OAR 690-086-0170.*

*This rule requires descriptions of the City's current and future service area and population projections, demand projections for 10 and 20 years, and the schedule for when the City expects to fully exercise their water rights. The rule also requires comparison of the City's projected water needs and the available sources of supply, an analysis of alternative sources of water, and a description of required mitigation actions.*

### 5.1 Delineation of Service Area

#### **OAR 690-086-0170(1)**

Lowell's current service area is shown in Exhibit 2-1. Growth is anticipated to occur in within this service area as infill and as development of vacant land occurs. This growth over the 20 year planning period will add new customers to the City's existing water system. The City's municipal code prohibits expansion of the City's water system to areas beyond city limits, therefore, the City's service area will only grow as a result of annexations of land within the UGB.

### 5.2 Population Projections

#### **OAR 690-086-0170(1)**

The City's population is projected to increase from 1,196 in 2020 to 1,408 in 2032 and 1,513 in 2042 as shown in Exhibit 5-1. These future estimates are based on a forecast conducted by PSU's Population Research Center (PRC) and modified by the City to account for population growth resulting from a recently completed large residential development. This development added 94 persons to the City and was not included in PSU's forecast. These additional residents were added to PSU's population forecast starting in 2021 and had the effect of increasing the average annual growth rate (AAGR) relative to the growth rate in PSU's forecast and the AAGR between 2032 and 2042. The methodology and the basis for these population projections are found in an excerpt from the City's 2022 WSMP in Appendix B.

#### **Exhibit 5-1. Projected Population, 2032 and 2042**

<b>Year</b>	<b>Population</b>	<b>AAGR</b>
<b>2020</b>	1,196	-
<b>2032</b>	1,502	1.9%
<b>2042</b>	1,525	0.2%

## 5.4 Demand Forecast

### **OAR 690-086-0170(3)**

As part of its WSMP, the City conducted a demand forecast for its 2022 WSMP to estimate ADD and MDD by 2042. To project the City’s ADDs, the City relied on a per capita water use factor and multiplied this factor by the future populations for 2032 and 2042 (see Section 5.2). The water use factor was estimated to be 103 gallons per capita per day (gpcd) and calculated by dividing the historical average ADD for treated water from 2016 to 2020 by the City’s 2020 population of 1,196. MDD was calculated by multiplying ADDs by a peaking factor of two. The City selected this factor based on the historical peaking factor, which trended down from 3.6 in 2011 to 1.7 in 2020 as shown in Section 2.

The City conducted a demand forecast for the WSMP based on water produced at the WTP. However, this WMCP considers the projected rate of water diverted from the Middle Fork Willamette River. As a result, the City refined the WSMP forecast for this WMCP to include water use during the WTP treatment process. This “process water” includes water used to backwash the WTP filters to remove particles that become trapped in the filter media and reduce the filter’s effectiveness over time. Incorporating this process water into the demand forecast captures the full amount of water diverted by the City under its surface water right. The City measures the volume of process water at the WTP via master meters and determined that total process water accounted for 2.8 percent of total diverted water from 2016 to 2020. Therefore, the City increased the forecasts of water demand calculated for the WSMP by 2.8 percent. The resulting future demands are shown in Exhibit 5-2.

MDD is forecast to reach 322,946 gallons per day or 0.50 cfs, an increase of approximately 36 percent from 2020. As previously noted, a majority of this increase is due to the addition of the 94 persons added to the system by 2021.

### **Exhibit 5-2. Demand Forecast, 2020-2042**

	ADD (gal/cfs)	MDD (gal/cfs)
<b>2020 (Actual)</b>	138,928 / 0.21	237,580 / 0.37
<b>2032</b>	159,038 / 0.25	318,076 / 0.49
<b>2042</b>	161,473 / 0.25	322,946 / 0.50

## 5.5 Schedule to Exercise Permits and Comparison of Projected Need to Available Sources

### **OAR 690-086-0170(2) and (4)**

To meet the City’s 20 year projected demand of 0.5 cfs, the City will rely on Certificate 46884 (1.0 cfs) which authorizes diversions from the Middle Fork Willamette River as its primary source of supply over this period. Historically, this surface water source has proven to be reliable and available and the City foresees that this source will remain a stable source of supply into the future. Certificate 23721 (0.44 cfs)



and Permit G-13499 (0.45 cfs) authorize appropriation from two wells. Due to current water quality constraints these groundwater rights are held in reserve for emergency use when blended with surface water.

The City has developed 0.116 cfs of 0.45 cfs of Permit G-13499 and has a claim of beneficial use and certificate request pending with OWRD. The City intends to submit a request to extend the time line to develop the remaining portion of Permit G-13499; the City understands that following the extension of time, access to water beyond 0.116 cfs will need to be addressed in a subsequent WMCP.

## **5.6 Alternative Sources of Water**

### ***OAR 690-086-0170(5)***

OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet future water demand. Expansion of water use under the City's permit will need to be addressed following an extension of time and a subsequent WMCP. However, the City's groundwater supply can serve as a backup supply if blended with the City's surface water supplies when surface water supplies are available. Absent the availability of surface water, the City may truck in water supplies or rely on other measures until access to the City's source water can be restored.

## **5.7 Quantification of Maximum Rate and Monthly Volume**

### ***OAR 690-086-0170(6)***

OAR 690-086-0170(6) requires a quantification of the maximum rate and maximum monthly volume of water to be diverted if expansion or initial diversion of water allocated under an existing permit is necessary to meet demands in the 20-year planning horizon. Expansion of water use under the City's permit will need to be addressed following an extension of time and a subsequent WMCP.

## **5.8 Mitigation Actions under State and Federal Law**

### ***OAR 690-086-0170(7)***

Under OAR 690-086-0170(7), for expanded or initial diversion of water under an existing permit, the water supplier is to describe mitigation actions it is taking to comply with legal requirements of the Endangered Species Act (ESA), Clean Water Act, and other applicable state or federal environmental regulations. Expansion of water use under the City's permit will need to be addressed following an extension of time and a subsequent WMCP.

## **5.9 New Water Rights**

### ***OAR 690-086-0170(8)***

Under OAR 690-086-0170(8), an analysis of alternative sources of additional water is required if acquisition of new water rights will be necessary within the next 20 years to meet the projected water

demands. The City does not intend to acquire new water rights to meet its demands within the next 20 years, so the provisions of this section are not applicable.

**Appendix A**

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**Letter to Affected Local Government and Response**





August 19, 2022

Ms. Amber Bell, Planning Director  
Lane County  
3050 N. Delta Highway  
Eugene, OR 97408  
Amber.Bell@lanecountyor.gov

Subject: Water Management and Conservation Plan for Lowell

Dear Ms. Bell,

The City of Lowell (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier will make its draft WMCP available for review by any affected local government and seek comments related to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version by email of the City's draft WMCP for your review.

Please provide any comments to me by September 19, 2022. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter or email response to that effect would be appreciated. You may send your comments to me at [thenkle@gsiws.com](mailto:thenkle@gsiws.com).

If you have any questions, please feel free to contact me at 971-235-2550. Thank you for your interest.

Sincerely,  
GSI Water Solutions Inc.

A handwritten signature in black ink that reads "Tim Henkle". The signature is written in a cursive, flowing style.

Tim Henkle  
Water Resources Consultant

Enclosure

## Tim Henkle

---

**From:** MILLER Keir C <Keir.MILLER@lanecountyor.gov>  
**Sent:** Tuesday, August 23, 2022 10:57 AM  
**To:** Tim Henkle  
**Cc:** BELL Amber R; EICHNER Lindsey A  
**Subject:** RE: City of Lowell Draft WMCP for Review

Hi Tim,

I've reviewed the Draft WMCP for the City of Lowell to assess consistency with the Lane County Rural Comprehensive Plan (RCP). I find no conflicts between the Draft WMCP and the RCP and the plan, as proposed, appears consistent with the polices of the RCP.

Please let me know if you have any additional questions.

Keir

### **Keir Miller | Manager**

Lane County | Land Management Division  
3050 North Delta Hwy | Eugene, OR 97408  
Office: 541-682-4631 | Fax: 541-682-3947  
[keir.miller@lanecountyor.gov](mailto:keir.miller@lanecountyor.gov) | [www.lanecounty.org/lmd](http://www.lanecounty.org/lmd)

---

**From:** Tim Henkle <thenkle@gsiws.com>  
**Sent:** Friday, August 19, 2022 10:01 AM  
**To:** MILLER Keir C <Keir.MILLER@lanecountyor.gov>  
**Subject:** FW: City of Lowell Draft WMCP for Review

[EXTERNAL 

Hi Keir,

In Amber's and Lindsey's absences, please see below and find the attached documents.

Thank you,

Tim

---

**From:** Tim Henkle  
**Sent:** Friday, August 19, 2022 9:49 AM  
**To:** [Amber.Bell@lanecountyor.gov](mailto:Amber.Bell@lanecountyor.gov)  
**Cc:** Max Baker <[mbaker@ci.lowell.or.us](mailto:mbaker@ci.lowell.or.us)>  
**Subject:** City of Lowell Draft WMCP for Review

Hello Ms. Bell,

Please find a cover letter and draft Water Management and Conservation Plan for the City of Lowell. The City is requesting your review of the WMCP and response. Please note the 30 day requested response time.

Thanks,

Tim

**Tim Henkle**

**Water Resources Consultant**

phone: 971-236-2550

1600 SW Western Boulevard, Suite 240, Corvallis, OR 97333

GSI Water Solutions, Inc. | [www.gsiws.com](http://www.gsiws.com)





## **Appendix B**

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# **Population Projection, Excerpt from Draft 2022 Water System Master Plan**



# City of Lowell

LANE COUNTY, OREGON

## Water Master Plan

September 2022

[www.civilwest.com](http://www.civilwest.com) | Willamette Valley | North Coast | South Coast | Rogue Valley



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### 3.3 Population

#### 3.3.1 Historical and Existing Population

A population analysis for Lowell was completed using data from the US Census, and PSU Population Resource Center (PRC) on past, present, and projected future population growth for cities within Lane County.

TABLE 3.3.1 – LANE COUNTY HISTORICAL AND FORECAST POPULATIONS

Figure 1. Lane County and Sub-Areas—Historical and Forecast Populations, and Average Annual Growth Rates (AAGR)

	Historical			Forecast					
	2000	2010	AAGR (2000-2010)	2019	2044	2069	AAGR (2010-2019)	AAGR (2019-2044)	AAGR (2044-2069)
Lane County	322,959	351,715	0.9%	371,361	426,041	480,634	0.6%	0.6%	0.5%
Coburg	969	1,032	0.6%	1,308	1,687	1,955	2.6%	1.0%	0.6%
Cottage Grove	8,952	10,164	1.3%	10,284	11,677	13,172	0.1%	0.5%	0.5%
Creswell	3,959	5,333	3.0%	5,663	7,573	9,813	0.7%	1.2%	1.0%
Dunes City	1,229	1,303	0.6%	1,292	1,474	1,665	-0.1%	0.5%	0.5%
Eugene	160,551	177,369	1.0%	192,607	232,099	273,794	0.9%	0.7%	0.7%
Florence	8,783	10,230	1.5%	10,579	12,518	14,635	0.4%	0.7%	0.6%
Junction City	5,942	6,100	0.3%	6,919	9,080	11,328	1.4%	1.1%	0.9%
Lowell	857	1,045	2.0%	1,108	1,352	1,620	0.6%	0.8%	0.7%
Oakridge	3,239	3,308	0.2%	3,278	3,344	3,320	-0.1%	0.1%	0.0%
Springfield	61,910	67,738	0.9%	70,278	76,443	81,677	0.4%	0.3%	0.3%
Veneta	2,737	4,561	5.2%	4,767	6,591	8,662	0.5%	1.3%	1.1%
Westfir	287	255	-1.2%	254	272	288	0.0%	0.3%	0.2%
Outside UGBs	63,544	63,277	0.0%	63,023	61,930	58,707	0.0%	-0.1%	-0.2%

Sources: U.S. Census Bureau, 2000 and 2010 Censuses; Forecast by Population Research Center (PRC).

Note: For simplicity each UGB is referred to by its primary city's name.

#### 3.3.2 Projected Population

According to the 2020 US Census, the population of Lowell was 1,196. Since 2020, there have been several new developments in town that were not accounted for in the PSU estimate. These developments are adding approximately 35 EDUs to the system, which will add approximately 94 persons to the 2020 census number, pushing the population to 1,290. Using the AAGRs (from the table above) beyond this slated bump in population from 2021 onward, the population at the end of this planning period (2045) is projected to be 1,560.