Draft for OWRD Review

Water Management and Conservation Plan

City of La Pine

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Appendices

Appendix A: Letter to Affected Government

1. Municipal Water Supplier Plan Elements

This section satisfies OWRD's requirements to list the affected local governments to whom the plan was made available and propose a date for submittal of an updated plan.

1.1 Introduction

The City of La Pine (La Pine or City) is located on the east side of the Cascade Mountain range in Oregon. It is 30 miles south of Bend along U.S. Route 97 which bisects the City. Nearby major water bodies include the Little Deschutes River that borders the west side of the City and also includes the Long Prairie Slough that runs through the southwestern portion of the City. The City was incorporated December 7, 2006. Prior to 2006, businesses and residents relied on private wells to meet their water needs. In 1997, the La Pine Water District (District) was formed and constructed and maintained a water system to serve the local community, though the water system's service area was limited to only portions of the City. The District obtained two permits authorizing the use of groundwater, which served as the District's source of supply. In 2012, the District was dissolved as an entity and the City acquired the water system and was assigned the District's two water use permits. The City continues to rely on groundwater as the City's source of supply.

In the 2020s, La Pine experienced significant development through infill within City limits and annexations. Between 2020 and 2023, population within City limits increased by 56 percent, from 2,005 to 3,126. The City's water system serves most of the City, but some residents still rely entirely on private wells and some users of the municipal water system continue to rely on private wells for irrigation purposes. Despite this recent historical growth, the City's service area still includes large areas of developable land. The City anticipates using this land to help accommodate future growth projected for the area.

1.2 Plan Requirement

This is the City's third WMCP, with previous WMCPs developed in 2000 and 2014. This WMCP is an update to the City's 2014 WMCP. This WMCP meets all of OWRD's requirements for WMCPs as adopted by the Water Resources Commission effective December 2018.

1.3 Plan Organization

The WMCP is organized into the following sections, each addressing specific sections of OWRD's requirements. Section 2 is a self-evaluation of the City's water supply, water use, water rights and water system. The information developed for Section 2 is the foundation for the sections that follow. The later sections use this information to consider how the City's water conservation and use of its water supply can meet the City's water needs.

Section
Section 1 – Water Supplier Plan
Section 2 – Water Supplier Description
Section 3 – Water Conservation Element
Section 4 – Water Curtailment Element
Section 5 – Water Supply Element

1.4 Affected Local Governments

Thirty days before submitting this WMCP to OWRD, the City made the draft WMCP available for review by Deschutes County along with a request for comments relating to consistency with the local government's comprehensive land use plan. No comments were received. The letter requesting comments is found in Appendix A.

1.5 Plan Update Schedule

The City anticipates submitting an update of this WMCP within 10 years of the final order approving this WMCP. 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

The City is not requesting additional time to implement metering or a previous benchmark.

2. Municipal Water Supplier Description

This section satisfies OWRD's requirements to describe the water supplier's water sources, service area and population, water rights, and adequacy and reliability of the existing water supply. OWRD 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.

Demand refers to the quantity of water delivered to a distribution system from a water treatment plant, wholesale supplier, native groundwater well, or an aquifer storage and recovery (ASR) well. Demand includes metered consumption, for example, residential, commercial, industrial, public, and irrigation customers; unmetered public uses, including firefighting, hydrant flushing, among other uses; and water lost to leakage, reservoir overflow, evaporation, and other factors.

Consumption is equal to metered water use and unmetered, authorized water uses, for example system flushing. Demand minus consumption equals water loss. The components of water loss are apparent and real losses. Apparent losses include unauthorized consumption and meter inaccuracies, among other loss types, and real losses include leakage and evaporation.

Generally, demand and consumption in 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.
- Monthly demand equals the total volume of water produced in a month divided by the number of days in the month.
- Maximum monthly demand (MMD) equals the highest demand in one of the 12 months of a calendar year.
- Peaking factors are the ratios of one demand value to another. For this WMCP, the peaking factor is a ratio of the MDD to the ADD.

2.2 Water Sources

La Pine relies entirely on water from two wells, commonly known as Wells 1 (1A) and 2 (2B), located approximately one and a half miles east of La Pine located within the Little Deschutes River basin.

2.3 Interconnections with Other Systems

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

2.4 Intergovernmental Agreements

The City does not have exchange agreements, intergovernmental cooperation agreements, nor water supply or delivery contracts. The City does not have surface water diversion, storage, or regulation facilities.

2.5 Service Area Description and Population

The City's service area is within the City limits and contiguous with the City's Urban Growth Boundary (UGB), as shown in Exhibit 2-1. A small number of residents, however, continue to use private wells as their primary sources of supply and are not connected to the City's water system. In some cases, residents with a service connection to the City's water system use City water for base consumption needs and rely on private wells to meet irrigation needs as a cost-savings measure for those residents. For example, the City began serving the Cagle and Glenwood Acres areas in 2023 which added an additional 326 single family residences to the City's service area and most of the users in these areas continue to irrigate using water from private wells.

The City has experienced significant growth recently. Portland State University's Population Research Center estimated the 2023 population within the City was 3,126 in 2023, an increase of 24 percent since 2020.

Significant portions of the service area are underdeveloped or serve agricultural purposes. For example, Exhibit 2-1 shows a large under-developed area in the City center which covers approximately 320 acres. Areas with developable land such as these will help the City accommodate anticipated future growth.

2.6 Historical Water Demands

System demand is the sum of the volume of water appropriated from the City's two wells. Exhibit 2-2 summarizes the City's annual water demands from 2018 through 2023.

Exhibit 2-2. Historical Water Demands, 2018-2023

Year	Demand (MG)	ADD (mgd)	Maximum Monthly Demand	
			MG	MMD Month
2018	98.5	0.27	16.2	August
2019	97.1	0.27	13.8	August
2020	105.9	0.29	15.9	August
2021	132.5	0.36	19.8	July
2022	134.5	0.37	18.3	July
2023	144.3	0.40	22.3	July

Since 2018, the City's demand ranged from 97.1 million gallons (MG) (2019) to 144.3 MG (2023). Exhibit 2-3 presents annual demands from Exhibit 2-2, highlighting the significant increase in demand as a result of the fast growth of the City. As previously noted, the City experienced large annual increases in population since incorporation and particularly in the previous five years. In addition, the City continues to add residential services to City residences that were previously served by private wells. ADD is based on annual demands, so these values fluctuate in tandem. Because the City does not track maximum day demands, these are not included in this exhibit. For purposes of this WMCP, a peaking factor of 2.5 (2.5 times the ADD) is used and is based on the City's 2016 Water System Study Update.[1]

[1] *City of La Pine, Oregon, Water System Study Update* (2016), Anderson-Perry and Associates

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Exhibit 2-1. System Schematic

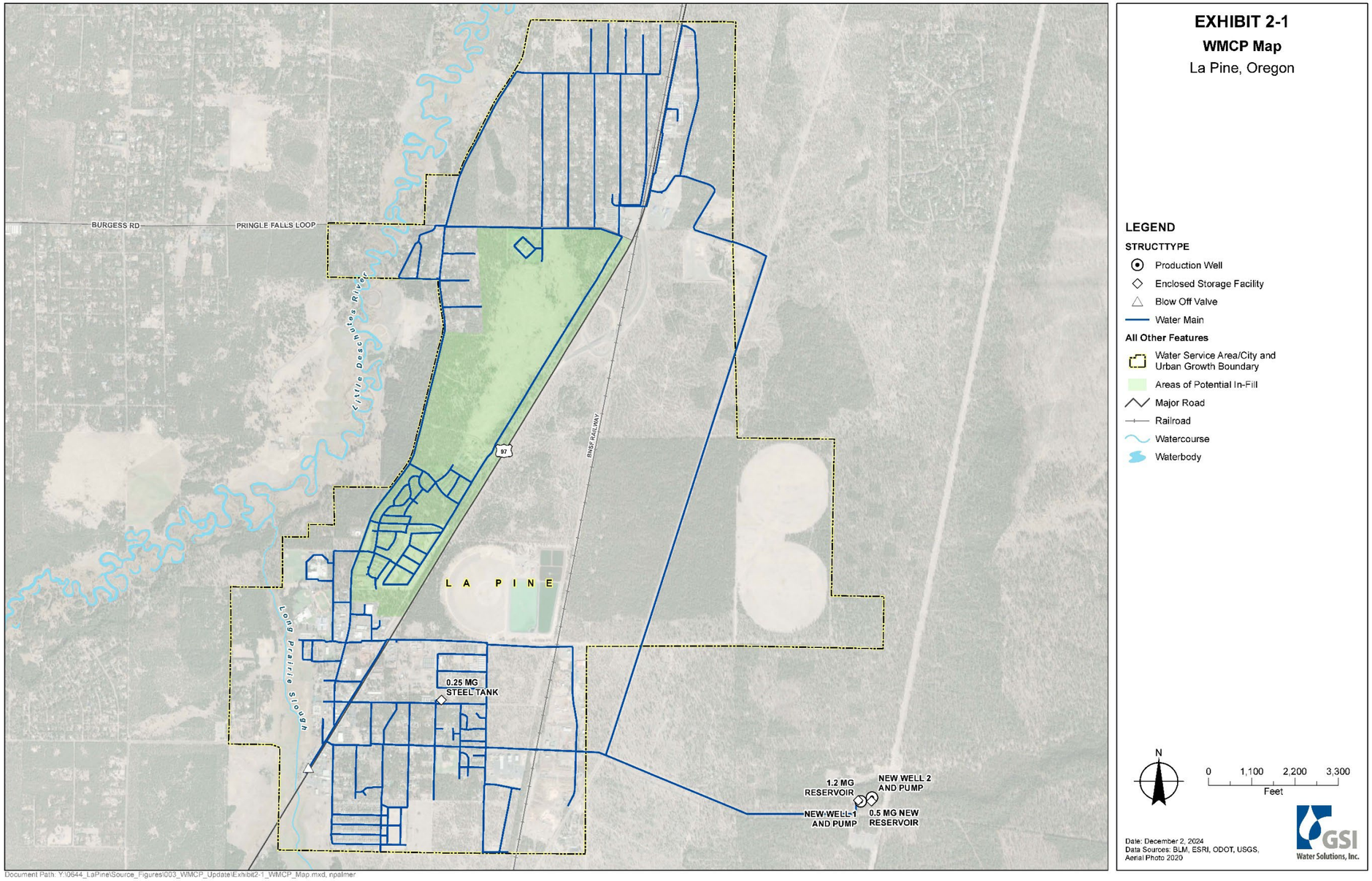

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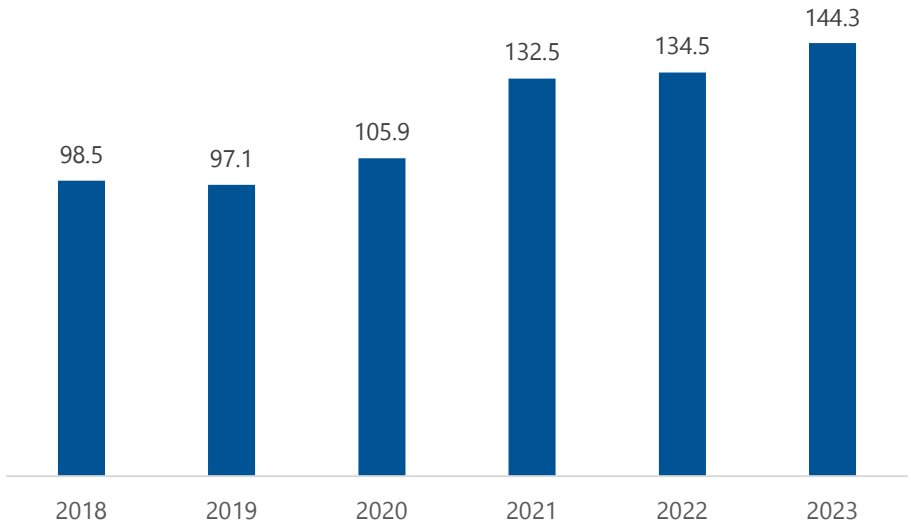
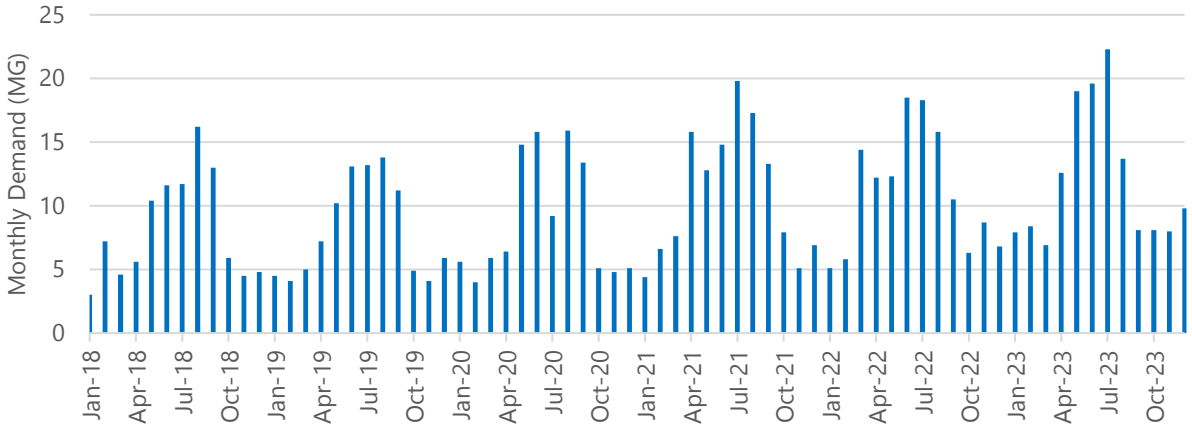
Exhibit 2-3. Historical Annual Water Demands (MG)



2.6.1 Monthly Demand

As shown in Exhibit 2-2, maximum monthly demand occurred in July and August each year, ranging from 13.8 MG (2019) to 22.3 MG (2023). This feature of the City's demand is highlighted in Exhibit 2-4 that shows monthly demand by volume since 2018 trending upwards. This seasonal nature of demand is primarily attributable to outdoor uses of water, such as irrigation, and commercial and industrial cooling water uses during the summer months, among other factors. Winter months show demand at its lowest, however, similar to the trend of nearly year-over-year increases in monthly demands during the summer, winter monthly demands also showed an increasing trend.

Exhibit 2-4. Monthly Demand (MD)



Demand for July 2020 was unusually low relative to July demand volumes of other years. The City suspects this low volume was due to a temporary situation associated with its infrastructure, such as a well taken offline or an improperly working meter. Current City staff that manage the

water system were not employed by the City at that time and can only speculate on this aberration in demand.

2.7 Customer Characteristics and Use Patterns

The following is an analysis of the City's customer water use based on metered water use records from 2019 through 2023 obtained from the utility billing system.

2.7.1 Customer Description

The City's customers are categorized into four customer classes: residential, commercial, construction, and non-bill. Exhibit 2-5 shows the number of accounts by customer category in 2023. Residential class represents the largest block of users on the system. The Construction class shows the number of meters rented by contractors for use during construction projects. Given the considerable construction that occurred in the City in 2023, the count of meters rented is the highest in City history at 31 meters rented. The Non-bill class had nine meters in 2023 that registered indoor water use at City facilities and water used for irrigation at properties owned by the City. The Commercial class includes all of the remaining City customer types not included in the other classes.

Exhibit 2-5. Number of Accounts by Customer Class, 2023

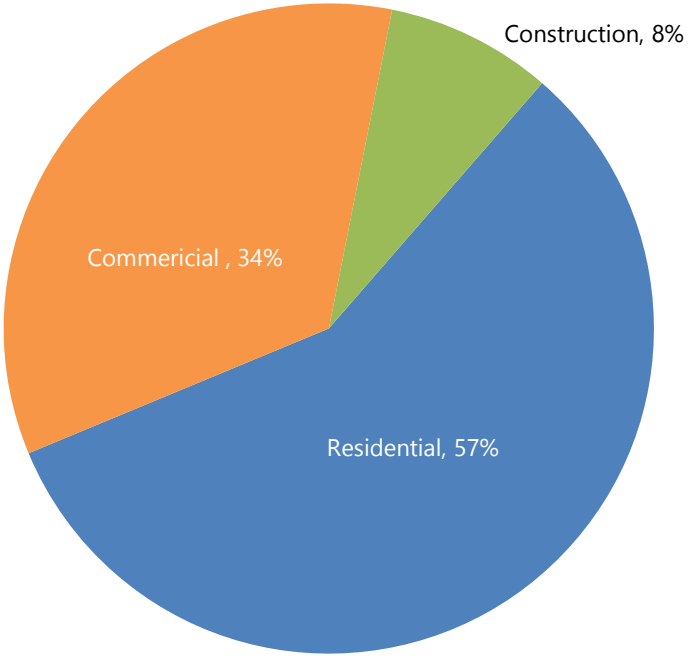
Customer Class	Number of Accounts
Residential	1,178
Commercial	213
Construction	31
Non-Bill	9
Total	**1,413**

2.7.2 Annual Consumption

Exhibit 2-6 illustrates the amount of water consumed by each customer class in 2023 as a percentage of total consumption. The City's Residential class used the most water in 2023, 57 percent, followed by the Commercial class at 37 percent. The Residential class consumption as a percentage of total consumption is significantly lower than the percentage presented in the City's 2014 WMCP of 37.5 percent. This difference may be attributable to the significant growth in the Residential class since 2014.

The City reviews but does not record the volumes of water metered at the nine Non-bill class connections and therefore consumption is not shown for this class in this exhibit. According to City staff operating the system, the total annual volume of usage by the Non-bill class is very small relative to the total annual volume of consumption.

Exhibit 2-6. Percentage of Consumption by Customer Class of Total Consumption, 2023



The total annual consumption for the combined classes shows an increasing trend in consumption from 2019 to 2023, as presented in Exhibit 2-7. This trend is consistent with the growth in the number of customers served by the City over this period. However, consumption in 2022 was the lowest of the five-year period which is not consistent with the observed trend of annually increasing residential customers. The City suspects that the utility billing consumption report generated for 2022 is inaccurate. As a result, the City cannot rely on the consumption data for this year.

Exhibit 2-7. Annual Water Consumption, 2019-2023

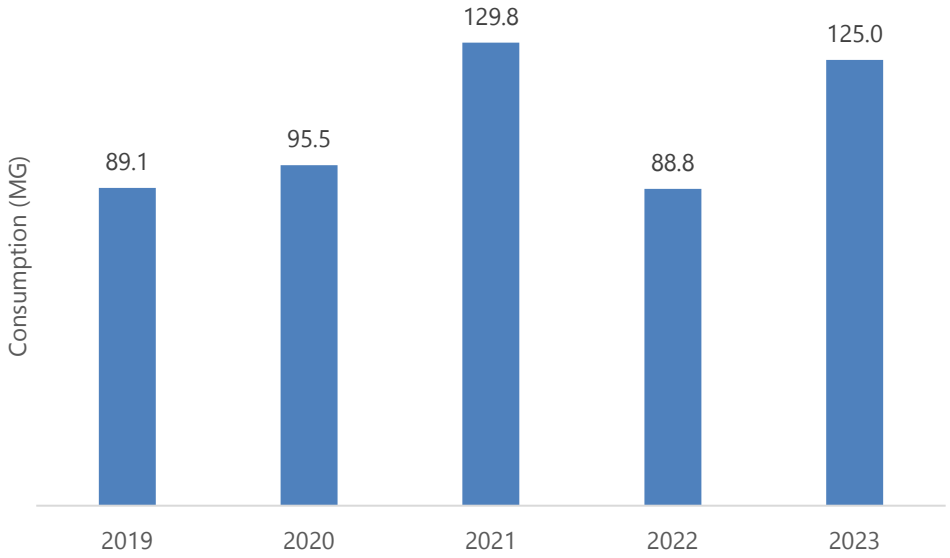
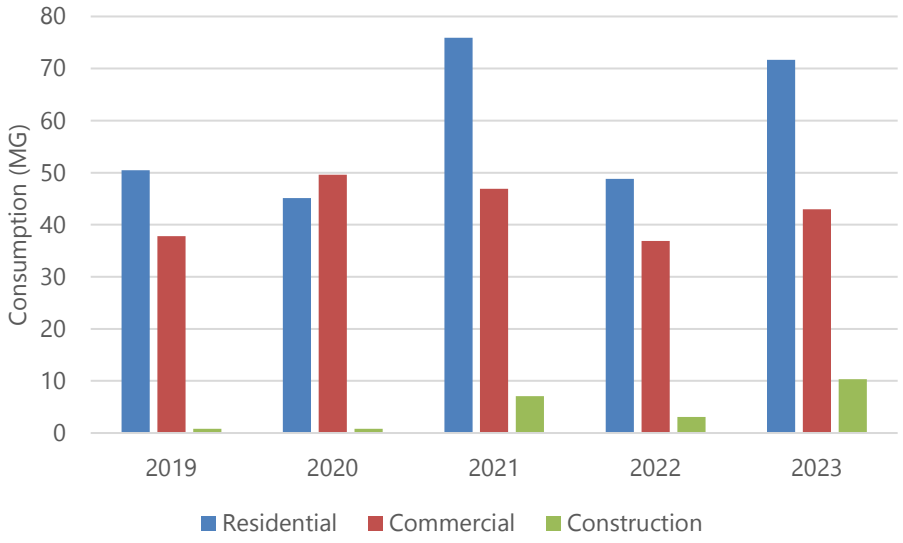


Exhibit 2-8 describes annual metered water use by customer classes. Residential water use exceeds the consumption volume of other classes over this period except for 2020 when the Commercial class consumption exceeded Residential water consumption. As previously noted, Exhibit 2-7 highlights that total consumption in 2022 was lower than any of the other years. Exhibit 2-8 provides additional detail by showing that consumption for all the customer classes had unexpectedly lower consumption volumes in comparison to 2021 and 2023. Again, the City suspects an error in the 2022 utility billing report.

Exhibit 2-8. Annual Water Use by Customer Category, 2019-2023



Significant changes in the Residential customer count over time are evident when comparing historical consumption volumes found in the City's 2014 WMCP and 2019 WMCP Progress

Report to more recent consumption data. For example, Residential use averaged 38.7 MG from fiscal year 2012/13 to 2018 (based on data in the City's 2019 Progress Report) and Residential consumption averaged 60.8 MG from 2019 to 2023, excluding 2022.

Unlike the Residential consumption, Commercial class water use showed a decrease over time. Commercial consumption averaged 52.7 MG based on data presented in La Pine's 2019 WMCP Progress Report as compared to an average of 44.3 MG over the previous five years, excluding 2022. It is not clear to the City why the average consumption volume of the Commercial class decreased over this period.

2.8 Water Loss

Water loss is the difference between demand and consumption. Exhibit 2-9 shows estimated annual losses from 2019 to 2023. During this time, two of the three years showed La Pine's water loss was less than 10 percent of demand. In 2022, the loss calculation appears unusually high as a result of the error in the utility billing consumption report for that year.

La Pine's water losses are a result of real losses, such as system leakage, and apparent water losses, for example meter errors. The City is not aware of unauthorized water use (i.e., theft).

Exhibit 2-9. Water Losses, 2019-2023

	Annual Demand (MG)	Metered Consumption (MG)	Loss (MG)	Loss as Percentage of Demand
2019	97.1	89.1	8.0	8.2%
2020	105.9	95.5	10.4	9.8%
2021	132.5	129.8	2.7	2.0%
2022	134.5	88.8	45.7	34.0%
2023	144.3	125.0	19.3	13.4%

2.9 Water Rights

2.9.1 Water Rights Descriptions

La Pine holds one municipal water use permit, Permit G-17636; one quasi-municipal water use permit, Permit G-13444 which was amended by T-9241; and one certificated irrigation water right, Certificate 94539.

Permit G-17636 (issued under the Deschutes Basin Groundwater Mitigation Program) authorizes the use of up to 1.4 cfs, not to exceed an annual volume of 1,013 acre-feet (AF) at Wells 1 and 2. This right has a priority date of September 13, 2010, and a completion date of August 2, 2036.

Permit G-13444 authorizes the use of up to 2.23 cfs at Wells 1 and 2, with a priority date of November 8, 1993, and a completion date of October 1, 2022.

Certificate 94539 authorizes use of groundwater for irrigation of 75 acres during the irrigation season of March 1 to October 31. The maximum rate of appropriation for Certificate 94539 is 0.21 cfs limited to a maximum of 0.105 cfs from each of the two wells. Certificate 94539 is not

used for potable water supply and is not connected to the City's water distribution system and will not be discussed further in this WMCP.

Exhibits 2-9 and 2-10 show additional information about these rights. Exhibit 2-12 shows the City's historical use of its municipal and quasi-municipal water rights by source.

2.9.2 Aquatic Resource Concerns

La Pine holds groundwater rights, none of which are water quality limited nor have listed fish species. The City's water rights do not authorize appropriation in a Critical Groundwater Area designated by OWRD. The City's Permit G-17636 does require mitigation under the Deschutes Basin Groundwater Mitigation Program.

2.10 Evaluation of Water Rights/Supply

La Pine's water supply has been adequate to meet water system demands and has been a reliable source of supply. Both potable supply wells develop water from the Upper Deschutes Basin Regional Aquifer and have reported yields of over 1,000 gallons per minute (gpm). Static water level measurements taken at the wells in 2019, 2020, and 2024, and provided to OWRD show small declines that are likely reflecting dryer than normal conditions over the last decade. Permit G-17636 does contain water level decline conditions that the City will continue to monitor.

The City's water quality monitoring program confirms water quality is excellent in the aquifer in which the City's wells are completed, with the City is meeting or exceeding water quality standards annually.

The City primarily relies on Permit G-13444 to meet its supply needs. In 2014, OWRD issued a final order approving the City's WMCP and authorized access to the permit's full rate of 2.23 cfs. The City has since fully developed the permit and intends to submit a Claim of Beneficial Use (COBU) and certificate request.

The City's water use Permit G-17636 authorizes the use of Wells 1 and 2 at a combined maximum rate of 1.4 cfs (628 gpm) with a maximum annual volume of up to 1,013 AF. As described above, use of water under Permit G-17636 requires mitigation under the Deschutes Basin Groundwater Mitigation Program. The mitigation is to offset consumptive use of water under Permit G-17636, calculated by OWRD to be 40 percent of the volume of water pumped under the permit annually. To use the full 1,013 AF authorized under the permit the City will need to provide 405.2 AF of mitigation or 402.5 mitigation credits. Per the City's current incremental development plan for use of Permit G-17636, the City has provided 2.1 mitigation credits, allowing for use of up to 5.25 AF annually. Use of additional volumes of water under this permit would require the City to acquire additional mitigation credits. Currently, obtaining mitigation credits in the Little Deschutes Basin Zone of Impact (where OWRD requires mitigation to be provided under Permit G-17636) is challenging due to scarcity and associated inflated costs.

Exhibit 2-10. Municipal Water Rights

Application	Permit	Claim, Decree, or Transfer	Certificate	Sources	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Volume (AF)	Authorized Date for Completion	Maximum Rate of Withdrawal to Date	
										Instantaneous (cfs)	Annually (MG)[1]
G-17422	G-17636	-	-	Wells 1 & 2	9/13/2010	Municipal	1.4 cfs	1,013	8/2/2036	0	137.6
G-13552	G-13444	T-9241	-	2 wells[2]	11/8/1993	Quasi-municipal	2.23 cfs	-	10/1/2022	2.23	

[1] Annual water volume is in water years and was obtained from water use reporting data in OWRD's Water Rights Inventory System.

[2] This permit shares the same wells as Permit G-17636.

Exhibit 2-11. Non-Municipal Water Right

Application	Permit	Claim, Decree, or Transfer	Certificate	Sources	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Volume (AF)	Period of Use	Authorized Date for Completion	Maximum Rate of Withdrawal to Date	
											Instantaneous (cfs)	Annually[1] (MG)
G-12500	G-12545	-	94539	Well 1	6/20/1996	Irrigation of 75 acres	0.21 cfs, 0.105 from each well	-	3/1-10/31	N/A	0.21 cfs	15.01
				Well 2								12.32

[1] Annual water volumes are in water years and were obtained from water use reporting data in OWRD's Water Rights Inventory System.

Exhibit 2-12. Municipal and Quasi-Municipal Water Rights Use by Source by Water Year

Water Use Report ID	Source	Water Rights	2023 WY Average Withdrawal[1]			Five-Year (2019-2023) Average Withdrawal[1]		
			Annual (MG)	Monthly (MG)	Daily (mgd)	Annual (MG)	Monthly (MG)	Daily (mgd)
63696	WELL 1A (DESC 54986/L-50208)	Permit G-17636, Permit G-13444 (T-9240)	70.10	5.84	0.19	61.07	5.09	0.17
63697	WELL 2B (DESC 55049/L-50209)		67.53	5.63	0.19	57.85	4.82	0.16
33282	WELL 1 (DESC 8116)	Certificate 94539	0.00	0.00	0.00	0.00	0.00	0.00
33283	WELL 2 (DESC 8134)		0.00	0.00	0.00	0.00	0.00	0.00

[1] Annual water volumes are in water years and were obtained from water use reporting data in OWRD's Water Rights Inventory System.

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2.11 System Description

The City operates a public drinking water system under Public Water System Identification Number OR4101496. A system schematic showing major water system components is provided in Exhibit 2-1.

The City relies on Wells 1 and 2 to meet system demands. These are located approximately one and half miles east of City limits. As of 2024, both wells have a pumping capacity of 890 gpm each and are fitted with variable frequency drives.

Well water is pumped to one of two adjacent above-ground reservoirs capable of storing up to 1.7 MG of water total. (A second reservoir was constructed in 2023). From these reservoirs, water is gravity fed to the distribution system which also contains a 0.25 MG above-ground steel reservoir. Most of the distribution system was constructed in the 2000s though the City significantly expanded the system through 2024 system to accommodate urban growth. Exhibit 2-1 includes the latest infrastructure additions to the system.

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3. Water Conservation Element

This section addresses OWRD's requirements to describe specific required conservation measures and benchmarks and additional conservation measures implemented by the water provider.

3.1 Progress Report

This is the City's third WMCP, requiring the City to provide an update on the City's progress meeting its 2014 conservation measures and associated benchmarks as described in the City's 2014 WMCP. Exhibit 3-1 describes this progress and includes responses from the City's 2019 WMCP Progress Report as reference.

Exhibit 3-1. Water Conservation Program Progress Report

Conservation Measures	2014 Benchmarks	2019 Status	2024 Status
Required Existing or Expanded Conservation Measures (OAR 690-086-0150)			
Water audit	Beginning in 2015, the City will have detailed water audit information available and will track this information to determine usage patterns, lost water from system leaks, and other pertinent operational data. (Note: This water audit benchmark can be found in the City's 2014 WMCP on page 12 of Appendix 5.3, under OAR 690-086-150(4)(f).	The City had detailed water audit information by 2015 and performed audits annually thereafter. The City intends to continue performing annual water audits.	The City continued to collect production (demand) and consumption information in order to perform annual water audits. Current staff understand that water audits were conducted through 2022, however due to staff changes, staff is not able to verify.
System metering	All new water system connections will be metered.	The City continues to meter all existing water system connections and meters all new connections.	The City continues to meter all existing water system connections and meters all new connections.

Exhibit 3-1. Water Conservation Program Progress Report (cont.)

Conservation Measures	2014 Benchmarks	2019 Status	2024 Status
Required Existing or Expanded Conservation Measures (OAR 690-086-0150) continued			
Meter testing and maintenance program	A new meter testing and maintenance program will be developed in 2017 to include the following elements:	The City developed a program in 2017 which has included the following elements:	The City revised its program in 2023 and includes the following elements:
	All meters will be replaced or rehabilitated on a maximum 20-year schedule.	The City has made significant progress in replacing customers' meters well within this schedule. The City has progressively been replacing older meters with meters that have Automatic Meter Reading (AMR) technology. The City looks to replace all customer meters and master meters at its wells within the next 5 years. The AMR technology has improved the efficiency of the City's meter reading program and increased accuracy of reads.	By 2017, nearly all service meters had been replaced with positive displacement-style meters that were fitted with AMR technology. Master meters were approximately 25 years old and were replaced during a well rehabilitation project in 2024 with ultra-sonic style meters.
	All meters will be tested every five years and meters that fall below manufacturers' standards will be repaired or replaced.	With implementation of the new meter testing and maintenance program, new meters will not be tested but will be replaced every 20 years or more frequently if individual meters are suspected of providing inaccurate reads. The City continues to test larger meters, including master meters, using independent contractors and will replace or repair these meters as needed.	Due to the age of service meters and life expectancy of 20 years, no testing is necessary at this time. If individual meters are suspected of providing inaccurate reads, the City will replace these meters. Master meters are tested annually using independent contractors.
	The City will develop a meter schedule that lists customer account ID, meter data (size, type, etc.), meter installation date, and any noted meter problems and corrections.	The City developed a meter schedule that includes customer account ID, meter data, meter installation date, and any meter problems and corrections.	The City continues to collect meter-specific information, including customer account ID, meter data, meter installation date, and any meter problems and corrections. This information is used to determine a meter replacement schedule.
	The City will develop a replacement and rehabilitation schedule for all meters for budgetary purposes.	The City developed a replacement and rehabilitation schedule when the City established its meter testing and maintenance program described above.	The City's schedule has meters being replaced within 20 years of installation or when meters fail. Master meters may be rehabilitated if annual testing reveals meter accuracy falls outside of City standards.

Exhibit 3-1. Water Conservation Program Progress Report (cont.)

Conservation Measures	2014 Benchmarks	2019 Status	2024 Status
Required Existing or Expanded Conservation Measures (OAR 690-086-0150) continued			
Rate structure	The City's water rate structure is based on metered usage with overage charges for consumption beyond the base allowance.	The City continues to bill customers based, in part, on the volume of water consumed beyond the basic allowance.	The City continues to bill customers based, in part, on the volume of water consumed beyond the basic allowance.
Water loss	Not applicable. Unaccounted water loss averaged 9.01 percent.	The City's water loss continues to remain below 10%.	The City's water loss exceeded 10 percent in 2023.
Public education	In 2015, the City will establish a public education program to encourage efficient water use and low water landscaping. The public education program will be implemented by April 2017.	The City established a public education program and implemented the program by 2017. The program includes one annual, multi-day visit with school children to discuss the importance of efficient water use, water quality, and other topics. These visits have included La Pine Elementary and La Pine High School students and faculty.	Since publication of the City's 2019 WMCP progress report, the City ceased in-person public outreach in 2020 at the outset of the COVID pandemic. Due to staffing changes, current City staff cannot verify that this measure was re-initiated following the easing of restrictions in 2022. However, the City has identified new measures to implement that will impact a greater number of customers.

3.2 Use and Reporting Program

The City's water use measurement and reporting program complies with the measurement standards and process established by OWRD. The water use records can be found on the OWRD water use reporting website: (http://apps.wrd.state.or.us/apps/wr/wateruse_report/). The City measures the water appropriated at its Wells 1 and 2 using ultrasonic meters.

3.3 Required Conservation Measures

OWRD requires that all water suppliers establish 5-year benchmarks for implementing the following water management and conservation measures:

- Annual water audit
- System-wide metering
- Meter testing and maintenance
- Unit-based billing
- Water loss
- Public education

During the next 5 years, the City plans to initiate, continue, or expand the following conservation measures that are required of all municipalities.

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 to identify leaks in the system and authorized and unauthorized water uses, either metered or estimated.

The City has performed annual water audits periodically by subtracting the total volume of water consumed by the City's customers through metered service connections from total demand (volume of water appropriated at the City's wells that enters the distribution system). The City has committed to performing these audits annually.

The City analyzes its own water use and implements practices to reduce losses and increase efficiency. For example, the City regularly searches for water leaks that have surfaced or during meter reads, will note any leaks at the meters. When leaks are identified, the City promptly repairs these leaks.

Five-Year Benchmarks

- Continue to perform annual water system audits.
- Continue searching for leaks that have surface and repair leaks when found.

3.3.2 System-wide Metering

All of the City's service connections are metered. The City's municipal code requires that all service connections are metered (Section 26-114).

Five-Year Benchmark

- Continue to require meters on all service connections.

3.3.3 Meter Testing and Maintenance

The City has a meter testing and maintenance program that identifies and replaces failed meters upon discovery. Failed meters are identified by staff during the monthly billing process. Meters that register very low or no water use are targeted for inspection by staff and are replaced as needed.

Testing of meters at service connections is not warranted given the age of most of these meters (2017) and the City's project to replace meters installed previous to 2017 by late 2025. Typically, the useful life of a meter is approximately 20 years. Master meters, however, are tested annually and recalibrated as needed. In 2024, the City replaced both well master meters as part of the Well 1 rehabilitation project.

Five-Year Benchmarks

- Continue identifying meters suspected of failure and inspect, repair, or replace these meters as needed.
- Continue testing master meters annually.

3.3.4 Water Rate Structure

The City's water rate structure is based, in part, on the quantity of water used. La Pine uses separate rates for residential and commercial customers, as shown in Exhibit 3-2.

Exhibit 3-1. Volumetric Water Rates

Tier	Volume (gal)	Residential		Commercial	
		$/1,000 gallons			
Tier 1:	0 - 3,600	$	1.31	$	2.73
Tier 2:	3,601 - 7,200	$	1.97	$	2.73
Tier 3:	>7,200	$	3.28	$	2.73

Five-Year Benchmark

- Continue to bill customers based, in part, on the volume of water consumed.

3.3.5 Water Loss Analysis

The City's water loss shows a loss of 13.4 percent in 2023, the highest loss experienced by the City over the last five years, excluding 2022 when water consumption volumes are suspect therefore produced an artificially high-water loss calculation. From 2014 to 2021, water losses did not exceed 10 percent which is expected given the age of the water system.

OWRD requires that a municipal water provider with water loss over 10 percent must provide a description and analysis identifying potential factors for the loss and selected actions for remedy within two years of issuance of a final order by OWRD for this WMCP. If, after five years, water losses are greater than 10 percent, the municipal water provider will develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system, a line

replacement program, or a water loss control program consistent with American Water Works Association's standards. To meet this rule, La Pine will provide a description and analysis to OWRD as required.

Five-Year Benchmarks

- Provide a description and analysis identifying potential factors for losses and select actions for remedy within two years of the final order approving this WMCP.
- Notify OWRD of the analysis performed by the City following completion of the analysis.
- Confirm accuracy of annual water consumption reports.

3.3.6 Public Education

Historically the City's public education program consisted of an annual visit to local schools to discuss the importance of efficient water use, water quality, and other topics with students. These visits occurred at La Pine Elementary and La Pine High School. The City's visits to these local schools paused at the outset of the COVID pandemic and have not resumed. La Pine intends to begin its public outreach to school aged children by presenting a lesson on water and water conservation at the local library. In addition, the City will expand it program to include the following measures in the next five years:

- Include a page on the City's website devoted to tips on efficient uses of water indoors and outdoors.
- Include a message annually in the City's Consumer Confidence Report (CCR). The publication date of the CCR coincides with the early irrigation season, providing an opportunity for the City to remind customers about the importance of efficient uses of water outdoors, such as proper irrigation and landscaping techniques.
- Annual article for the City's newsletter timed to coincide with the summer irrigation season on the topic of efficient use of water outdoors.
- Create a conservation brochure for distribution at libraries, City hall, or other locations accessible to the public and, if possible, distribute these at one or more City-sponsored events.
- Include bill stuffers in water bills periodically.
- Include a message on water bills about the importance of water conservation.

Five-Year Benchmark

- Implement the public education program as described that uses a variety of means to promote efficient uses of water to its customers.

3.4 Additional Conservation Measures

OWRD requires municipal water suppliers that serve a population of more than 1,000 and propose to expand or initiate the diversion of water under an extended permit for which resource issues have been identified, or if the population served is more than 7,500, to provide a description of the specific activities, along with a 5-year schedule to implement several additional conservation measures. The City has not identified resources issues associated with its water rights and serves a population of less than 7,500, therefore, this requirement does not apply.

3.5 Other Measures

In addition to the measures described in this section, the City reviews customers' bills monthly, ensuring timely feedback on water use which may encourage customers to become more efficient users of water. Also, the City is alerted to potential leaks on the customers' side of service meters when the utility billing system recognizes unusually high reads as compared to the same billing month the previous year. In response, the City contacts these customers to alert these customers of a potential leak. City staff offer the service to visit customers who suspect a leak and will offer suggestions to find and fix these leaks.

4. Water Curtailment Element

This section satisfies OWRD's requirements to describe past supply deficiencies and current capacity limitation. OWRD 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, catastrophic events, mechanical or electrical equipment failure, or other events not under control of the City.

4.2 History of System Curtailment Episodes

The City has not experienced any system curtailment episodes within the last 10 years. The City was considering implementing its curtailment plan in 2024 during the Darlene 3 fire. This fire occurred to the east of the City and covered approximately 4,000 acres, threatening over 1,000 structures in the La Pine area. To contain the fire, fire-fighting crews used the City's water system as one of its sources of supply over a four-day period, nearly causing a water shortage. In addition, the fire caused a power outage, though the City was able to continue operating the wells with the use of a generator.

4.3 Capability Assessment

The City evaluated its ability to provide water during a fire, drought, power outage, and aquifer contamination that could cause supply shortages. The City determined that it should be able to meet demand during a large fire and power outage based on its experience associated with the Darlene 3 fire. A short-term drought should not cause a supply shortage given that the wells develop groundwater from the Upper Deschutes Basin Regional Aquifer, however long-term continuation of the dry conditions of the last decade could result in declines of water levels causing the City to reduce use of these wells. Aquifer contamination may also cause a water supply shortage. The City does not have access to supplemental sources of supply, such as backup wells, surface water, or interties with other systems.

If the City experiences a supply shortage, the City could rely on its in-line distribution system reservoirs for up to five days if the reservoirs are full based on historical ADD. During peak season, full reservoirs may be able to meet demand up to a maximum of two days based on an estimate of historical MDD.

The City does not have capacity limitations that impinge on the City's ability to meet demands.

4.4 Curtailment Stages and Initiating Conditions

The City developed a four-stage curtailment plan to be invoked in the event of a water supply shortage. These stages are of increasing severity and could be initiated and implemented in progressive steps or a later stage could be implemented directly.

Exhibit 4-1 presents the four curtailment stages, as well as their initiating conditions (i.e., triggers). Initiation of a curtailment stage is based on the specific circumstances of the actual event. The decision to implement curtailment will also consider the knowledge and judgment of City staff members familiar with the water system. City staff may evaluate such considerations as the extent of system damage or contamination, duration of repair, costs, fire hazards, and weather forecasts.

All but the last of the curtailment plan's initiating conditions consider the capacity of the water system relative to demands. System capacity is defined by the production capacities of the City's wells, the storage capacities of the City's storage tanks, capabilities of the distribution system lines and appurtenances, and the associated water supply water rights. The current maximum capacities of the wells are 880 gpm each and storage capacity is 1.7 MG.

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

Curtailment Stages	Initiating Conditions
Stage 1	System capacity *anticipated* to only meet, but not exceed, system demands for a period of three consecutive days or more: or Well production rates *anticipated* to only sustain, not increase, reservoirs levels.
Stage 2	System capacity only meets, but not exceeds, system demands for a period of three consecutive days or more: or Well production rates only sustain, not increase, reservoirs levels.
Stage 3	System capacity can meet only a maximum of 90 percent of demand for three or more consecutive days; or Reservoir levels are declining and anticipated to decline for three or more days.
Stage 4	The City cannot meet basic water needs, creating a health and safety hazard, as a result of any event.

4.5 Authority

Per Municipal Code 26.2.13, the City Manager may declare a water emergency and impose measures to restrict the use of water, as necessary. The City Manager must report any measures to Council and the Council may modify these measures. Council has the authority to terminate any measures.

4.6 Notifications of Curtailment

The City will inform customers about the curtailment events using a variety of means, such as, but not limited to, issuing public service announcements to notice residents and publicize the event by posting notifications on the City's website and social media sites and requesting local media run articles about the shortage. If necessary, specific water distribution areas will be identified in postings, on the City's website, and through County Sheriff dispatch calls.

4.7 Curtailment Measures

The plan includes both voluntary and mandatory measures for each stage of alert, depending upon the cause, severity, and anticipated duration of the shortage.

4.7.1 Stage 1 (Voluntary)

Under Stage 1, the measures are voluntary. These measures include:

- Encourage customers to voluntarily reduce indoor water usage by implementing the following:
    - Repair leaks in bathrooms, kitchens, or laundry rooms observed at faucets, toilets, showers/tubs, and other water fixtures.
    - Turn off faucet water when washing dishes or brushing teeth.
    - Take shorter showers (e.g., 5 minutes maximum).
    - Install a shower head with flows less than 2.5 gallons per minute.
    - Wash only full loads in dishwashers and clothes washers.
- Irrigate landscaping between 7 p.m. and 8 a.m., when evaporation is lowest.

4.7.2 Stage 2 (Mandatory)

Under Stage 2, the City will continue to encourage customers to reduce indoor water use voluntarily, per Stage 1. Additional measures under Stage 2 are mandatory and include the following:

- Irrigate landscaping between 7 p.m. and 8 a.m.
- Prohibit washing vehicles and water usage for construction, except as required by law.
- Prohibit washing or wetting of hard-surfaced areas (e.g., driveway) with water.
- Encourage restaurants to avoid serving water unless requested.
- Encourage lodging facilities to reduce water usage by requesting lodgers to utilize towels and bedding for more than one day.
- Prohibit pressure washing of buildings unless required for painting, repair, remodeling, or reconstruction.
- Discontinue flushing of water mains, except for emergency purposes.
- City to reduce or eliminate irrigation of landscaped (including grass) areas.

4.7.3 Stage 3 (Mandatory)

Stage 3 extends the mandatory measures from Stage 2, continues to encourage customers to reduce indoor water use voluntarily per Stage 1, and adds new measures that restrict non-essential water usage as follows:

- All outdoor uses of water are prohibited except to maintain the health and safety of the City's customers.
- Allow water use from fire hydrants only for fire prevention purposes.
- The City will place a moratorium on all new development until the City has the capacity to meet typical demands.

4.7.4 Stage 4 (Mandatory)

In Stage 4, water may only be used for essential purposes for all customers and the City. Essential use is defined as water required to meet the overall public health and safety of the City's customers. Actions such as fighting fire or use of water to reduce sanitation hazards are essential uses.

The City will perform the following:

- Notify the Oregon Drinking Water Program, Department of Human Services. and request assistance in responding to the emergency.
- Contact City, County, State, and Federal law enforcement officials, as appropriate.
- Contact the County public health officer, local doctors, and hospitals, as appropriate.
- Contact other Oregon Water/Wastewater Agencies Response Network requesting additional equipment and staff to provide emergency response operations.

The City will develop back-up plans during a Stage 4 curtailment event. These plans could include trucking water from other water supply agencies, directing residents to a pre-designated central water distribution facility, or potentially supplying bottled water.

4.8 Drought Declaration

If a declaration of a severe drought in Deschutes 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 Deschutes 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

This Water Supply Element satisfies OWRD's requirement to describe the City's current and future water delivery areas and population projections, demand projections for 10 and 20 years, and the schedule for when the City expects to fully exercise its water rights. This section also presents the City's projected water needs and the available sources of supply, provides an analysis of alternative sources of water, and describes required mitigation actions.

5.1 Delineation of Service Area

OAR 690-086-0170(1)

The City's existing service area is within City limits and is shown in Exhibit 2-1. The City does not expect an expansion of its service area within the next 20 years due to the large tracts of undeveloped and underdeveloped land within the existing service area that are available for development. Most of this land is zoned for residential development and is large enough to accommodate the anticipated increases in population within the next 20 years. Additional commercial or industrial land is available within the existing urban cores located to the north, west, and south of the City.

5.2 Population Projections

The historical average annual growth rate (AAGR) of the City's population observed from 2020 to 2023 was over 2 percent. Population growth is expected to continue increasing through 2044 at a similarly high rate of growth. To project its future population, the City referenced PSU's population projections for La Pine to calculate an AAGR through 2044 of 2.1 percent. La Pine applied this AAGR to a starting population in 2023 of 3,126 to project population for 2034 and 2044.

Exhibit 5-1. Projected Population and Demand, 2034 and 2044

Year	Population	Projected ADD (MGD)	Projected MDD (MGD)	Projected MDD (cfs)
2023 (Actual)[1]	3,126	0.40	--	--
2034	3,924	0.50	1.26	1.94
2044	4,824	0.62	1.54	2.39

[1] City does not record MDD.

5.3 Demand Forecast

The City projected ADD for 2034 and 2044 using a per capita based approach. La Pine multiplied the population estimates shown in Section 5.2 for 2034 and 2044 by 128 gpcd to obtain ADD estimates for those years. The per capita value of 128 gpcd is based on the ADD in 2023 of 0.40 mgd divided by an estimated 2023 population of 3,126. To estimate future demand MDD, the City multiplied the projected ADDs in 2033 and 2044 by the City's estimated peaking factor of 2.5. The results of this forecast are shown in Exhibit 5-1, with MDD reaching 2.39 cfs by 2044.

5.4 Schedule to Exercise Permits and Comparison of Projected Need to Available Sources

During periods of peak demand, La Pine has simultaneously operated its two potable water supply wells to maintain adequate levels in distribution system storage reservoir. Based on this beneficial use of 2.23 cfs under Permit G-13444, the City has fully developed the permit and intends to submit a COBU and associated request for a water right certificate.

The City's Permit G-17636 authorizes use of up to 1.4 cfs with a maximum annual volume of 1,013 AF. The City's current incremental mitigation plan for Permit G-17636 includes 2.1 mitigation credits, providing access to 5.25 AF of the permit. The current completion date for Permit G-17636 is August 2, 2036; Permit G-17636 is not an extended permit.

As noted in Exhibit 5-1, based on a per capita calculation of projected demand, only a small portion of Permit G-17636 will be needed during the 20-year planning horizon of this plan. However, the per capita demand method does not reflect typical municipal water supply operational regimes (such as maintaining full reservoirs following diurnal peaks in demand). As a result, the City anticipates significantly more reliance on Permit G-17636 over the next 20 years as compared to the value in Exhibit 5-1. The extent of reliance on Permit G-17636 will be based in part on the ability to obtain permanent mitigation credits in the Little Deschutes Zone of impact which are currently difficult to find and typically cost prohibitive.

Between now and 2036 the City will continue to monitor the need to use Permit G-17636 to fulfill the City's operational water demands. As needed, the City will also pursue the acquisition of permanent mitigation credits and update its incremental mitigation plan allowing for greater use of water under the permit. To the extent the permit is not fully developed by 2036 the City will seek the required extension of time and use contemporary information about operational needs and mitigation credit availability to estimate the time frame to fully develop the permit.

5.5 Alternative Sources

OWRD requires an analysis of alternative sources of water to see if any initial diversion of water allocated under existing permits is necessary to meet future water demand. The City intends initial diversion of water allocated under Permit G-17636 during the planning period of this WMCP; therefore, this requirement applies.

5.5.1 Conservation

The City intends to continue implementing its water management and conservation program and to add additional water conservation measures over the 20-year planning horizon of this WMCP as noted in Section 3. This could delay the need for additional supply. However, even with an assumed conservation savings of 3 percent (equivalent to 0.07 cfs in 2044) realized by the ongoing implementation of La Pine's conservation program, the City will still need to pursue initial diversion of water under its existing permit G-17636 to meet 2044 projected per capita demands, not to mention typical operational demands.

5.5.2 Interconnections

Interconnections can be an effective means for water providers to obtain additional sources of water supplies. This regional approach makes sense when water providers are in close proximity and at least one has surplus supplies available. Because La Pine is relatively remote from other water providers—the closest large water provider is Bend at approximately 30 miles—making an intertie economically infeasible for the City.

5.5.3 Cost Effectiveness

OWRD requires an assessment of whether the projected water needs can be satisfied through other conservation measures that would provide water at a cost that is equal to or less than the cost of other identified sources.

As stated above, the City is committed to continuing to implement water conservation measures. The costs for the City to continue to use Permit G-13444 or initiate use of Permit G-17636 is minimal since the City would not need to construct new or expand existing infrastructure for the use of either or both. The expansion of La Pine's conservation program through implementation of new measures beyond those identified in Section 3 would cost the City more to initiate and maintain on a per unit basis than use of its existing sources of supplies. Therefore, the City intends to rely on conservation and water use under Permits G-13444 and G-17636 to meet the projected future system demand of the City during the next 20 years.

5.6 Quantification of Projected Maximum Rate and Monthly Volume

OWRD requires a quantification of the maximum rate of withdrawal and maximum monthly use if expansion or initial diversion of water allocated under an existing permit is necessary to meet demands during the planning period of this WMCP.

Assuming Permit G-17636 is used at the maximum rate of appropriation of 1.4 cfs at 24 hours per day over a 30-day period, the monthly volume of water would equal approximately 27 MG (82 AF).

5.7 Mitigation Actions under State and Federal Law

For expanded or initial diversion of water under an existing permit, OWRD requires that the water supplier is to describe mitigation actions it is taking to comply with legal requirements of the Endangered Species Act, Clean Water Act, and other applicable state or federal environmental regulations.

Permit G-17636 has a condition requiring the City to mitigate for use of the permit under OWRD's Deschutes Basin Groundwater Mitigation Program. The City will continue to comply with the mitigation program requirements and update its submittal of mitigation credits and its incremental development plan as appropriate.

5.8 New Water Rights

If a municipal water supplier finds it necessary to acquire new water rights within the next 20 years in order to meet its projected demand, an analysis of alternative sources of the additional water is required. The City does not intend to seek a new water right during this period.

Appendix A

Letter to Affected Government

GSI Water Solutions, Inc.

December 13, 2024

Will Groves
Planning Manager
Deschutes County
117 NW Lafayette Avenue
Bend, OR 97703
william.groves@deschutes.org

Subject: Water Management and Conservation Plan for City of La Pine

Dear Mr. Groves,

The City of La Pine (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the water management and conservation planning requirements of the Oregon Water Resources Department.

Under these requirements, a water supplier will make its draft Water Management and Conservation Plan (WMCP) available for review by affected local governments and seek comments related to consistency with the local governments' comprehensive land use plans. We are providing you an electronic version of the City's draft WMCP for your review.

Please provide any comments within 30 days from the date of this letter. 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.

If you have any questions, please feel free to contact me at 971-236-2550. Thank you for your interest.

Sincerely,
GSI Water Solutions Inc.

Tim Henkle
Water Resources Consultant

Enclosure