

SECTION 1 INTRODUCTION AND EXISTING WATER SYSTEM

Introduction

The purpose of this Water Distribution System Master Plan (WDSMP) is to perform an analysis of the City of Grants Pass's (City's) water system and:

- Document water system upgrades, including significant changes in water supply completed since the 2001 *Water Distribution System Master Plan*
- Estimate future water requirements including potential water system expansion areas
- Identify deficiencies and recommend water facility improvements that correct deficiencies and provide for growth
- Update the City's capital improvement program (CIP)

In order to identify system deficiencies, existing water infrastructure inventoried in this section will be assessed based on estimated existing and future water needs developed in **Section 2** and water system performance criteria described in **Section 3**. The results of this analysis are presented in **Section 4**. **Section 5** identifies improvement projects to mitigate existing and projected future deficiencies and provide for system expansion including a prioritized CIP. The planning and analysis efforts presented in this WDSMP are intended to provide the City with the information needed to inform long-term water distribution infrastructure decisions.

This plan complies with water system master planning requirements established under Oregon Administrative Rules (OAR) for Public Water Systems, Chapter 333, Division 61.

Related Plans

This WDSMP is consistent with the objectives or information presented in the following related planning and infrastructure documents:

- *Grants Pass Water Distribution System Master Plan*, January 2001, West Yost & Associates.
- City of Grants Pass, *Comprehensive Community Development Plan*, Last amended February 2010.
- *Grants Pass Urban Growth Boundary Amendment*, as approved by the Department of Land Conservation and Development, March 11, 2015.

- *Water Treatment Plant Facility Plan Update*, City of Grants Pass, January 2014, Murray, Smith & Associates, Inc.
- *Water Management and Conservation Plan Update*, City of Grants Pass, June 2014, Murray, Smith & Associates, Inc.
- *Coordinated Population Forecast for Josephine County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2015-2065*, Prepared by Population Research Center, College of Urban and Public Affairs, Portland State University, March 2015
- *Water and Wastewater SCADA Systems Master Plan*, City of Grants Pass, July 2015, Carollo
- *Emergency Operations Plan Update*, City of Grants Pass, 2015, Murray, Smith & Associates, Inc.

Water System Background

The City owns and operates a public water system that supplies potable water to residents, businesses and public institutions within the city limits and a small number of customers in the North Valley area. This section describes the water service area and inventories the City's water system facilities including existing supply sources, pressure zones, finished-water storage reservoirs, pump stations, control valves and distribution piping.

Plate 1 in **Appendix A** illustrates the City's water service area limits, water system facilities and distribution piping.

Service Area

The City's existing water service area includes all existing customers within the Grants Pass city limits and a small area of unincorporated Josephine County five miles north of the City between Merlin and Interstate 5 referred to as the North Valley. The City's water system provides fire suppression to specific areas of North Valley including North Valley Industrial Area (NVIA) and the Paradise Ranch development. **Figure 1-1** at the end of this section illustrates the City's existing water service area.

Conditions of Service

All properties located within the city limits or UGB are eligible for service from the public water system. Water service is provided through a connection to an existing water mainline along the property's frontage or, if there is no existing mainline, by extending a mainline to the property from the City's existing distribution system at the property owner's expense. Residential developments of more than four lots and commercial developments within the UGB are required to extend public water mains and connect to the City's water system.

Smaller residential developments of four lots or less are required to extend mains and connect to City water if they are within 100 feet of an existing City water main.

New customers within the UGB are required to sign a Service and Annexation Agreement which outlines the property owner's rights and obligations as a Grants Pass service customer until the property is annexed by the City. Connection charges are assessed for all new connections to the City water system.

Customers

A number of developed properties within the city limits were historically served by private groundwater wells. Many of these properties, including much of the Fruitdale area in southeast Grants Pass, do not receive City water but continue to be served from private wells. The Rogue Community College campus southwest of the City is also served through private groundwater wells and distribution facilities. For the purpose of this analysis, these properties are not included in the City's existing water service area.

The City water system supplies some Planned Unit Developments (PUDs), such as the Westlake Village and Rogue Lea Estates 55+ manufactured home communities. Homes within each PUD are served through private distribution mains which connect to the City's water system at a single master meter connection.

Supply Facilities

The Grants Pass Water Treatment Plant (WTP) uses conventional filtration to treat surface water drawn from an adjacent intake on the Rogue River. The WTP is the sole source of potable water for the City. Finished water is pumped by the High Service Pump Station from the WTP clearwell into the City's distribution system Pressure Zone 1. The plant typically operates between 8 and 24 hours per day, depending on system demands. During the peak demand months of July through September, the plant is operated for up to 24 hours per day to meet peak day demands. The WTP's current hydraulic capacity is approximately 20 million gallons per day (mgd).

The WTP was built in 1931 with a single sedimentation basin and three filters with a design capacity of approximately 3.5 mgd. The WTP has undergone several upgrades and expansions to serve a growing population and to meet more stringent treatment standards. Capacity upgrades were completed in 1950, 1961, and 1983, and the WTP has received numerous process and safety upgrades over the past three decades.

A *WTP Facility Plan Update* (MSA) was completed in 2014 following a structural evaluation of the WTP facilities. The plan analyses found that facility repairs, upgrades and future capacity expansions needed to accommodate anticipated growth were not technically or financially favorable at the current WTP site. The City is pursuing full replacement of the WTP at a new site.

Water Rights

The City holds developed water rights of 19.9 mgd with additional undeveloped rights of 36.7 mgd for a total of 56.6 mgd. The City's undeveloped rights are subject to persistence of fish requirements on the Rogue River. Under low flow conditions at certain times of the year, the City's rights are subject to curtailment as set forth in State issued Extensions of Time for development of these water rights. The City's current water rights are listed in **Table 1-1**.

**Table 1-1
Grants Pass Water Rights Summary**

Application Number	Permit Number	Certificate Number	Priority Date	Beneficial Use	Permit Rate (cfs)	Developed Rate (cfs)	Undeveloped Rate (cfs)	Status ¹	Current Completion Date
--	--	D15839	1888	Municipal and domestic use, irrigation	12.5	12.5	0.0	NC	--
S34141	S26901	89629	7/19/1960	Municipal use	25	16.95	8.05	NC	--
S41672	S45827	--	12/2/1965	Municipal use	25	0.0	25.0	NC	10/1/2065
S64732	S47346	--	1/13/1983	Municipal use	25	1.3	23.7	NC	10/1/2090
Total, cfs (mgd)					87.5 (56.6)	30.75 (19.9)	56.75 (36.7)		

Note: 1. "NC" = "not cancelled"

Pressure Zones

The City's existing distribution system is divided into five primary service levels or pressure zones and one sub-zone. Pressure zones are defined by ground topography and their hydraulic grade lines (HGLs) are determined by overflow elevations of water storage facilities, discharge pressures of pump stations or outlet settings of pressure reducing facilities serving the zone.

Due to the City's steep and varied topography, portions of Pressure Zones 2, 3 and 4 are not able to feasibly be connected into a single service area for each zone. As a result, each of these three pressure zones has several hydraulically and geographically independent service areas. For the purposes of this study, each zone service area is designated with both the pressure zone number and a letter code corresponding to the facility serving that area. For instance, the Pressure Zone 2 service area supplied from the Meadow Wood Pump Station is designated 2MW. **Table 1-2** provides a summary of each pressure zone and facilities serving that zone. Pressure zone configurations are illustrated in the existing water system schematic, **Figure 1-2**, at the end of this section.

**Table 1-2
Pressure Zone Summary**

Zone	HGL (ft)		Elevations Served (ft)	Approx. Static Service Pressure (psi)	Facilities Supplying the Zone
	Nominal	Operational ¹			
1	1,108.5	1,108.5	900 - 1,020	38 - 90	High Service Pump Station (WTP), Reservoirs 3, 5, 11
2	1,240	1,240	1,020 - 1,140	43 - 95	Lawn Ridge & Madrone Pump Stations, Reservoirs 4, 6
2HT		1,220	1,020 - 1,150	30 - 87	Hilltop Pump Station
2HK		1,210	1,010 - 1,135	32 - 87	Harbeck Pump Station
2NH		1,280	1,010 - 1,150	56 - 117	New Hope Pump Station
2MW		1,250	1,030 - 1,140	48 - 95	Meadow Wood Pump Station
2A	1,150	1,150	985 - 1,025	54 - 71	9th & Savage and Manzanita PRVs
3	1,370	1,370	1,140 - 1,280	39 - 100	Champion Pump Station, Reservoir 8
3MW		1,330	1,140 - 1,290	35 - 82	Meadow Wood Pump Station
3P		1,350	1,040 - 1,220	56 - 134	Panoramic Pump Station
3WX		1,360	1,125 - 1,165	84 - 102	Williams Crossing Pump Station
3S		1,430	1,130 - 1,280	65 - 130	Starlite Pump Station, Starlite PRV
3B	1,340	1,340	1,120 - 1,165	76 - 95	Beacon Dr PRV
4	1,520	1,450-1,500	1,280 - 1,420	35 - 95	Hefley Pump Station, Reservoir 13
4LR		1,510	1,280 - 1,420	39 - 100	Laurel Ridge Pump Station
NV	1,403	1,400	995 - 1,165	102 - 175	Reservoir 15

Note: 1. Operational HGL is the average HGL for each zone based on pump station discharge pressures and reservoir levels recorded by the City's SCADA system for facilities serving each zone.

Storage Reservoirs

The City's water system has eight reservoirs with a total combined storage capacity of approximately 20.53 million gallons (MG). **Table 1-3** presents a summary of the City's existing storage reservoirs. Reservoirs 3, 5 and 11 serving Zone 1 are supplied from the WTP. All other reservoirs are supplied by booster pump stations which monitor the reservoir water level. For multiple reservoirs in a pressure zone, each reservoir is equipped with an altitude valve to control accidental overflows. Reservoirs 3, 5 and 11 serving Zone 1 and Reservoirs 4 and 6 serving Zone 2 have altitude valves installed. Existing City reservoirs are summarized in **Table 1-3**.

**Table 1-3
Reservoir Summary**

No.	Location	Zone Served	Year Built	Type	Capacity (MG)	Floor Elevation (ft)	Overflow Elevation (ft)
3	500 Block Woodson Dr.	1	2014	concrete	5.0	1,078.5	1,108.5
4	1500 Block Ridge Rd.	2	1953	concrete	0.75	1,216	1,240.0
5	1400 Block Sherman Ln.	1	1983	concrete	3.5	1,079.5	1,108.5
6	2200 Block Crown St.	2	1982	concrete	3.5	1,211	1,240.0
8	Heiglen Loop Rd.	3	1983	concrete	2.0	1,341	1,370.0
11	1420 Denton Trail	1	1999	concrete	4.5	1,078.5	1,108.5
13	1700 Block Sunset Ln.	4	1980	concrete	0.08	1,445	1,455.0
15	3900 Block Highland Ave.	North Valley	1985	concrete	1.3	1,374	1,403.0

Pump Stations

The City operates 13 booster pump stations in addition to the High Service pumps at the WTP. The pump stations serve both open and closed zones. An open zone includes storage reservoirs which are filled by the pump station and serve customers by gravity. Pump stations serving closed zones supply constant pressure to customers without the benefit of gravity storage facilities.

Several of the City's constant pressure pump stations and the High Service pumps at the WTP have variable frequency drives (VFDs). VFDs allow a pump to operate faster or slower in order to provide a wider range of flow rates to meet varying customer water demands. Many of the City's constant pressure pump stations also have pressure tanks. A pressure tank is a small water storage vessel that uses compressed air to maintain a consistent pressure at the tank outlet. As water flows out of the tank to customers the pressure in the tank drops which signals pumps to refill the tank. Both VFDs and pressure tanks are used to maintain consistent service pressure to customers under low demand conditions while minimizing pump cycling on and off which reduces wear and equipment maintenance. **Table 1-4** summarizes the City's existing pump stations.

**Table 1-4
Pump Station Summary**

Pump Station	Pressure Zone	Serves	No. of Pumps	Nominal Capacity (gpm)	VFD	Pressure Tank
High Service Pump Station (Water Treatment Plant)	1	Reservoirs 3, 5 & 11	6	20,100	Yes	No
Lawnridge	2	Reservoir 6	4	4,400	No	No
Madrone	2	Reservoir 4	3	2,690	No	No
Harbeck	2HK	Constant Pressure	3	1,368	Yes	No
Hilltop	2HT	Constant Pressure	7	2,480	Yes	Yes
New Hope	2NH	Constant Pressure	6	3,156	Yes	Yes
Meadow Wood	2MW	Constant Pressure	3	1,700	Yes	Yes
	3MW	Constant Pressure	3	1,053	Yes	Yes
Champion	3	Reservoir 8	3	4,700	No	No
Starlite	3S	Constant Pressure	5	1,698	Yes	Yes
Laurel Ridge	4LR	Constant Pressure	4	1,816	Yes	Yes
Williams Crossing	3WX	Constant Pressure	2	140	No	Yes
Panoramic Loop	3P	Constant Pressure	4	2,220	Yes	Yes
Hefley	4	Reservoir 13	4	1,758	No	No
North Valley	NV	Reservoir 15	3	1,070	No	Yes

Control Valves

The City's distribution system includes several pressure reducing valves (PRVs) that are used for one of two primary purposes:

1. To provide supply to customers in Zone 2A or 3B. PRVs are the only facilities providing service pressure to these zones. These PRVs generally have parallel valves, a smaller 2-inch diameter valve for lower demands and a larger 6- or 8-inch diameter valve to serve larger demands and fire flow.
2. To provide backup supply from a higher elevation zone

Table 1-5 summarizes the City's PRVs.

**Table 1-5
PRV Summary**

Location	Zone From	Zone To	Size (in)	Pressure Setting (psi)	Service
Meadow Wood PS	3MW	2MW	2	82	Backup
			6	75	
1025 NW Starlite Place	4LR	3S	2	60	Backup
			6	55	
NE Savage St & NE 9th St	2	2A	10	54	Supply
NW Manzanita Ave & NW Hawthorne Ave	2	2A	6	72	Supply
1316 NE Beacon Drive	4	3B	6	80	Supply

Distribution Piping

The City's distribution piping includes various pipe materials in sizes up to 36 inches in diameter. The total length of piping in the service area is approximately 188 miles. Pipe material documentation is not readily available for much of the distribution piping, but is understood to be mostly cast iron and ductile iron. **Table 1-6** presents a summary of pipe lengths by diameter.

Table 1-6
Distribution Piping Summary

Diameter (in)	Approx. Length (miles)
2	2.7
4	1.5
6	44.3
8	77.1
10	8.1
12	36.1
14	0.4
16	11.7
20	3.6
24	1.0
30	1.0
36	0.01
Total Length	187.5

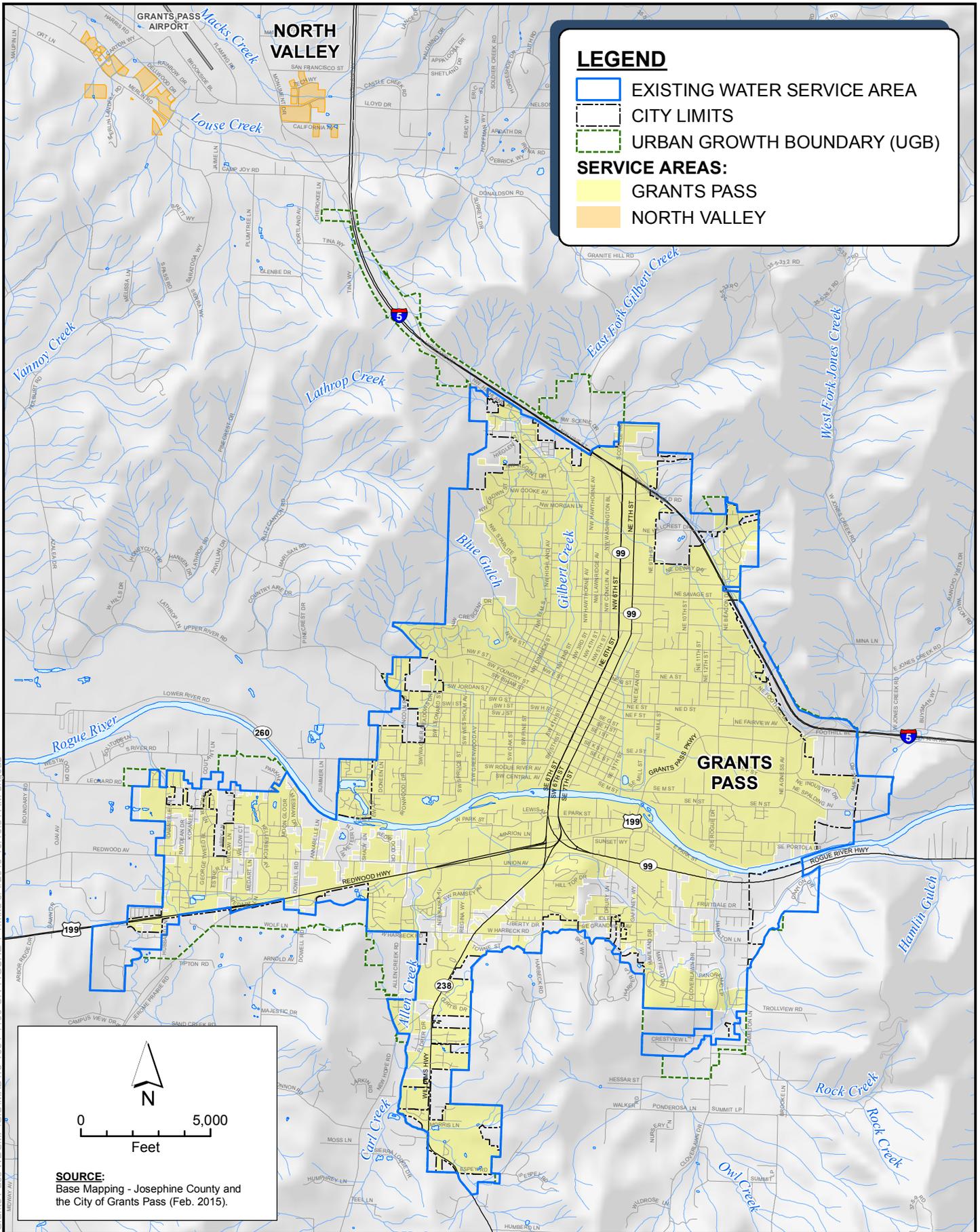
SCADA System

The City's supervisory control and data acquisition (SCADA) system monitors all storage reservoirs and pump stations within the City's water distribution system and provides for manual or automatic control of certain facilities and operations. The SCADA system also collects and stores system status and performance data.

All facilities are equipped with remote telemetry units (RTUs) that monitor reservoir water levels, pump station on/off status, discharge pressure and flow rates. In addition, some sites are equipped with intrusion, overflow warning and fire alarms which alert staff to unauthorized access, flooding or fire. All signals from the RTUs are collected and transmitted to a computer terminal at the WTP which enables City staff to view the status of the water system. More detailed information regarding the City's SCADA system is provided in the 2015 *Water and Wastewater SCADA Systems Master Plan* (Carollo).

Summary

This section presents a summary of the City's existing water system, including service area, supply facilities, pressure zones, storage and pumping facilities, control valves and distribution system piping.



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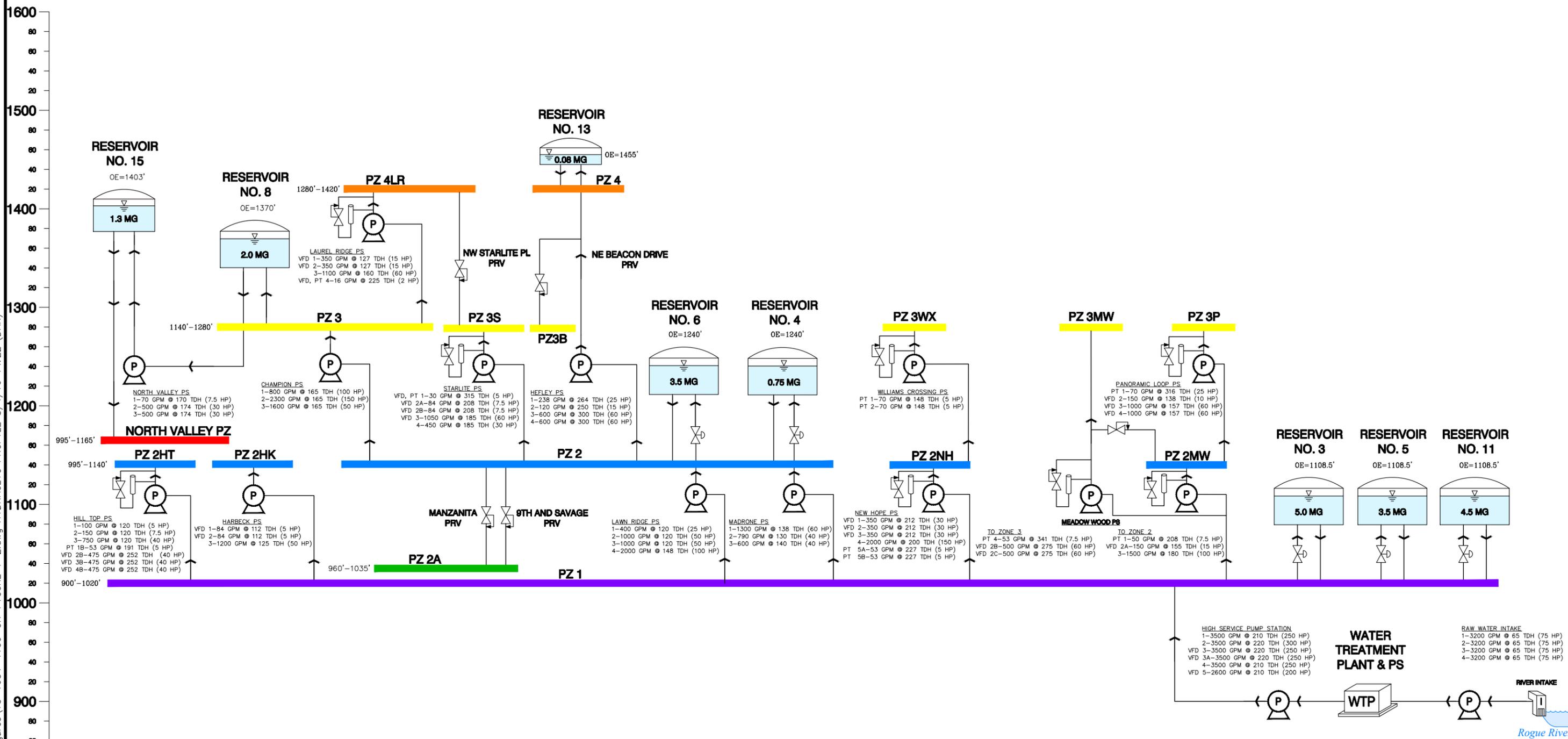


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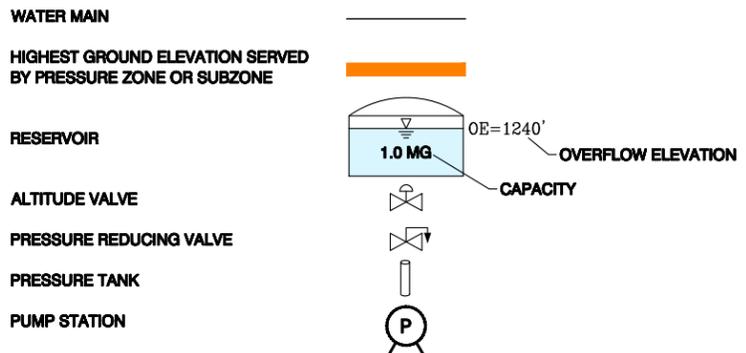
Figure 1-1 Existing Water System Service Area



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LEGEND



ABBREVIATIONS

EL	ELEVATION
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
MG	MILLION GALLONS
OE	OVERFLOW ELEVATION
PRV	PRESSURE REDUCING VALVE
PS	PUMP STATION
PT	PRESSURE TANK
PZ	PRESSURE ZONE
TDH	TOTAL DYNAMIC HEAD
VFD	VARIABLE FREQUENCY (SPEED) DRIVE

DATA SOURCE: JASON CANADY - CITY OF GRANTS PASS WATER TREATMENT PLANT SUPERVISOR, MARCH 2015.



CITY OF GRANTS PASS

FIGURE 1-2

Water Distribution System Master Plan

Existing Water System Schematic

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