City of Klamath Falls

2020 Water Master Plan



TETRA TECH

April 2020

City of Klamath Falls 2020 Water Master Plan

April 2020

PREPARED FOR

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ACRONYMS/ABBREVIATIONS

Acronym or Abbreviation	Definition
ADD	average-day demand
AWIA	America's Water Infrastructure Act
AWWA	American Water Works Association
BPS	booster pump station
CIP	capital improvement plan
CMU	concrete masonry unit
EPA	Environmental Protection Agency (U.S.)
ERU	equivalent residential unit
fps	feet per second
GIS	geographic information system
gpm	gallons per minute
HMI	human-machine interface
LCR	Lead and Copper Rule
MCL	Maximum Contaminant Level
MDD	maximum-day demand
MG	million gallons
mgd	million gallons per day
OAR	Oregon Administrative Rule
OHA	Oregon Health Authority
ORS	Oregon Revised Statute
PHD	peak-hour demand
PLC	programmable logic controller
PRV	pressure relief valve
psi	pounds per square inch
PSPRC	Portland State Population Research Center
PWS	public water system
RTCR	Revised Total Coliform Rule
RTU	remote terminal unit
SCADA	supervisory control and data acquisition
SDC	system development charge
TCR	Total Coliform Rule
UGB	urban growth boundary
UGB	urban growth boundary
USDA	U.S. Department of Agriculture
WHPP	wellhead protection plan
WMP	Water Master Plan

1. INTRODUCTION AND SYSTEM DESCRIPTION

The 2019 City of Klamath Falls Water Master Plan (WMP) is an update to the City's 2010 WMP. The update inventories water system assets, documents the condition of facilities, updates the water system hydraulic model, and estimates system demand based on projected population growth. The structure and content of the WMP are designed to meet the City's needs and the requirements of Oregon Administrative Rule (OAR) 333-061-0060(5). An up-to-date master plan enables the City to proactively set appropriate developer requirements and fees to address improvements needed for new development as it occurs. Current conditions and future development are based on City-provided projections and the best information available.

The planning period for the WMP extends through 2038 to enable City staff to respond to new water system demand. The WMP provides a capital improvement plan (CIP) to meet current and future demand and to replace aging and seismically non-resilient assets. The CIP integrates the findings and recommended storage system capital improvements of the City's recent Seismic Resiliency Plan (BergerABAM, 2018).

Water demand projections are based on current information regarding future land use and population growth projections. Since the 2010 WMP, there has not been significant growth within the service area. Estimates of growth and water demand used in the WMP are based on projections provided by the Portland State University Population Research Center and historical data for 2012 – 2018. Because of the economic downturn during this period, the historical growth trends may not be fully representative of future conditions. Available data were carefully evaluated and extrapolated to provide a realistic and defensible planning scenario for the future.

The WMP service area includes the current water system service area and currently unserved developable land within the current Klamath Falls urban growth boundary (UGB). It excludes areas served by private water systems—the Ridgewater and Southview developments and the Skyline Water District.

1.1 SYSTEM HISTORY AND OWNERSHIP

The water system was established by the City in April 1895, through a franchise and licensing agreement to construct and operate a private water system known as Klamath Falls Light and Water Company. The Klamath Falls Light and Water Company installed the system's water mains, reservoir and pumping plant and operated the system until 1911, when the system was purchased by the California Oregon Power Company. The system was later purchased by Oregon Water Corporation. In 1978, the City of Klamath Falls purchased the water system, making it a municipality-owned and -operated system. Through its various ownerships, private systems were added to the system and existing assets were acquired. As a result, many of the system's existing assets were constructed prior to the City taking ownership. Under City ownership, the water system has continued to grow through acquisition of smaller, adjacent private water systems, including:

- The Moyina Heights water system, with a customer base of 600 residential connections, was added in 1980 and a transmission main was constructed connecting the system to the City's system.
- The Orindale water system, comprising three smaller water systems, was added in 1983 and became known as Stewart Lenox/Fairhaven area. These three interconnected systems were served from an

independent source of supply until 2008. In 2008, a transmission main was completed connecting the Stewart Lenox/Fairhaven area to the City's water system.

- In 2002, the City assumed ownership of the First Addition to the Moyina Improvement District Water System. This system consisted of 38 residential customers. To improve reliability and quality, the system was connected to the City water system at two connection points.

1.2 SERVICE AREA DESCRIPTION

1.2.1 Physical Characteristics

The City of Klamath Falls is on the southern shore of Upper Klamath Lake in Klamath County in south central Oregon. The water system service area covers all areas within the UGB, as shown in Figure 1-1, with the exception of the Southview and Ridgewater planned developments on the west side and the Skyline Water District north of Sierra Heights on the east side (these areas are shown as shaded on the figure).

The City is the largest water provider in the region, providing water to a population of approximately 43,000 through 16,000 metered service connections. Only 50 percent of the water system's service connections are within the city limits. The City maintains an intergovernmental agreement with Klamath County to provide water for areas outside city limits. The system is not bounded by any neighboring public water systems. All users in the region receive water from either the City, private water systems, or private wells.

The service area is relatively flat to gently sloping, with increasing elevation toward the hillsides and UGB boundaries. Elevations range from 4,100 feet to just over 5,000 feet. The region's climate is classified as high desert. Humidity is low, average annual rainfall is 14.2 inches, and average annual snowfall of 38.5 inches. The average temperature range is 50 ºF to 85 ºF in the summer and 20 ºF to 40 ºF in the winter. The water system is in seismically active area.

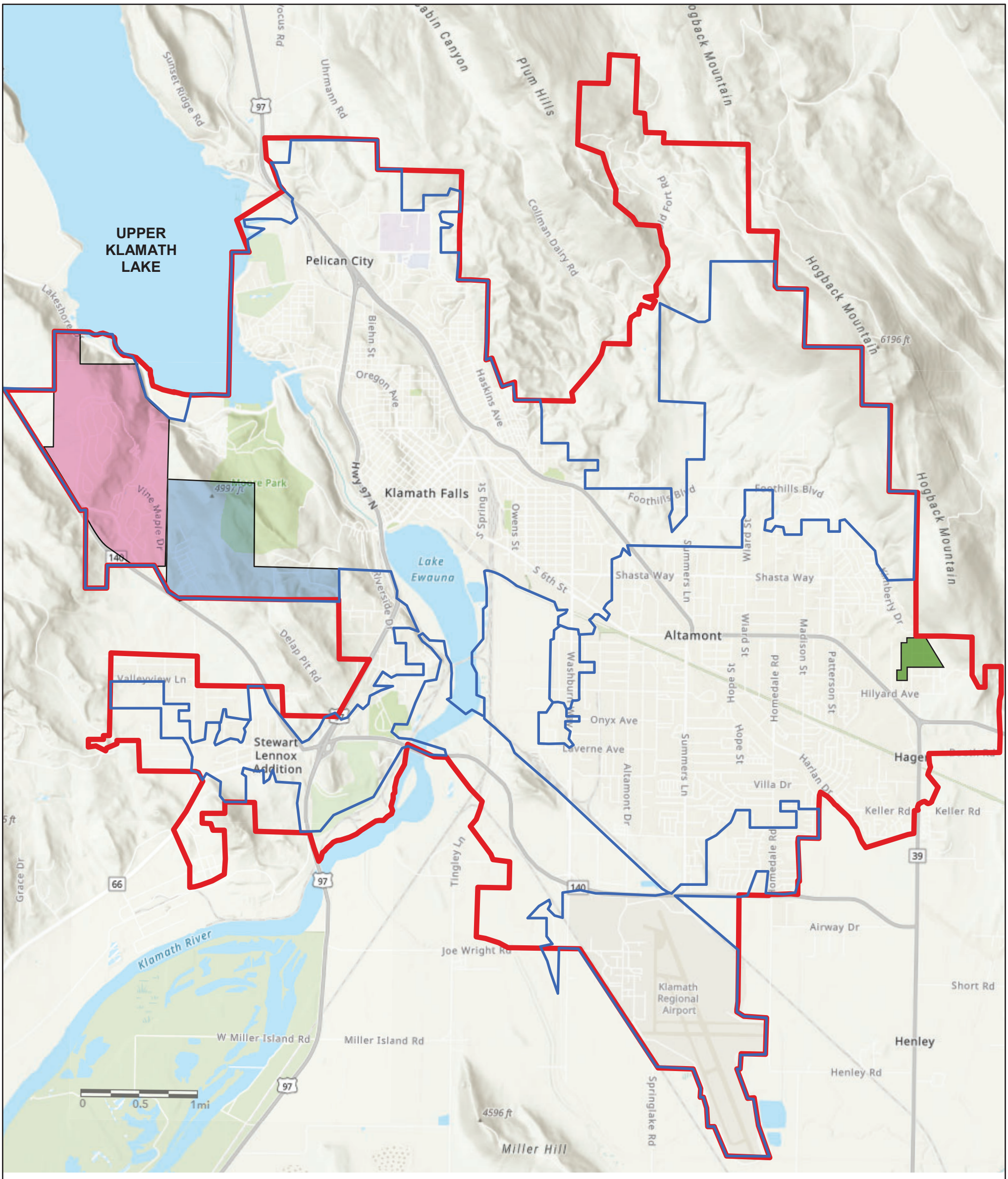
1.2.2 Land Use

Figure 1-2 shows designated land uses in the UGB. This information was obtained from the City Community Development Department and from the Klamath County Planning Department. The City's adopted zoning and general plan and the County's adopted zoning and assessor parcel information were supplemented with more specific development information where available. The WMP's growth and land use projections are based on the best available information provided by the City Planning Department regarding growth trends and approved plans. Table 1-1 summarizes the land use types and the corresponding City and County zoning categories. Table 1-2 summarizes existing and developable acreage of various land uses within the study area. These estimates were obtained using GIS tools from the land use database information illustrated on Figure 1-2. Water demand in the City's water system is primarily for residential purposes. Single family and multiple family residential meters equal approximately 90.2% of all services, while commercial and industrial equal approximately 7.8%, fire and irrigation equal approximately 1% each..

This WMP evaluates service to some anticipated developments that the City has agreed to serve, although the customers may not yet be on-line. Table 1-3 shows developments within the UGB that have plans and/or tentative approval from either the City or County, as of the time of this WMP.

1.3 WATER SYSTEM DESCRIPTION

A hydraulic profile schematic of the water system is provided in Figure 1-3. Figure 1-4 illustrates the City's service area by pressure zone. The service zones are indicated and cross-referenced by color coding. The following sections summarize existing service zones and water system assets as of December 2018.



LEGEND

- UGB
- CITY LIMITS
- SOUTHVIEW
- SKYVIEW
- RIDGEWATER

N

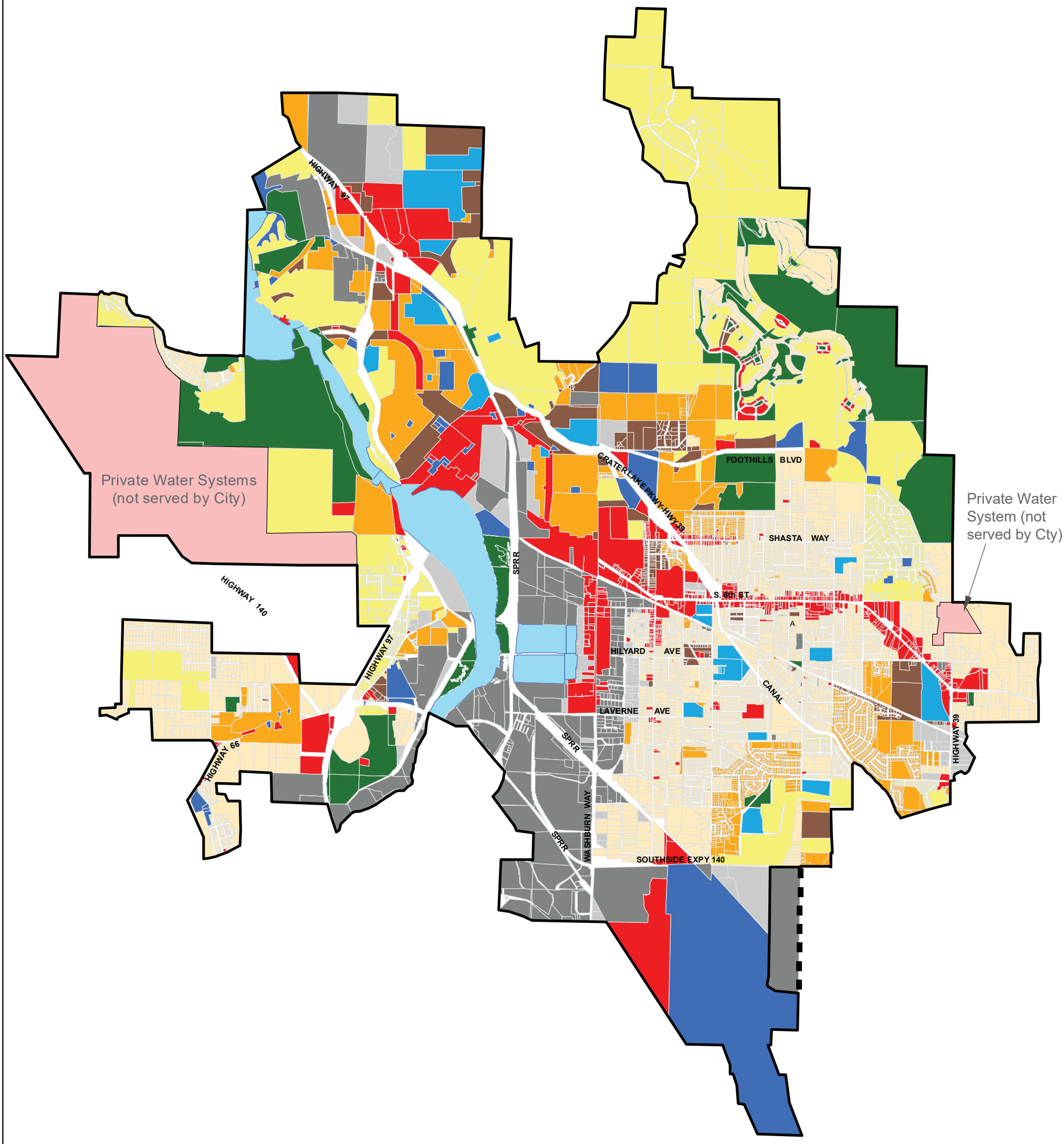
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City of Klamath Falls
2020 Water Master Plan

WATER SERVICE AREA

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FIGURE 1-1



LEGEND

Land Use Type

- Water Body
- Commercial
- Light Industrial
- Heavy Industrial
- Very Low Density Residential
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Open Space
- Public Facility
- Public Facility School
- Right of Way
- Private Water System
- Urban Growth Boundary (UGB)
- Potential Future UGB

N

0 2,500 5,000 Feet

City of Klamath Falls
2020 Water Master Plan

LAND USE AND DEVELOPMENT MAP

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FIGURE 1-2

Table 1-1. Master Plan Land Use Types Within Study Area

Master Plan Land Use Type	Corresponding Zoning Categories	
	City	County
Residential		
Very Low Density Residential	Single-family residential	RS (suburban residential): 10,000-square-foot minimum lots
Low Density Residential	Single-family residential	RL (low density residential): 7,000-square-foot minimum lots
Medium Density Residential	Medium-density residential	RM (medium density residential): 5,000-square-foot minimum lots
High Density Residential	Apartment residential	RH (high density residential): 10,000-square-foot for 10 – 24 units per acre
Non-Residential		
Commercial	Office, neighborhood commercial, general commercial, mixed use	All commercial categories (C – commercial, CG – commercial general, CN – commercial neighborhood, CR – commercial recreation, CT – commercial transportation)
Light Industrial	Light industrial	IL (industrial light)
Heavy Industrial	Industrial	IH (industrial heavy)
Public Facility, Public Facility-School	Public	N/A
Open Space, Special Reserve, No City Water Service	Special reserve, open space	NR (non-resource), EFU (exclusive farm use), F and FR (forestry, range)
Lake, Ponds	N/A	N/A
Street Right-of-Way	N/A	N/A

Table 1-2. Summary of Land Use Acreages within Master Plan Study Area

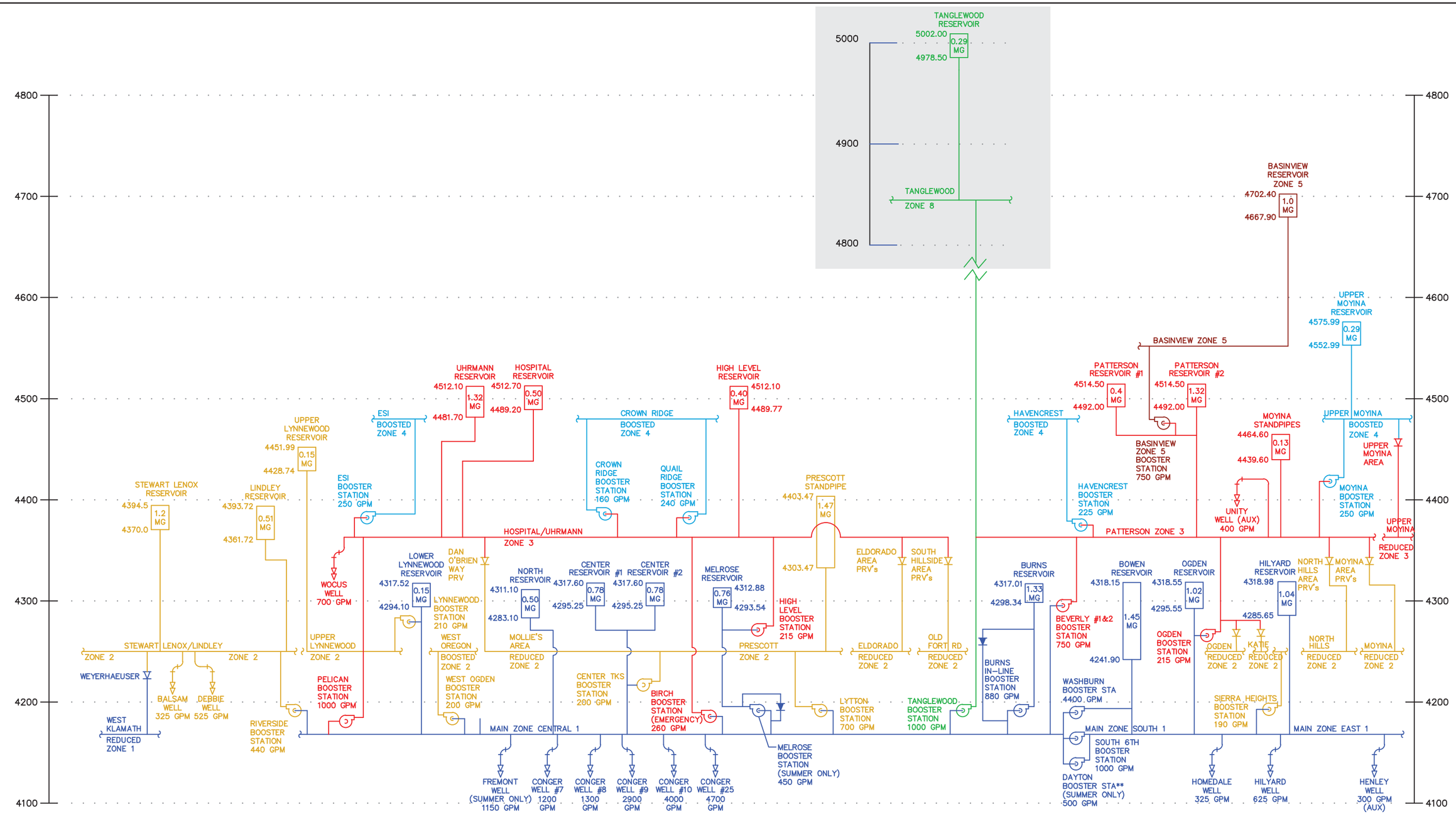
Land Use Type	Area (acres)	
	Existing[a]	Available for Development
Residential		
Very Low Density Residential	2,354	7,792
Low Density Residential	1,974	6,771
Medium Density Residential	1,640	4,263
High Density Residential	456	1,441
Subtotal - Residential	*6,424*	*20,271*
Non-Residential		
Commercial	1,268	3,243
Light Industrial	347	1,376
Heavy Industrial	969	4,919
Public Facility - School	247	632
Public Facility	1,672	4,129
Subtotal - Non-Residential	*4,503*	*14,299*
Others (no City Water Service is planned for these land uses)		
Water Bodies (Lake, Ponds)	904	1,808
Open Space, Special Reserve, No City Water Service, Right of Way (Freeways, Railroads)	1,626	4,454
Private Water Systems (e.g., Southview, Ridgewater)[b]	1,795	3,590
Subtotal - Others	*4,325*	*9,842*
Total	**15,252**	**44,412**

a. Existing areas include some anticipated developments with plans and/or tentative approval, although the customers may not yet be on-line (as shown on Table 1-3).
b. Southview and Ridgewater areas are within the UGB but not within the service area.

Table 1-3. Anticipated Developments within Planning Period

Subdivision Name[a, b]	Total Lots	Existing Scenario			Intermediate Scenario [c]
		Developed Lots	Undeveloped Lots	Infrastructure	Undeveloped Lots
Clover Falls	200	0	200	N/A	0
Cregan Park	70	0	70	N/A	0
Crown Ridge	N/A	0	40	COMPLETE	40
Dove Hollow	18	12	6	COMPLETE	6
Eden Gardens	20	0	20	N/A	0
Emerald Meadows	34	0	34	N/A	0
Grandview	30	0	30	N/A	0
Hacienda Heights	24	0	24	N/A	0
Harbor Isles	N/A	0	47	COMPLETE	47
Harbor View Phase 1	46	10	36	COMPLETE	36
Harbor View Phase 3	56	0	56	PARTIAL	56
Hidden Valley Phase 2	54	0	54	NONE	54
Juniper Ridge	36	6	30	PARTIAL	30
Keiger Heights	13	0	13	N/A	0
Kerns Tracts	63	0	63	N/A	0
Klamath Industrial Park	8	2	6	COMPLETE	6
Link River Estates	50	0	50	COMPLETE	50
Madsen Corner	19	0	19	COMPLETE	19
Partridge Hill	58	38	20	PARTIAL	20
Pheasant Run	87	47	40	COMPLETE	40
Prairie Meadows	47	47	0	COMPLETE	0
Quail Point Estate	N/A	0	9	COMPLETE	9
Ross Ranch/Credenda/Westwind	163	0	163	N/A	0
Sage Meadows Phase 2	22	22	0	COMPLETE	0
Sherwood Forest	11	2	9	COMPLETE	9
Sierra Heights 1st Addition	96	96	0	COMPLETE	0
Sky Ridge Estates	204	196	8	PARTIAL	8
Summerfield	63	30	33	PRIVATE	0
Sunset Village (El Cerrito)	24	24	0	COMPLETE	0
Sunset Village (Hager Lane)	N/A	N/A	N/A	NONE	0
Timbermill Shores – Mixed Use	14	0	14	COMPLETE	14
Valley Vista	158	0	158	N/A	0
TOTAL	**1688**	**502**	**1252**		**444**

a. The Klamath Heights subdivision is not shown, as the City is not anticipating development at this time (currently impractical).
b. Inclusion in this table does not guarantee capacity or availability of water or signify current plan approval.
c. Includes potential development that have plans and/or tentative approval from the City or County at the time of this WMP.



LEGEND

- SUPPLY SOURCES
- PUMP STATIONS
- 4312.88 / 0.76 MG / 4293.54 – TANK OVERFLOW ELEV (FT) / TANK WITH CAPACITY (MG) / TANK BOTTOM ELEV (FT)
- PRESSURE RELIEF VALVE TO SERVICE ZONE

ZONE 1
ZONE 2
ZONE 3
ZONE 4
ZONE 5
ZONE 8

* – PUMP STATION CAPACITIES ARE NOMINAL FIRM CAPACITIES (LARGEST PUMP OUT OF SERVICE, CAPACITY=SUM OF DESIGN CAPACITIES)

** – SINGLE PUMP AT THIS STATION

N

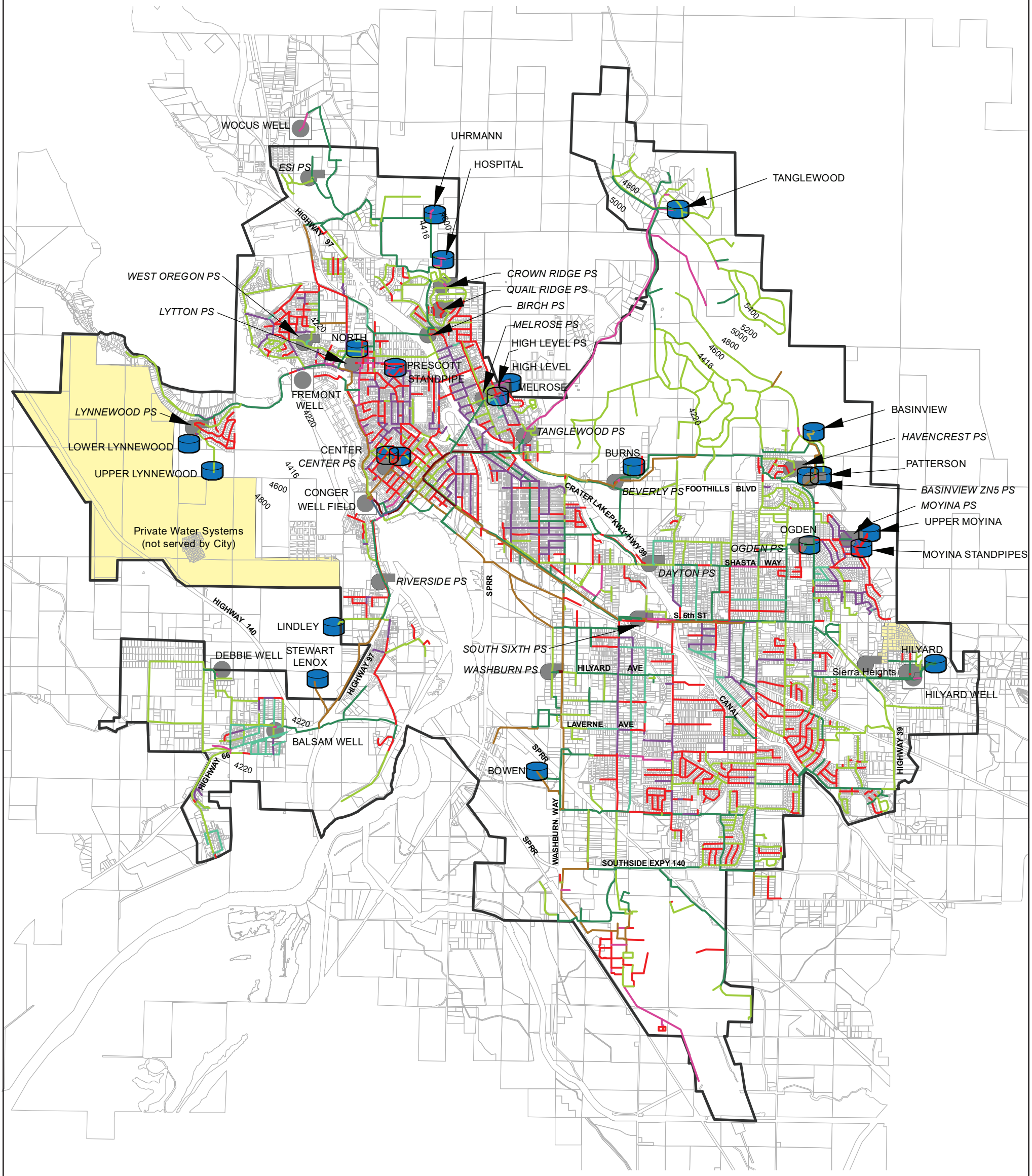
1 Miles

City of Klamath Falls
2020 Water Master Plan

WATER SYSTEM OPERATIONAL SCHEMATIC

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FIGURE 1-3


WOCUS WELL
UHRMANN
HOSPITAL
ESI PS
TANGLEWOOD
HIGHWAY 97
4416
4600
4800
5000
WEST OREGON PS
CROWN RIDGE PS
QUAIL RIDGE PS
LYTTON PS
BIRCH PS
MELROSE PS
NORTH
HIGH LEVEL PS
PRESCOTT
STANDPIPE
HIGH LEVEL
MELROSE
FREMONT
WELL
4220
LYNNEWOOD PS
TANGLEWOOD PS
BASINVIEW
HAVENCREST PS
LOWER LYNNEWOOD
CENTER
CENTER PS
BURNS
PATTERSON
UPPER LYNNEWOOD
CONGER
WELL FIELD
BEVERLY PS
FOOTHILLS BLVD
BASINVIEW ZN5 PS
MOYINA PS
UPPER MOYINA
CRATER LAKE PKWY-HWY 39
OGDEN
OGDEN PS
SHASTA WAY
MOYINA STANDPIPES
Private Water Systems
(not served by City)
DAYTON PS
RIVERSIDE PS
SPRR
HIGHWAY 140
S. 6th ST
LINDLEY
SOUTH SIXTH PS
HILYARD
DEBBIE WELL
STEWART
LENOX
WASHBURN PS
HILYARD AVE
Sierra Heights
HILYARD WELL
HIGHWAY 97
CANAL
LAVERNE AVE
BALSAM WELL
HIGHWAY 66
BOWEN
WASHBURN WAY
HIGHWAY 39
SOUTHSIDE EXPY 140
LEGEND
PIPE DIAMETER:
2"
4"
6"
8"
10"
12"
16"
20"
24"
36"
TANK
PUMP STATION
WELL
UGB
N
1
Miles
City of Klamath Falls
2020 Water Master Plan
WATER SYSTEM FACILITIES
TETRA TECH
FIGURE 1-4

1.3.1 Service Zones

Six service zones and a number of subzones serve similar elevation ranges across the service area, as shown on Figure 1-5. Table 1-4 summarizes the source of supply for each zone and sub-zone as well as the reservoirs, wells, booster stations, and pressure relief valves (PRVs) associated with each. The Main subzone in Zone 1 is the lowest and largest subzone in the system. It consists of three sections: Central, South, and East. Twenty-two smaller subzones serve outlying or higher elevation areas.

The configuration of the existing system limits the amount of water that can effectively be conveyed to some areas.

1.3.2 System Interties

The water system is not connected to any other municipal water system. There also are no functional interties with the private water systems located within the UGB.

1.3.3 Inventory of Existing Assets

Groundwater Wells

The City's water supply comes from groundwater, drawn from 13 deep groundwater wells at depths between 300 feet and 1,000 feet. Two of these wells are for emergency use only. A 14th well, Moyina #4 is not online. Five wells at the Conger Wellfield supply approximately 80 percent of production. Table 1-5 lists the existing wells.

Treatment Facilities

The water system does not operate with centralized treatment. Drinking water is dosed at each wellhead with flow-paced gas chlorination as it is pumped to storage prior to delivery. The chlorinated water is distributed directly to end users from storage with no further treatment.

Booster stations

The City operates 24 booster stations dispersed across the system and operated to move water to higher pressure zones or boost service pressures in a given pressure zone. Table 1-6 is a summary of the booster stations. Figure 1-3 depicts the relationship between booster stations and pressure zones; pumps can be used to offset pressure losses when conveying water to some outlying areas.

Water Storage

The City operates and maintains 22 potable water storage facilities at 19 sites, with a total storage capacity of 16.7 million gallons (MG). Individual capacities range from 0.13 to 1.47 MG. The storage tanks range in age from 11 to 90 years. A summary of the storage tank characteristics is included as Table 1-7.

Pressure Regulating Stations

Pressure regulating stations are located where water is supplied from a high-pressure zone to a lower pressure zone. PRVs are used to avoid over-pressurizing customers at lower elevations. Table 1-8 summarizes key features of the City's 10 pressure regulating stations.

Piping

Water is conveyed through 280 miles of transmission and distribution mains and 1,026 fire hydrants. The water distribution system includes pipelines ranging in diameter from 2 to 24 inches. Piping materials for the water system are summarized in Table 1-9. The greatest quantity of the piping material is polyvinyl chloride pipe

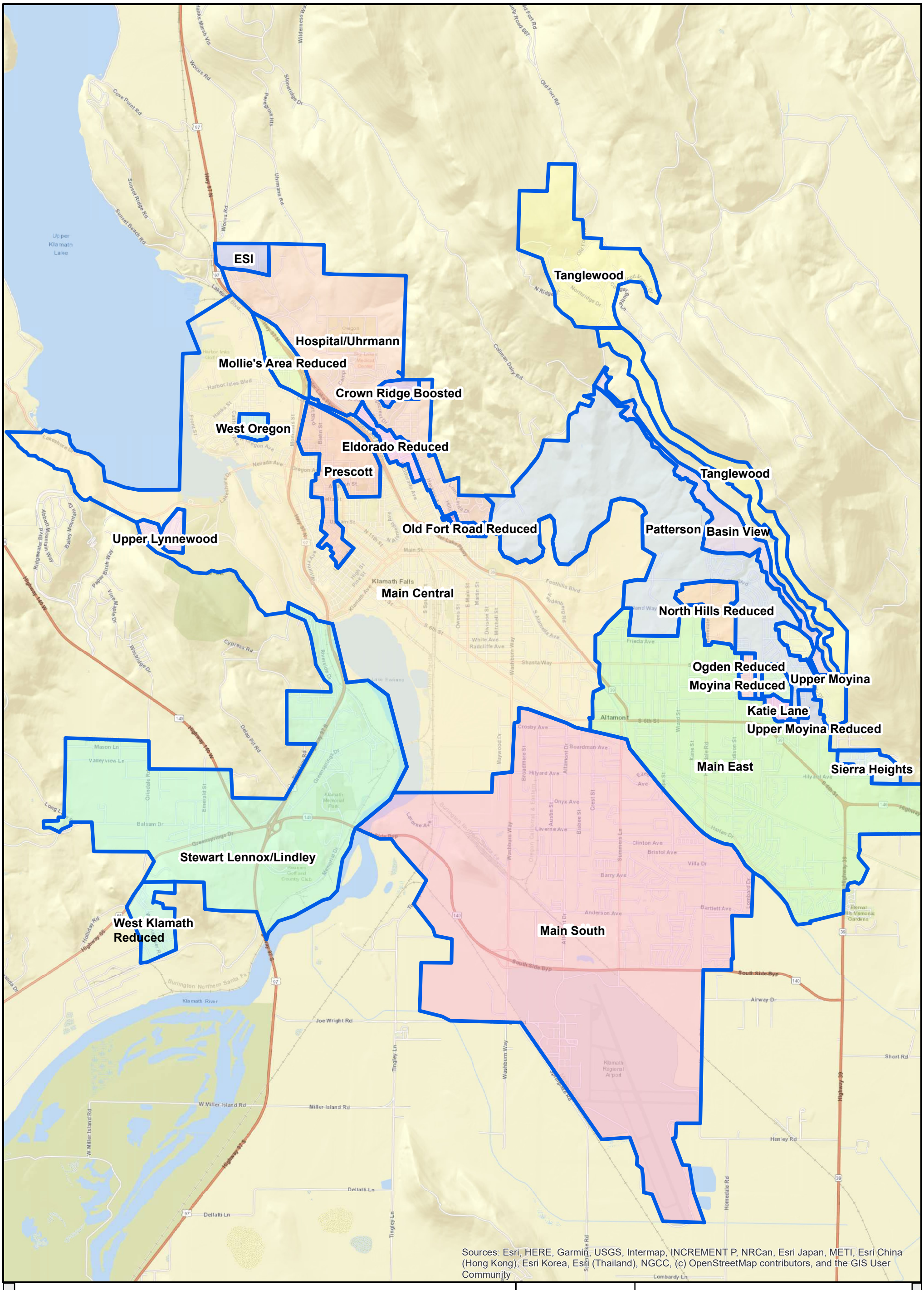
(35 percent) followed by cast iron (24 percent), then asbestos cement (20 percent). Roughly 6 percent of total piping is of unknown material. The most common pipe size is 8-inch, at 31 percent of the total, followed by 6-inch at 24 percent and 12 inch at 19 percent. Figure 1-4 depicts the current distribution system by pipe size.

WATER SERVICE POLICIES

The City has established policies, terms and conditions pertaining to water service that address the following topics:

- Water service curtailment
- Water service extension
- Main size
- Oversizing
- Complaint response
- Meter removal
- Service reinstatement
- Service pressure
- Cross-connections
- System damages by property owner
- Meter and hydrant Installation requirements

Details are included in Appendix A.



LEGEND

Pressure Zones

N

0.6 Miles

CITY OF KLAMATH FALLS
DRINKING WATER MASTER PLAN

Water System Pressure Zones

TETRA TECH

Figure 1-5

Table 1-4. Existing Service Zones and Subzones

Subzone Name	Subzone Type[a]	Facilities in or Serving the Subzone			
		Active Wells	Reservoirs	Booster stations	PRVs
ZONE 1					
Main Central **Main South** **Main East**	Reservoir	Conger#7 Conger #8 Conger #9 Conger #10 Conger #25 Fremont Henley Hilyard Homedale	L. Lynnewood North Center #1 Center #2 Melrose Bowen Ogden Hilyard Burns	South 6th Washburn Dayton (backup) Melrose In-Line Burns In-Line pan	
West Klamath Reduced	PRV (Stewart Lenox-PRV)				Weyerhaeuser
ZONE 2					
Stewart Lenox / Lindley	Reservoir	Debbie Balsam	Stewart Lenox Lindley	Riverside (backup)	
Upper Lynnewood	Reservoir		U. Lynnewood	Lynnewood	
West Oregon	Booster Only			West Oregon	
Mollie's Area Reduced	PRV (PRV-2-HWY)				Dan O'Brien Way
Prescott	Reservoir		Prescott	Center & Lytton	
Sierra Heights	Booster Only			Sierra Heights	
Eldorado Reduced	PRV (PRV-2)				Eldorado Area
Old Fort Road Reduced	PRV (PRV-6)				South Hillside
North Hills Reduced	PRV (PRV-1)				North Hills Area
Moyina Reduced	PRV (PRV-13)				Moyina Area
Ogden Reduced	PRV (PRV-OGDEN)				Ogden
Katie Lane Reduced	PRV (Katie Lane)				Katie Lane
ZONE 3					
Hospital/Uhrmann	Reservoir	Wocus	Uhrmann Hospital High Level	Birch High Level Pelican	
Patterson	Reservoir	Unity	Patterson #1 Patterson #2 Moyina Standpipe	Beverly Ogden	
Upper Moyina Reduced	PRV (PRV-3)				Upper Moyina Area
ZONE 4					
ESI	Booster Only			ESI	
Crown Ridge Boosted	Booster Only			Crown Ridge Quail Ridge	
Havencrest	Booster Only			Havencrest	
Upper Moyina	Reservoir		U. Moyina	Moyina	
ZONE 5					
Basin View	Reservoir		Basin View	Basin View	
ZONE 8					
Tanglewood	Reservoir		Tanglewood	Tanglewood (Laguna)	

Table 1-5. Existing Groundwater Wells

Well Name	Identification No.	Location	Depth (feet)
Conger #7	12923	530 Conger Avenue (Conger Wellfield)	370
Conger #8	37866	530 Conger Avenue (Conger Wellfield)	830
Conger #9	37867	530 Conger Avenue (Conger Wellfield)	435
Conger #10	46115	530 Conger Avenue (Conger Wellfield)	559
Conger #25	30205	530 Conger Avenue (Conger Wellfield)	625
Balsam #20	30200, 30204	4047 Balsam Dr.	438
Debbie #22	13322	2623 Debbie Dr.	380
Wocus #1[a]	38275	790 Longacre Ln.	530
Moyina #4[b]	12872	1401 Kimberly Dr.	1,100
Fremont #11	30203	510 Nevada Dr.	701
Henley #12 [c]	30202	4623 Alt Way	155
Homedale #13	11636	1430 Homedale	427
Unity #18 [c]	11637	2000 Chinchilla	1,000
Hilyard #19	37981	7850 Margraf Ln	732

a. The City previously considered adding another well at the Wocus site. However, this is no longer being considered due to potential regulatory hurdles associated with water rights, land use permitting, and the potential cost of treatment if arsenic removal is required.
b. The Moyina well is not currently in use.
c. Emergency Use only wells.

Table 1-6. Booster Station Summary

Facility Name	Location	Originating/ Receiving Zones	Elevation (feet)	Pumps and Capacity	Operational Notes
Basin View	Patterson Reservoir	3/5	4492	#1 – 750 #2 - 750	Basin View Reservoir Level
Beverly	Beverly Dr/ Foothills Blvd	1/3	4193	#1 - 750 #2 - 750	Patterson #1 Reservoir Level; Patterson #2 Reservoir optional; Works with Ogden Booster Station; during summer, Beverly is lead station. Located in same facility as Burns Pump.
Burns	Beverly Dr/ Foothills Blvd	3/1	4193	#3 - 1000	Burns Reservoir Level; inline to Burns Reservoir Located in same facility as Beverly Pump
Birch	Birch St/ Delores St	1/3	4212	#1 - 260 #2 - 260	Uhrmann Reservoir Level; Hospital Reservoir optional
Center	Center Tank	1/2	4297	#1 - 200 #2 - 200	No control; manually operated 24/7 during peak demand periods
Crown Ridge	1807 Harmony Lane	3/4	4131	#1 - 160 #2 - 600	Discharge pressure; operated 24/7; pumps to zone with no storage. Works with Quail Ridge booster serving same area.
Dayton	Dayton St/ Shasta Way	1/1	4424	#1 - 500	No control; manually operated 24/7 during peak demand periods (works with South 6th Booster Station in summer only)
ESI	ESI Way/ Harbor View St	3/4	4291	#1 - 10-60 #2 - 60-250 #3 - 1500	Discharge pressure; operated 24/7; variable-frequency-drive Pumps #1 & #2

Facility Name	Location	Originating/ Receiving Zones	Elevation (feet)	Pumps and Capacity	Operational Notes
Havencrest	5871 Havencrest Dr	3/4	4254	#1 - 150 #2 - 225 #3 – 375	Discharge pressure; operated 24/7
High Level	Melrose Reservoir	1/3	4440	#1 - 225 #2 - 435	High Level Reservoir Level
Link River Estates	1935 California Street	1/2	N/A	#1 – 50 #2 – 160 #3 – 160 #4 – 880 #5 - 880	Discharge pressure/demand operated 24/7; variable-frequency drives on all pumps
Lynnewood	Lower Lynnewood Reservoir	1/2	4388	#1 - 210 #2 - 210	Upper Lynnewood Reservoir Level
Lytton	Lytton St / Van Camp St	2	4215	#1 – 700 #2 - 700	Prescott Reservoir Level
Melrose	2030 Melrose Street	1/1	4167	425	Melrose Reservoir Level; Summer only, inline to fill the tank
Moyina	Lower Moyina Reservoir	3/4	4113	#1 - 500 #2 - 250	Upper Moyina Reservoir Level
Ogden	1435 Ogden St	1/2 & 3	4173	#3 – 215 #4 - 430	Patterson Reservoir Level. Works with Beverly Booster; during winter, Ogden is lead station.`
Pelican	4048 Lakeport Blvd	1/3		#1 – 1000 #2 – 1000 #3 - 1000	Uhrmann Reservoir/Hospital Reservoir Levels
Quail Ridge	Wade Circle / Eulalona Ct.	3/4	4388	#1 – 80 #2 - 240 #3 - 430	Discharge pressure; operated 24/7; pumps to zone with no storage. Works with Crown Ridge booster serving same area.
Riverside	800 block Riverside Dr	1/2	4091	#1 – 440 #2 - 440	Lindley Reservoir Level
Sierra Heights	Sierra Heights Blvd / Hilyard Ave	1/2		#1 - 10-50 #2 - 40-190 #3 - 1000	Discharge pressure; operated 24/7; variable-frequency-drive Pumps #1 & #2
South 6th Street	3700 block South 6th St	1/1	4113	#1 - 1000 #2 - 1000	Bower and Ogden Reservoir Level
Tanglewood (at Laguna)	Laguna St/Old Fort Rd	1/8	4286	#1 - 1000 #2 - 1000 #3 - 1000	Tanglewood Reservoir Level
Washburn	2515 Hilyard Ave	1/1	4091	#1 – 1500 - 3100 #2 – 1500 - 3100 #3 – 1500 - 3100 # 4 Future (same)	Bowen Reservoir Level; All variable-frequency-drive 100-horsepower pumps – up to 4,400 gallons/minute total with two pumps running.
West Oregon	W Oregon Av / Harvard St	1/2		#1 - 50 #2 - 200 #3 - 600	Discharge pressure; operated 24/7; zone has no storage.

Table 1-7. Water Storage Facilities

Storage Facility	Pressure Zone Served	Age (years)	Capacity (MG)	Type	Supply Source or Controlling Pump Station	Elevations (feet)	
						Bottom	Overflow
Basin View	5	13	0.53	Welded	Basin View BPS	4677.9	4702.7
Bowen	1	24	1.45	Welded	Washburn BPS	4241.9	4318.2
Burns	1	24	1.33	Welded	Beverly BPS	4298.3	4317.0
Center No. 1	1	90	0.78	Riveted	Conger Wellfield	4295.3	4317.6
Center No. 2	1	88	0.78	Riveted	Conger Wellfield	4295.3	4317.6
High Level	3	87	0.40	Riveted	High Level BPS	4489.8	4512.1
Hilyard	1	23	1.04	Welded	Hilyard Well	4285.7	4319.0
Hospital	3	54	0.50	Welded	Wocus Well Birch BPS	4489.2	4512.7
Lindley	2	36	0.51	Welded	Riverside BPS	4361.7	4393.7
L. Lynnewood	1	44	0.15	Welded	Fremont Well	4294.1	4317.5
U. Lynnewood	2	45	0.15	Welded	Lynnewood BPS	4428.7	4452.0
Melrose	1	79	0.76	Welded	Melrose BPS	4293.5	4312.9
Moyina Lower	3	68	0.13	Welded	Gravity fill from Patterson L. Moyina	4439.6	4464.6
Moyina Upper	4	63 refurbished 2007	0.29	Welded	Moyina BPS	4553.0	4576.0
North	1	90	0.50	Riveted	Conger Well Fremont Well	4283.1	4311.1
Ogden	1	43	1.02	Welded	6th Street BPS	4295.6	4318.6
Patterson #1	3	43	0.41	Welded	Beverly BPS Ogden BPS	4492.0	4511.5
Patterson #2	3	20	1.31	Welded	Beverly BPS Ogden BPS	4492.0	4514.5
Prescott	2	23	1.47	Welded	Lytton Booster	4303.5	4403.5
Stewart Lenox	2	11	1.24	Concrete	Balsam Well Debbie Well	4370.0	4394.5
Tanglewood	8	58	0.29	Welded	Laguna BPS	4978.5	5002.0
Uhrmann	3	20	1.32	Welded	Wocus Well Birch BPS	4481.7	4512.1

Table 1-8. Pressure Regulating Stations

Pressure Zone	Supply Zone	Size (inches)	Station Location	Pressure Setting (psi) Inlet[a]	Outlet[b]
Zone 1 West Klamath Reduced	2	6 and 2	Weyerhaeuser Rd / Highway 66	78	42
		2	Douglas / Granite (serves only a few homes)	98	54
Zone 1 Main Central (Harbor Isles Area) [c]	2	6	Lakeport Blvd / Quarry St (purpose is solely for fire backup to area)	73	42
Zone 2 Mollie's Area Reduced (Dan O'Brien Way)	3	8	Highway 97 / Dan O'Brien Rd.	145	76
Zone 2 Eldorado Reduced	3	6	Eldorado / Sloan	110	46
		4	N. Pacific Terrace / Van Ness	88	44
		2	Lowell / Pacific Terrace	110	50
Zone 2 Old Fort Road Reduced (South Hillside Area)	3	4	Dixon / Damont	120	62
		4	Hillside / Auburn	115	48
Zone 2 North Hills Reduced	3	4	Homedale / Foothills Blvd.	92	60
		6	Spring Crest / Madison	96	60
		8 and 3	Shasta View Blvd.	120	70
Zone 2 Moyina Reduced	3	2	Katie Lane	120	84
		4	Carlson / Valhalla	104	78
Zone 2 Ogden Reduced	3	2	Ogden Booster Station	106	72
Zone 2 Katie Lane Reduced	3	6 and 2	Katie Lane/Patterson Street	120	84
Zone 3 Upper Moyina Reduced	4	4	Climax / Kimberly Dr.	84	64

a Maximum pressure of the zone from which the PRV is served (the effective elevation of the PRV), expressed in pounds/square inch (psi)
b. Pressure of the PRV on the reduced-pressure side, expressed in psi
c. Pressure sustaining station

Table 1-9. Inventory of Water Mains by Length, Size, and Material

Diameter (inches)	Length of Pipe (feet) Asbestos cement	Cast iron	Ductile iron	Polyvinyl Chloride	Steel	Unknown	Total	%
2	1,189.8	1,291.9	17.9	15,145.0	102,959.2	730.3	**121,334.1**	*8.7%*
4	13,711.7	148,948.6	1,185.6	28,659.7	13,680.7	1,580.4	**207,766.7**	*15.0%*
6	139,891.2	123,776.8	3,922.0	63,410.6	6,387.2	2,392.5	**339,780.3**	*24.5%*
8	77,488.2	48,041.9	7,925.3	187,979.6	5,505.2	3,666.7	**330,556.9**	*23.8%*
10	2,071.8	16,305.3	409.7	6,280.1	16,436.8	6,892.5	**48,395.2**	*3.5%*
12	67,526.2	35,950.9	48,270.9	109,974.1	4,851.4	2,232.7	**268,806.2**	*19.4%*
16	5,003.4	7,303.2	42,016.2	13,885.6	456.8	149.8	**68,815.2**	*5.0%*
20	---	651.7	2,720.3	---	---	259.8	**3,631.8**	*0.3%*
Total (ft)	**306,842.3**	**382,270.3**	**106,467.9**	**425,334.7**	**150,276.3**	**17,904.7**	**1,389,096.2**	***100%***
%	*22.1%*	*27.5%*	*7.7%*	*30.6%*	*10.8%*	*1.3%*	***100%***	

2. ASSET CONDITION ASSESSMENT

The water system asset condition assessment presented in this water system plan update addresses the Conger Wellfield, all 24 booster stations, and twenty of the system's twenty-one storage tanks. This included all of the system's steel tanks; the newest (2007) storage tank in the system, the Stewart-Lennox buried concrete reservoir was not included The assessments data is a compilation of field assessment for the *2018 Water Storage Seismic Vulnerability, Security, and Condition Evaluation* (BergerABAM, 2018) (Appendix B) and field site visits conducted for this water system plan update.

2.1 CONGER WELLFIELD AND TRANSMISSION

The Conger Wellfield provides 80% of the City's water demand. From the wellfield water can be directed the Center Tanks, the distribution system, or simultaneously to both. The transmission pipelines are 16- and 20-inch cast iron. The condition of the pipelines is unknown and was not observed. There has been no operational indication that there is an issue with the integrity of the pipelines.

The wellhouses at the at Conger Wellfield are all CMU construction with an externally accessed separate room for chlorine storage. All of the wellhouses have been constructed to a previous seismic standard. There is on-site backup power generation available to the two largest wells. The wellfield is fully fenced at the perimeter and each of the wellhouses is in good condition. Appendix C provides a photo log of the wellfield's assets condition. While security at the wellhouses is less than adequate for facilities of this type and criticality, there is no history of significant malevolent intrusion.

2.2 DISTRIBUTION STORAGE

The City operates and maintains 22 potable water storage facilities varying in size from 0.13 million gallons (MG) to 1.47 MG and in age from 23 to 90 years in service. This includes 21 steel tanks and one concrete tank. Of all the assets, only the Basin View Tank was designed according to current seismic code; the Prescott Tank was designed to a previous seismic code. Although City staff has done an exceptional job maintaining these facilities, age has taken its toll; even well-maintained, functional assets become obsolete and expensive to maintain. The City is experiencing the result of this aging through continued noted vulnerabilities reported by the regular Oregon Health Authority (OHA) water system surveys (formerly referred to as Sanitary Surveys).

The condition assessment of the twenty storage tanks included security, seismic resilience (addressed in Section 8) and appurtenance, coating, and corrosion evaluations all conducted by field investigation and review of available dive video footage provided by the City. In addition to asset assessment, the field evaluations addressed general site conditions, adequacy of maintenance space, drainage, erosion, and all-season accessibility.

The inspection of tank appurtenances included a review of the following:

- External ladder
- Internal Ladder
- Roof safety railings
- Roof arrest system
- Shell manway access
- Silt stops
- Vents
- Vent screens
- Overflow piping
- Roof access hatch
- Roof drainage
- Roof water tightness
- Inlet/outlet
- Operational level gauge

Tank coatings were evaluated for the following:

- Chalking
- Chipping
- Crevice corrosion
- Coating loss
- Cathodic protection
- Surface corrosion
- Organic material growth
- Ponding
- Pitting
- Rust staining
- Coating thickness
- Wall thickness
- Coating adhesion

A summary of the storage tank condition assessment is provided here; the full report is included as Appendix B.

The basis of evaluation for appurtenance and coatings condition guidance included industry standard subjective visual and objective field tests to evaluate coating condition and wall thickness, AWWA Standard D100 for Welded Carbon Steel Tanks, AWWA Manual M42 for Steel Water Storage Tanks, the Oregon State Department of Water Resource requirements for public water systems, and the Occupational Safety and Health Agency worker safety requirements.

The exterior visual coatings evaluation consisted of determining the overall condition of the coating and exposed steel that could be viewed from the ground level and roof surfaces, viewing the interior from the roof access hatch and observing specific coating and corrosion defects. The coating characteristics were subjectively evaluated in the following manner, depending on the characteristic:

- Chalking
- Chipping
- Crevice Corrosion
- General Coating Losses
- General Surface Corrosion
- Organic Material Growth
- Ponding
- Pitting
- Rust Staining
- Coating Thickness
- Wall Thickness Measurements
- Coating Adhesion Testing
- Cathodic Protection System Testing
- Protective Current Requirement Testing

Findings are summarized in Table 2-1 and Table 2-2.

2.3 DISTRIBUTION BOOSTER STATIONS

The distribution booster stations site assessments were conducted on July 10-11, 2019. The overall condition of the booster stations varies from poor to new. All stations were operable and of acceptable

appearance. The most common issue was security measures at the sites. While there isn't any record of significant intrusion, security can typically be described as inadequate. Table 2-3 summarizes each asset's condition. Appendix D includes individual asset field notes and photo logs.

2.4 OPERATIONS CENTER

The City's Water Operations Center is located at 610 Market Street in the industrial warehouse section of the City. The Operation Center houses operations and maintenance staff and equipment. The facility is a converted former rail car repair building. It is a wood-framed, corrugated-steel-sided building constructed prior to current seismic codes. A structural analysis of the building was not conducted as part of this WMP. Generally, the building is in good condition and meets the needs of the utility at this time. Exterior and interior photos of the facility are shown in Figure 2-1.



Figure 2-1. Water Operations and Maintenance Facility

Table 2-1. Tank Code Compliance for Appurtenances

ASSET	External Ladder	Internal Ladder	Roof Safety Railings	Roof Arrest System	Shell Manway Access		Roof Access Hatch			Silt Stop		Vents		Vent Screens		Overflow Piping		Watertight Roof		Drainage	Access	Inlet/ Outlet	Level Gauge
	OSHA	OSHA	OSHA	OSHA	OSHA	AWWA	OHA	OSHA	AWWA	OHA	AWWA	OHA	AWWA	OHA	AWWA	OHA	AWWA	OHA	AWWA	AWWA	AWWA	OHA	Not Required
Basin View				Not required in addition to safety railing or other personal fall protection										A	A								
Bowen													(24)	B, D	B, D								
Burns													(24)			%	%			(1)			
Center East					(3)	(3)	(10)	(23)	(23)				(24)					%, 8,9	%	(6)			
Center West					(3)	(3)							(24)			(11)				(6)			
High					(3)	(3)	(10)					(16)	(16)	E	E					(6)			
Hilyard																%	%						
Hospital						(4)		(23)	(23)			(17)	(24)			%	%						
Lindley	(13)		(15)			(12)							(24)	%	%	%	%				N (14)		
Lynnwood Lower						(4)		(23)	(23)			(16)	(24)	C	C					(7)			
Lynnwood Upper						(4)		(23)	(23)	N (5)	N (5)	%	%	F	F	(25)	(25)			(1)			
Melrose					(3)	(3)	N	(23)	(23)	%	%		(24)	C	C	%	%			(7)			
Moyina Lower					It is recommended that no further investment be made in this asset																		
Moyina Upper						(20)												(18)		(7)			
North	(22)	(22)			(3)	(3)	N	(23)	(23)				(24)	B, D	B, D	%	%			(7)	(14)		
Ogden			(26)			(20)	(19)					(16)	(24)			Y				(1)			
Patterson #1						(4)	(10)			%	%		(24)							(7)			
Patterson #2																							
Prescott																							
Stewart Lennox	(27)		(27)		(27)	(27)				(27)	(27)												
Tanglewood								(23)	(23)				(24)	C	C	(21)	(21)			(7)	(14)		
Uhrmann																							

Absent
Present
Present, but inadequate, or incomplete

Notes:

1 Drainage not bad but could be improved
2 Not used
3 Only 1 shell manway having 20-inch diameter
4 Only 1 shell manway having 24-inch diameter
5 Appears to have holes at floor level per video
6 Poor drainage with debris up against tank
7 Poor drainage
8 Calking on steel roof plates around vent
9 Holes in telemetry box need to be plugged
10 Not sealed and size not code compliant
11 Inadequate repair at upper elbow
12 Two 24-inch diameter manways
13 Top rung above roof plate (tripping hazard)
14 Not graveled for all weather access
15 Could have larger working space
16 Does not prevent windblown rain and snow
17 Completely closed up with metal sheeting and non-functional
18 Conduit hole needs screened or plugged
19 Need hatch sealed on East roof manway
20 Only 1 shell manway having 30” diameter
21 Needs to have proper drainage away from tank
22 Ladder safety system required over 24’
23 Does not provide 30-inch obstruction-free headspace
24 Requires additional opening of 20 inches for use as vent
25 No flap secured barrier on outlet
26 Install side railing for added safety at ladder
27 Not applicable, buried tank
A Needs 24-mesh insect screen
B Need bird and animal screen
C Should be galvanized for durability
D Screen needs repair
E Screen not fully covering opening
F Screens not adequately protecting tank
% Cannot locate or cannot visually inspect

Table 2-2. Coatings Condition Assessment Summary

Asset	Coatings								Cathodic Protection and Internal Coating	Priority Action	Notes
	External	Internal Roof	Internal Dry Sidewalls	Internal Submerged Sidewalls	Internal Surface Corrosion	External Coating Adherence	Dry Film Thickness Average Range (mils)	Wall Thickness Range (mils)			
Basin View						Well Adhered	9-11.1	241-247	Installed, but no power to site.	2 yrs.	• Install cathodic protection within next 2 years • Cleaning during next maintenance cycle.
Bowen						Well Adhered	7.0-10.4	185-500	Coating in good condition	low	• Caulking of crevice seams. • Cleaning during next maintenance cycle.
Burns						Well Adhered	6.6-11.9	180-256	Coating in good condition	low	• Caulking of crevice seams and cleaning during next maintenance cycle. • Repair coating spot damage.
Center East						Poor	2.9-9.5	178-1000	Coating is thin and inadequate	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
Center West						Poor	3.1-7.6	198-1000	Coating is thin and inadequate	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
High						Poor	1.7-4.0	188-1000	Coating is thin and inadequate	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
Hilyard						Well Adhered	6.6-18.6	117-318	Coating in good condition	3-5 yrs.	• Inspect coating blistering during next maintenance cycle.
Hospital						Well Adhered	1.9-6.8	197-323	Coating is thin and inadequate	1-3 yrs.	• Coating removal, steel repair, and recoating may be warranted • Install cathodic protection
Lindley						Poor	2.7-16.2	186-246	Very poorly coated	2-5 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Coal tar coating should be removed and a new coating system should be installed. • Inspect steel surfaces. • Exterior coating should be removed and a new coating system applied. • Install cathodic protection.
Lynnwood Lower						Well Adhered	9.8-21.3	176-236	Coating in very good condition	1-3 yrs.	• Minor maintenance and coating spot repair
Lynnwood Upper						Well Adhered	9.9-17.9	172-242	Coating in very good condition	1-3 yrs.	• Minor maintenance and coating spot repair
Melrose						Poor	1.4-6.9	188-381	Coating is thin and inadequate	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
Moyina Lower	It is recommended that no further investment be made in this asset										
Moyina Upper						Well Adhered	9.5-18.0	131-254	Coating in very good condition	1-3 yrs.	• Spot repair of coating. • Caulk roof lap joints and beam/roof plate gaps.
North						Poor	1.9-4.0	197-388	Coating is thin and inadequate	3-5 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated.
Ogden						Well Adhered	0.8-4.0	186-439	Coating is fair	7-10 yrs.	• Interior coating needs to be removed and all surfaces should be properly prepared and coated. • Exterior sidewalls should be over-coated.
Patterson #1						Poor	3.5-6.8	239-247	Coating is thin and inadequate	3-5 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated.
Patterson #2						Well Adhered	5.9-12.4	234-373	Coating in good condition	1-3 yrs.	• Caulk roof joints
Prescott						Well Adhered	6.7-18.9	180-632	Coating in good condition	1-3 yrs.	• Coating spot repair and lap joins caulked
Stewart Lennox	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Tanglewood						Poor	0.8-12.0	194-259	Coating in good condition	3-5 yrs.	• Install cathodic protection • Exterior coating needs to be removed and all surfaces should be properly prepared and coated.
Uhrmann						Well Adhered	6.0-11.2	236-373	Coating in good condition	Low	• Coating spot repair and lap joins caulked

Good condition
Poor condition or absent, requiring priority attention
Adequate, requires attention at next schedule maintenance

Notes:
1. Buried tank, not applicable.

Table 2-3. Booster Station Condition Assessment Summary

	Construction		Condition						Security						Overall
Asset	Building	Roof	Building	Roof	Communication	Doors	Windows	Pumps	Locks	Doors	Windows	Perimeter Fencing	Alarms	Surveillance	Condition
Basin View	Hydronics Vault	Fiberglass	V. Good	Good	Yes	None	None	V. Good	Padlock	None	N/A	No	None	None	V. Good
Beverly	Hydronics Vault	Fiberglass	Good	Good	Yes	Good	None	Good	Padlock	Integrated	N/A	No	None	None	V. Good
Birch	Brick Masonry	Metal Lift-off	Good	Good	Yes	Good	Good	Good	Commercial	Commercial Steel	Three windows steel plates in place of panes. Internally secured	No	None	None	Fair
Burns	Co-located with Beverly														V. Good
Center	Brick Masonry	Concrete - attached to tank	Poor	Poor	Yes	Poor	None	Fair	Residential	Wood Residential	N/A	No	None	None	Poor
Crown Ridge	N/A	Steel Access Hatch	N/A	V. Good	Yes	Good	None	V. Good	Padlock	Steel hinged hatch	N/A	No	None	None	V. Good
Dayton	CMU	Metal	Good	Good	Yes	Good	None	Good	Commercial	Commercial Steel	Vent screen, no windows	No	None	None	Good
ESI	Hydronics Vault	Fiberglass	V. Good	V. Good	Yes	Good	None	V. Good	Padlock	Integrated with roof	N/A	No	None	None	V. Good
Havencrest	Hydronics Vault	Fiberglass	V. Good	Good	Yes	None	None	V. Good	Padlock	None	N/A	No	None	None	V. Good
High Level	Concrete	Concrete	Poor	Poor	Yes	Good	Fair	Good	Residential steel with large vertical sliding windows and screen	Good	Residential with external screen mesh	No	None	None	Poor
Link River	Architectural Block	Metal	Excellent	Excellent	Yes	Excellent	None	Excellent	Commercial	New steel and steel roll-up	No	No	None	None	Excellent
Lynnwood	CMU	Metal	Good	Good	Yes	Good	Poor	Fair	Commercial	Commercial Steel	External mesh	No	None	None	Fair
Lyton	Hydronics Vault	Fiberglass	V. Good	Good	Yes	None	None	V. Good	Padlock	None	N/A	No	None	None	V. Good
Melrose	CMU Vault	Hinged steel plate	Poor	Poor	Yes	None	None	Could not view - suspect	None	None	N/A	No	None	None	Poor
Moyina	CMU	Metal Lift-off	Fair	Fair	Yes	Good	None	Good	Commercial	Commercial Steel	N/A	No	None	None	Fair
Ogden	Composite Wood Steel Siding	Metal	Excellent	Excellent	Yes	Good	None	Good	Commercial	Commercial Steel	External steel mesh on vent opening	No	None	None	Fair
Pelican	Architect. Block	Metal	Excellent	Excellent	Yes	Excellent	None	Excellent	Commercial	New steel and steel roll-up	N/A	Yes	None	None	Excellent
Quail Ridge	N/A	Steel Access Hatch	N/A	V. Good	Yes	Good	None	V. Good	Padlock	Steel hinged hatch	N/A	No	None	None	V. Good
Riverside	CMU	Metal	Good	Good	Yes	Good	Poor	Fair	Commercial grade	Commercial Steel	External mesh	No	None	None	Good
Sierra Heights	CMU	Metal	Good	Good	Yes	Good	None	Good	Commercial	Commercial Steel	N/A	No	None	None	Excellent
South 6th	CMU	Metal	Good	Good	Yes	???	Poor	Good	Residential	Steel hollow core with residential grade with large screen window	Steel mesh on fan opening. Fan in window, not secure	No	None	None	Fair
Tanglewood	Brick Masonry	Concrete	Fair	Fair	Yes	Good	Poor	Fair	Commercial	Commercial Steel	External steel mesh on one side on bldg. Residential grade windows	No	None	None	Fair
Washburn	Architect. Block	Metal	Excellent	Excellent	Yes	Good	None	Excellent	Commercial	Commercial steel and steel rolling door	N/A	No	None	None	Excellent
West Oregon	Hydronics Vault	Fiberglass Split Top	V. Good	V. Good	Yes	V. Good	None	Fair	Padlock	Very Good	N/A	No	None	None	Good

New/Excellent
Very Good
Good
Fair
Poor

3. BASIC PLANNING DATA

Water demand projections are central to planning capital improvements and evaluating water resource needs. The planning information in this chapter is used throughout the WMP to assess current conditions and future requirements of the water system. This section summarizes current water demand and presents the methodology and results of water demand projections for the WMP's planning period.

3.1 ANALYSIS METHODOLOGY

City water demand is based on customer service meter data. Currently, this data is collected on a monthly basis and recorded approximately a month following production due to billing cycles. The City does not collect daily demand data and has no means of determining it from available data. The City is installing smart meters on all service meters, which will make more accurate demand tracking possible in the future.

The current monthly data collection allows calculation of average-day demand (ADD), but limits the ability to estimate maximum-day demand (MDD), peak-hour demand (PHD) and unaccounted-for water. These data points were estimated from the available data as follows:

- ADD was calculated as the total demand (in gallons) for a given year divided by 365 days to provide demand in gallons/day.
- MDD was approximated by identifying the maximum-demand month, which for the Klamath Falls regularly occurs in July, and dividing total demand in that month by 31 days. This does not provide a true MDD because averaging dampens the daily variations over the course of the month.
- Based on engineering judgment and characteristics of the City's water system, a peaking factor of 1.8 was used to determine the PHD.

3.2 HISTORICAL WATER DEMAND MEASUREMENT AND PRODUCTION

3.2.1 Historical Annual Water Production and Demand

Comparing historical water production against demand is a basis for beginning to determine unaccounted-for water and estimating the ability of the system to produce enough water to meet demand. The City's water production is recorded daily. Annual water production data for the 2014 – 2018 period was compared to annual demand for the same period. Over that period, total annual production decreased by 3.6 percent and demand decreased by 5 percent. Figure 3-1 and Table 3-1 summarize that trend.

3.2.2 Historical Demand by Service Zone

Historical demand for the 2014 – 2018 period was allocated by service zone to provide an understanding of how demand was distributed across the service area. Table 3-2 shows that nearly 75 percent of all demand is attributed to the Main Zone. The remaining 25 percent of demand is distributed across the 22 other subzones. Of those, only four (Stewart Lenox/Lindley, Prescott, Hospital/Uhrmann, and Patterson) account for more than 2 percent of demand.

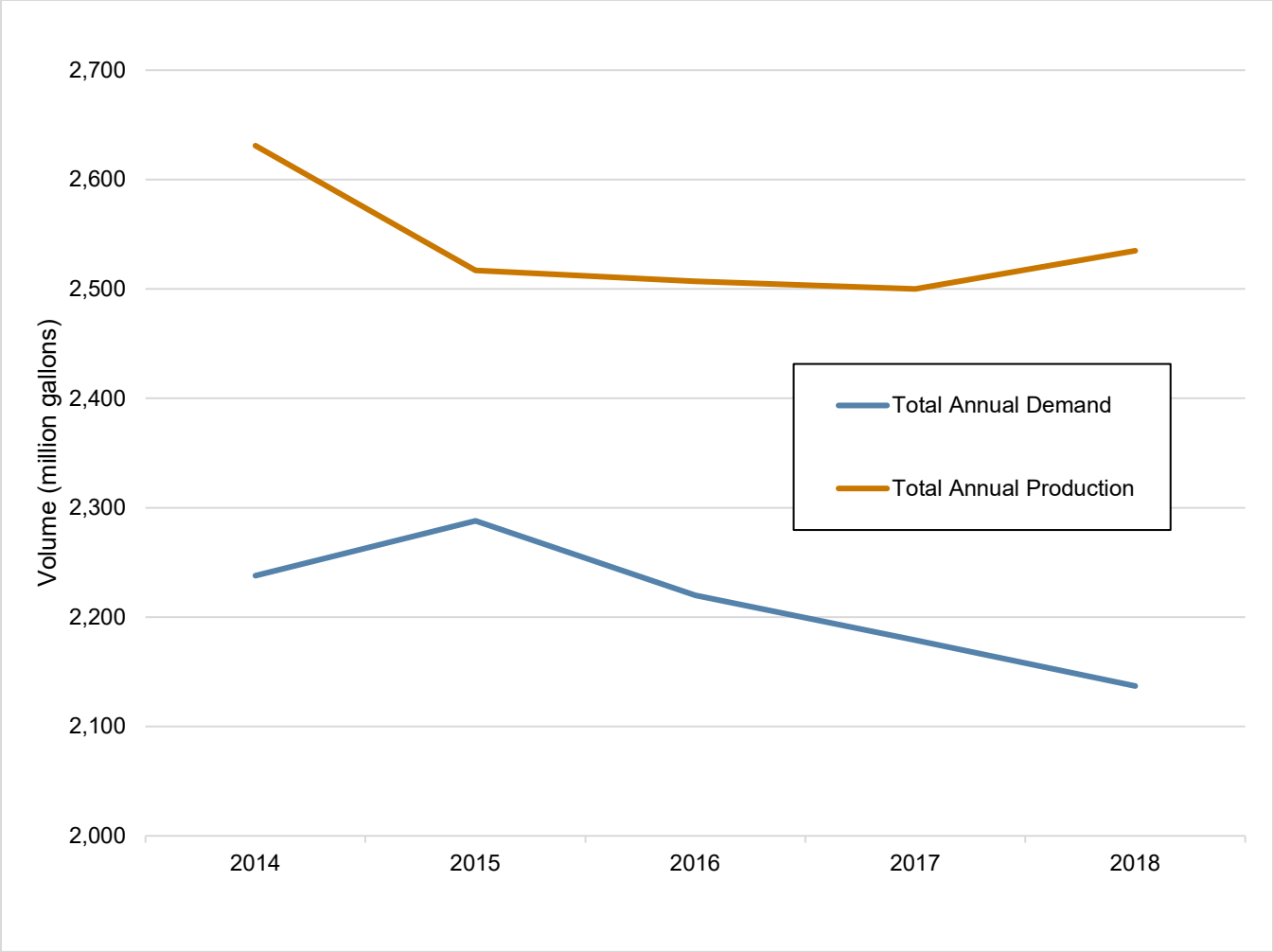


Figure 3-1. Historical Annual Demand and Production Comparison

Table 3-1. Historical Annual Demand and Production Comparison

	2014	2015	2016	2017	2018
Maximum-Day Demand (million gallons)[a]	10.31	10.71	11.4	11.04	11.62
Annual Average-Day Demand (million gallons)[b]	6.13	6.3	6.0	6.0	5.9
Peaking Factor	1.68	1.70	1.90	1.84	1.97
Total Annual Demand (million gallons)	2,238	2,288	2,220	2,179	2,137
Total Annual Production (million gallons)	2,631	2,517	2,507	2,500	2,535

a. Maximum-day demand is based on July demand divided by 31 days.
b. Annual average-day demand is based on the total annual demand divided by 365 days.

Table 3-2. 2014 - 2018 Annual Demand by Service Zone

Subzone	Annual ADD Metered Water (million gallons)					
	2014	2015	2016	2017	2018	2018 % of Total
ZONE 1						
Main (Central, South and East)	1,685.41	1,716.86	1,651.54	1,650.29	1,604.60	74.78
West Klamath Reduced	25.66	26.97	26.54	19.12	39.12	1.79
ZONE 2						
Stewart Lenox / Lindley	69.66	73.02	75.31	73.09	67.57	3.18
Upper Lynnewood	11.47	10.78	10.98	10.07	10.20	0.48
West Oregon	6.66	6.92	7.18	7.05	6.78	0.32
Mollie's Area Reduced	14.07	14.89	15.95	14.72	12.28	0.56
Prescott	58.82	60.00	58.12	57.51	53.97	2.51
Sierra Heights	6.93	7.30	6.84	7.45	6.56	0.31
Eldorado Reduced	30.12	30.79	28.34	28.67	25.77	1.23
Old Fort Road Reduced	7.63	7.30	7.41	7.39	6.73	0.32
North Hills Reduced	23.03	22.14	22.87	20.95	19.84	0.94
Moyina Reduced	13.20	12.97	13.20	12.98	12.39	0.60
Ogden Reduced	3.60	3.60	3.57	3.35	3.36	0.16
Katie Lane Reduced	6.55	6.71	6.40	5.88	5.50	0.27
ZONE 3						
Hospital/Uhrmann	136.65	145.36	144.26	125.87	132.66	6.23
Patterson	63.47	65.41	67.05	64.61	61.66	3.01
Upper Moyina Reduced	8.16	8.39	8.16	7.33	7.02	0.34
ZONE 4						
ESI	7.32	8.54	8.74	7.86	7.45	0.35
Crown Ridge Boosted	9.12	8.93	8.29	8.17	7.72	0.37
Havencrest and Upper Moyina	37.42	36.69	35.79	33.21	32.19	1.55
ZONE 5						
Basin View	5.36	7.01	6.63	6.17	6.04	0.31
ZONE 8						
Tanglewood	7.45	7.78	7.32	7.34	8.11	0.38
Total	**2,237.8**	**2,288.4**	**2,220.5**	**2,179.1**	**2,137.5**	**100.0**

3.3 EXISTING DEMAND

3.3.1 Distribution by Customer Class

The City categorizes water demand under five customer account classifications: commercial, industrial, irrigation, multi-family residential, and single-family residential. Table 3-3 summarizes water demand by customer class for 2018. In addition to showing overall demand, the table shows the number of equivalent residential units (ERUs) in each customer class. An ERU is defined as the annual ADD used by a typical single-family residential service. It is calculated as the annual ADD for all single-family services divided by the number of single-family services. For 2018, this value was 240 gallons per day per service. Dividing the total ADD of other customer classes by this value defines those classes in equivalent residential units, effectively indicating how many single-family services would use the same quantity of water as the services in that customer class.

The data show that water demand in Klamath Falls is driven by residential use. Single-family residential use accounts for 57 percent of demand. Commercial users account for another 32 percent of demand. Multi-family accounts make up 9 percent of demand. Although an individual industrial or irrigation user can have a dramatic impact on demand, these classifications overall account for only 3 percent of demand.

Table 3-3. 2018 Demand by Customer Account Classification

Customer Class	No. of Services	Minimum-Day Demand (MG) [a]	MDD (MG) [b]	Annual ADD (MG) [c]	ADD Per Single-Family Residence (gallons)	ERUs[e]	Percentage of Total ERUs
Commercial	1,221	1.08	3.72	1.85		7,699	32%
Industrial	2	0.03	0.18	0.03		125	1%
Irrigation	169	0.005	0.41	0.14		583	2%
Multi-Family Residential	298	0.44	0.88	0.52		2,164	9%
Single-Family Residential	13,859	1.911	7.66	3.33	240[d]	13,859	57%
Total	**15,549**	**3.47**	**11.62**	**5.88**		**24,430**	**100%**

a. Minimum-day demand is based on the average demand in the month of February 2018.
b. Maximum day demand is based on the average demand in the month of July 2018.
c. Average day demand is based on the total 2018 annual demand divided by 365.
d. ADD per single-family residence is used in the calculation of ERUs for all other customer classes.
e. Single-family ERU value is equal to the number of services. ERUs for all other customer classes are calculated by dividing the customer class annual ADD by the ADD per single-family residence (240 gallons).

3.3.2 High-Demand Users

Table 3-4 lists the 10 highest water demand users in the water service area for 2017. Data for 2018 was unavailable at the time of this report. The highest demand user, the Wastewater Co-Gen Makeup Water, accounted for only 4.5 percent of total system demand. The demand of existing industrial and commercial users is relatively insignificant.

Table 3-4. Top 10 Water Users (2017)

Top 10 Water Users 2017	Customer Type	ADD (million gallons/day)
Wastewater Co-Gen Makeup Water	Commercial	0.26
Kingsley Field	Commercial/ Industrial	0.07
Jeld Wen Fiber	Commercial	0.06
Klamath County Jail	Commercial	0.05
City of Klamath Falls Wastewater	Commercial	0.05
Klamath Co-Generation Domestic Water	Commercial	0.04
Sky Lakes Medical Center	Commercial	0.04
Klamath County Fair Board	Commercial	0.03
Emerald Estates	Multi-Family	0.03
Aspen Mobile Village	Multi-Family	0.03

3.3.3 Fire Flow

Fire flow demand refers to the rate of water flow necessary to control fires within the service area. The water system should be designed to maintain a minimum pressure of 20 pounds per square inch (psi) at the point of fire flow delivery as well as throughout the system under MDD conditions.

The *Klamath Falls Public Works Engineering Standards* (Section 7-4.1.2) set requirements for fire flow (in gallons per minute (gpm)) and duration (in hours) in accordance with requirements set by the Oregon State Fire Marshall. The state requirements are based on the International Fire Code, with amendments authorized by the Oregon Revised Statute (ORS) 476.030 and in accordance with OAR Chapter 837, Division 40.

Table 3-5 summarizes fire flow requirements and standards for each customer classification. The fire flow requirements shown are the criteria used in the hydraulic analysis of the distribution system. Results of the hydraulic model identified areas that require improvement in order to meet fire flow demands.

Table 3-5. Fire Flow Requirements

Class	Minimum Pressure (psi)	Minimum Fire Flow (gpm)	Minimum Duration (minutes)
Residential Single-Family	20	1,500	120
Residential Multifamily	20	1,500	120
Commercial	20	2,500	180
Schools	20	2,500	180
Industrial	20	2,500	180

3.4 POPULATION FORECAST

3.4.1 Population Research Center Projections

Population projections produced by the Portland State Population Research Center (PSPRC) are the accepted standard forecasts for estimating growth in Oregon. The most recent PSPRC population forecast for Klamath County was published in June 2018. This data was used to project population growth through the 20-year planning horizon of this WMP.

The 2018 PSPRC Klamath County report provides county-wide projections as well as forecasts for the City of Klamath Falls UGB, other cities' UGBs, and county areas outside of the UGBs. The Klamath Falls UGB is the service area for the City's water system. Figure 3-2 and Table 3-6 show the PSPRC projected growth within the County.

Source Portland State Population Research Center

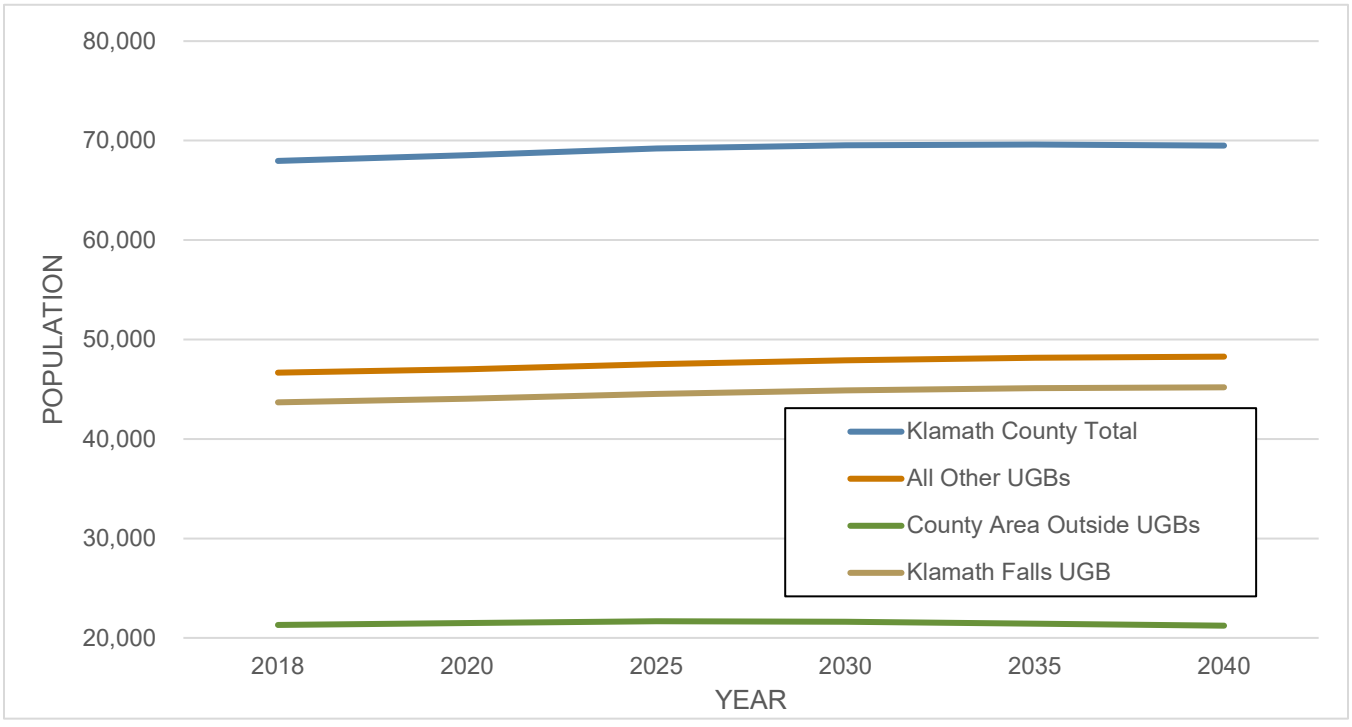


Figure 3-2. County and UGB Population Forecast

Table 3-6. PSPRC Population Forecast 2018-2040

Population Projection Area	2018	2020	2025	2030	2035	2040	Overall Growth	Annual Average Growth %
Klamath Falls UGB	43,684	44,040	44,531	44,888	45,102	45,194	2.55%	0.13
Merrill UGB	935	937	941	945	948	950	1.37%	0.07
Malin UGB	838	834	842	849	855	860	3.02%	0.15
Chiloquin UGB	770	766	763	768	780	791	3.16%	0.16
Bonanza UGB	441	445	452	464	474	483	7.87%	0.41
Areas Outside UGBs	21,288	21,506	21,674	21,631	21,446	21,230	-1.30%	-0.06
Klamath County Total	**67,957**	**68,528**	**69,203**	**69,545**	**69,604**	**69,509**	**1.41%**	**0.07**

The PSPRC estimates an increase in the populations of Klamath County and the Klamath Falls UGB of 981 and 1,154, respectively, by 2040. This projection includes a decline in Klamath County population during the last five years of the planning period. The Klamath Falls UGB is expected to make modest increases over the planning period.

3.4.2 Projected New Construction Development

In addition to overall growth in the Klamath Falls UGB, the potential distribution of the growth was evaluated based on anticipated development. Due to the slow nature of growth, only platted developments expected to be built during the 20-year planning period were assessed. These developments have a plan review process underway or have received tentative approval from the City or County. Table 1-3 summarizes anticipated development during the planning period.

There are currently 1,252 developable lots planned within the Klamath Falls UGB. The City Planning Department estimates that that 35 percent of those (444 lots) will be developed by 2040. Of those 444 lots, 291 have water service infrastructure (distribution mains and service connection to the property line) in place; the remaining 153 developable lots do not have distribution mains extended.

3.4.3 Non-Residential Growth

At the time of the development of this WMP, no known industrial, commercial or other type of high-demand users are planned to be added to, or subtracted from, the system. All additional demand is considered to come from population growth.

Water demand projections based on population and per capita demand were developed in order to determine the ability of the City's resources and production to meet future demand. Projections were developed as follows:

- Per capita ADD for 2018 was estimated by dividing the 2018 ADD (5.9 million gallons per day) by the 2018 population (43,684). The resulting per capita demand is 135 gallons.
- Per capita MDD was estimated by applying a 2.1 multiplier to the ADD and dividing by the 2018 population. The resulting per capita MDD is 266 gallons.
- To project demand, the 2018 per capita ADD and MDD were multiplied by projected population at 10-year intervals. Due to the anticipated limited growth, a more detailed evaluation was unnecessary.

As shown in Table 3-7 and Figure 3-3, current production meets the future demand. The City's production capacity and resource availability far exceed even MDD throughout the planning period. Production capacity and availability are capable of meeting the demand of unanticipated large industrial users should the opportunity become available.

Table 3-7. Demand and Production Capacity

	2018	2030	2040
Demand			
Average-Day Demand (gallons/day)	5,897,340	6,059,880	6,101,190
Maximum-Day Demand (gallons/day)	11,620,000	11,940,208	12,021,604
Production/Capacity			
Reliable Production (gallons/day)		27,300,000	
Full Capacity (Total Water Rights) (gallons/day)		36,950,000	

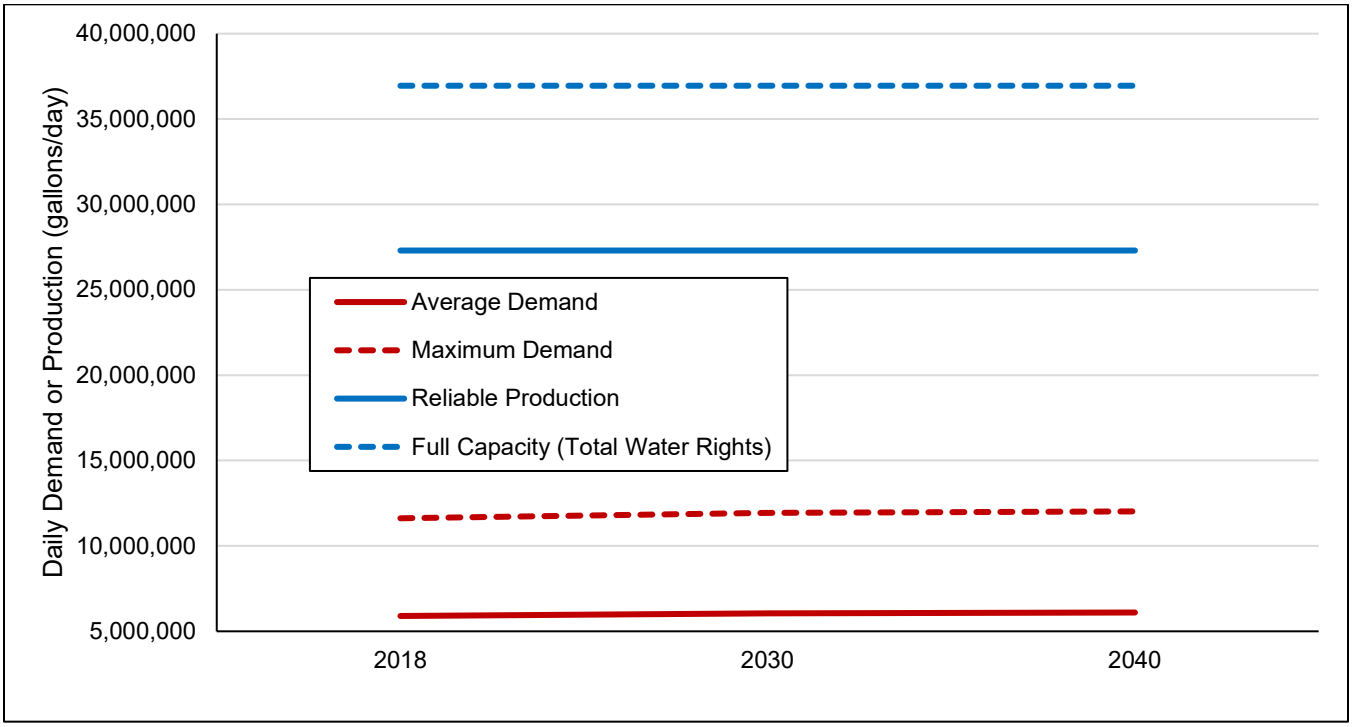


Figure 3-3. Demand and Production Capacity in Million Gallons Per Day

3.5 WATER LOSS

System water loss is defined as the difference between metered production and metered sales. These losses are divided into two categories:

- **Non-revenue losses** represent water that can be tracked and quantified but is not billed, such as operational, flushing, and construction use.
- **Unaccounted-for water** represents unbilled water that cannot be tracked, such as fire-fighting, leaks, main breaks, metering inaccuracies, illegal connections, and other types of unmetered water use.

Historically, total water loss had reached 21 percent of production and a method of discerning between non-revenue losses and unaccounted-for-water was not available. Beginning in 2010, the City instituted an ongoing program to replace old and outdated meters with more accurate meters and a systematic internal leak detection program. Subsequent data reflects these steps to reduce unaccounted-for-water, as production decreased in 2015 even as demand peaked.

The data shows that a renewed focus on unaccounted-for-water is warranted, as demand has steadily decreased between 2015 and 2018, but production was essentially flat between 2015 and 2017 and increased in 2018. Based on the comparison between production and demand for the 2014 – 2018 data period, the City has reduced total water loss to 15 percent. Figure 3-4 shows the 2014 – 2018 annual demand and production and the total water loss. The total water loss was reduced to a minimum of 9 percent in 2015. Unaccounted-for water gradually increased after that to 15 percent by 2018.

The City is in the process of system-wide implementation of smart service meters. The real-time data available from the smart meters will provide a tool for better identifying the cause of, and rectifying, both non-revenue water and unaccounted for water.

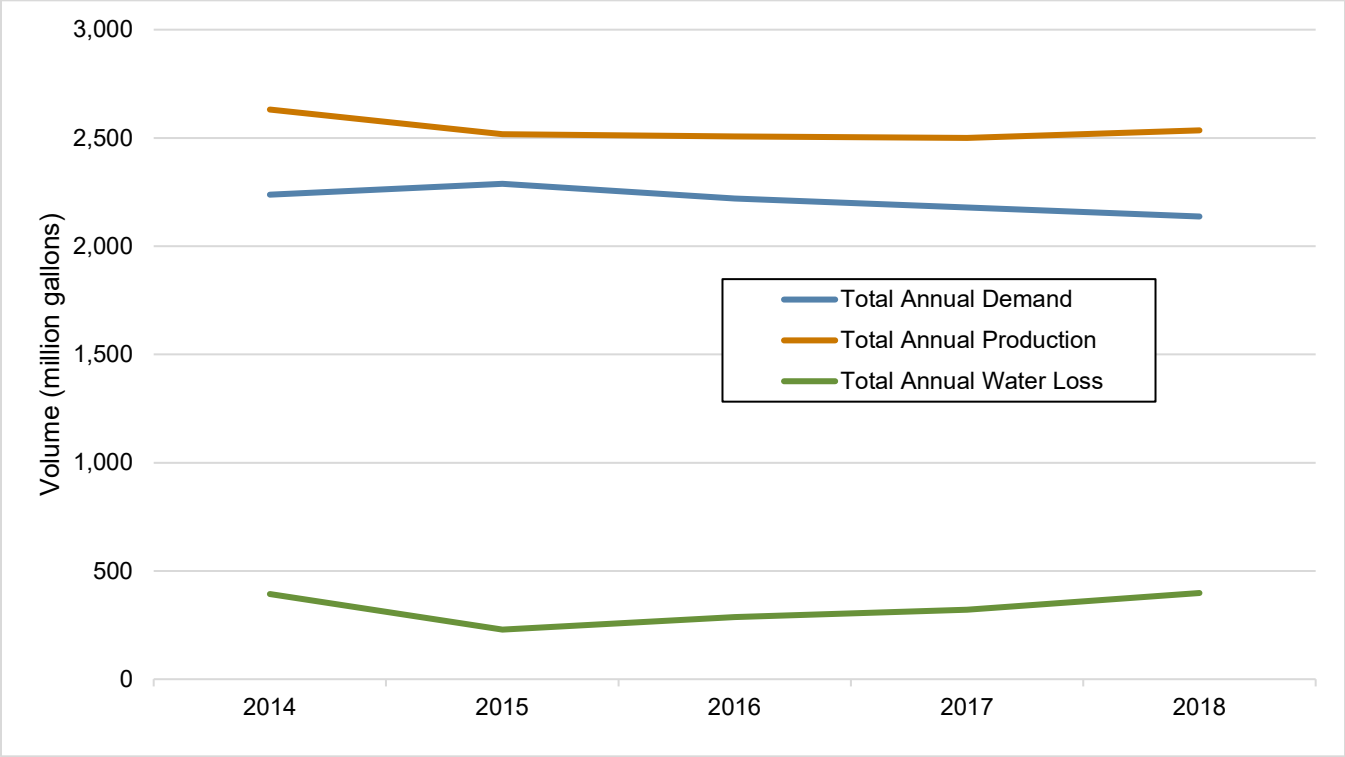


Figure 3-4. 2014 – 2018 Annual Demand, Production and Total Water Loss

4. SYSTEM ANALYSIS

The hydraulic analysis for this water master plan used modeling to evaluate the ability of the water system to provide required fire flows and service pressures. The model was used to evaluate the hydraulic capacity of the existing system and to identify system improvements to increase capacity as needed. This chapter outlines the approach and assumptions used in analyzing the distribution system and the findings of the analysis.

4.1 MODEL CONFIGURATION

Innovyze's InfoWater (version 12.4) was used for the hydraulic analysis of the water distribution system. The City maintains a hydraulic model of its water distribution network. The City's model, last calibrated in 2010, was the starting point for the analysis. For this update, the pipe network and calibration were reviewed and updated.

As a representation of the real system, the hydraulic model includes assumptions and simplifications based on the availability of data. Some data, such as ground elevation and pipe diameter, have little uncertainty. Other data, such as pipe friction, represent greater uncertainty and were adjusted as needed during calibration of the model. Actual system pressures and fire flows may vary from the model results, depending on the system, field conditions, and actual diurnal demand patterns.

4.1.1 Model Network

The existing pipe network was reviewed and compared to system modifications reported by the City. Water main modifications since the last plan were updated in the model. Also added to the model was the Pelican Booster, which went online in 2019 to serve the Main Central pressure zone.

4.1.2 Model Demand

The aggregate magnitude of demand used in the model is presented in Chapter 3 and summarized as follows:

- 2018 Maximum-Day Demand—8,070 gallons per minute (11.6 million gallons per day)
- 2018 Peak-Hour Demand—14,440 gallons per minute (20.8 million gallons per day)

A geographic distribution of demand was developed based on Klamath Falls' August 2017 demand data by individual parcel.

4.1.3 System Settings

The initial settings for pumps, tanks, pipes, and valves from the existing model were used for this analysis. See Appendix E for details.

4.1.4 Hydrant Testing and Model Calibration

Calibration of the updated model started with measurements of pressure and energy loss in the system. City utility staff collected hydrant flow and pressure data at six hydrant test locations as shown in Figure 4-1 (figures are included at the end of this chapter). Hydrant testing at each location proceeded as follows:

- Crews measured the static pressure (pressure with no flow through the hydrant) at two closed hydrants.
- Crews opened one hydrant (the "flow hydrant") and recorded the flow at that hydrant and the pressure at the other hydrant (the "residual hydrant"). The pressure at the residual hydrant while the flow hydrant is open is called the residual pressure.
- During the tests, a pressure drop (the difference between the residual and static pressures at the residual hydrant) of at least 10 psi was targeted to reduce uncertainty in the measurements.
- Crews recorded data on boundary conditions—such as well and booster station operation and reservoir levels—during the hydrant flow tests.

Static pressures were calibrated using the static pressures measured at the residual hydrant and the recorded boundary conditions. The static pressures were considered calibrated when the measured and modeled static pressures were within 5 psi. Residual pressures at the residual hydrant also were calibrated to a goal of model values being with 5 psi of the field-measured pressures.

Energy losses in the system were calibrated by matching the pressure drop at the residual hydrant. Measured flow at the flow hydrant was entered into the model and the roughness coefficient was adjusted until the measured and modeled pressure drops were similar. The acceptable variance between the measured and modeled pressure drops was 5 psi. To complete the calibration, "C" factor adjustments were made within the range of 100 to 140 and the elevation of the Bowen reservoir was corrected.

The hydrant test results are summarized in Table 4-1.

4.2 EVALUATION CRITERIA

Prior to analysis of the system, evaluation criteria were developed, as summarized in Table 4-2.

4.3 EVALUATION OF EXISTING SYSTEM

4.3.1 System Analysis

The existing system analysis included all pipes, pumps, tanks, and wells currently in the Klamath Falls system. The system model was run in the static (steady-state) mode under appropriate scenarios to compare pressure, velocity, and available fire flow results against the design criteria. Appendix E summarizes assumptions pertaining to valve settings and reservoir levels. Model scenarios were run for the existing system to evaluate the following:

- Pressures at PHD
- Fire flow at MDD
- Pipe flow velocity at PHD

Table 4-1. Summary of Hydrant Calibration Results

Run No.	Pressure Zone	Test Location	Time	Date	Flow Hydrant				Residual Hydrant							
					Field Data		Model Data	Difference between Observed and Modeled Static Pressures (psi)	Field Data			Model Data			Difference between Observed and Modeled Pressure Drops (psi)	Difference between Observed and Modeled Residual Pressures (psi)
					Static Pressure (psi	Flow (gpm)	Static Pressure (psi)		Static Pressure (psi)	Residual Pressure (psi)	Pressure Drop (psi)	Static pressure (psi)	Residual Pressure (psi)	Pressure Drop (psi)		
1	Hospital/ Uhrmann	Jade Terrace Crystal Terrace	8:40 AM	7/24/19	31	1098	33	-2	36	32	4	34	30	4	0	2
2	Hospital/ Uhrmann	Jade Terrace Crystal Terrace	8:50 AM	7/24/19	29	1047	34	-5	36	30	6	34	26	8	-3	4
1	Main Central	Lynnewood Lakeshore[a]	6:45 AM	7/18/19	68	1813	68	0	60	36	24	58	35	23	1	1
2	Main Central	Lynnewood Lakeshore[a]	6:45 AM	7/18/19	68	1688	68	0	58	32	26	58	30	28	-2	2
1	Main Central	Siskiyou Hytton	7:05 AM	7/18/19	36	1517	35	1	30	26	4	27	24	2	2	2
2	Main Central	Siskiyou Hytton	7:05 AM	7/18/19	36	1405	36	0	28	22	6	28	25	2	4	-3
1	Main Central	Esplanade Earle[b]	10:55 AM	9/24/19	57		55	3	38			36				
1	Main South	Altamont	8:12 AM	6/11/19	90	2455	90	0	87	80	7	89	83	6	-3	1
1	Main South	Washburn 3600	6:40 AM	6/8/17	97	2365	97	0	97	87	10	97	87	10	0	0

a. Suspect partially closed valve from Lower Lynnewood Tank. Large minor losses added to simulate hydrant test results.
b. Retest, only static pressures calibrated

Table 4-2. Evaluation Criteria

Criteria	Value
Residential Fire Flow Requirement	1,500 gallons/minute
Commercial Fire Flow Requirement	2,500 gallons/minute
Maximum Flow Velocity @ Peak-Hour Demand	7.0 feet/second
Minimum Pressure @ Peak-Hour Demand	40 pounds/square inch
Minimum Pressure @ Maximum-Day Demand + Fire Flow	20 pounds/square inch
Maximum Pressure @ Peak-Hour Demand without PRVs for Individual Services	105 pounds/square inch

4.3.2 Results

The results and deficiencies discussed below are independent of ongoing programs that may exist for annual replacement of undersized water lines (4 inches and smaller) or water lines made of undesirable materials (asbestos concrete, unlined cast iron, steel, etc.).

Pressure at PHD

Pressure deficiencies were assessed by modeling PHD conditions and looking for system operating pressures below 40 psi, the City's minimum level of service pressure target. Areas that exhibited low pressures typically were in the immediate vicinity of reservoirs and pumps and did not affect residential services, with the exception of the area in the Main Central Zone just west of the West Oregon Zone and the area just west of the Prescott Zone as shown in Figure 4-2. Detailed results are provided in Appendix F.

The modeling also identified a few areas of the City where system pressures are high—exceeding 105 psi.

Fire Flow at MDD

Under MDD conditions, analysis revealed that the distribution system has many areas that do not achieve required fire flow of 1,500 gpm for residential or 2,500 gpm for commercial, as shown in Figure 4-3. Detailed results are provided in Appendix G.

Most of the fire flow deficiencies identified by the modeling of the existing system are associated with 4-inch distribution mains. In the West Oregon and Prescott Zones, undersized pumps compound fire flow deficiencies.

Dead end deficiencies in the existing system are shown in Figure 4-4; dead ends are excluded from subsequent fire flow figures in this chapter.

Flow Velocity at PHD

Velocities exceeding the 7-foot-per-second criterion for peak hour demand were flagged. A few short pipes exceeded this velocity by less than 1 foot per second. These issues could not be fixed with reasonable upsizing, and no further recommendations were made. No further velocity issues were identified.

4.3.3 Recommendations

A significant amount of 4-inch water main is present throughout the system. Water mains smaller than 6 inches are not appropriate for meeting fire flow requirements. This report recommends the eventual replacement of all 4-inch and smaller mains where required to meet fire flow requirements. Table 4-3 lists the location of pipes to be replaced in a first phase, along with the length and diameter of the proposed replacement pipes. Figure 4-5 shows the location of these Phase 1 improvements. The improvements are prioritized by the severity of the fire flow deficit in each area. These improvements also improve the pressure deficiencies identified. One additional Priority 1 improvement is to replace the West Oregon Pump to address the inadequate capacity of the existing pump.

In addition to the prioritized Phase 1 improvements, dead end mains should generally be looped to allow for sufficient pipe conveyance; however, specific recommendations are not included. Similarly, wherever distribution system pressure exceeds 105 psi at PHD, individual service PRVs should be used to reduce pressures to customers.

Table 4-3. Phase 1 Pipe Upgrades to Meet Fire Flow Requirements

Street	Length (feet)	Diameter (inches)	Street	Length (feet)	Diameter (inches)
PRIORITY 1					
101. Hospital/ Uhrmann Pressure Zone; South					
Hillside Avenue	1530	8	Loma Linda Drive	2130	8
Laguna Street	1560	8	Melrose Street	520	8
Linda Vista Drive	1330	8			
102. Main Central Pressure Zone; West					
Lakeshore Drive	2660	8			
103. Moyina Reduced Pressure Zone					
Bryant Avenue	1100	8	Patterson Street	340	8
Chinchalla Way	310	8	PRV	450	8
Climax Avenue	1370	8			
104. Stewart Lenox/Lindley Pressure Zone; Annex					
Butte Street	630	6	Highway 66	2700	12
Butte Street	1310	8			
105. Upper Moyina Pressure Zone					
Eberlein Avenue	650	8	Kimberly Drive	1540	8
Hilton Drive	1020	8	Kimberly Drive	2780	10
Kimberly Court	280	8	Tamara Drive	470	8
106. West Klamath Reduced Pressure Zone					
Weyerhaeuser Road	1770	8	Weyerhaeuser Road	810	12
PRIORITY 2					
107. Main Central Pressure Zone; East of Prescott					
11th Street	2580	8	Klamath Avenue	820	8
5th Street	620	8	Leroy Street	680	8
9th Street	490	8	Lookout Avenue	1090	8
Broad Avenue	1150	8	Lowell Street	610	8
Canby Street	480	8	Manzanita Street	1190	8
Commercial Street	1960	8	Melrose Street	540	8
Crater Lake Pkwy	1050	8	Monclaire Street	400	8
Crescent Avenue	3840	8	Oregon Avenue	3280	8
Cross Crater Lake Pkwy	610	8	Pacific Terrace Avenue	930	8
Cross Street	240	8	Prospect Street	240	8
Delta Street	650	8	Rose Street	350	8
Delta Street	720	12	Upham Street	1170	8
East Street	280	8	Upham Street	220	12
Eldorado Avenue	2210	8	Washington Street	360	8
Elm Avenue	370	8	Worden Avenue	1150	8
High Street	690	8			

Street	Length (feet)	Diameter (inches)	Street	Length (feet)	Diameter (inches)
108. Main Central Pressure Zone; West of Prescott					
Delta Street	180	8	Siskiyou Street	430	8
Doty Street	490	8	Siskiyou Street	1310	8
Oregon Avenue	890	8	Uerlings Street	370	8
Roosevelt Street	370	8			
109. Main South Pressure Zone; Washburn					
Bartlett Avenue	370	8	Mazama Drive	1230	8
Highland Way	240	8	Off-Road	830	8
Hope Street	860	8	Summers Lane	3640	8
110. Prescott Pressure Zone					
5th Street	310	12	Lakeview Avenue	1950	12
6th Street	1360	12	Last Street	640	8
7th Street	320	12	Lincoln Street	320	12
8th Street	330	8	Longview Avenue	950	8
8th Street	260	12	Lytton Street	420	8
Addison Street	1000	8	Lytton Street	680	12
Addison Street/ Academy Street	1690	12	Mt Whitney Street	370	8
Between Grant Street and Lincoln Street	320	8	Mt Whitney Street	330	12
Biehn Street	560	12	Prescott Street	1170	12
Delta Street	270	12	Sargent Avenue/Lytton Street	2050	8
Doty Street	290	8	Shelley Street	1100	8
Doty Street	370	12	Siskiyou Street	520	8
Hawthorne Street/ Biehn Street	790	8	Upham Street	130	8
Holabird Avenue	360	8	Van Ness Street	720	8
Iowa Street	1200	12	Worden Avenue	1290	8
111. Main East Pressure Zone; 6th Street					
6th Street	1300	8	Maryland Avenue	650	8
Boardman Avenue	660	8	Nile Street	940	8
Crest Street	100	8	Onyx Avenue	660	8
Delaware Avenue	1410	8	Peck Drive	330	8
Dennis Drive	730	8	Simmers Avenue	500	8
Gettle Street	1600	8	Summers Ln	2600	8
Hager Ln	240	8	Thompson Avenue	720	8
Hilyard Avenue	830	8	Walton Drive	760	8
Homedale Road	1510	8	Windsor Avenue	530	8
Hope Street	1350	8			
112. Stewart Lenox/Lindley Pressure Zone; North					
Cypress Avenue	560	12	Lippincott Avenue	280	8
Frontage Road	1180	12	Minnesota Avenue	180	8
Lewis Street	1150	12	Riverdale Drive	5050	12
Lindley Way	310	8	Rogers Avenue	1190	8
113. Upper Moyina Reduced Pressure Zone					
Climax Avenue	660	8	Kimberly Court	190	8
Cottage Avenue	1390	8	Unity Street	540	8

Street	Length (feet)	Diameter (inches)	Street	Length (feet)	Diameter (inches)
PRIORITY 3					
114. Eldorado Reduced Pressure Zone					
Dahlia Street/Eldorado Avenue	2340	8	Painter Street	710	8
Pacific Terrace Avenue	1450	8	Sloan Street	230	8
115. Main Central Pressure Zone; East of Railroad, South of Highway 39					
Burns Street	700	8	Michigan Avenue	190	8
Darrow Avenue	550	8	Mitchell Street	340	8
Division Street	1600	8	Mortimer Street	400	8
Eldorado Avenue	1650	8	Oak Avenue/ Canal Bike Trail	800	8
Fleishhacker Street	230	8	Orchard Avenue/Washburn Way	2180	8
Home Avenue	630	8	Owens Street	840	8
Main Street	2390	8	Wantland Avenue	2690	8
116. Main Central Pressure Zone; Near West Oregon					
Angle Street	1080	8	Link Street	510	8
Bismark Street	1150	8	McLean Street	1160	8
California Avenue	2470	8	Nevada Avenue	40	8
Corvallis Street	630	8	Nevada Avenue	1430	12
Hanks Street	2480	8	Oregon Avenue/ Hawkins Street	1210	8
Hawkins Street	640	8	Wildland Drive/ Hogue Drive	720	8
Keno Street	420	8	Wocus Street	1140	8
Lake Ridge Court	340	8			
117. Mollie's Area Reduced Pressure Zone					
Highway 97	1160	12			
118. Prescott Pressure Zone; Center Tank Pumping					
Center Pump	N/A	N/A			
119. Upper Lynnewood Pressure Zone					
Buck Island Drive/ Arrowhead Road	1630	10	To Upper Lynnewood Tank	1822	10
Cedar Ridge Drive	730	10	Vista Way	840	10
Ponderosa Drive	1160	10	Wild Plum Drive	1960	10
120. West Oregon Pressure Zone[a]					
Mt Pitt Street	790	8	West Oregon Pump pipes	290	8
PRIORITY 4					
121. Hospital/Uhrmann Pressure Zone; Mid					
Fairmont Street	1130	8	Ridgecrest Drive	1490	8
Lexington Avenue	560	8	Terrace Avenue	1170	8
Mountain View Blvd	760	8	Van Ness Street	480	8
122. Main Central Pressure Zone; Near Conger Well Field					
High Street	310	8			
123. Patterson Pressure Zone					
Alva Avenue	360	8	Moyina Way	860	8
Carlson Drive	1430	8	Shasta Way	410	8
Everlein Avenue	400	8	Tamara Drive	170	8
McClellan Drive	670	8			

a. For the West Oregon Pressure Zone, Priority 3 improvements include new West Oregon Pumps in addition to the pipe upgrades shown.

4.4 EVALUATION OF PHASE 1 SYSTEM

4.4.1 System Analysis

The system model with the Phase 1 improvements implemented was run in the static (steady-state) mode under appropriate scenarios to compare pressure, velocity, and available fire flow results against the design criteria. The same 2017 MDD demand is utilized for this analysis, as the growth rate projected for the next decade will not affect the overall demand of the distribution system. Model scenarios were run for the system incorporating Phase 1 improvements to evaluate the following:

- Pressures at PHD
- Fire flow at MDD
- Pipe flow velocity at PHD

4.4.2 Results

Pressure at PHD

Following Phase 1 improvements, some pressure issues are resolved but others remain, as shown on Figure 4-6 and in Appendix H.

Fire Flow at MDD

The modeled fire flows following the Phase 1 improvements are shown in Figure 4-7 and Appendix I. The results show most of the problem areas identified for existing conditions being resolved with the improvements in place.

Flow Velocity at PHD

Minimal velocity issues are present in the modeled scenarios.

4.4.3 Recommendations

Additional pumping improvements were identified to address the pressure deficiencies remaining in the system after implementation of the Phase 1 improvements. Specifically, these improvements would address pressure issues in the Hospital/Urhmann, Prescott and Main Central Pressure Zones.

Recommendations for Phase 2 also took into consideration the decommissioning of water system assets that was recommended in a previous report. The City's 2018 Water Tank Vulnerability Assessment recommended decommissioning the following tanks: Melrose, Hospital, North, Lower Lynnewood, Patterson 1, and Lower Moyina. Additionally, the City plans to remove the Melrose Booster Station. An analysis of these decommissioning recommendations found that they would alter the Phase 2 recommendations as shown in Table 4-4. They also would require additional piping improvements to complete system connections in the absence of the removed assets. The resulting recommendations for Phase 2 improvements are listed in Table 4-5 and shown on Figure 4-5.

The Phase 2 recommendations assume that assets will be decommissioned as recommended in the 2018 vulnerability assessment. If not, then the additional improvements for the Main Central Pressure Zone in Table 4-4 are recommended, and the system disconnection solutions in Table 4-5 are not needed.

Table 4-4. Potential Phase 2 Improvements Affected by Decommissioning of Assets

Pressure Zone	Issue	Improvement Needed Without Proposed Decommissioning	Effect of Proposed Decommissioning
Main Central; West of West Oregon	High Elevation	Create new pressure zone for this area and add pumping	Issue is resolved with removal of Lower Lynnewood, area now fed by Upper Lynnewood
Main Central; West of Prescott	High Elevation	Add area to Prescott Zone with valve closures and pipe improvements	Issue is resolved with removal of North Tank; area is now fed by Prescott/other tanks

Table 4-5. Phase 2 Improvements

Pressure Zone	Reference Number	Issue	Solution	Street	Length (feet)	Diameter (inches)
Prescott	201	System Disconnection	Connect North Prescott area to Prescott Tank	Biehn Street	80	12
Upper Lynnewood	202	System Disconnection	Connect Upper and Lower Lynnewood	Vista Way	600	10
Upper Moyina	203	System Disconnection	Connect Lower and Upper Moyina	Kimberly Drive	40	6
Hospital/Uhrmann	204	Low Pressure – High Elevation	Expand the Crown Ridge Boosted pressure zone by adding pumps near the (disconnected) Hospital Tank			
Prescott	205	Low Pressure – High Elevation	Create pressure zone and add pumping near (disconnected) North Tank (see Figure 4-8)			

4.5 EVALUATION OF PHASE 2 SYSTEM

4.5.1 System Analysis

The system model with the Phase 1 and Phase 2 improvements implemented was run in the static (steady-state) mode under appropriate scenarios to compare pressure, velocity, and available fire flow results against the design criteria. One Phase 2 improvement—a new pressure zone in the North Prescott area (Improvement #205) was omitted from the model for simplicity at this time. The same 2017 MDD demand is utilized for this analysis, as the growth rate projected for the next decade will not affect the overall demand of the distribution system. Model scenarios were run for the system incorporating Phase 1 and Phase 2 improvements to evaluate the following:

- Pressures at PHD
- Fire flow at MDD
- Pipe flow velocity at PHD

4.5.2 Results

Pressure at PHD

The tank decommissioning in Phase 2 resolves many of the pressure issues identified previously (see Figure 4-9 and Appendix J).

Fire Flow at MDD

With the Phase 2 improvements in place, the decommissioning of assets does not result in any additional fire flow deficiencies. The fire flow performance is shown in Figure 4-10 and Appendix K.

Flow Velocity at PHD

Minimal velocity issues are present in the modeled scenarios.

4.5.3 Recommendations

No additional improvements are recommended based on the Phase 2 modeling.

4.6 SUMMARY OF DEFICIENCIES AND IMPROVEMENTS

Small-diameter piping in large portions of the city is causing fire flow deficiencies. Further, fire flow deficiencies are caused by pump capacity issues in the Prescott and West Oregon areas. The following tasks were identified to address these issues.

- Complete the Phase 1 improvements to the existing system outlined and prioritized in Table 4-3.
- Complete the Phase 2 improvements outlined in Table 4-5.
- Decommission Melrose, Hospital, North, Lower Lynnewood, Patterson 1, and Lower Moyina tanks and the Melrose Booster Station.

Jade Terrace
Crystal Terrace
Siskiyou
Hytton
Lynnwood
Lakeshore
Esplanade
Earle
Washburn 3600
Altamont

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

LEGEND

Hydrant Test Locations
- Flow Hydrant
- Residual Hydrant
- Tank
- Pump
- Well
- Pipe

Pressure Zones
- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced
- North Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

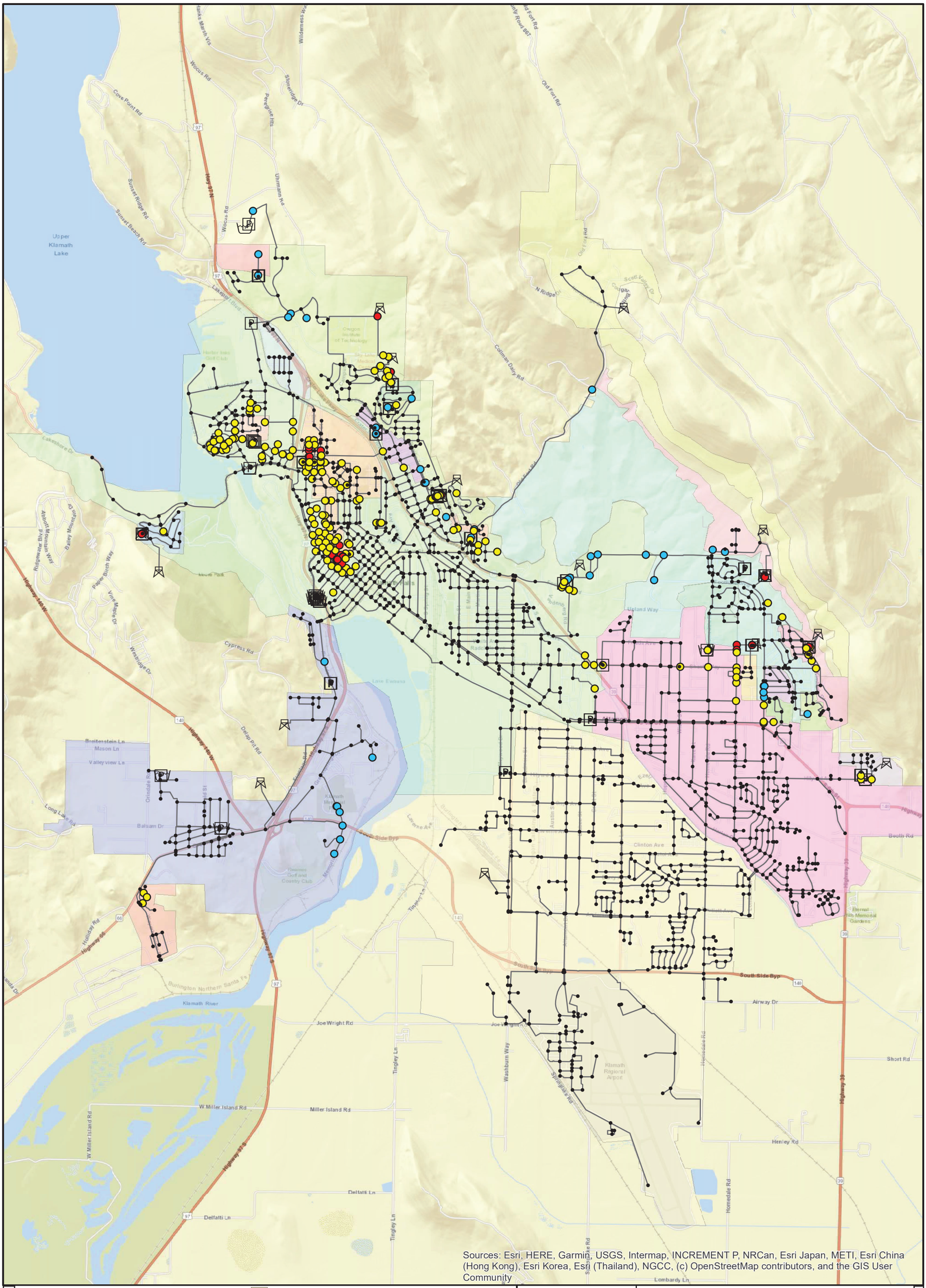
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CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Hydrant Test Locations

TETRA TECH

FIGURE 4-1



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

LEGEND

Pressure
- <20 psi
- 20 psi - 40 psi
- 40 psi - 105 psi
- >105 psi
- Pump
- Well
- Tank
- Pipe

Pressure Zones
- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

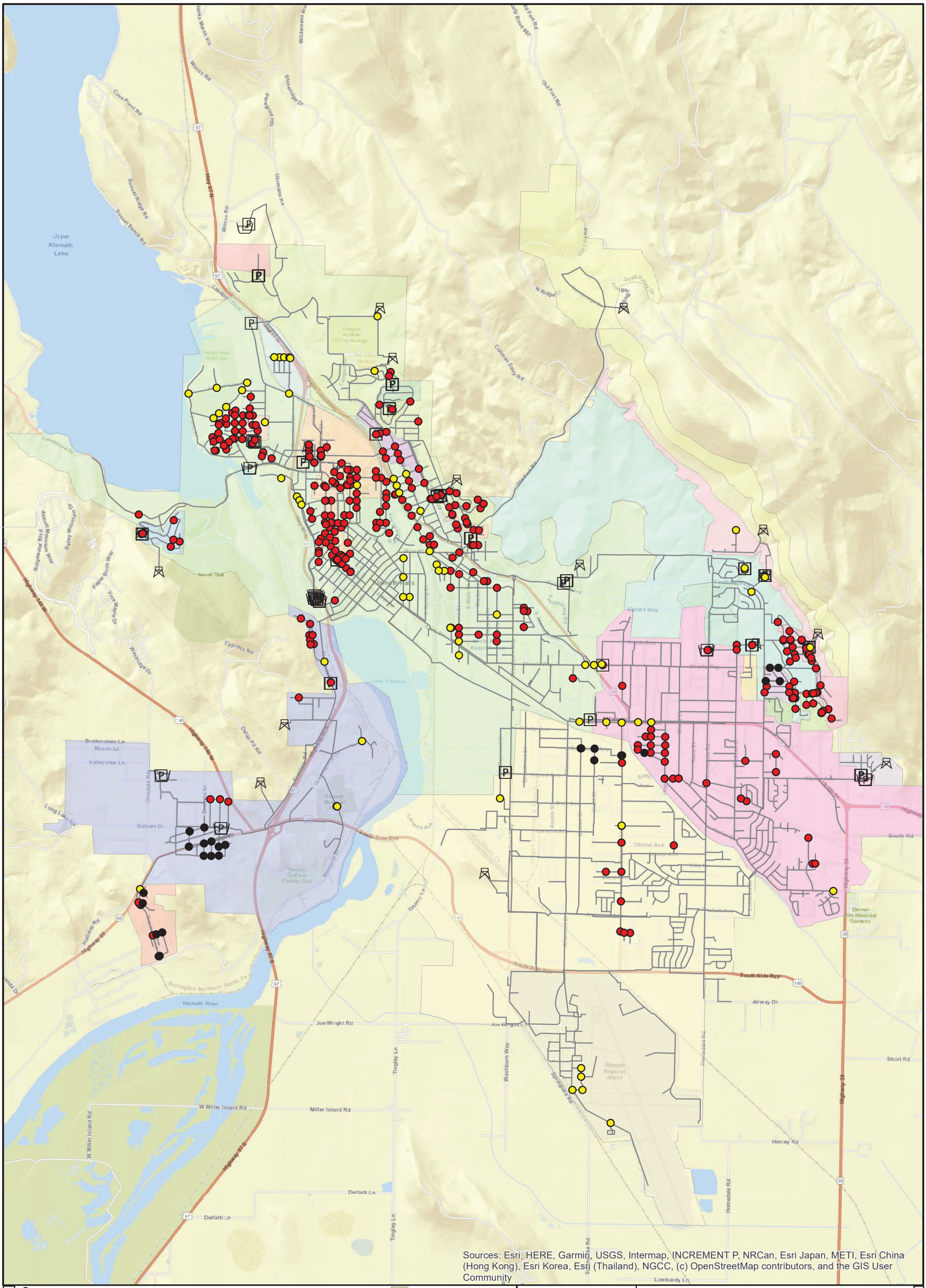
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CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Pressure at Peak Hour Demand in the Existing System

TETRA TECH

FIGURE 4-2



LEGEND

- 2 Inch Pipes With No Hydrants
- Does Not Meet Commercial Fireflow Level of Service
- Does Not Meet Residential Fireflow Level of Service
- Pump
- Reservoir
- Tank
- Pipe

Pressure Zones

- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

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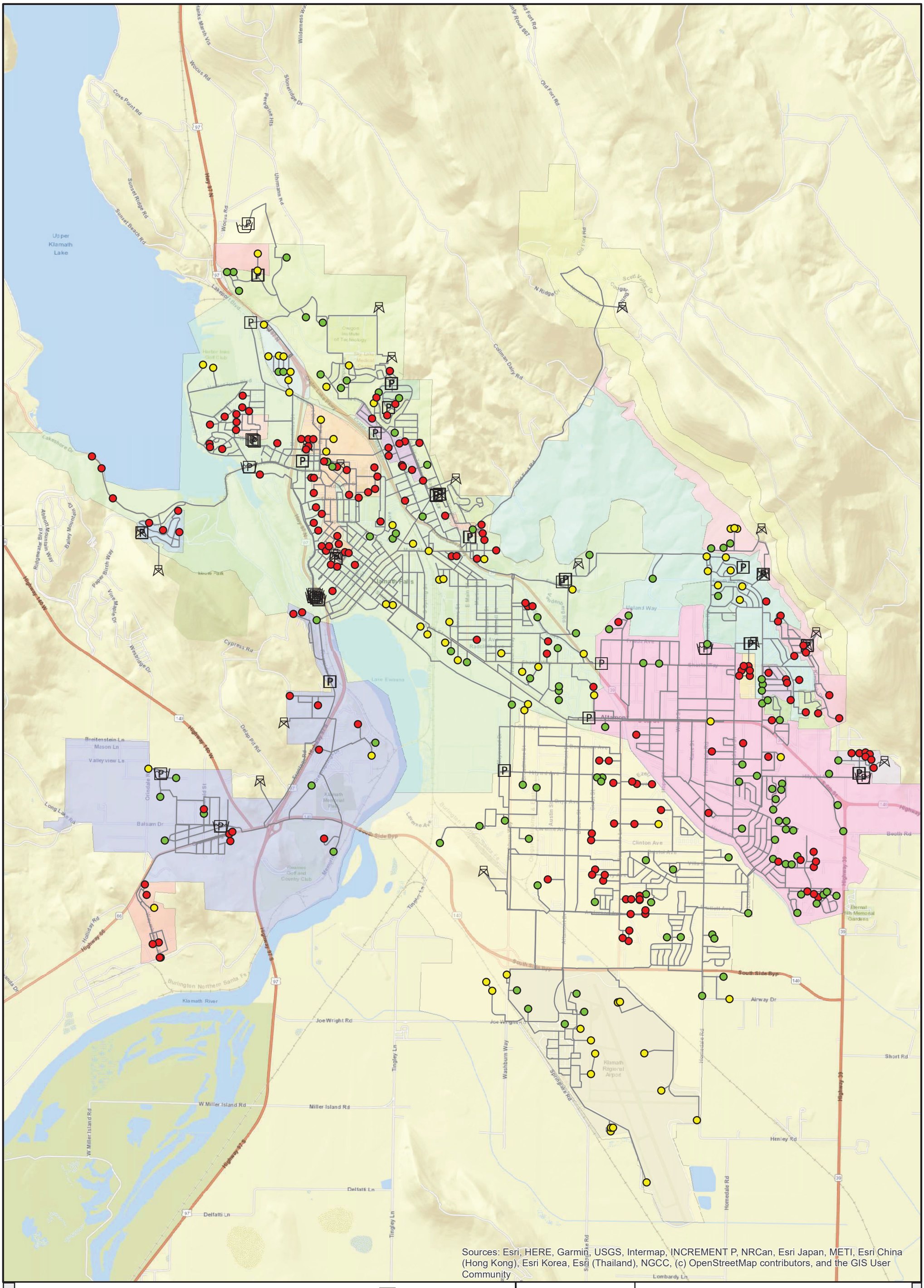
0.6 Miles

CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Fire Flow at Maximum Day Demand
in the Existing System (Excluding Dead Ends)

TETRA TECH

FIGURE 4-3



LEGEND

Residential Dead Ends
- Does Not Meet Residential Fireflow Level of Service
- Meets Fireflow Requirements

Commerical Dead Ends
- Does Not Meet Commercial Fireflow Level of Service
- Meets Fireflow Requrements
- Tank
- Pump
- Well
- Pipe

Pressure Zones
- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

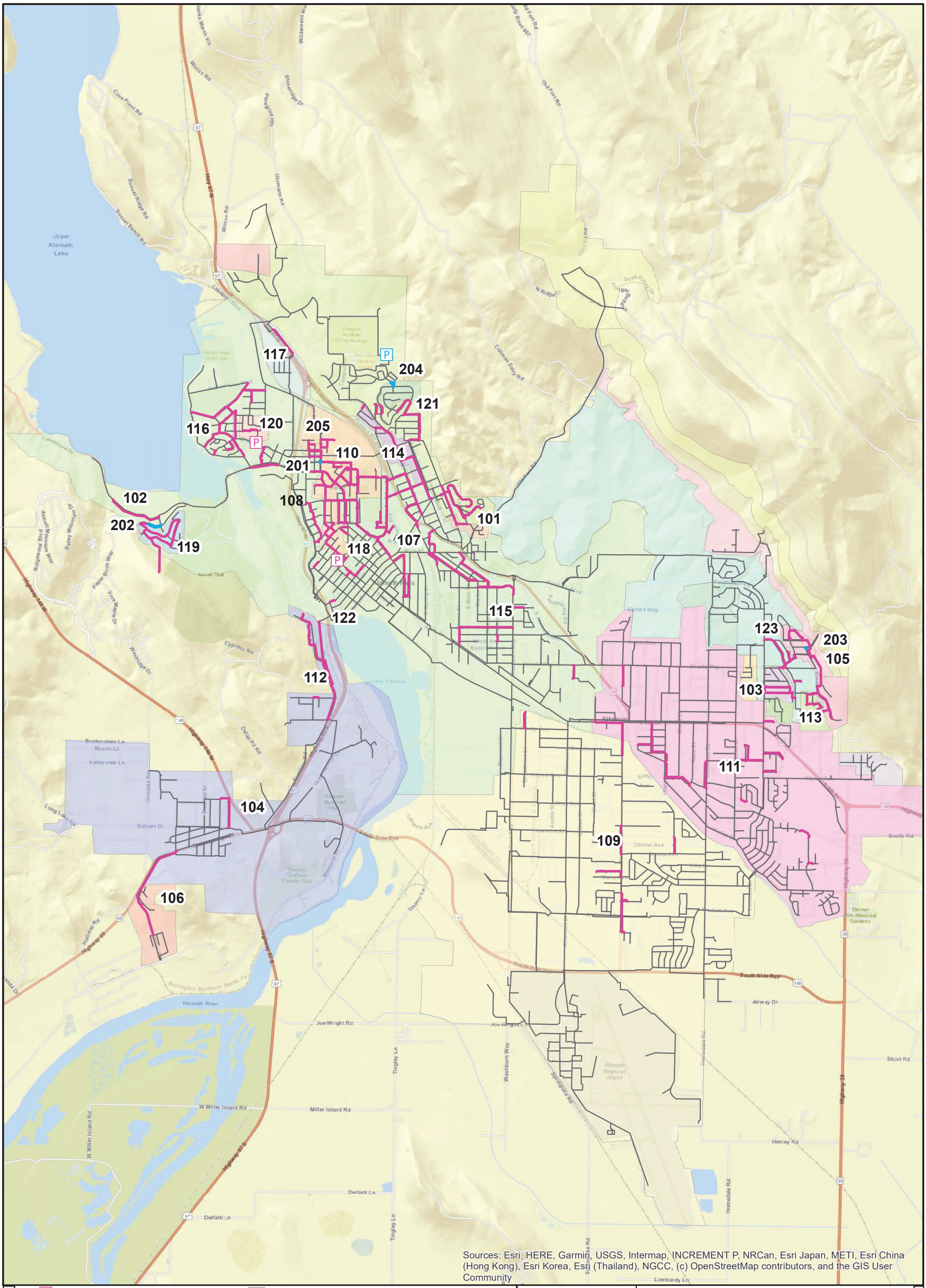
0.6 Miles

CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Fire Flow at Maximum Day Demand
at Dead End Junctions in the Existing System

TETRA TECH

FIGURE 4-4



LEGEND

- Phase 1 Pump
- Phase 1 Pipe
- Phase 2 Pump
- Phase 2 Pipe
- Existing Pipe

Pressure Zones

- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

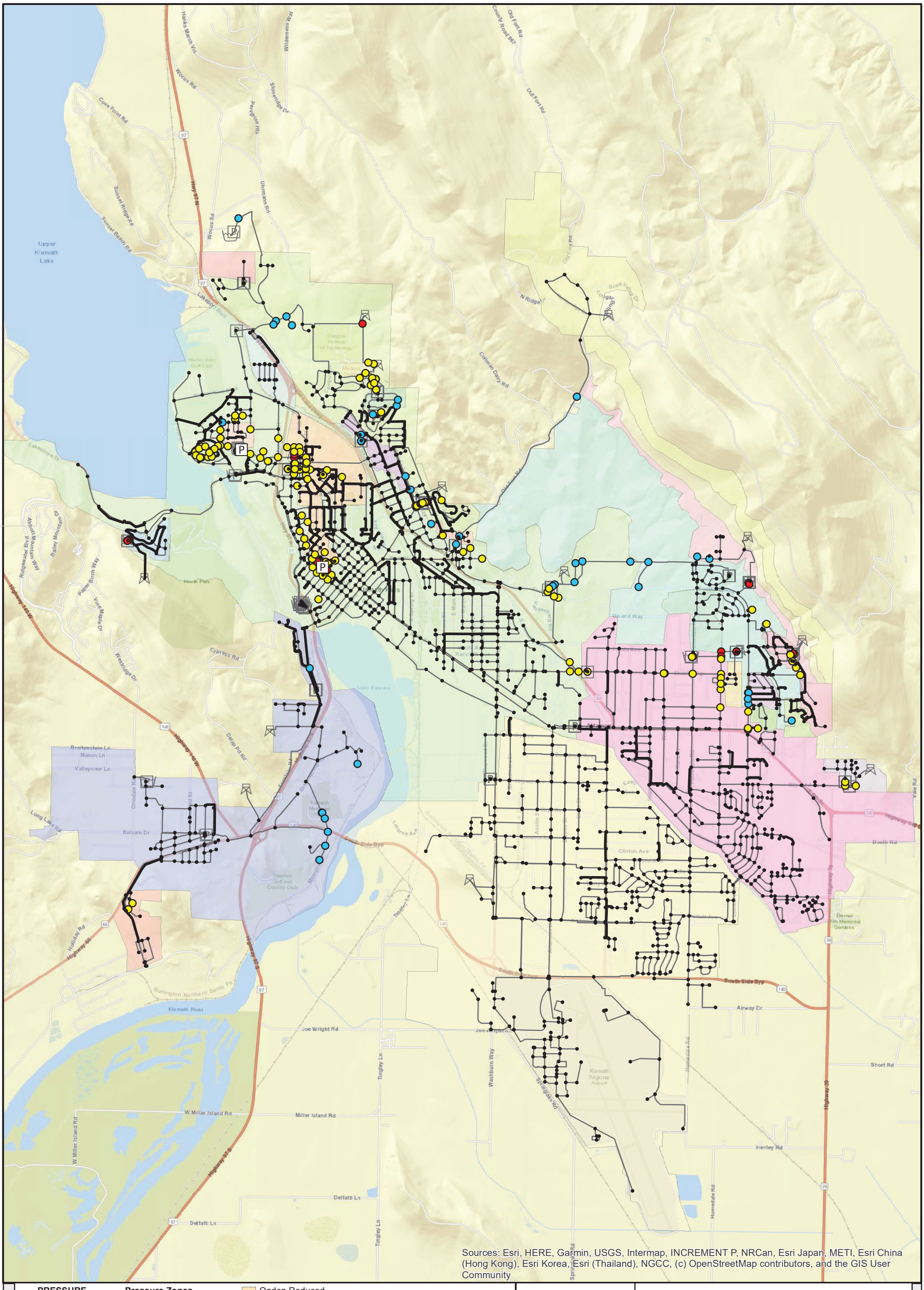
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CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Phase 1 and Phase 2 Upgrades to the Existing System

TETRA TECH

FIGURE 4-5



LEGEND

PRESSURE
- <20 psi
- 20 psi - 40 psi
- 40 psi - 105 psi
- >105 psi
- Phase 1 Pump
- Phase 1 Pipe
- Existing Pump
- Existing Well
- Existing Tank
- Existing Pipe

Pressure Zones
- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

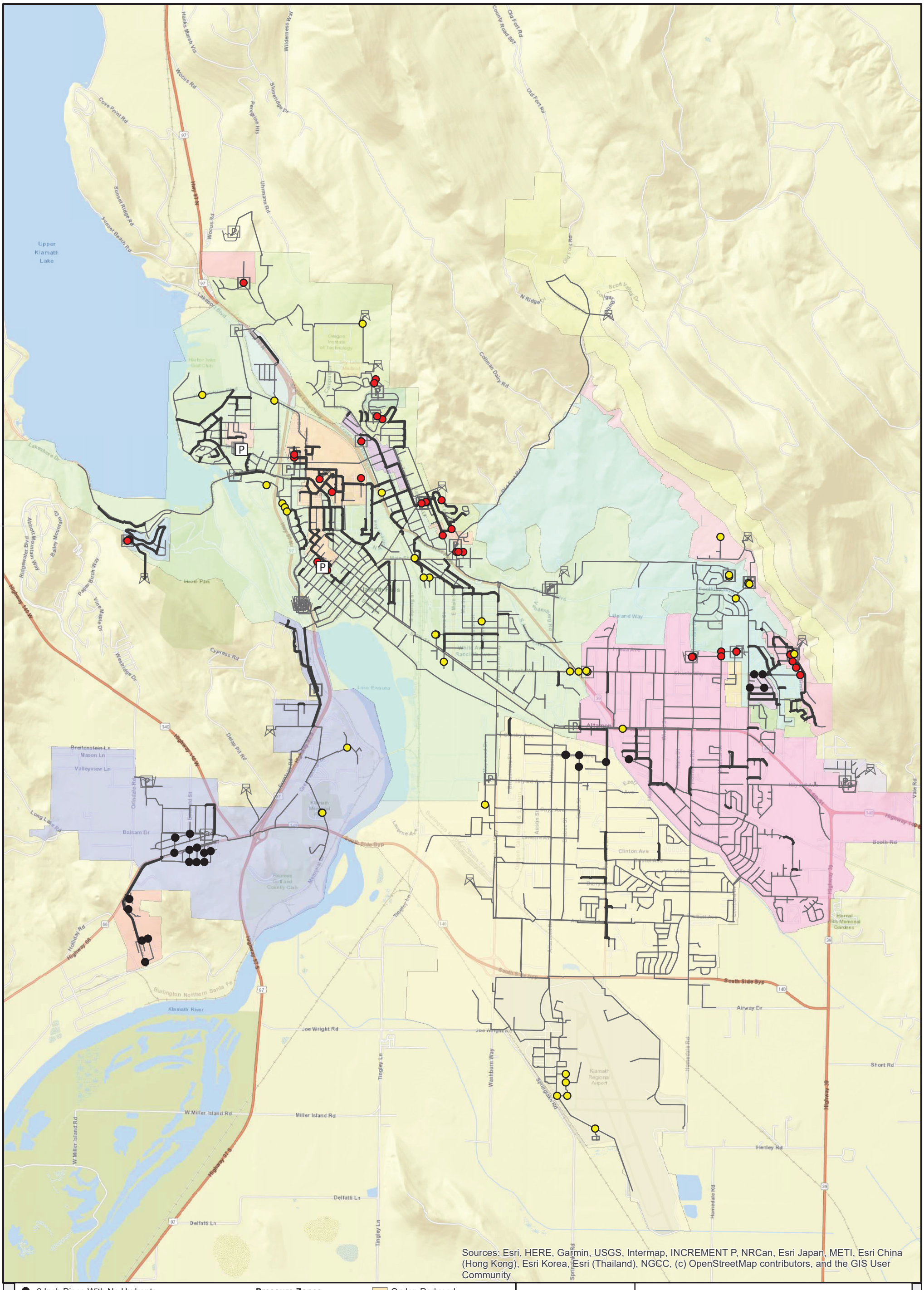
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CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Pressure at Peak Hour Demand in the Existing System with Phase 1 Improvements

TETRA TECH

FIGURE 4-6



LEGEND

- 2 Inch Pipes With No Hydrants
- Does Not Meet Commercial Fireflow Level of Service
- Does Not Meet Residential Fireflow Level of Service
- Phase 1 Pump
- Phase 1 Pipe
- Existing Pump
- Existing Well
- Existing Tank
- Existing Pipe

Pressure Zones

- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

0.6 Miles

CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Fire Flow at Maximum Day Demand in the Existing System with Phase 1 Improvements (Excluding Dead Ends)

TETRA TECH

FIGURE 4-7

Area to be included
in proposed pressure zone.

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

LEGEND

- Phase 2 Pump
- Phase 1 and Phase 2 Pipe
- Existing Pump
- Existing Pipe
- Existing Well
- Existing Tank

Pressure Zones

- Crown Ridge Boosted
- Eldorado Reduced
- Hospital/Uhrmann
- Main Central
- Mollie's Area Reduced
- Prescott
- West Oregon

N

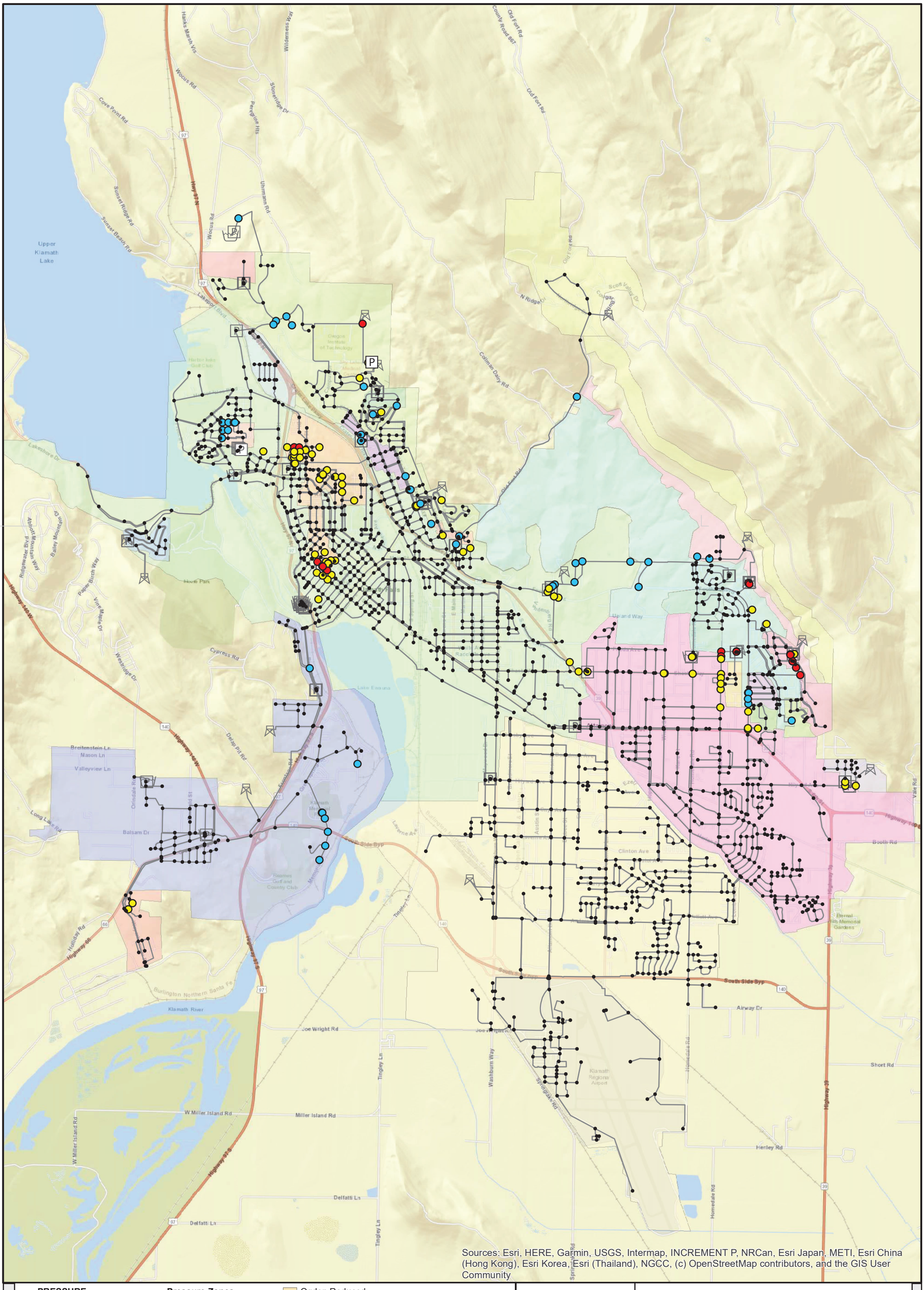
0.1 Miles

CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Proposed Pressure Zone

TETRA TECH

FIGURE 4-8



LEGEND

PRESSURE
- <20 psi
- 20 psi - 40 psi
- 40 psi - 105 psi
- >105 psi
- Phase 2 Pump
- Phase 2 Pipe
- Existing or Phase 1 Pump
- Existing Pipe
- Existing Well
- Existing Tank

Pressure Zones
- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

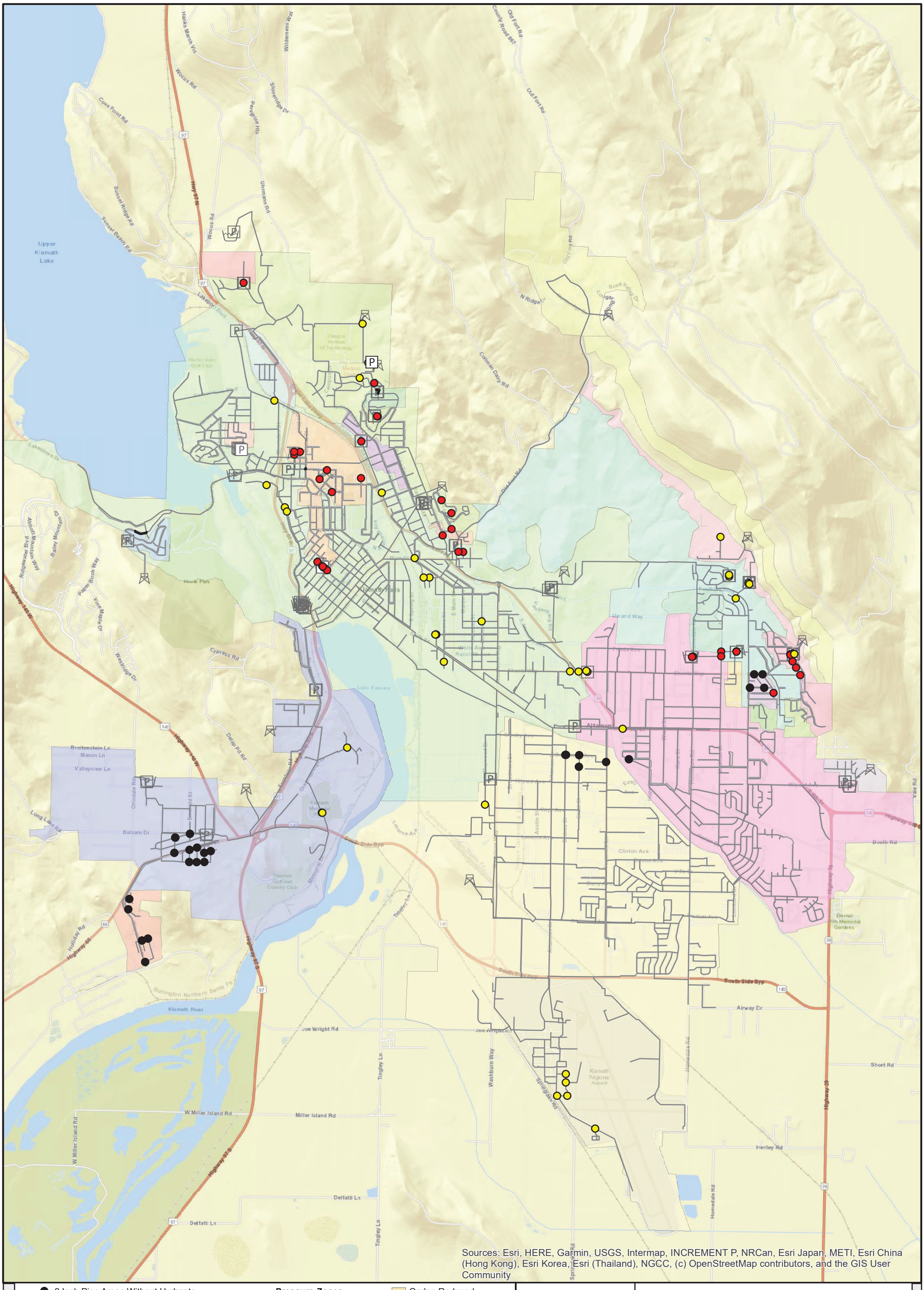
0.6 Miles

CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Pressure at Peak Hour Demand
in the Existing System
with Phase 1 and Phase 2 Improvements

TETRA TECH

FIGURE 4-9



LEGEND

- 2 Inch Pipe Areas Without Hydrants
- Does Not Meet Commercial Fireflow Level of Service
- Does Not Meet Residential Fireflow Level of Service
- Phase 2 Pump
- Phase 2 Pipe
- Existing or Phase 1 Pump
- Existing Well
- Existing Tank
- Existing Pipe

Pressure Zones

- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced North
- Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

0.6 Miles

CITY OF KLAMATH FALLS
2020 WATER MASTER PLAN

Fire Flow at Maximum Day Demand
in the Existing System with
Phase 1 and Phase 2 Improvements
(Excluding Dead Ends)

TETRA TECH

FIGURE 4-10

5. SOURCE OF SUPPLY AND EMERGENCY SUPPLY

The City of Klamath Falls is a 100 percent groundwater system. The City operates 13 wells with capacities ranging from 0.5 to 6.8 million gallons per day (mgd). Eighty percent of the City production capacity is represented by five wells that make up the Conger Wellfield. The City's eight other production wells, associated with specific distribution storage tanks, make up the remaining 20 percent. A 14th well, Moyina #4, is not in use. Table 5-1 lists the pumping capacities and water rights associated with each well.

5.1 SOURCE RELIABILITY

Because the City is 100 percent reliant on a groundwater source of supply, wellhead protection is critical to source reliability. In 1992, the City participated in the *Wellhead Delineation Demonstration Project for the Conger Wellfield* (Golder, 1992; funded by the U.S. Environmental Protection Agency (EPA)). While that project addressed the delineation and characterization of the Conger Wellfield and aquifer, it does not meet current Oregon Department of Environmental Quality voluntary requirements for a wellhead protection plan (WHPP). The City is developing a WHPP that will be amended to this WMP. It will include the following elements:

- A delineation of wellhead protection areas
- A description of public participation efforts, including notification of property owners and residents within the wellhead protection area of the development of the WHPP.
- Formation of a WHPP team; description of steps taken to provide opportunity for interests within the affected area to participate; and documentation that local public hearing procedures were followed in developing and adopting the WHPP.
- The responsible management authorities within the wellhead protection area.
- The expectations, responsibilities, and duties for each responsible management authority
- The procedure used to notify and attempt to involve responsible management authorities who are not willing to sign the plan
- Inventory of potential contaminant sources
- Past practices that may have resulted in a threat to the groundwater
- Potential sources of contamination presently existing
- Potential sources of contamination that may exist in the future.
- Management actions to be employed to reduce the risk of contamination to the groundwater
- The process used to address unanticipated potential sources of contamination that may be located within the wellhead protection area
- Management plans that directly regulate farming practices for the purpose of protecting water quality on agricultural lands within a wellhead protection area
- Contingency plan for wellhead protection areas
- Requirements for siting new wells in accordance with Oregon Health Authority rules

WELL CHARACTERISTICS

The wells in use range in drilled depth from 155 feet (Henley) to 1,000 feet (Unity). The wells at the Conger Wellfield range in drilled depth from 370 to 830 feet. While the wells are dilled relatively deep, the pump settings for which data was available are much shallower. Table 5-1 summarizes the drilled and pump setting depths.

The well casing diameters range from 8 to 20 inches. The oldest wells in the system are Conger #7 and #8, drilled in 1926 and 1930, respectively. In 1995 the Conger #8 and #9 casings were replaced and resealed. The average age of wells in the system is 46 years; the average age of the wells at the Conger Wellfield is 64 years. Individual well ages and well pump characteristics are listed in Table 5-1.

WELL OPERATION

The water system currently operates in a manner controlled by water levels in the Center Tanks. All water in Zones 2 through 5 and Zone 8 originates in Zone 1. When demand increases anywhere in the system, that demand is initially met from a zone-specific storage or pumping facility. That demand, and resulting calls for water, ultimately cascades down to Zone 1 and the two Center Tanks.

When the water level in the hydraulically connected Center Tanks drops, the wells at the Conger Wellfield are sequentially engaged to meet demand. The order in which this occurs is variable, depending on seasonal conditions and demand. In operating the Conger Wellfield, the City considers power conservation and the cost of running the pumps to determine which wells to operate. The order of operation and Center Tank set points are shown in Table 5-2. Operators will adjust set points and lead pump designation to reduce on/off cycles, increase storage, and respond to weather. Set points are adjusted through the City's SCADA (supervisory control and data acquisition) system.

Once the wells are engaged, water is pumped directly into the distribution system. The wells remain in service until production exceeds demand and all system storage is replenished, ending with the Center Tanks. Because the wells pump directly into the distribution system at times of demand, all storage tanks float on the system until demand diminishes and filling begins.

The remaining wells are associated with specific tanks and are brought into production based on water levels in that specific tank:

- Wocus Well to Uhrmann Tank (Hospital Optional)
- Fremont Well to Lower Lynnewood (North Optional)
- Balsam to Stewart-Lenox
- Debbie to Stewart Lenox
- Hilyard to Hilyard Tank
- Henley to distribution (emergency only)
- Homedale to distribution (peak only)
- Unity to distribution (emergency only)

Operating the same as the Conger Wellfield, these wells when called, pump directly into distribution until demand is met. When production exceeds demand, the tanks are filled to the set point and the well pump is shut down:

Under normal operating conditions 100% of demand is met by the Conger well field. Under peak operating conditions, demand is met by a combination of Conger (92 percent), Hilyard, Wocus, Debbie and Balsam (8 percent) wells. The remaining wells, Fremont, Henley, Homedale, and Unity are brought on-line only during high demand or emergency due to water quality or well conditions as summarized in Table 5-1.

Table 5-1. Klamath Falls Groundwater Well Characteristics

Well Name	Identification Number	Location	Year Drilled	Depth Drilled (feet)	Casing Size[a] (inches)	Control Points and Operational Notes	Water Rights (mgd)			Pump Capacity	
							Certified	Permitted	Total[b, c]	(gpm)	(mgd)
Conger #7	12923	530 Conger Avenue (Conger Wellfield)	1926	370	16	Center Tanks	2.33	--	2.33	1,100	1.6
Conger #8	30198		1930	830	12	North Reservoir; Center Tanks optional	3.75	2.71	6.46	1,125	1.6
Conger #9	37867		1958	435	16	Center Tanks	4.19	0.41	4.59	3,500	5.0
Conger #10	30195		1968	559	20	Center Tanks	4.59	1.16	5.75	4,200	6.0
Conger #25	30205		1992	625	20	Center Tanks	7.11	--	7.11	4,700	6.8
Subtotal Capacity in Conger Wellfield							***21.97***	***4.28***	***26.24***	***14,625***	***21.0***
Balsam #20	30200	4047 Balsam Dr.	1989	438	10	Stewart Lenox Reservoir	0.32	0.65	0.97	325	0.5
Debbie #22[b]	13322	2623 Debbie Dr.	1987	380	16		--	2.13	2.13	525	0.7
Subtotal Capacity in Stewart-Lenox Area							***0.32***	***2.78***	***3.10***	***850***	***1.2***
Wocus #1[c]	38275	790 Longacre Ln.	1991	530	8	Uhrmann Reservoir; Hospital Reservoir optional. Arsenic at levels below regulatory limit.	1.08	1.08	2.16	750	1.1
Moyina #4	12872	1401 Kimberly Dr.	1961	1100	16	NA – not used	0.16	--	0.16	0	0.0
Fremont #11	30203	510 Nevada Dr.	1961	701	16	Lower Lynnewood Reservoir; North Reservoir optional. Only used in summer due to high manganese.	1.58	--	1.58	1,100	1.6
Henley #12	30202	4623 Alt Way	1993	155	10	No control; emergency use only due to high manganese.	--	1.01	1.01	320	0.5
Homedale #13	11636	1430 Homedale	1981	427	16	No control; operated 24/7 during peak demands; sand issues.	1.08	--	1.08	400	0.6
Unity #18	11637	2000 Chinchilla	1977	1000	12	No control; emergency use only due to high levels of entrained air	0.54	--	0.54	325	0.5
Hilyard #19	11002	7850 Margraf Ln	1993	732	16	Hilyard Reservoir	1.08	--	1.08	550	0.8
Subtotal Capacity of Remaining Wells							***5.52***	***2.09***	***7.61***	***3,445***	***5.1***
Total Capacity							**27.81**	**9.15**	**36.95[d]**	**18,920**	**27.3**

a. The wells are typically cased to a depth where the geology is stable (e.g., the wells in the Conger Wellfield are cased to a depth of approximately 160 feet).
b. City conducted an evaluation of the Debbie Well to determine if it could be upsized in the future. The report indicates that the long-term (safe yield) pumping rate for the Debbie Well is 1,500 gpm if the existing well is improved to its maximum capacity. An alternate option would be to keep the existing well and install another deep well in the same aquifer, which would provide some redundancy. A new well should be located at least 2,000 feet away from the existing deep wells in the area (including larger capacity irrigation wells).
c. City considered adding another well at the Wocus site, but this is no longer being considered due to the potential regulatory hurdles associated with water rights, land use permitting, and the potential cost of treatment if arsenic removal is required.

Table 5-2. Typical Conger Wellfield Well Order of Operation and On/Off Set Points

Order Brought On-Line	Well	Typical Winter Set Points (feet)		Typical Summer Set Points (feet)	
		Start	Stop	Start	Stop
1st	Conger #10	17.5	20.5	19.5	20.5
2nd	Conger #9	16.0	19.5	18.0	20.0
3rd	Conger #8	15.0	18.5	17.0	19.5
4th	Conger #7	14.5	18.0	16.0	18.5
5th	Conger #25	13.0	17.5	14.0	18.0

5.2 GROUNDWATER RIGHTS

The process of securing water rights in Oregon requires potential users, such as the City, to obtain authorization from the Oregon Water Resources Department in the form of a permit providing authorization to begin using the water beneficially. After a permitted water right has been fully developed and shown to have been put to beneficial use, the Water Resources Department issues a water right certificate as a permanent water right, as long as the water is used at least once every five years in accordance with the water right.

According to City documentation, the City has certified rights to 43.0 mgd of groundwater capacity based on proven beneficial use. The City also has an additional 14.2 mgd of permitted rights, for total water right of 57.2 mgd. The City remains in the process of proving beneficial use to certify all its permitted rights. The City's interpretation of its water right is that it has the option of transferring water rights within the same aquifer, which may allow locating new wells in other areas if needed for future system service and hydraulics.

Table 5-3 summarizes the City's permitted and certificated water rights. Table 5-1 summarizes the water rights of each well used as a source of supply.

5.3 PUMPING CAPACITY

As shown in Table 5-1, the total pumping capacity of all wells is 27.3 mgd, including the Conger Wellfield pumping capacity at 21.0 mgd. Total certified and permitted water rights are 36.95 mgd. Figure 5-1 compares the pumping capacity, water rights, and projected average-day demand (ADD) and maximum-day demand (MDD) through 2038. As the figure shows, the current water rights and pumping capacity are adequate for the projected 2038 ADD and MDD flows of 8.9 mgd and 17.8 mgd, respectively.

5.4 APPLICABLE DRINKING WATER QUALITY REGULATIONS

Water quality standards address both source water/water treatment and distribution system quality. The City is responsible for monitoring requirements under the following rules:

- Source water:
  - Chemical Contaminant Rule
    - Inorganics contaminants
    - Volatile Contaminants
    - Synthetic Organic Contaminants
  - Arsenic Rule

Table 5-3. City of Klamath Falls Water Rights Documentation Summary

Certificate Number	Permit Number	Application Number	Source	Use	Point of Diversion No.	Priority Date	Authorized Use (cubic feet/second)
89554	G3011	T6366	Balsam #20	Muni.	30200	2/7/1966	0.50
	G11090	G12051	Balsam #20	Muni.	30204	3/21/1990	1.00
	G10854	G11654	Debbie #22	Muni.	13322	5/18/1987	3.30
	G7362	G7695	Henley #12	Muni.	30202	6/10/1977	1.56
COBU submitted[a]	G1541	T6852	Conger #10	Muni.	46115	2/15/1960	1.80
80755	G1541	T6852	Conger #10	Muni.	46115	2/15/1960	1.00
87794	G12798	G13336	Conger #10	Muni.	46115	3/19/1993	6.10
90795	G11324	G12050	Conger #25	Muni.	30205	3/21/1990	11.00
80755	G1541	T6852	Conger #7	Muni.	12932	2/15/1960	3.60
80755	G1541	T6852	Conger #8	Muni.	37866	2/15/1960	5.80
	G12799	G13335	Conger #8	Muni.	37866	3/19/1993	4.20
32192	G756	G861	Conger #9	Muni.	37867	2/13/1958	4.00
93759	G12800	G13334	Conger #9	Muni.	37867	3/19/1993	2.47
	G12800	G13334	Conger #9	Muni.	37867	3/19/1993	0.63
89500	G11082	G11904	Fremont #11	Muni.	30203	4/5/1989	2.45
87789	G12886	G14247	Hilyard #19	Muni.	37981	1/31/1996	1.67
83111	G9241	G10156	Homedale #13	Muni.	11636	2/12/1981	1.67
32191	G349	G470	Moyina #4	Muni.	12872	9/7/1956	0.25
82984	G9242	G10177	Unity #18	Muni.	11637	2/24/1981	0.83
93758	G13109	G12663	Wocus #1	Muni.	38275	9/23/1991	1.67
	G13109	G12663	Wocus #1	Muni.	38275	9/23/1991	1.67
Total							**57.17**

A Claim of Beneficial Use submitted 4/19/19

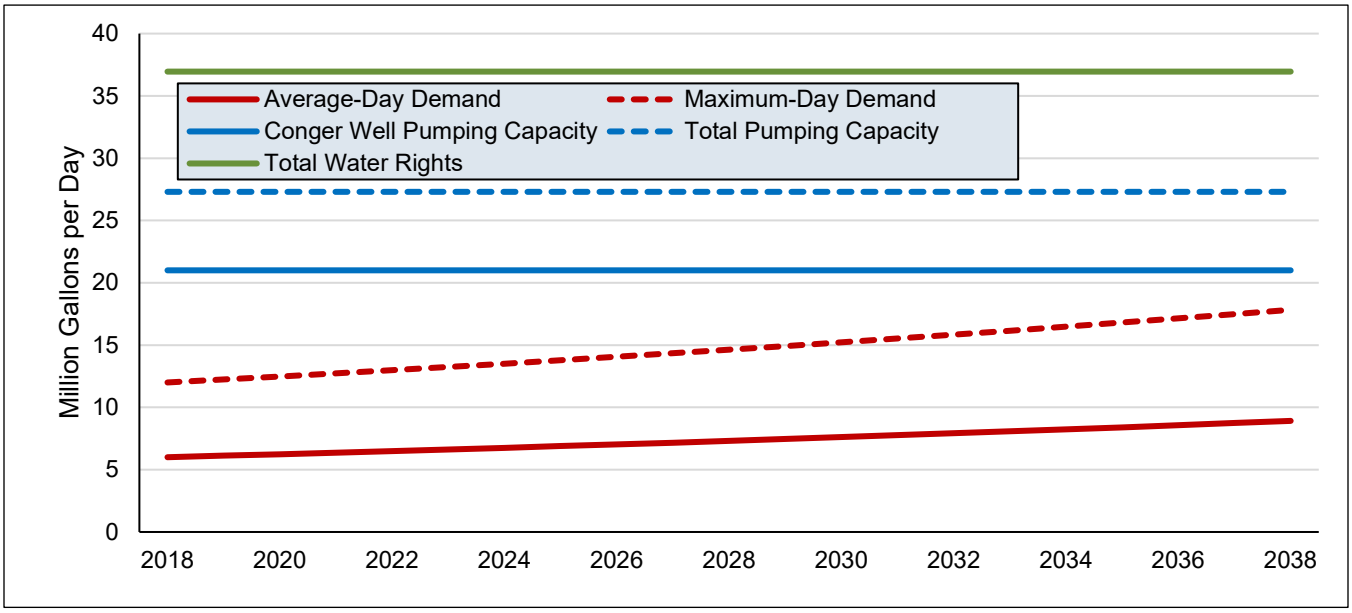


Figure 5-1. Projected Demand and Capacity

- Distribution and Source Water:
  - Groundwater Rule
- Distribution System:
  - Total Coliform Rule (TCR)
  - Lead and Copper Rule (LCR)
  - Disinfectants and Disinfection Byproducts Rule

Under these regulations the City monitors for 135 regulated and unregulated potential contaminants based on a frequency ranging from daily to every nine years, as prescribed by regulatory requirements.

Each of these rules, with the exception of asbestos, requires a specifically designed monitoring plan that identifies sampling location and frequency. The current (2018) monitoring schedule is shown in Table 5-4. A description of each rule is included below.

Table 5-4. Regulatory Compliance Monitoring Frequencies

Constituent	Frequency	Last Samples	Next Scheduled Monitoring
Nitrate	Annually	7/18	7/19
Metals	Every 9 years	7/11	7/20
Organics	Every 3 years	8/18	8/21
Volatile Organics	Every 3 years	7/17	7/20
Radionuclides	Every 6 years	7/17	7/23

5.4.1 Revised Total Coliform Rule

The Revised Total Coliform Rule (RTCR) identifies provisions for monitoring for total coliform as an indicator of bacteriological quality. Under the rule, water systems must develop a monitoring plan that identifies a prescribed number of monitoring locations based on population. Based on its current population, the City collects and analyzes 40 samples per month. If a sample tests positive for the presence of total coliform, the RTCR outlines resampling procedures and public notification triggers. The City's *Coliform Monitoring Plan* is included as Appendix L. Table 5-5 outlines the key provisions of the RTCR.

5.4.2 Lead and Copper Rule

The Lead and Copper Rule reduces the risk of lead and copper in drinking water, which primarily originate in plumbing materials. Prescribed monitoring conducted on a three-year interval determines if additional measures are required. The City has developed an *LCR Monitoring Plan* identifying the number, location, and frequency of samples to be collected. Because historical samples have been below LCR action level, the City has qualified for a reduced monitoring frequency of every three years. Currently, the City collects the required 30 samples for a system of its size. LCR sample sites are in homes most vulnerable to lead and copper corrosion; generally, homes built between 1982 and 1987 and using copper plumbing. The *LCR Monitoring Plan* and 2016 results are included as Appendix M.

Table 5-5. Revised Total Coliform Rule Key Provisions

Provision Category	Key Provisions
Contaminant Level	• Addresses the presence of total coliforms and E. coli in drinking water. • The maximum contaminant level goal is zero for E. coli, The maximum contaminant level (MCL) is based on the occurrence of a condition that includes routine and repeat samples. • For total coliforms, public water systems (PWSs) must conduct a Level 1 or Level 2 assessment of their system when they exceed a specified frequency of total coliform occurrences. • An MCL violation or failure to take repeat samples following a routine total coliform-positive sample will trigger a Level 1 or Level 2 assessment. • Any sanitary defect identified during a Level 1 or Level 2 assessment is to be corrected by the PWS. These are the treatment technique requirements of the RTCR.
Monitoring	• Develop and follow a sampling plan that designates the PWS's collection schedule. This includes location of routine and repeat water samples. • Collect routine water samples on a regular basis (monthly, quarterly, annually). Have samples tested for the presence of total coliforms by a state certified laboratory. • Analyze all routine or repeat samples that are total coliform positive for E. coli. • Collect repeat samples (at least three) for each total coliform positive routine sample. • For PWSs on quarterly or annual routine sampling, collect additional routine samples (at least three) in the month after a total coliform routine or repeat sample. • Seasonal systems must monitor and certify the completion of state-approved startup procedures.
Level 1 and Level 2 Assessments and Corrective Actions	• PWSs are required to conduct a Level 1 or Level 2 assessment if conditions indicate they might be vulnerable to contamination. PWSs must fix any sanitary defects within a required timeframe.
Reporting and Recordkeeping	• PWSs are required to report certain items to their states. These reporting and recordkeeping requirements are essentially the same as under TCR. The addition to the requirements is the Level 1 and Level 2 requirements.
Violations, Public Notification and Consumer Confidence Report	• PWSs incur violations if they do not comply with the requirements of the RTCR. The violation types are essentially the same as under the TCR with few changes. The biggest change is no acute or monthly MCL violation for total coliform positive samples only. • Public notification is required for violations incurred. Within required timeframes, the PWS must use the required health effects language and notify the public if they did not comply with certain requirements of the RTCR. The type of public notification depends on the severity of the violation. • Community water systems must use specific language in their Consumer Confidence Reports when they must conduct an assessment or if they incur an E. coli MCL violation.

5.4.3 Disinfectants and Disinfection Byproducts Rule

The Disinfectants and Disinfection Byproducts Rule establishes monitoring requirements for the formation of trihalomethane and haloacetic acid compounds that can be byproducts of disinfection. The rule applies to all utilities that practice chemical or ozone disinfection and deliver water with a disinfectant residual. Because these byproducts change in concentration with time, sample sites are located to represent extremes of the distribution system representing maximum water age.

In the City's system, one sample for total trihalomethanes and one sample for total haloacetic annually. The City collects these samples in at 1450 Homedale Road and Lynnewood Booster Station as representative of average and maximum residence times in the distribution system.

5.4.4 Other Monitoring Frequency Requirements

The City's required monitoring frequency for inorganic and organic contaminants is summarized in Table 5-4.

5.5 SOURCE WATER QUALITY

The water quality of the City's groundwater varies by location. The overall quality of the Conger Wellfield and the Balsam, Hilyard and Debbie Wells is excellent and meets all primary drinking regulatory requirements. The Wocus well meets all health-related primary requirements; arsenic has been detected at this well, but it is at levels below regulatory limits for safe consumption.

Water quality of the Homedale and Unity Wells meets all requirements, but both wells have structural issues. These issues lead to "sanding" in the Homedale well and entrained air in the Unity well. The Homedale well is only used during peak demand times and the Unity well only in the event of an emergency.

The Fremont and Henley Wells meet all primary regulations but exceed a secondary limit addressing aesthetic quality, for manganese. Manganese is not a health concern, but the levels can cause staining of fixtures and clothing over time. The City does not treat to reduce the manganese level; it uses the Fremont Well only in the event of high summer demand and the Henley Well only in the event of an emergency.

5.6 COMPLIANCE MONITORING RESULTS FOR 2013-2018

For the period of 2013-2018, the City has not experienced any compliance monitoring or water quality violations. No regulatory exceedances occurred regarding regulated contaminants. Numerical results of most recent specific samples are included in Appendix N.

5.7 EMERGENCY SOURCES OF SUPPLY

The City is 100% reliant on its groundwater source of supply. There is no alternative surface water source of supply currently available for potable water. Additionally, there are no neighboring utilities with whom system interties can occur. The only option for alternate supply during emergencies is the hauling of water.

The Drinking Water Program has published guidelines for those hauling drinking water, to help them provide safe water. A copy of these guidelines is included in Appendix O.

5.8 SUMMARY

The City possesses an ample, high-quality source of supply in the Conger Wellfield, which is the primary source of supply. However, the lack of alternative sources of supply in the City's water portfolio is a concern. Without the Conger Wellfield the City has no other source capable of meeting even a minimal level of demand across the system. Because there are no neighboring systems, the opportunity for interties is not available.

Based on projected population growth, the City anticipates average annual demand increases of 0.2 percent through 2038. Although current supply and production can meet the anticipated 2038 annual-average and maximum-day demand, the City should begin to identify additional sources of supply to diversify its production over the long term.

6. OPERATION AND MAINTENANCE PROGRAM

6.1 SYSTEM CONTROL PROCEDURES

The Klamath Falls water system includes 24 booster stations. Eleven are constant speed pumps controlled on an ON/OFF basis depending on water level in a corresponding storage tank and/or downstream pressure changes based on demand. The remaining 13 booster station pumps are equipped with variable frequency drives that allow the pump motor to be throttled to more closely and continually respond to variations in water levels and downstream pressure changes.

Operational control and system monitoring of the pumping and storage facilities are accomplished through a proprietary SCADA system built upon supervisory computers located at the Water Division office (610 Market Street) and the Maintenance Division office (1199 S Spring Street). The communication infrastructure consists of radio and line connections using proprietary software to connect the supervisor computers. The supervisory computers allow operators to monitor system conditions, gather data on system processes and send control commands to remote pumping facilities. Field-connected devices at remote pumping and storage facilities include remote terminal units (RTUs), programmable logic controllers (PLCs), human-machine interface (HMI), and communication infrastructure.

The RTUs and PLCs are connected to sensors (pressure transducers) and actuators (motor controls). Both units have embedded ladder logic control capabilities and are networked to the supervisory computer system through the communication infrastructure. RTUs and PLCs can operate autonomously under the near real-time control of the pump station using a last-command feature that enables the system to operate in the event of communications infrastructure failure. Upon resumption of communications, operators can resume monitoring and control.

The HMI offers the operator a real time graphical output of operational status of the pump stations, water levels, and storage data. It is linked to the supervisory computers and provides live data to drive mimic diagrams, alarm displays and trending graphs. The HMI also gives the operator the ability to switch a pump on or off or alter sequencing.

Critical control features are equipped with out-of-range alarm functionality. The system continually monitors pre-programmed and/or programmable alarm conditions. When an alarm event is detected, the system activates a visual alarm indicator at the supervisory computer on the HMI and, depending on the alarm and system conditions, can initiate a call notification to the responsible operator. Once triggered, the alarm must be acknowledged, and alarm conditions cleared, to deactivate the indicator.

6.1.1 Typical System Operation Controls

Production Well Run Status

As customer usage increases, the water level in the water storage tank drops. At an adjustable pre-programmed level, a signal is sent from the water storage tank PLC through the communication infrastructure to the production well PLC, signaling well startup. As customer usage decreases and the water level rises in the water storage tank

to an adjustable pre-programmed level, a signal is again communicated to the production well signaling the well pump to shut down.

Closed Loop Multi-Pump Booster Station Status

As customer usage increases, the downstream pressure drops to a pre-programmed level at the booster station PLC. A signal sent from the PLC to the pump motor causes Pump #1 to start and operate at a speed controlled by the variable frequency drive to maintain downstream pressure/flow to meet customer demand. Should the downstream pressure continue to decrease as determined at the PLC, a signal is sent from the PLC to a second pump motor, causing Pump #2 to start. As the downstream pressure increases as detected at the PLC, a signal is sent to Pump #2 then to Pump #1 to slow and shut down.

Open Loop Multi-Pump Booster Station Status

As customer usage increases, the water level in the water storage tank drops. At an adjustable pre-programmed level, a signal is sent from the water storage tank PLC through the communication infrastructure to the booster station PLC signaling Pump #1 to start. If customer usage continues to increase, a second signal is sent from the water storage facility PLC to the pump station PLC causing Pump #2 to start. As customer usage decreases and the water level rises in the water storage tank to an adjustable pre-programmed level, a signal is sent to Pump #2 then to Pump #1 to slow and shut down.

6.1.2 Typical Alarms

An alarm event may occur at a control location should the SCADA system detect conditions such as the following:

- Line power outage
- Communication fault
- Pump fault/failure to start
- Low or high water level in storage tanks
- High discharge pressure/Low suction pressure

Should an alarm condition exist, the SCADA system will activate a visual alarm at the HMI and initiate an automated phone call to the responsible operator.

6.2 PREVENTIVE MAINTENANCE PROGRAM

6.2.1 Regular Preventive Maintenance Procedures and Frequency

Table 6-1 summarizes the regular procedures included in the City's ongoing preventive maintenance program, along with the frequency with which each procedure is to be performed.

Table 6-1. Summary of Preventive Maintenance Procedures

System Component	Maintenance	Frequency
Air valves	Located, marked, inspected, and repaired/replaced	5-year
Altitude valve	Maintained by department staff	5-year
Pressure relief valves	Maintained by department staff	5-year
Pump control valves	Maintained by department staff	5-year
Valve Program	Inspect and repair in-line and hydrant valves	Every 2 years
Meters	Maintain as needed	Routine
Hydrants	Verify location, inspect, and repair	Annually
Pumps	Inspect; grease as needed, check pressure, alternate pumps. Log water pumped, check against average residential usage to monitor pump hours, pump efficiency, and detect water potential system leaks	Weekly
Pump Houses	Miscellaneous (paint pump house and manifolds, check heaters and all SCADA alarms)	As required
Reservoirs	Visually inspect access ladders and hatches to ensure security. Visually inspect outside walls for cracks or damp spots, flush SCADA transducers.	Weekly
	Cleaning	As needed
Service connections	Maintain	Routinely
Transmission and distribution lines	Visually inspect and repair leaks	As needed

6.2.2 Procedures for Shutdown and Restart

The following summarizes the routine shutdown and restart procedures when there is a need to take a pump, storage tank, or transmission main off line for maintenance:

- Pump repair
  - Check and start standby pump
  - Adjust valves and remove pump for repair
  - Install repaired pump
  - Bleed air to avoid cavitation
  - Adjust valves and start pump
  - Refer to pump manual for information as needed
- Reservoir cleaning or maintenance
  - Notify customers of cleaning and maintenance and possible turbid water and low pressure
  - Notify the fire district that a specific storage tank will be emptied for cleaning or repair but that normal pressure will be maintained, if possible
  - Install a temporary bypass on the pump manifold
  - Maintain normal system pressure as much as possible with bypass regulators and pop-off valves
  - Turn off inlet to the storage tank and drain for cleaning
  - Clean the storage tank
  - Slowly fill the tank while maintaining normal pressure to customers
  - When the tank is full, remove the bypass regulator and pop-off valves.
  - Begin normal pumping
- Transmission main maintenance or repair
  - Notify customers of cleaning and maintenance and possible turbid water and low pressure

- Turn off all meter settings that will be affected by the area shutdown
- Turn off the pumps at the lower storage tank
- Report to the dispatcher and general manager the estimated time needed to clean or repair the line
- Isolate the area by turning off the valves
- Turn off the low valve first
- Restrict flow by use of a second valve
- Clean line or make repair
- Flush line, if needed, remove debris and/or air
- Check for leaks after the pump has been restarted
- Return all meter settings to their previous state before the shutdown occurred
- Notify dispatcher that the water main has been cleaned or repaired
- Check storage tank level

6.3 EMERGENCY RESPONSE PLAN

The City's *Water Emergency Response Plan* (originally prepared in 2005 and revised in 2016) addresses water system vulnerabilities and response to water emergencies. The complete plan is included as Appendix P. It includes the following:

- Emergency response mission and goals
- System information
- Chain of command – lines of authority
- Severity of emergencies
- Emergency notification
- Notification procedures
- Water quality sampling
- Effective communication
- Response actions for specific events
- Alternative water sources
- Curtailing water use
- Returning to normal operation
- Plan, implementation, and practice

6.4 WATER SHORTAGE CONTINGENCY MEASURES

The City maintains a four-stage Curtailment Plan in the event of water shortage or unplanned water emergency. This plan is included in the City's *Water Management and Conservation Plan* (originally prepared in 2012 and revised in 2018) and described in Section 4.393 of the Klamath Falls City Code. The four levels of action are described below:

- Level 1—Water Shortage Alert
    - General recognition of drought conditions in Klamath County
    - Demand reaches 80 percent of water supply capacity for a period of three or more days, or the water supply approaches the minimum required for fire protection or other essential needs
    - City administrator will issue a broad request for water conservation—via local newspaper, radio, television, and the City's Web site—to consist of the following:
        - Request for voluntary reduction in water use by all water customers

  - Summary of the current water situation, reasons for the requested water reductions, and a statement that mandatory reductions will be necessary if the voluntary efforts are not sufficient to reduce peak water use by 10 percent.
  - Voluntary elimination of landscape watering between 10 a.m. and 8 p.m. (except for drip irrigation)
  - Outdoor irrigation on an odd/even schedule (odd-numbered houses water on odd-numbered days and even-numbered houses water on even-numbered days)

- Level 2—Serious Water Shortage

  - Issued drought declaration for Klamath County or water demand is 81 to 90 percent of water supply capacity for three or more consecutive days
  - Customers outside the city limits are required to conduct outdoor watering according to an odd/even schedule
  - The following actions are be prohibited for all customers:

    - Outdoor irrigation between the hours of 10:00 a.m. and 8:00 p.m., except drip irrigation systems
    - Irrigating in a manner that produces runoff for more than 5 minutes
    - Washing hard-surfaced areas, except where necessary for public health or safety
    - Not controlling a plumbing leak within 24 hours after discovery
    - Washing vehicles without using a shutoff nozzle, except if washing such vehicles at a commercial or fleet vehicle washing facilities using water recycling equipment
    - Offering water for consumption where food is sold or served to any person, unless expressly requested
    - Using water to clean, fill, or maintain decorative fountains, lakes, or ponds unless re-circulated
    - Using water for construction, except for building construction and preparation for painting
    - Filling swimming pools, including toy/play pools, with a capacity in excess of 100 gallons; however, water can be used to replace volume lost as a result of evaporation

- Level 3—Severe Water Shortage

  - Issued when water demand is greater than 90 percent of supply capacity for three or more consecutive days. In addition to the restrictions in Level 2, the following restrictions will be implemented:

    - Outside water use inside the city limits is restricted to an odd/even schedule
    - Irrigation of outside plants outside the city limits is prohibited, except trees, shrubs and food plants
    - All nonessential water use outside the city limits is prohibited
    - Moratorium on new water service connections and water main extensions within the distribution system

- Level 4—Critical Water Shortage

  - If there is a failure of a water system component or non-drought emergency condition resulting in an immediate shortage of water, a Level 4 determination will be issued. In addition to the restrictions in Level 3, the following restrictions will be implemented:

    - All nonessential water uses for all customers.
    - Irrigation of outside vegetation, except trees, shrubs and food plants.

6.5 CROSS-CONNECTION CONTROL PROGRAM

The City has established a cross-connection control program. The program, described in full in Appendix Q, addresses the following:

- Conditions of service
- Customer responsibility
- City responsibility
- Backflow requirements
- Allowed backflow assemblies
- Installation requirements
- Inspections
- Compliance
- Recordkeeping
- Testing
- Failed devices
- Unethical practices

6.6 EQUIPMENT AND SUPPLIES INVENTORY

All physical records are maintained, kept complete, and updated in the Water/Geothermal Division of the City's Public Works Department. Monthly inventory status reports on supplies show quantity on hand as well as the necessary information to reorder. A physical count of all inventory is conducted annually. Manufacturers' technical specifications and material data safety sheets are maintained in the Division office to ensure proper ordering of parts.

The City uses gas chlorine for disinfection of groundwater at each well location. Each location is stocked with an active 150-pound cylinder and one backup cylinder.

6.7 RECORDKEEPING

Table 6-2 summarizes the City's recordkeeping procedures.

6.8 OPERATION AND MAINTENANCE PROGRAM ORGANIZATION

Figure 6-1 summarizes the 2019 organizational structure of City's operation and maintenance programs. Table 6-3 lists current operations staff and their certifications.

Table 6-2. Recordkeeping Procedures

Record	Frequency	Retention Period	Comment
Pump Station Hours and Master Meter Usage	Logged weekly	3 years	Checked against average residential usage. Used to monitor pump flow, pump efficiency, water consumption, and to detect large leaks.
Manager's Report		7 years	Statement of profit and loss with budget comparison, water system income statement, water system balance sheet including assets, debts, and operating revenues and expenses.
Field Logs	Daily	3 years	Document field activities.
Pump Hour Sheets	Weekly	3 years	Completed as part of pump inspection.
Trouble Tickets	as needed	Division discretion	Generated as needed to direct meter maintenance. Part of computerized utility management program.
Chlorine Residual Monitoring	Monthly	3 years	Maintained at Water Division office
Coliform Monitoring	Monthly	5 years	Maintained at Water Division office
Lead and Copper	As scheduled	As long as operational	Maintained in Water Division office
Monitoring of trihalomethanes and haloacetic acid	Quarterly	As long as operational	Maintained at Water Division office
Asbestos	Every 9 years	As long as operational	Maintained at Water Division office
Other Water Quality Records	As scheduled	As long as operational	Maintained at Water Division office
Source Meter Readings	Summarized monthly	7 years	Maintained at Water Division office
Pumping Power Usage	Recorded monthly	7 years	Maintained at Water Division office
Service Meter Reading		7 years	
Corrective Action Reports		10 years	
Meter Read Quality Control	Monthly	7 years	Random sampling of meter reads. Maintained at Water Division office

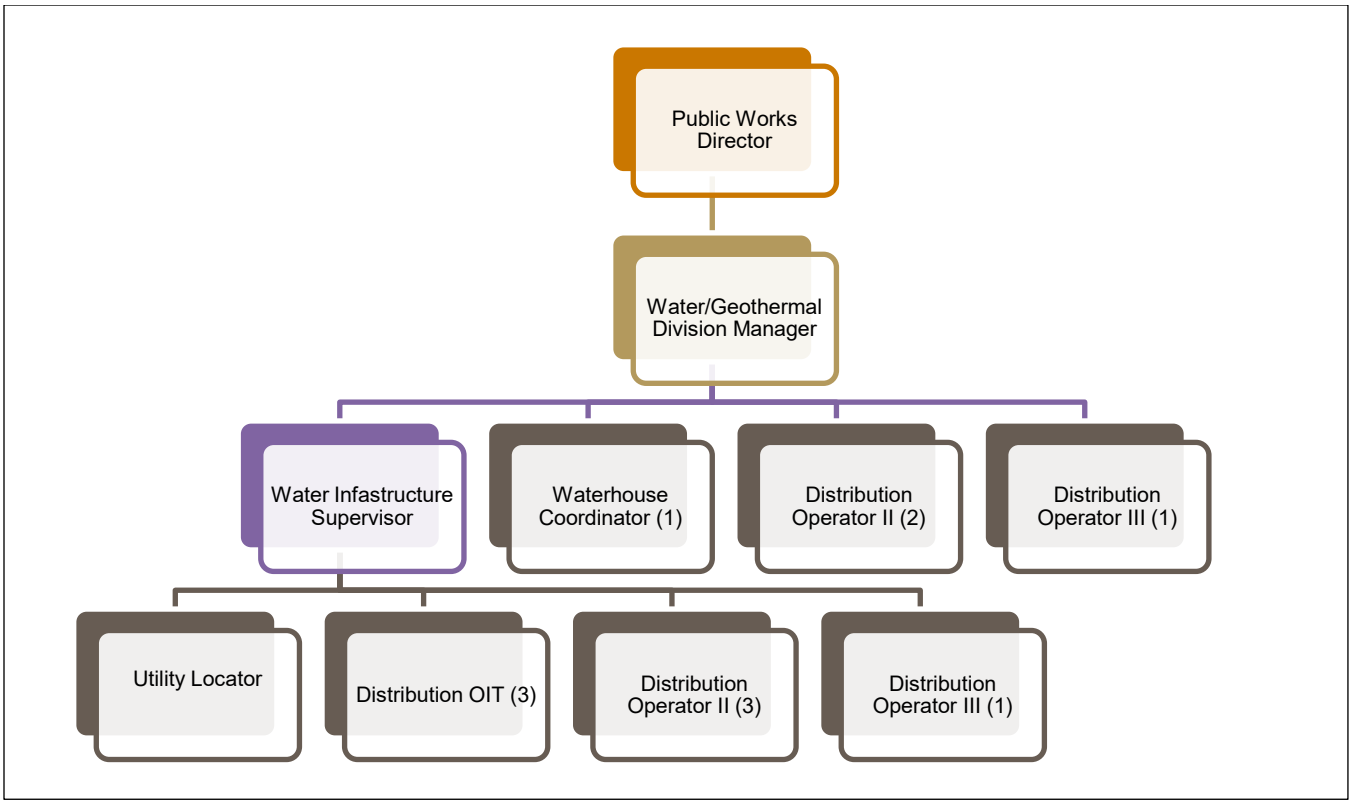


Figure 6-1. Public Works Organization

Table 6-3. Water System Operations Staff and Certifications

Staff	Operator Certification Grade/Type	Staff	Operator Certification Grade/Type
Randy Travis	Water Distribution Operator IV (Direct Responsible Charge)	**Jose Luna**	Water Distribution Operator II
Rod Denson	Water Distribution Operator IV	**Eric Thornton**	Water Distribution Operator II
Andy Foster	Water Distribution Operator III	**Terry Sellars**	Water Distribution Operator II
Alan Harris	Water Distribution Operator III	**Kody Fritz**	Water Distribution Operator I
Robbie West	Water Distribution Operator III	**Bryan Butler**	Water Distribution Operator I
Byron Collman	Water Distribution Operator II	**Joshua Mattos**	Water Distribution Operator I
Chris Barrington	Water Distribution Operator II	**Vicki Swafford**	Water Warehouse Coordinator--
Edgar Cisneros	Distribution Operator in Training		

7. PERFORMANCE STANDARDS

The City's water system design standards describe performance objectives and design criteria for water system asset design, construction and performance. The standards are within accepted industry standards as recommended by the American Water Works Association.

7.1 FACILITY DESIGN STANDARDS

7.1.1 Production Wells

The City requires that new production wells provide a minimum of 115 percent of the maximum-day demand at ultimate buildout of the area to be served by the well. New production wells dedicated to the City must have a minimum capacity of 420 gallons per minute (gpm). Generator backup power sized to operate the well pump and associated facilities is required. Generators must be diesel-powered and capable of operating for 24 hours without refueling.

7.1.2 Service Pressure

The Oregon Health Authority requires a minimum service pressure of 20 pounds per square inch (psi) al all times. The City's standard sets minimum and maximum service pressures of 40 psi and 105 psi during normal use periods. Under fire flow conditions, the minimum allowable pressure is 20 psi.

Most service pressures in the City are between 60 and 80 psi. Some exceed that range where individual pressure relief valves on customer services exceed 80 psi per the Uniform Plumbing Code.

7.1.3 Pipeline Size and System Hydraulics

The City's design standards provide the following direction for pipeline sizing and system hydraulics:

- The City allows standard diameters of 8, 12, 16, 20, and 24 inches.
- Minimum pipe diameter is 8 inches in residential areas and 12 inches in commercial/industrial areas.
- Pipes must be appropriately sized to provide a minimum residual pressure of 20 psi within the existing system during fire flow conditions and 40 psi during peak demand conditions.
- Maximum flow velocity is 5 feet per second (fps) for normal operating conditions and 7 fps during peak hour demand. The 5 fps is used for designing new improvements; the 7 fps maximum is used in evaluating the need for improvements.

7.1.4 Fire Flow

Klamath County Fire District No. 1 provides fire service in the City. The Fire District follows the requirements set by the Oregon State Fire Marshall in the 2014 Oregon Fire Code. These requirements are based on the 2003 International Fire Code with Oregon amendments as authorized by Oregon Revised Statute (ORS) 476.030 and in accordance with Oregon Administrative Rules Chapter 837, Division 40.

According to Fire District requirements, the minimum available fire flow for 1- and 2-family dwellings must be 1,000 gpm for structures of 3,600 square feet or less. For structures larger than 3,600 square feet in total building area, higher fire flows of 1,500 gpm or more are required. These flows must be provided for a minimum 2-hour duration. Required fire flows are determined on a case-by-case basis depending on size of the building and type of construction. If buildings have approved fire sprinklers, the required flow may be reduced by up to 50 percent at the discretion of the Fire District.

To meet the Fire District's requirements, the City's fire flow criteria require water availability at 20 psi minimum residual pressure at a rate of 1,500 gpm for 2 hours in residential areas. Commercial/industrial and schools require the same minimum pressure of 20 psi at 2,500 gpm for 3 hours. To provide for fire flows at all time, the City's standards require gravity storage in a given zone, or a pumping capacity to meet fire flow with backup power generation that supplies the zone.

7.1.5 Water Storage

Water system storage is sized based on the following three components: operational storage (also called equalizing or balancing storage); fire reserve storage; and emergency storage. Water systems with groundwater supply, such as the City's, sometimes use wells with backup power to provide some or all of these components. The use of pumping to meet storage requirements was described in detail in Chapter 4.

The City's design standard for storage specifies the ability to provide 100 percent of the maximum-day demand plus the applicable fire flow for:

- any proposed development larger than 450 equivalent residential units
- developments that will impose capacity requirements greater than the existing system will support

For areas with multiple storage or pumping facilities, storage requirements may be reduced upon concurrence by the City and Fire District.

7.1.6 Pumping Capacity

The City's water booster station design standards apply wherever a pressure zone requires installation of a booster station to provide adequate capacity and/or water pressure. Design requirements are specific to the distribution pressure zone and the hydraulic conditions of the system supplying the station. When a booster station is required, a developer must provide a detailed hydraulic modeling study to verify the booster station operation and the system operation before and after installation. The City accepts only booster stations that serve more than 25 equivalent residential units.

The water booster station design standards require new facilities to maintain water supply during emergencies, through diesel generator backup power sized to fully power all pumps and associated facilities for at least 24 consecutive hours without re-fueling.

7.1.7 Pressure Reduction

Pressure-relief valves are typically used in the following circumstances:

- When an area is geographically or topographically isolated from the zone to which it logically belongs
- To compensate for elevation variations in a zone
- When a zone does not have storage
- When a zone experiences high pressures.

The cost of pumping to high elevations and delivering water to lower elevations via PRVs needs to be balanced against the cost of building additional storage tanks and booster stations to eliminate the need for PRVs.

The City requires a PRV to provide pressure of 40 to 105 psi. PRV design and hydraulic criteria are specific to the area served. The developer must provide a detailed hydraulic study with modeling to verify the PRV station operation and the system operation before and after installation of the PRV. Design criteria include the following:

- The PRV must consist of one or more small (2- to 4-inch) valves for normal operation, and a large valve to meet fire flow.
- The small valves must operate continuously under normal operations. The large fire flow valve would operate infrequently as a backup to the small valve under peak conditions and during fire flows.
- The total valve capacity must equal a minimum of the maximum-day demand plus fire flow. During demand conditions that are at or lower than the average on the maximum day, the small valves would be adequate to meet demands. During peak hour demands on maximum (high demand) days and during fire flows, the large valve would also operate.
- The fire flow requirement is 1,500 gpm for PRV-supplied zones that are primarily residential and 2,500 gpm for PRV-supplied zones that are non-residential.
- To provide redundancy, the small valves must be sized at, or close to, the average hourly demand on the maximum demand day at buildout.

7.1.8 Performance Objective Summary

Table 7-1 summarizes key performance objectives included in the facility design standard criteria.

7.2 STANDARD DETAILS

The City maintains standard details for the installation of water system infrastructure. The current water system standard details are included in Appendix R.

7.3 CONSTRUCTION STANDARDS

The City maintains detailed engineering standards for City staff, developers, and contractors installing any utility assets. Section 7, addressing the water system, is included as Appendix S. These standards address:

- Air vacuum control valve
- Appurtenances
- Average-day demand
- Backflow prevention assembly
- City water system
- Engineered plan
- Equivalent residential unit
- Flush out
- Point of service
- Pressure zone
- Tie-ins
- Water mains
- Water utility maps
- Water services
- Facilities, infrastructure and property access
- Water system model
- Development permit
- Site construction permit
- Production facilities
- Wells
- Well pumping facilities
- Water storage tanks
- System control
- Design criteria
- City wells
- Fire flow requirements
- Storage requirements
- System pressure
- Water velocity
- Site enclosures
- Property
- Distribution systems
- Water mains
- Tapping main lines
- Working with asbestos pipe
- Booster stations
- Valves
- Services
- Fire hydrants
- Pressure zone control
- Air-vacuum control
- Flush outs
- Backflow control
- Appurtenances
- Disinfection of facilities
- Buildings

Table 7-1. Summary of the Key Performance Objectives

Component	Description
Production Wells	• Firm well capacity = maximum-day demand • System-wide reserve capacity = well capacity of a minimum of 15% of total maximum day demand for reserve • Backup power required for well pumps
Service Pressure	• Minimum during peak-hour demand on the maximum day = 40 psi • Minimum with fire flow plus maximum day demand = 20 psi residual at hydrants • Target maximum pressure of 105 psi

Pipeline Size and System Hydraulics	• Sized to meet minimum pressure requirements
	• Velocity: 5 fps desired; 7 fps maximum during peak-hour demand
	• Minimum pipe diameter:
	  ○ 8 inches in residential areas
	  ○ 12 inches in commercial/industrial areas
	• Standard allowable diameters of 8-, 12-, 16-, 20-, and 24-inch.

Fire Flow	• Required fire flows on system-wide basis:
	  ○ 1,500 gpm residential
	  ○ 2,500 gpm non-residential
	• Zone must have either gravity storage or pump station with backup power.

Water Storage	• Sum of following three components = 100% of maximum day demand plus fire reserve:
	  ○ Operational (balancing or equalizing) storage (about 30 to 50% of maximum-day demand)
	  ○ Emergency storage (50 to 70% of maximum-day demand)
	  ○ Fire reserve for most critical (highest) required flow in zone
	• An emergency storage credit is applicable if there is standby power at wells and booster stations, where the pumping capacity with standby power can be considered equivalent to providing emergency storage in tanks.

Pumping Capacity	• Firm pumping capacity requirements:
	  ○ Zones with water storage = maximum day demand
	  ○ Small booster zones without storage = peak hour on maximum day plus fire pump.
	• All zones must have capacity to lift water to next higher zones.
	• Firm capacity defined with the largest pump out of service (which may be a fire pump).
	• Minimum of 2 pumps to meet non-fire conditions.
	• Backup power required at booster stations.

Pressure Reduction	• Required total valve capacity = peak hour demand plus fire flow. • PRV stations typically have one or more small valves for normal operation, plus a large valve to provide fire flow and backup to small valves.

8. SEISMIC RESILIENCE ASSESSMENT

Given the Klamath Falls water system's age and the service area's proximity to regular seismic activity, a system-side comprehensive seismic evaluation was undertaken to assess facility vulnerability. Results are summarized in the sections below.

In addition to the findings presented here, the City's *Water System Emergency Plan* identifies system vulnerabilities to a variety of natural and human-caused emergencies and outlines emergency response procedures (Appendix P). As required by the America's Water Infrastructure Act (AWIA), the City will be conducting a water system risk and resiliency assessment and revising the Emergency Response Plan by December 31, 2020 and June 30, 2021, respectively.

8.1 WATER STORAGE TANKS

The City's water storage system is aging, with assets varying from 11 to 90 years of service. Today it includes 21 steel tanks and one concrete tank on 19 sites. Of all the storage assets, only the Basin View and Stewart Lenox Tanks are designed according to current seismic code; the Prescott Tank was designed to a previous seismic code. The system is operated in such a way that increased demand is met with increased production, resulting in storage floating on the system. Therefore, resiliency of the storage tanks is critical. To address this, the City prepared the *Potable Water Storage Tank Seismic, Security, and Condition Evaluation* (Appendix B) in 2018. This section presents the evaluation's findings.

8.1.1 Evaluation Approach

The 2018 seismic evaluation provided a comprehensive assessment of all the City's steel storage tanks in terms of seismic resiliency, security vulnerability, coating condition, corrosion, and appurtenances. It included on-site inspections of each steel storage tank and an on-site geotechnical review for some assets of concern. Ground motion for a design seismic event was estimated within a 500-foot radius of each site. The evaluation also included a conceptual hydraulic assessment of the system to determine which, if any, storage facilities could be removed from the system or replaced with a reduced number of facilities without impacting service. The study used the structural and geotechnical data collected to estimate costs for upgrade, rehabilitation or replacement of each asset.

8.1.2 Recommendations

The comprehensive evaluation yielded long-term opportunities for maintenance cost reduction, streamlined operation, and greater resiliency and reliability. It provided the City with a plan to efficiently, cost-effectively, and comprehensively upgrade the potable water storage system and achieve seismic resiliency within 10 years.

System Reconfiguration

The results of the evaluation of a system reconfiguration are summarized in Table 8-1.

Table 8-1. Water System Storage Reconfiguration Summary

Configuration Change	Resulting Improvement	Capacity Change	Assets Removed from System
Replace High Level Tank with 3.0-MG tank	New, larger High Level Tank	+2.1 MG to Zone 3	Hospital
Replace both Center Tanks with two 2.5-MG tanks	Two new, larger Center Tanks; High Level Booster Station reduced to 150 gpm	+4.7 MG to Zone 1	North, Melrose, L. Lynnewood, Melrose Booster
Decommission Patterson #1 and Lower Moyina	Patterson #2 operating at capacity	-0.1 MG to Zone 3	Patterson #1, L. Moyina

The proposed reconfiguration consists of the following:

- Three new, seismically resilient tanks
- Patterson #2 tank operating at capacity
- 6.8 million gallons of additional storage
- Six tanks and one booster station removed from service

Seismic Design Criterion

In the absence of federal or state regulatory requirements for resiliency retrofitting of potable water storage facilities, the recommendations of the 2018 seismic evaluation were based on level-of-service and performance criteria outlined by the City. Based on the evaluation of geological conditions and the maximum credible event, it was decided that all storage assets (classified as critical facilities) need to be designed to withstand a 7.4-magnitude seismic event originating from a local fault.

Seismic Upgrades

The recommended seismic capital improvements are shown in Table 8-2. The City's acceptance of the seismic resiliency improvements served as the baseline for development of the capital improvement program for this Water Master Plan. The assumed implementation of the storage tank improvements and their project schedule served as a starting point for system modeling.

8.2 CONGER WELLFIELD TO CENTER TANKS TRANSMISSION

Normal operation of the City's water system relies on the five wells that make up the Conger Wellfield and the transmission between the wellfield and the Center Tanks. The wellhouses at the at Conger Wellfield are all CMU construction with an externally accessed separate room for chlorine storage. All of the wellhouses have been constructed to a previous seismic standard. There is on-site backup power generation available to the two largest wells

Transmission from the wellfield can be directed the Center Tanks, the distribution system, or simultaneously to both. The transmission pipelines are 16- and 20-inch cast iron that are not seismically restrained nor fitted with flexible joints. The condition of the pipelines is unknown, but there is no operational indication that there is an issue with the integrity of the pipelines.

There are no recommended seismic improvements included in the capital improvement plan associated with this water system master plan and it 20-year horizon for the following reasons:

- Available on-site back-up power
- The flexibility to move water into the distribution system through two separate operational schemes
- No indication of existing condition issues
- Consideration being given to a potential second source of supply

Table 8-2. Water Storage Tank Seismic Improvements

Asset	Improvement	Schedule			
		2020-25	2026-30	2031-35	2036-40
Basin View	Structural		$5,000		
Bowen	Structural		$5,000		
Burns	Structural		$5,000		
Center #1	Replace	$5,439,400			
Center #2	Replace	$5,439,400			
High	Replace		$3,560,300		
Hilyard	Structural		$5,000		
Hospital	Decommission		--		
Lindley	Replace		$985,600		
L. Lynnewood	Decommission	--			
U. Lynnewood	Replace		$627,400		
L. Moyina	Decommission	--			
U. Moyina	Replace				$709,500
Melrose	Decommission	--			
North	Decommission	--			
Ogden	Structural		$209,000		
Patterson #1	Decommission	--			
Patterson #2	Structural		$5,000		
Prescott	Structural		$427,000		
Tanglewood	Replace			$976,200	
Uhrmann	Structural		$5,000		
Total Investment		**$10,878,800**	**$5,839,300**	**$976,200**	**$709,500**

It is recommended that during the next update of the water master plan that the City conduct a more in-depth condition assessment of the transmission lines and consideration of seismic resilience features when the lines are replaced. This recommendation will become more of a priority if an adequate second supply cannot be secured.

8.3 BOOSTER STATIONS

The City's water system booster stations are a combination of above grade CMU, masonry brick, composite wood structures and below grade Hydronics fiberglass vaults and shown in Figure 8-1.

One exception is the Melrose booster station, one of the oldest in the system, which is a CMU vault.

With the exception the new Pelican booster station all of the booster stations are designed to a previous seismic code. As shown in Appendix D, the booster stations are small, single room facilities with roof heights under 10 feet, with the exception of Pelican and Link River booster stations (designed to current seismic code) and Tanglewood booster station which is unreinforced masonry brick and a roof height of approximately 20 feet. More detailed descriptions of each booster station is included in Appendix D.



Figure 8-1. Water System Booster Station Construction Examples

The booster stations in the Klamath Falls system are designed to increase service pressure within particular a sub-zone or, in the case of the Lyton booster station, to move water between zones. The most critical of the booster stations, Pelican, is the newest (on-line September 2019). While the other pump stations do not constitute critical backbone assets to the system their priority is less than that of the recommended storage tank improvements. Further, some of the older booster stations will be addressed along with the storage improvements.

Therefore, as with the Conger Well field and transmission lines, it is recommended that during the next update of the water master plan the City begin to identify a replacement/upgrade schedule for the booster stations implement seismic improvements as part of those activities.

9. CAPITAL IMPROVEMENT PROGRAM

This chapter summarizes recommended capital improvements and planning level costs based on the analyses performed for this water master plan update. Table 9-1 lists the improvements by category—source, transmission, storage, pumping, distribution, planning and evaluation, and property acquisition—with a schedule of expenditures for each. Projects not included in the first 10 years are long-range projects that may be included in subsequent 10-year CIPs depending on need. The following criteria were the basis for project selection priority:

- Compliance with regulatory/health and public safety requirements
- Seismic resiliency
- Transmission, distribution, and storage improvements
- Sources of supply to meet projected growth
- System reliability/repair
- Scheduling of project budgets for financing

Unless there was an identified need to implement a given improvement by a specific date, the projects were scheduled to equalize annual capital costs to the extent possible. This CIP is based on current system conditions and needs to provide a direction for City budgeting. As system needs change over the course of the planning period, projects may be combined, modified, or removed as necessary to address development, regulatory changes, and other future circumstances. Figure 9-1 shows the location of the recommended improvements.

Planning-level cost estimates in 2019 dollars were developed for the projects identified in the 10- and 20-year planning windows to include:

- Contractor overhead and profit (15 percent)
- Planning level estimate contingency (25 percent)
- Engineering/design and construction management (20 percent).

The transmission and distribution main planning-level cost estimates consist of unit and lump-sum prices based on a recent bid tabulation process for public works projects in Oregon and Washington and Means 2019. Cost estimates include:

- Furnishing and installation of piping
- Valves and fittings
- Gravel
- Asphalt repair
- Fire hydrant assemblies
- Construction contingency
- Engineering and administration.

Cost estimates were developed using the following assumptions as appropriate:

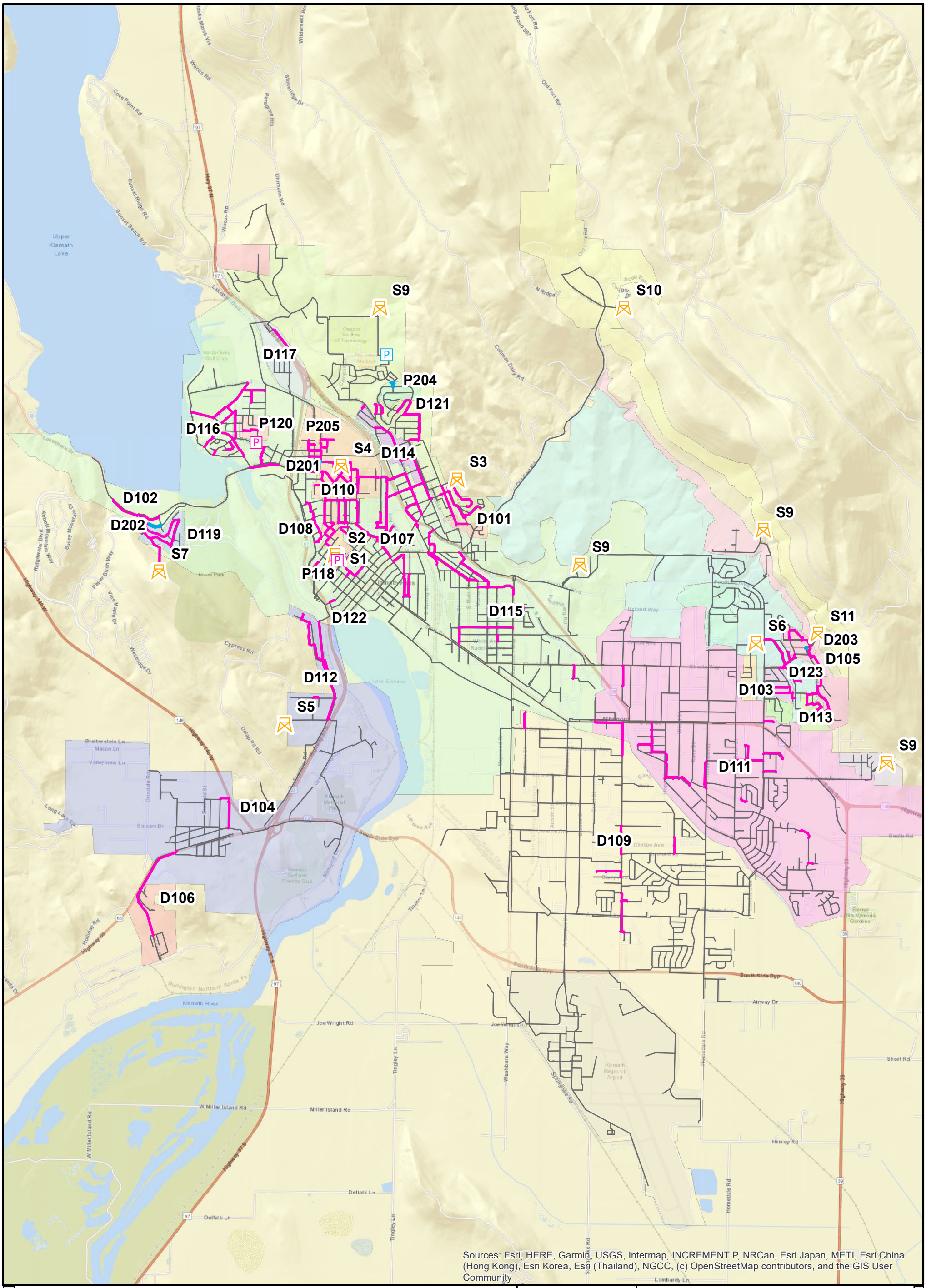
- All pipe is ductile iron, cement-mortar lined, AWWA Class 52.
- Pipe bedding will consist of 6 inches of crushed rock above and below the pipe.

- 10 percent of the pipeline trench length is backfilled with select imported backfill.
- Along arterials, 80 percent of the pipeline trench length is filled with controlled density backfill to a depth of 4 feet.
- Hydrant assemblies are installed every 800 feet.
- Isolation valves are installed every 600 feet.
- Where pipeline is in a roadway, asphalt restoration includes an 8-foot-wide patch of asphalt, 4 inches thick, overlying 6 inches of crushed surfacing. Concrete restoration includes a 10.5-foot-wide patch of concrete, 8 inches thick, overlying 6 inches of crushed surfacing.

Table 9-1. Capital Improvement Program

Project Number	Capital Improvement Project	Recommended Schedule										
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 - 2040
Source Improvements												
	None Recommended at This Time											
Transmission Improvements												
	None Recommended at This Time											
Storage Improvements												
S1	Replace Center Tank #1 with 5 MG steel tank	$5,439,400										
S2	Replace Center Tank #2 with 5 MG steel tank			$5,439,400								
S3	Replace High Tank with 3 MG steel tank					$3,560,300						
S4	Prescott Tank seismic resiliency upgrades							$427,000				
S5	Replace Lindley Tank								$985,600			
S6	Ogden Tank seismic resiliency upgrades									$209,000		
S7	Replace Lynnewood Upper Tank										$627,400	
S8	Storage system security and structural improvements	$92,600	$92,600	$92,600	$92,600	$92,600	$92,600	$92,600	$92,600	$92,600	$92,600	
S9	Hilyard, Burns, Uhrmann, and Basin View tank recoating											$2,066,400
S10	Replace Tanglewood Tank											$976,200
S11	Replace Upper Moyina Tank											$709,500
Subtotal		***$5,532,000***	***$92,600***	***$5,532,000***	***$92,600***	***$3,652,900***	***$92,600***	***$519,600***	***$1,078,200***	***$301,600***	***$720,000***	***$3,752,100***
Pumping Improvements												
P118	Fire Flow Pump at Center Tank to Prescott Pressure Zone									$223,000		
P120	Fire Flow Pump to West Oregon Pressure Zone (includes associated piping improvements)										$466,000	
P204	Add Pumps by Hospital Tank to expand Crown Ridge Boosted Pressure Zone											$1,257,000
P205	Add Pumps by North Tank to create new pressure zone											$1,257,000
Subtotal										***$223,000***	***$466,000***	***$2,514,000***
Distribution Improvements												
D101	8” pipe in south Hospital/Uhrmann Pressure Zone		$1,717,500									
D102	8” pipe in west Main Central Pressure Zone		$647,000									
D103	8” pipe in Moyina Reduced Pressure Zone		$868,500									
D104	6”, 8”, and 12” pipe in the annex of Stewart Lenox /Lindley Pressure Zone		$1,369,400									
D105	8” and 10” pipe in Upper Moyina Pressure Zone		$1,797,300									
D106	8” and 12” pipe in West Klamath Reduced Pressure Zone		$706,600									
D107	8” and 12” pipe east of Prescott in Main Central Pressure Zone			$7,615,900								
D108	8” pipe west of Prescott in Main Central Pressure Zone				$982,000							
D109	8” pipe in Main South Pressure Zone, Washburn				$1,741,500							
D110	8” and 12” pipe in Prescott Pressure Zone					$6,411,900						
D111	8” pipe in Main East Pressure Zone, 6th Street						$4,234,000					
D112	8” and 12” pipe in north Stewart Lenox/Lindley Pressure Zone							$3,178,400				
D113	8” pipe in Upper Moyina Reduced Pressure Zone								$676,000			
D114	8” pipe in Eldorado Reduced Pressure Zone								$1,150,500			
D115	8” pipe east of Railroad and south of Highway 39 in Main Central Pressure Zone								$3,690,500			
D116	8” and 12” pipe near West Oregon in Main Central Pressure Zone									$3,886,800		
D117	12” pipe in Mollie’s Area Reduced Pressure Zone									$394,600		
D119	10” pipe in Upper Lynnewood Pressure Zone										$2,441,270	
D121	8” pipe in mid Hospital/Uhrmann Pressure Zone										$1,357,500	
D122	8” pipe near Conger Well Field in Main Central Pressure Zone											$76,500
D123	8” pipe in Patterson Pressure Zone											$1,045,000
D201	12” pipe to connect North Prescott to Prescott Tank											$25,800
D202	10” pipe to connect Upper and Lower Lynnewood											$180,000
D203	6” pipe to connect Lower and Upper Moyina											$7,200
Subtotal			***$7,106,300***	***$2,723,500***	***$7,615,900***	***$4,234,000***	***$6,411,900***	***$4,328,900***	***$4,366,500***	***$4,281,400***	***$3,798,770***	***$1,334,500***

Project Number	Capital Improvement Project	Recommended Schedule										
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 - 2040
Planning and Evaluation Studies												
E1	Water System Plan Update										$200,000	
Subtotal											***$200,000***	
Property Acquisition												
	None Recommended at This Time											
TOTAL		**$5,532,000**	**$7,198,900**	**$8,255,500**	**$7,708,500**	**$7,886,900**	**$6,504,500**	**$4,848,500**	**$5,444,700**	**$4,806,000**	**$5,184,770**	**$7,600,600**



LEGEND

- Phase 2 Pump
- Phase 2 Pipe
- Phase 1 Pump
- Phase 1 Pipe
- Existing Pipe
- Tank Improvements

Pressure Zones

- Basin View
- Crown Ridge Boosted
- ESI
- Eldorado Reduced
- Hospital/Uhrmann
- Katie Lane
- Main Central
- Main East
- Main South
- Mollie's Area Reduced
- Moyina Reduced
- North Hills Reduced
- Ogden Reduced
- Old Fort Road Reduced
- Patterson
- Prescott
- Sierra Heights
- Stewart Lennox/Lindley
- Tanglewood
- Upper Lynnewood
- Upper Moyina
- Upper Moyina Reduced
- West Klamath
- West Oregon

N

0.6 Miles

CITY OF KLAMATH FALLS
DRINKING WATER MASTER PLAN

Capital Improvement Program

TETRA TECH

FIGURE 9-1

10. UTILITY RATES AND CIP FUNDING OPTIONS

Water systems require continuous reinvestment in existing assets as well as financing for capital improvements to expand the system and replace assets beyond their service life. Therefore, financial viability is critical to management of the water system in order to meet customer needs. A water system remains financially viable and addresses operation and maintenance needs through rates and charges associated with water usage and system access. Capital improvements addressing new and replaced facilities are often addressed through a combination of rates, system development charges, loans, grants and municipal bonds.

This chapter outlines the City's current rate structure and funding mechanisms for capital improvements.

10.1 WATER UTILITY RATES

The City's water rate structure charges a flat rate capacity charge based on meter size plus a consumption charge per unit consumed (1 unit = 100 cubic feet or 747.9 gallons) that is the same for all customers ($2.82), as shown in Table 10-1. The City bills monthly based on whole units of water consumption. Additional consumption is carried to the next month's billing cycle. Customers residing within the city limits receive a 30 percent discount on the consumption charge.

Table 10-1. Water rate unit charges by meter size

Meter Size (inches)	Capacity Charge per Meter	Consumption Charge per Unit
5/8"	$1.47	$2.82
1"	$3.72	
1 ½"	$7.40	
2"	$11.83	
3"	$22.17	
4"	$39.98	
6"	$73.94	
8"	$118.27	

10.2 CAPITAL FUNDING RESOURCES

In addition to cash financing available from water rates, the City may use multiple sources to fund water system capital improvement program, as described below.

10.2.1 Government Programs

Federal and state grant programs were historically available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, significantly reduced in scope and amount, or replaced by low-interest loan programs. Remaining grants programs are usually lightly funded and heavily subscribed. Nonetheless, even the benefit of low-interest loans makes the effort of applying worthwhile. Funding programs for which the City might be eligible are described in the following sections.

Special Public Works Fund

The Special Public Works Fund provides funds for publicly owned facilities that support economic and community development in Oregon. Funds are available to public entities for:

- Planning, designing, purchasing, improving or constructing publicly owned facilities
- Replacing publicly owned essential community facilities
- Emergency projects as a result of a disaster.

This fund is available to cities, counties, special districts, and other municipally incorporated entities. Loans up to $10 million are available for small to large projects, with very favorable interest rates and terms up to 30 years for most projects. Limited grant funding is available for technical assistance and emergency projects based on financial analysis. Specific information can be obtained from staff in the Economic Development Division of Business Oregon (http://www.oregon4biz.com/directory.php?d=1).

Drinking Water Revolving Fund Loan and Drinking Water Source Protection Fund

Two state and federally funded loan programs are available for drinking water system improvements that are needed to maintain compliance with the federal Safe Drinking Water Act:

- The Safe Drinking Water Revolving Loan Fund is designed for collection, treatment, distribution and related infrastructure projects.
- The Drinking Water Source Protection Fund is designed for the protection of drinking water sources.

Both are funded by yearly grants from the EPA, matched with funds from Oregon's Water/Wastewater Financing Program. The program is managed by the Oregon Health Authority, and the loans are managed by the Oregon Infrastructure Finance Authority.

Funding is available for all sizes of water systems, although 15 percent of the funds are reserved for systems serving a population of fewer than 10,000. Owners can be a non-profit, private party or municipality, but systems cannot be federally owned or operated. To be funded, a project must solve an existing or potential health hazard or noncompliance issue under federal or state water quality standards. The following are the main types of eligible activities:

- Engineering, design, upgrade, construction or installation of system improvements and equipment for water intake, filtration, treatment, storage, transmission
- Acquisitions of property or easements
- Planning, surveys, legal/technical support and environmental review
- Investments to enhance the physical security of drinking water systems and water sources

The Safe Drinking Water Revolving Loan Fund program provides up to $6 million per project (more with proper additional approval) with the possibility of subsidized interest rate and principal forgiveness for disadvantaged communities. The standard loan term is 20 years or the useful life of project assets, whichever is less, and may be extended up to 30 years for a disadvantaged community. Interest rates are 80 percent of the state or local bond index rate. The maximum loan under the Drinking Water Source Protection Fund is $100,000 per project.

More information is available at http://www.orinfrastructure.org/Infrastructure-Programs/SDW/.

Rural Economic Development Loan & Grant Program in Oregon

The U.S. Department of Agriculture's (USDA's) Rural Economic Development Loan and Grant program provides funding for rural projects through local utility organizations. The program provides low-interest loans to

local utilities and in some cases a grant may be combined with a loan to reduce user cost. The program assists qualified applicants who are not otherwise able to obtain commercial credit or reasonable terms.

Eligible applicants include most state and local government entities, private non-profits and federally recognized tribes. Area that may be service include rural areas and towns with populations of less than 10,000, tribal lands in rural areas and low-income unincorporated areas.

Community Development Block Grant Program

Grants and technical assistance are available to develop liveable urban communities for persons of low and moderate incomes by expanding economic opportunities and providing housing and suitable living environments.

The application period opens annually on October 1 and closes December 31. Non-metropolitan cities and counties in rural Oregon can apply for and receive grants. All projects must meet one of three national objectives:

- The proposed activities must benefit low- and moderate-income individuals.
- The activities must aid in the prevention or elimination of slums or blight.
- There must be an urgent need that poses a serious and immediate threat to community health or welfare.

Funding amounts are based on the applicant's need, the availability of funds, and other restrictions defined in the program's guidelines. The maximum grants possible for any one project are:

- Public works water and wastewater improvements – $2,500,000
- Public works preliminary/engineering planning – $150,000
- Community/public facilities – $1,500,000
- Emergency projects – $500,000

Detailed information is available at http://www.orinfrastructure.org/Infrastructure-Programs/CDBG.

The Water Infrastructure Finance and Innovation Act Program

The Water Infrastructure Finance and Innovation Act program is a federal credit program administered by the EPA for water and wastewater infrastructure projects. Eligible borrowers are as follows:

- Local, state, tribal, and federal government entities
- Partnerships and joint ventures
- Corporations and trusts
- Clean Water and Drinking Water State Revolving Fund programs

The program can fund development and implementation activities for eligible projects:

- Projects that are eligible for the Clean Water State Revolving Fund, notwithstanding the public ownership clause
- Projects that are eligible for the Drinking Water State Revolving Fund
- Enhanced energy efficiency projects at drinking water and wastewater facilities
- Brackish or seawater desalination, aquifer recharge, alternative water supply, and water recycling projects
- Drought prevention, reduction, or mitigation projects
- Acquisition of property, if it is integral to the project or will mitigate the environmental impact of a project
- A combination of projects secured by a common security pledge or submitted under one application by a State Revolving Fund program

Eligible development and implementation activities are:

- Development phase activities, including planning, preliminary engineering, design, environmental review, revenue forecasting, and other pre-construction activities
- Construction, reconstruction, rehabilitation, and replacement activities
- Acquisition of real property or an interest in real property, environmental mitigation, construction contingencies, and acquisition of equipment
- Capitalized interest necessary to meet market requirements, reasonably required reserve funds, capital issuance expenses and other carrying costs during construction

Important program features include:

- Minimum project size of $5 million for communities of 25,000 or less
- Maximum funding of 49 percent of eligible project costs
- Maximum total federal assistance of 80 percent of a project's eligible costs
- Maximum final maturity date 35 years from substantial completion
- Maximum of 5 years that repayment may be deferred after substantial completion
- Interest rate equal to or greater than the U.S. Treasury rate of a similar maturity at the date of closing
- Projects must be creditworthy and have a dedicated source of revenue
- National Environmental Protection Act, Davis-Bacon, American Iron and Steel, and all other federal cross-cutter provisions apply.

10.2.2 Bond Financing

Revenue bonds secured by revenues of the issuing utility are commonly used to fund capital improvements that exceed a utility's financial resources. Revenue bonds typically bear higher interest rates than other types of debt and often require additional security measures to protect bondholders from default risk. Such measures may include the maintenance of dedicated reserves and minimum financial performance standards (e.g. bond debt service coverage).

Oregon law does not require a public vote for issuing revenue bonds. While there is no explicit statutory bonding limit, the conditions that come with revenue bonds often impose practical limits on a utility's level of indebtedness. Excessive levels of debt may reduce flexibility to phase in rate increases and increase the overall cost of capital investment given the related interest payments. Bond rating agencies also consider debt service coverage when assigning a debt rating—higher levels of indebtedness make it more difficult for a utility to meet the coverage ratios that rating agencies require for the highest rating. In recent years, coverage ratios required for higher ratings have often exceeded the minimum legal standards outlined in applicable bond covenants. Ratings are financially important because higher ratings generally provide access to lower interest rates.

10.2.3 System Development Charges

System development charges (SDCs) are one-time charges assessed on new development (growth) to pay for the costs of expanding public facilities. Growth creates additional infrastructure demand; SDCs provide a mechanism to allow new growth in a community to pay for its share of infrastructure costs rather than existing taxpayers or utility ratepayers. The City's current SDC rate charges are included as Appendix T.

The idea behind SDCs is that long-time residents have paid for the systems that are already in place through property taxes, utility rates, and other means. If those systems need to be expanded to accommodate growth, it is not paid for at the expense of the existing population.

State law authorizes SDC collection for growth-related expansion of water, sewer, parks, transportation, and stormwater management systems. State law requires a city to develop a methodology that takes into account the value of existing or planned capacity in the infrastructure system to serve new development. The law allows that an SDC may include a reimbursement fee, an improvement fee, or a combination of the two.

- The reimbursement fee is based on the value of available reserve capacity for capital improvements already constructed or under construction. The methodology must consider the cost of existing facilities, prior contributions by existing users, the value of unused capacity, grants, and other relevant factors. Reimbursement fee revenue may be spent only on capital improvements associated with the system for which the particular SDC is assessed, including expenditures relating to repayment of indebtedness.
- The improvement fee is designed to recover all or a portion of the costs of planned capital improvements that add system capacity to serve future development. The methodology must be designed in a manner that SDCs will not exceed the growth-related costs from the capital project list. Improvement fee revenue may be spent only on capacity-increasing capital improvements on the project list, including expenditures relating to repayment of debt for such improvements.

By state law, revenue from SDCs may not be used to repair existing infrastructure or to otherwise address existing deficiencies. In addition, SDC expenditures are limited by type (water SDCs cannot be used for sewer projects, sewer SDCs cannot be used for water projects, etc.).

REFERENCES

BergerABAM. 2018. Seismic Resiliency, Security, and Condition Assessment Report.

Golder. 1992. Wellhead Delineation Demonstration Project for the Conger Wellfield. Funded by the U.S. Environmental Protection Agency

Appendix A. Water Service Terms and Conditions

WATER POLICY

(Council Action 12-79; Public Works Director 6-86;
Administrative 11-97; amended 9-98; 10-02; amended 07/04)

All new construction that will connect to City Water, including existing structures that have never had City water service or have had service discontinued, shall conform to the City of Klamath Falls "Public Works Engineering Standards" (PWES) manual. The costs of the development and/or required extensions of public facilities shall be a part of the development cost and will be funded entirely by the development (or applicant) served.

Water Curtailment In the event the City Manager determines a water shortage emergency condition exists and authorizes emergency water curtailment measures such determination and water curtailment measures shall comply with Klamath Falls City Code, Water Curtailment Plan Sections 4.390 to 4.395.

In the event that the City is forced to curtail or reduce water supply to any current customer, the curtailment will be administered according to Klamath Falls Water Management and Conservation Plan, Section 4.

In an **EXTREME** water emergency, priority of water service shall be given to Public Health facilities within and outside City Limits

Water Service Extension Policy (Resolution No. 04-23, rescinded Resolution 3340). The following are the water service extension policies:

1. The City provides water service in its proprietary capacity.
2. City will continue to provide water service to all existing services outside the City limits as of the date of this policy. Any person or business requesting an increase to existing commercial or industrial water services outside the City (including the addition of a new fire service), or proposing the conversion of existing residential use to commercial or industrial use, shall be required to sign a consent to annex form before water service is increased or extended, and the City will immediately initiate annexation if the subject property is contiguous with the City.

3. Water service will be granted to new applicants as long as surplus water capacity exists. Applicants will receive water service according to the following priority schedule:
    A. Property and new development within the City limits;
    B. Residential property outside the City, if the lot (parcel) size is one acre or less;
    C. New subdivisions, parcels larger than one acre, or development outside the City.
4. City will comply with state laws regarding the extension of water service beyond the Urban Growth Boundary.
5. Regarding new water service extensions outside the City limits, any person or business initiating a new subdivision or a partition when the total of all parcels exceeds one acre or proposing any commercial or industrial development shall be required to sign a consent to annex form before water service is extended, and the City will initiate annexation immediately if the subject property is contiguous with the City.

Frequently quoted Water Policy details

Water main extensions will be constructed "to the full extent" of the property to be served, plus twenty (20) linear feet. See PWES, Section 7-4.2

All construction plans and specifications will be approved by the City Department of Public Works. The City will inspect all construction and the developer will pay inspection fees per the PWES, Section 2.

City water mains will be sized per the PWES, Section 7-4.1. In no case will water mains be smaller than eight (8) inches in diameter in residential areas and twelve (12) inches in commercial/industrial areas.

The City may fund "over-sizing" expenses for contractor (developer) installed water mains that are larger than twelve (12) inches. Financial and construction agreements must be finalized before construction.

The City will:

- Evaluate all damage to Water Division property and infrastructure promptly.
- Evaluate all customer inconvenience reports (pressure, smell, taste etc.) as soon as possible after receipt.

- Remove any water meter that indicates water consumption, in the absence of a "signer of record" after six months of inactivity.
- Reinstate meters that were removed from safe and usable service settings upon receipt of a $50 reinstatement fee. This section does not apply to services that are involved in non-payment, water theft or water quality disputes.
- Increase water service size at any existing service location, provided the distribution system will support the increased capacity and the customer pays all appropriate installation costs and System Development Charges.
- Maintain minimum water pressure of twenty (20) pounds per square inch at the "point of service" (see PWDS Section 7-2.1.8), as required by the Oregon Health Division.
- Require cross-connection control (back-flow prevention) devices at all water services where water system contamination **MAY** be possible.

Permanent changes to a water service that are required because of customer action or neglect will be billed to the customer at established "time, material and equipment" rates, plus a 15 percent administrative fee.

Fees and charges required for water service installation, per City Code, are due and payable at the time of application for service. Applicants will provide all required property identification and billing information before fees and charges are accepted.

All services, larger than two (2)-inch in diameter will be installed by a licensed contractor at the applicant's expense. Please note PWES Section 7-4.4.

All fire hydrants will be installed by the developer or licensed contractor at the time of original construction at the applicant's expense per PWES 7-5.5.

City of Klamath Falls 2020 Water Master Plan

Appendix B. 2018 Water Storage Seismic Study

Water Tank Vulnerability Assessment

City of Klamath Falls
Potable Water Storage Tank Seismic, Security, and Condition Evaluation

Submitted to

City of Klamath Falls
Klamath Falls, Washington

DRAFT

25 May 2018

Submitted by

BergerABAM
700 NE Multnomah Street, Suite 500
Portland, Oregon 97232-4120

A18.0067.00

WATER TANK VULNERABILITY ASSESSMENT

City of Klamath Falls
Potable Water Storage Tank Seismic, Security, and Condition Evaluation

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SECTION 1.0 BACKGROUND

The City of Klamath Falls (City) operates and maintains 22 potable water storage facilities within five pressure zones. These assets vary in size from 0.13 million gallons (MG) to 1.47 MG and in age from 23 to 90 years in service. During its service life, the water system has expanded, in many cases, through acquisition of developer-designed and constructed storage tanks. The City is the third owner of the water system. The result today is 21 steel tanks on 19 separate sites (the Stewart-Lennox concrete tank was not evaluated as part of this project). Of all the assets, only the Basin View Tank was designed according to current seismic code; the Prescott Tank was designed to a previous seismic code. Although City staff has done an exceptional job maintaining these facilities, age has taken its toll; even well-maintained, functional assets become obsolete and expensive to maintain. The City is experiencing the result of this aging through continued noted vulnerabilities reported by the regular Oregon Health Authority (OHA) water system surveys (formerly referred to as Sanitary Surveys). Because of the issues of age, condition, the number of tanks in the system, and the seismic and security vulnerabilities that go along with older facilities, this system-wide comprehensive evaluation of the assets' vulnerabilities was undertaken.

Currently, there are no federal or state regulatory requirements pertaining to seismic resiliency retrofitting or security measures for potable water storage facilities. Further, facility condition requirements are only dictated by an ability to deliver potable water that meets Safe Drinking Water Act requirements. In the absence of regulatory mandates, the recommendations of this study have been based on the desired level-of-service and performance criteria outlined by the City.

This project is designed to provide a comprehensive assessment of all 21 steel storage tanks in terms of seismic resiliency, security vulnerability, coating condition, corrosion, and appurtenances. This comprehensive evaluation has yielded real long-term opportunities for maintenance cost reduction, streamlined operation, and greater resiliency and reliability. This study provides the City with a plan to efficiently, cost-effectively, and comprehensively upgrade the potable water storage system.

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SECTION 2.0 PROJECT APPROACH

This evaluation was executed through a combination of workshops, desktop analysis, and field evaluation data collection. The project began with a workshop with City staff to:

- Review the tank asset prioritization ranking scores and adjustments.
- Review the security design basis threats, risks, and objectives.
- Determine the seismic design basis event.
- Review opportunities for system optimization.
- Review system/asset specific information pertinent to the project.

A priority ranking of the storage tanks and the criteria for scoring is shown in Table 1. The scoring criteria is included as Appendix A. The prioritization was conducted to assist with prioritization of improvement project.

Based on the workshop results, the guidelines for performance measurement were determined to be:

- All storage assets (classified as critical facilities) will be designed to withstand a 7.4-magnitude (M) seismic event originating from a local fault.
- Asset appurtenances will be evaluated against American Water Works Association (AWWA) industry standards for steel tanks, Oregon Health Authority (OHA) requirements for public health, and Occupational Safety and Health Administration (OSHA) worker safety standards.
- The primary security concern was identified as local nuisance trespassing.
- The priority objectives of security measures were identified as:
    1. Protecting water quality
    2. Restricting access to tank hatches
    3. Providing record/notification of unauthorized access
    4. Restricting site access

Following the project workshop, the project team conducted on-site inspections of each of the twenty-one steel storage tanks. During the inspections a detailed evaluation was conducted of coatings and corrosion, structural construction and condition, safety and general condition, and security. For some assets of concern an on-site geotechnical review was included. The findings of these inspections are discussed in the subsequent sections of the report. Asset specific field reports and photo records are included as Appendix B to this report.

In addition to the field inspections, a geotechnical profile of each site, using a 500 foot radius, was developed to predict the nature of ground motion occurring during the design basis event. This study used the structural, geotechnical, security, and condition data collected to develop costs for upgrade rehabilitate, or replacement of each asset.

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Finally, understanding that there was the potential for costly improvements to old facilities, the project conducted a holistic, conceptual hydraulic evaluation of the system to determine which, if any, storage facilities could be removed from the system or replaced with a reduced number of facilities without impacting service. The results of each of these project elements and recommendations for going forward are described in the following sections of this report.

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Table 1. Storage Asset Priority Ranking

Priority Rank	Tank Name	Year Built	Volume Rank	Age	Service Area Population Rank	Source to Other Tanks	Seismic Code Compliance	Security Score	Condition Score	Criticality Multiplier	Total Score
1	Center East	1928	14	89	22	20	10	5	3	1.5	245
2	Center West	1930	13	87	21	20	10	5	4	1.5	240
3	Hospital	1964	8	53	11	2	10	5	3	1.5	138
4	North	1928	9	89	15	2	10	5	3	0.7	93
5	Uhrmann	1998	19	19	5	1	5	5	2	1.5	84
6	Bowen	1994	21	23	20	1	5	5	2	1	77
7	High	1931	6	86	10	1	10	5	4	0.6	73
8	Ogden	1975	15	42	19	5	10	6	3	0.7	70
9	Melrose	1939	12	78	18	1	10	5	3	0.4	51
10	Moyina Lower	1950	1	67	3	1	10	6	5	0.4	37
11	Hilyard	1995	16	22	17	1	10	5	3	0.5	37
12	Moyina Upper	1955	4	62	6	0	10	6	2	0.4	36
13	Patterson 1	1975	18	42	14	3	5	5	2	0.4	36
14	Burns	1994	20	23	16	0	5	5	2	0.5	36
15	Tanglewood	1960	5	57	1	0	10	5	3	0.4	32
16	Lynnwood Lower	1974	2	43	12	1	10	5	2	0.4	30
17	Lynnwood Upper	1973	3	44	4	0	10	5	2	0.4	27
18	Lindley	1982	10	35	7	1	5	5	3	0.4	26
19	Prescott	1995	22	22	9	0	5	5	2	0.4	26
20	Patterson 2	1998	7	19	13	3	5	5	5	0.4	23
21	Stewart Lennox	2007	17	10	8	1	0	8	2	0.4	18
22	Basin View	2005	11	12	2	0	0	5	2	0.4	13

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SECTION 3.0 ASSET SECURITY ASSESSMENT

In 2003, the City conducted a water distribution system security vulnerability assessment in compliance with the federal Public Health Security and Bioterrorism Preparedness and Response Act. The assessment was conducted according the Risk Assessment Methodology for Water (RAM-W). At the time there was a heightened sense of concern because the Air National Guard's 173rd Fighter Wing was located in the City. Under the RAM-W methodology, a design basis threat was identified that was influenced by the presence of the military base. Fourteen years later and after review of the assets, it is apparent that the greatest risk to the storage facilities is nuisance trespassing typically associated with young adults climbing the facilities. All of the asset sites showed evidence of site/asset access. There has been no evidence or reports of attempts to access the contents of the tanks.

Based on these observations, the City redefined the design basis threat to reflect a casual trespasser more intent on tank climbing and graffiti rather than a deliberate attempt to compromise water quality. However, water quality remains of utmost importance to the City. Therefore, the following prioritized list of security objectives was identified:

1. Protection of water quality and public safety
2. Restriction of access to tank hatches
3. Recording/notification of unauthorized asset access
4. Restriction of site access

Based on these priorities each site was evaluated in the field for the following:

- Evidence of past intrusions
- Perimeter fencing
- Perimeter security
- Security gate
- Site surveillance
- Secured roof access
- Secured access hatch
- Secured vents
- Hatch intrusion alarms
- Intrusion isolation valves
- Alarms (audible or silent)

Table 2 provides a summary of the security features for each site.

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Table 2. Site Security Feature Summary

Asset	Security Issue											
	Evidence of Past Intrusions	Perimeter Fencing[1]	Perimeter Security[2]	Security Gate[3]	Site Surveillance	Secured Roof Access	Secured Access Hatch	Security Vent[4]	Hatch Intrusion Alarms	Intrusion Isolation Valves	Secured I/O, Valves, and Controls	Alarms (Audible or Silent)
Basin View	Yes											
Bowen	Yes											
Burns	Yes											
Center North	Yes											
Center South	Yes											
High	Yes											
Hilyard	Yes											
Hospital	Yes										NA	
Lindley	Yes							5				
Lynnwood Lower	Yes											
Lynnwood Upper	Yes											
Melrose	Yes											
Moyina Lower	It is recommended that no further investment be made in this asset											
Moyina Upper	Yes											
North	Yes											
Ogden	Yes											
Patterson #1	Yes										NA	
Patterson #2	Yes											
Prescott	Yes											
Tanglewood	Yes			6							NA	
Uhrmann	Yes											

1. Consistent and continuous chain link fence on 100% of the perimeter
2. Security fencing defined as 8 feet high with stranded barb wire secured to top and bottom rail *or* bottom buried 1-foot below grade.
3. Gate designed and installed to prevent unauthorized pedestrian and vehicle entry.
4. Vent designed to prevent direct access to the tank contents
5. The vent is secured with a nonstandard drum cap welded over the vent, making inspection impossible.
6. No vehicular access gate.

Site security feature color code:

	Absent
	Present
	Present, but inadequate, or incomplete

Generally, the security condition of the sites, relative to the identified security objectives, is poor. Beginning at the perimeter, fencing is present at all but two sites (Upper and Lower Moyina); however, the fencing does not serve as a security function at any of the sites. Sites showed evidence of past intrusion or damage from climbing, digging, removal of sections by staff, damage from rock slides, improper installation, inappropriate fencing material, and lack of top and/or bottom rails.

All sites were equipped with a vehicle/pedestrian gate, with the exception of Tanglewood, which had only a pedestrian gate. However, only the Tanglewood gate was properly installed to at least deter entrance. All other gates were inadequate from a security perspective because of improper installation, damage, or improper materials. The perimeter fencing and gates serve to demarcate the property boundaries of each site but provide no security value. At some locations the perimeter fencing was absent, and the boundary was marked by the adjacent property owner's fence.

All facilities showed some evidence of previous intrusion, or attempted intrusion, indicated by spray paint, etching of the coatings at ground level and on the roofs, bullet marks, rocks, and footprints. Some ladder gates, which were constructed of only 1/8-inch steel, showed evidence of attempts of bending the gate far enough to gain access. It was not possible to tell how recent the intrusions were, but "dated" graffiti indicated that there has been unauthorized activity at some facilities at least since the early 1990s.

The newer facilities (post-1990) are constructed with concrete vaults and steel hatch doors; however, the steel hatch doors are not locked and can be opened with a standard screwdriver. Roof access ladder security varied from no security, to post-construction installations that were either not secured or constructed of inadequate thickness steel, to fully designed and integrated cage gate/ladder guards. All facilities with some sort of ladder guard/cage gate were found to be locked. Newer tanks with ladder guards installed at the time of construction showed reduced evidence of unauthorized access, but not in all cases, as evidenced by graffiti at the top of Prescott Tank.

On the roofs, all hatches were found to be locked. Most roofs showed some sort of activity ranging from painting and etching, vent tampering, unauthorized activities, and rock throwing. Some of the newer facilities did have adequate vent covers to deter the design basis threat. The older facilities are not equipped with secure vents. In two cases, staff have installed vent covers that are secure, but they were welded in place, which prevents inspection or maintenance. There were, in two cases, open 1-inch drilled holes present from previously removed equipment that provided direct access to the tank contents.

None of the tanks are equipped with alarms/motion detectors to respond to or cameras to record unauthorized activity for prosecution. Prescott Tank has one "dummy" camera

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installed along with signage, but at the time of inspection, the camera was aimed at the tank wall. None of the sites are equipped with motion-activated site illumination.

An observed security issue related to the storage tanks, but off site, was key management. In order to conduct site inspections, the team was provided with a master key. That key provided access to every gate, access ladder, and tank hatch in the system. When staff has a large number of facilities, with multiple locks per site, a master key is necessary for efficiency. However, in such a situation key management is critical. Staff noted that each time a new lock is ordered, a new master key is provided with the lock. Assuming that each of the 22 tank sites has an average of three padlocks per site (gate, access ladder, and hatch), there are approximately 60 master keys in circulation that provide full, unrestricted access to all of the City's storage facilities. While this issue is outside the site security focus of this evaluation, it is recommended that the City review master key protocol and procedures and consider the following:

- A formal key check-out/check-in procedure
- Site-specific master keys or a separate master key for tank access hatches
- Securing the key inventory
- Maintaining a manageable number of keys rather than keeping all that have been provided
- Evaluation of "smart key" technologies that allow greater access control thorough access hierarchies, key activation/deactivation, key location, ingress/egress record keeping, and key management

3.1 Security Upgrade Recommendations

Table 3 summarizes the recommendations pertaining to security improvements for each asset. The table is color coded to reflect the priority of the recommendations. The recommendations that have been categorized as "priority upgrade" (RED) are needed to meet the City's prioritized security objectives of:

1. Protection of water quality and public safety
2. Restriction of access to tank hatches
3. Recording/notification of unauthorized asset access
4. Restriction of site access

Upgrades that are recommended for overall security, but not needed immediately to meet the City's objectives, are categorized as "secondary" (YELLOW) and can be implemented in the course of other site improvements. GREEN indicates adequate measures are in place.

3.2 Special Considerations

With the exception of Upper and Lower Moyina tanks, all sites have some style of fencing present demarcating the sites property boundary. All sites show damage to the fencing from previous intrusions and at the sites where fencing present, it does not provide a level of security. Because the fencing is on the property lines, the amount of

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fencing can be substantial and well in excess of what is needed to secure the tank, such as at the Patterson and Ogden sites. As the City considers installing security fencing, it is recommended that consideration be given to reducing the security fencing to the minimum footprint necessary to secure the tank while providing operations and maintenance space. The cost estimates presented later in this report have assumed a reduced footprint of 10 feet from the tank foundation to calculate the linear feet of security fencing required.

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Table 3. Site-Specific Security Recommendations

ASSET	Ladder Security	Motion Detection Surveillance Camera at Top of Roof Access Ladder	Security Vent	Motion Detection Illumination at Top of Roof Access Ladder	Access Hatch Intrusion Alarm	Hatch Intrusion Alarm Activated Automated Tank Isolation Valve	Security Vehicle/ Pedestrian Access Gate	Security Perimeter Fencing	Locks for All Vault Ingress Points	Concrete Vault Locking Steel Doors	Commercial Grade Steel Door and Locks on Building Ingress Point	Internal Security Steel Louvres on Window Ingress Points	Steel Roofs on Tank Operational Buildings	Secure Steel Controls Cabinet
Basin View										NA	NA	NA	NA	
Bowen	B									NA	NA	NA	NA	
Burns										NA	NA	NA	NA	
Center East	A													
Center West	A													
High	A													
Hilyard									NA	NA	NA	NA	NA	
Hospital	B								NA	NA	NA	NA	NA	
Lindley	B								NA		NA	NA	NA	
Lynnwood Lower	B									NA				
Lynnwood Upper	B								NA	NA	NA	NA	NA	
Melrose	A								NA	NA				
Moyina Lower	It is recommended that no further investment be made in this asset													
Moyina Upper	A								NA	NA	NA	NA	NA	
North									NA	NA				
Ogden	A									NA			NA	
Patterson #1	B										NA	NA	NA	
Patterson #2	A										NA	NA	NA	
Prescott										NA	NA	NA	NA	
Tanglewood	A								NA	NA	NA	NA	NA	
Uhrman										NA		NA	NA	

A – Integrated gate and ladder cover design
B – Hinged gate ladder cage ingress style

	Priority upgrade
	Secondary consideration
	Adequate measures are in place

SECTION 4.0 GEOTECHNICAL CONDITIONS ASSESSMENT

Shannon & Wilson conducted a conceptual-level review of geotechnical, geologic, and geo-seismic risks for each of the City's 21 steel potable water storage tanks. This review was performed in two distinct parts. First, a site visit was conducted for 12 of the tanks deemed the most vulnerable to geohazards. Second, a geo-seismic hazard assessment was performed following the Oregon Department of Geology and Mineral Industries (DOGAMI) methodology.

4.1 Geologic Setting

The Klamath Falls area lies along the northwestern edge of the Basin and Range physiographic province, just east of the High Cascades. The near-surface geology of the area represents a complex interaction between Cascade volcanism, tectonic extension, and sedimentation. Relevant excerpts of the mapping are shown in Appendix C (Geologic Map, Figure 1).

Volcanism in the Cascade Range is caused by the ongoing subduction of oceanic crust beneath the North American tectonic plate. The location of the volcanism with respect to the subduction zone is related to the angle at which the oceanic plate is subducting. That angle is a product of the age and rate of the plate subduction. Subduction-related volcanism is responsible for producing many of the 2-million- to 7-million-year-old basalts, basaltic andesites, and igneous intrusions.

Tectonic extension is common throughout the Basin and Range physiographic province and locally occurs in a northeast-southwest direction. The ongoing extension is accommodated by generally northwest-trending faults, which cause the valleys to subside relative to the parallel mountain ranges. This relative subsidence has shaped the Klamath Falls area topography into the long, northwest-trending valleys and parallel mountain ranges it is today.

Sedimentation in the Klamath Falls area varied greatly over geologic time, depending on the dynamic interplay between climate, topographic relief, and regional drainage patterns. This resulted in extensive deposits of cream-colored, diatomaceous, ash-rich mud, much like the modern lake mud of Upper Klamath Lake. Many of the ancient sediments, both from alluvial fans and from lake beds, lithified over time into sedimentary rocks, including conglomerates, sandstones, and mudstones. Unconsolidated sediment is still prevalent at the ground surface in the valley floors and on colluvial slopes in the uplands.

4.2 Seismic Setting

Earthquakes in the Pacific Northwest occur largely due to collision between the North American continental plate and the Juan de Fuca and Gorda oceanic plates. The continental and oceanic plates meet along a mega thrust fault called the Cascadia Subduction Zone (CSZ). The CSZ runs approximately parallel to the coastline from northern California to southern British Columbia. Compressional forces that exist

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between the colliding tectonic plates cause the denser oceanic plates to descend, or subduct, beneath the overriding continental plate. In the vicinity of the project sites, the majority of local seismic activity is due to ongoing regional extension in the Basin and Range province.

Shallow crustal faults and folds throughout Oregon have been located and characterized by the United States Geological Survey (USGS). The USGS provides approximate fault locations and a detailed summary of available fault information in the USGS Quaternary Fault and Fold Database. The database defines four categories of faults, Class A through D, based on evidence of tectonic movement known or presumed to be associated with large earthquakes within the last 2.6 million years. For Class A faults, geologic evidence demonstrates that a tectonic fault exists and that it has likely been active within that period. For Class B faults, there is equivocal geologic evidence of tectonic deformation, or the fault may not extend deep enough to be considered a source of significant earthquakes. Class C and D faults lack convincing geologic evidence of tectonic deformation in the last 2.6 million years, or have been studied carefully enough to determine that they are not likely to generate significant earthquakes.

According to the USGS Fault and Fold database, there are nine Class A faults within 25 miles of the approximate project area center, near the intersection of Washburn Way and the Klamath Falls-Malin Highway (OR39). The fault names, general locations relative to the project area center, and the times since their most recent deformation are summarized in Table 4. Class A faults locations are also shown on the Geologic Map, Figure 1 (Appendix C). The CSZ itself is approximately 180 miles to the west, with an average slip rate of approximately 1.5 inches (40 millimeters) per year, and the most recent deformation occurred about 300 years ago.

The most recent major earthquakes in the Klamath Falls area occurred on 20 September 1993. There were two main shocks, one M 5.9 and one M 6.0, and hundreds of smaller earthquakes with magnitudes below 3.9. The epicenters of both main shocks were located within the Mountain Lakes Wilderness, about 20 miles northwest of the center of this project's area. The earthquakes caused widespread landslides and rock falls, localized ground cracking, and significant damage to buildings and other infrastructure.

4.3 Geotechnical Evaluation Approach

Shannon & Wilson conducted a preliminary desktop review of each reservoir site and identified 12 sites of concern for field review. The site visits provided a conceptual-level review of the site conditions, tank foundation conditions, and geotechnical and geologic hazards at the site. The purpose of these site visits was not to provide a detailed geologic reconnaissance and identification of areas where risks are more significant and future study is warranted. A summary of each site visit is included as part of the field reports included in Appendix B. An overview of the important hazards is shown in Table 5.

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Table 4. USGS Class A Faults in the Klamath Falls Study Zone[a]

Fault Name	USGS Fault ID	Approximate Distance and Direction from Approximate Site Center [b]	Slip Rate [c]	Time Since Last Deformation [d]
Klamath Graben Fault System South Klamath Lake Section	843C	1.6 miles N-NE 4.4 miles W 5.7 miles SW	0.2 to 1.0 mm/yr	<15 ka
Faults on Modoc Plateau	840	4.9 miles NE	<0.2 mm/yr	<1.6 Ma
Sky Lakes Fault Zone	844	14.2 miles W-SW	<0.2 mm/yr	<15 ka
Gillem-Big Crack Fault System	3	19.7 miles S-SE	0.2 to 1.0 mm/yr	<130 ka
Cedar Mountain Fault System Mahogany Mountain Section	2A	19.9 miles SW	0.2 to 1.0 mm/yr	<15 ka
Cedar Mountain Fault System Cedar Mountain Section	2B	21.8 miles SW	0.2 to 1.0 mm/yr	<15 ka
Klamath Graben Fault System East Klamath Lake Section	843B	22.5 miles N-NW	<0.2 mm/yr	<1.6 Ma
Klamath Graben Fault System West Klamath Lake Section	843A	24.3 miles NW	0.2 to 1.0 mm/yr	<130 ka
Cedar Mountain Fault System Ikes Mtn.-Mt. Hebron Section	2C	24.6 miles SW	<0.2 mm/yr	<15 ka

a Information presented is based on USGS Quaternary Fault and Fold Database (Bryant, 2000, Personius, 2002)

b Approximate distance from site center (assumed to be the intersection of Washburn Way and the Klamath Falls-Malin Highway/OR39) to the nearest extent of fault mapped at the ground surface.

c mm/yr = millimeters per year; N/A = not available.

d Ma = "Mega-annum" or million years ago; ka = "kilo-annum" or thousand years ago.

4.3.1 Oregon Department of Geology and Mineral Industries Analysis

The Oregon DOGAMI developed a publication (open-file report O-13-06) based on the Oregon Resilience Plan CSZ scenario for the state of Oregon. The publication consists of GIS data of site conditions, ground motions, ground deformations, and other hazards associated with a M 9.0 event on the CSZ. The publication's datasets of interest for this project include the following:

- Shear Wave Velocity within 30 meters of the Ground Surface (V_{s30})
- Bedrock and Site Peak Ground Acceleration (PGA)
- Bedrock and Site 1-second Spectral Acceleration (SA1)
- Bedrock and Site Peak Ground Velocity (PGV)
- Liquefaction Susceptibility and Probability
- Earthquake-Induced Landslide Susceptibility and Probability

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Table 5. Summary of Site-Specific Risk Factors

Asset	Seismic Risks				
	Liquefaction	Landslide	Rock Fall Hazard	Foundation Quality	Notes
Basin View	Low	Medium	Low	Good	Low hazard
Bowen	Low	Low	Negligible	Good	Rock cut to the northwest requires some maintenance; Fill slope to the northeast is very steep.
Burns	Low	Medium	Low	Good	Some deterioration of the fill slope to the northeast; should be monitored
Center #1	Low	Medium	Negligible	No Fdn	Low hazard
Center #2	Low	Medium	Negligible	No Fdn	Low hazard
High	Low	Medium	Low	No Fdn	Weathering of upslope rock cut causes maintenance but does not appear to pose a significant geologic hazard
Hilyard	Low	Medium	-	-	No Geotechnical Site Visit
Hospital	Low	Medium	High	No Fdn	Large balanced rock should be removed
Lindley	Low	Medium	-	-	No Geotechnical Site Visit
Lynnwood Lower	Low	High	High	Poor	Risk of rock cut collapse; signs of differential settlement of the foundation
Lynnwood Upper	Low	Medium	Low	Very Poor	Signs of differential settlement of the foundation
Melrose	Low	Medium	None	No Fdn	Neighbor to the south-east draining water which is causing scour of the side slope should be addressed
Moyina Lower	Low	Medium	-	-	No Geotechnical Site Visit
Moyina Upper	Low	High	Low	No Fdn	Drainage to the south is eroding access; Fill slope to the southwest of tack is steep.
North	Low	Medium	-	-	No Geotechnical Site Visit
Ogden	Low	Medium	-	-	No Geotechnical Site Visit
Patterson #1	Low	Medium	High	Poor	Evidence of rock fall hazard near this tank
Patterson #2	Low	Medium	Low	Good	Low Hazard
Prescott	Low	Medium	-	-	No Geotechnical Site Visit
Tanglewood	Low	Medium	-	-	No Geotechnical Site Visit
Uhrman	Low	Low	Low	Excellent	Low Hazard

NOTE: "No Fdn" indicates that there is no foundation for this tank.

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Within the Klamath Falls area, the methodology indicates that the majority of these datasets were derived based on the Relative Earthquake Hazard Map of the Klamath Falls Metropolitan Area; the Oregon Geologic Data Compilation (OGDC) Release 5; and the Statewide Landslide Information Database for Oregon Release 2. The bedrock ground motions included in the publication were provided to DOGAMI by the USGS and are based on the USGS Cascadia M 9.0 scenario ShakeMap.

Following the publication of the open-file report O-13-06, DOGAMI published Release 3.3 of the Statewide Landslide Information Database for Oregon (SLIDO-3.3). The Geologic Map shown in Figure 1 (Appendix C) is from DOGAMI's Geologic Map of the Klamath Falls Area which is more specific to the Klamath Falls area than the statewide OGDC. Locations for historic shear wave velocity measurements are included in DOGAMI's Earthquake Hazard Maps and Seismic Risk Assessment for Klamath County, Oregon. These publications have not been incorporated into DOGAMI's CSZ scenario datasets.

4.3.2 Design Basis Seismic Event

For this analysis, the available ShakeMap data for planning scenarios, including the M 9.0 CSZ scenario used in DOGAMI's analysis was reviewed. The planning scenario that results in the highest ground motions in the Klamath Falls area is the ShakeMap for the M 7.4 Klamath Graben Fault System (east), which has an assumed epicenter about 14.5 miles northwest of the approximate site center in Upper Klamath Lake. The earthquake scenarios were developed for specific assumed events by the USGS for use in planning for potential future earthquakes and do not incorporate the likelihood of the assumed event occurring.

4.3.3 Seismic Hazard Maps

The purpose of the seismic hazard maps is to delineate the ground shaking and permanent ground displacement hazard across the service area based on an M 7.4 earthquake on the Klamath Graben Fault System. Ground shaking hazard is delineated in terms of the following:

- Peak ground acceleration (PGA)
- 0.3-second spectral acceleration (SA_{03})
- 1-second spectral acceleration (SA_1)
- 3-second spectral acceleration (SA_3)
- Peak ground velocity (PGV)

Permanent ground displacement (PGD) hazard is delineated by the following:

- Probability of liquefaction
- Probability of earthquake-induced sliding

These maps were derived using the same approach as the DOGAMI O-13-06 maps, but using bedrock ground motions from the M 7.4 Klamath Graben Fault System scenario, landslides from SLIDO-3.3, and geologic mapping from GMS-118. Also provided are

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maps developed as intermediate steps in deriving the final hazard maps, including liquefaction hazard and landslide susceptibility. Modifications to the O-13-06 methodology are summarized below.

4.3.4 Shear Wave Velocity, V_{s30}

Values of V_{s30} were assigned to the geologic map units based on information from publications GMS-118, IMS-19, and IMS-20. These values are estimates and assume that the material in the upper 100 feet is uniform. V_{s30} is the determining factor for selecting Site Classes, an input to most of the ground shaking and hazard calculations. The map of V_{s30} and Site Class is included in Appendix C Figure 2.

4.3.5 Ground Shaking

The PGA, SA_{03}, SA_1, and SA_3 site amplification factors for the Klamath Falls area were calculated from the V_{s30} raster described above. Using the approach referenced in O-13-06, the site amplification factors were applied to the USGS scenario bedrock PGA , SA_{03}, SA_1, and SA_3 maps to produce PGA , SA_{03}, SA_1, SA_3, and PGV maps modified for Site Class. Maps of PGA, SA_{03}, SA_1, SA_3, and PGV are included in Appendix C as Figures 3, 4, 5, 6, and 7, respectively.

4.3.6 Liquefaction Hazard and Probability

Liquefaction hazard classifications of "None" or "Low" were assigned to the geologic map units based on information from publications GMS-118, IMS-19, and IMS-20. These assume that the material is saturated; unsaturated soil will not liquefy, but may settle. A map of the liquefaction hazard is included in Appendix C as Figure 8.

The liquefaction hazard map described above followed the methods presented in O-13-06 and was used as the basis to develop a map of liquefaction probability included in Appendix C as Figure 9.

4.3.7 Landslide Susceptibility and Probability

The methodology described in O-13-06 using the GMS-118 geologic map units with SLIDO-3.3 landslide mapping as the base map was followed. Geologic groups were assigned to mapped units based on information from publications IMS-19 and GMS-118. Landslide susceptibilities were assigned assuming both "dry" and "wet" conditions (assuming the groundwater level is below the level of sliding or at the ground surface). Because DOGAMI's slope map was not included in O-13-06, a slope map was calculated from LiDAR data of the area to complete the landslide susceptibility maps. The landslide susceptibility maps for dry and wet conditions are included in Appendix C as Figures 10 and 11, respectively.

Using the refined landslide susceptibility and PGA maps described above, and following the methods presented in O-13-06, the probability of earthquake-induced landslides for dry and wet conditions was calculated. The results are included in Appendix C as Figures 12 and 13, respectively.

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4.4 Conclusions

The previous Table 5 summarized the severity of hazards at each of the assets. The risks described in the table are based on a high-level evaluation. These hazards are derived from the brief site visits performed and not the result of detailed analyses of the tank sites. In some cases, a detailed analysis will be required to better quantify each geo-seismic risk for a given reservoir site.

4.4.1 Highest Geotechnical/Geologic Risk Assets

The Lower Lynnwood reservoir is located just to the east of a tall rock cut that was likely constructed to facilitate its construction. The exposed rock seen in the rock cut has regular jointing that dips down towards the open face of the cut, which is considered problematic because failures in rock cuts tend to occur along preexisting joints. A large pile of rock debris that has fallen out of the open face can be found at the base of the rock cut. This is evidence that the face is not stable, and large chunks of rock should be expected to continue to fall off the face even without a large shaking event. To better understand the expected performance of this rock cut in a large seismic event similar to the one used in this study, a more detailed analysis is required. Geologic mapping of the face of the rock cut and other outcrops in the area can be used to create a stability model that can be used to better assess the geo-seismic risk. This study would help determine if an engineered solution, such as using rock bolts, could improve the seismic performance of the slope.

4.4.2 Other Geotechnical/Geologic Risks to Assets

The Hospital reservoir is also located at the base of a large rock cut. There are some large rock outcrops along the top of this rock cut that appear to be at risk of tumbling down to the tank. There is already a large block that has been dislodged and has descended part of the cut slope. It is roughly 5 feet in diameter and can be seen perched above the tank halfway down the hillside. To better quantify the geologic and geo-seismic risk, a focused geologic study of the stability of this rock slope would be required.

There is also a large rock outcrop to the east of Patterson No. 1 that has a large fallen block laying on the slope below it. Over time, it should be expected that this rock will shed additional blocks. While the garage associated with the residential property to the east may intercept most rocks that tumble towards the tank, a rock fall analysis may help quantify the risk.

4.4.3 Other Issues

There are a number of tanks without foundations. In particular, the Upper Moyina reservoir appeared to have extensive animal borrow holes beneath it. For areas of extensive borrow holes, maintenance through backfilling of holes using a clean gravel fill that is difficult to borrow through may reduce the activity.

Additionally, near Upper Moyina the drainages show heavy scour underneath the roadways. Without maintenance, vehicle access to this reservoir may be temporarily lost after a heavy rainfall event.

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SECTION 5.0 STRUCTURAL ASSESSMENT

Between 25 September and 27 September 2017, each tank site was visited to visually assess the current condition, site situation, and observable construction methods. Field notes and photographs documented these site visits (Appendix B). All tanks were in service at the time of the site visits, so observations of the interior were limited. However, the most recent cleaning and dive inspection videos and reports were reviewed to obtain a general assessment of the reservoir interiors. All observations were made visually, and no testing was performed.

The assets were found to be generally in good to excellent structural condition and appeared to be reasonably maintained. No signs of significant structural damage, destress, or elements that required immediate repair were observed. On-going maintenance needs such as coating repairs and grading around the tanks to provide good drainage away from foundations were present at most of the sites.

Because the water system has developed over nearly 100 years through multiple ownership and acquisition of developer-constructed assets, many of the tanks were constructed prior to City ownership and without any standard design criteria. Many of the as-built construction documents for the tanks are nonexistent or incomplete. Lack of construction details and design criteria made comprehensive structural evaluation difficult. Conservatively, it was assumed, based on experience, that smaller water systems, or developers, generally do not have the resources to provide comprehensive inspection during construction, resulting in a greater likelihood of construction defects.

5.1 Structurally Impacting General Observations

Site Maintenance

Most of the sites are in need of site grading to direct water away from the reservoir foundation. Grading to promote drainage will reduce the potential for water standing under the tank and associated corrosion of the floor plates. Tanks with concrete ring beam and slab foundations should be graded so the top of the foundation is 6 inches above the adjacent grade. Tanks with berm foundations should be surrounded by a 3-foot-wide band of 6-inch-deep, well-graded gravel sloped away from the reservoir. Soils should not be in contact with the reservoir wall.

There was evidence of burrowing animals undermining the reservoir foundations. Areas where burrowing animals or erosion has undermined the foundation should be repaired with a well-graded compacted gravel. Clearing vegetation will discourage burrowing animals from undermining the reservoir foundations.

Foundation Protection

High Level, North, Patterson 1, and Upper Moyina tanks are located on hillsides where eroded material from the hillside is covering the reservoir foundations. Either regular

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maintenance or a permanent barrier should be used to prevent soil from accumulating against the reservoir.

Settlement
The Lower and Upper Lynnwood Tanks appear to be experiencing settlement. Additionally, the older tanks – North and Center East and West Tanks – were noted during the dive inspections as possibly having some floor settlement. These tanks should have their bases surveyed for level to determine if they have settled. If settlement is minor, a program of monitoring should be instituted to determine if the settlement is ongoing and if remedial action is required.

Tank Base Seals
All of the tanks with a concrete foundation have seals between the concrete and steel that have failed or were not installed. Because of the dry climate around Klamath Falls, this does not appear to be a significant issue because there was very little corrosion observable under the reservoir lip. However, the AWWA D-100 Standard does require this joint to be sealed.

The base joint at Bowen Reservoir appears to be a grouted joint or grout was placed during construction to level the concrete slab foundation. The grout has failed and should be replaced.

Table 6 summarizes the structural features identified for each asset.

5.2 Structural Improvement Determination

The analyses conducted for this report are general and intended to identify planning-level seismic deficiencies. Design of specific remediation measures will require additional research, possibly material testing, and detailed analysis. For this report, assumptions were made to account for lack of specific reservoir construction information. None of the tanks had visible damage or deterioration that would impact seismic performance.

To determine the seismic resiliency, each tank was analyzed for its response to the seismic design event. The original design criteria specifying any seismic requirement considerations was unavailable for the tanks. Limited material of construction data was available for three of the assets. In the absence of the data, it has been assumed, and is likely, that assets designed in the 40-year period from 1920 and 1960 were completed with little, if any, consideration for seismic resilience. Eight tanks fall into this time period:

- Center East
- Center West
- North
- Melrose
- High Level
- Moyina Lower
- Moyina Upper
- Tanglewood

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Table 6. Structural Features of Evaluated Storage Assets

Asset	Structural Condition Summary						
	Anchoring	Materials of Construction[a]	Method of Construction	I/O/Overflow Connections[b]	Foundation Type	Structural Condition	Notes and Concerns
Basin View	No		Welded	F[c]	Ring	Good	
Bowen	Yes		Welded	F[c]	Slab	Excellent	Grout failure at base
Burns	No		Welded	F[c]	Ring	Good	
Center #1 (East)	No		Riveted	R	Berm	Fair	Reservoir age
Center #2 (West)	No		Riveted	R	Berm	Fair	Reservoir age
High	No		Riveted	R	Berm	Fair	Reservoir age
Hilyard	No	X	Welded	F[c]	Ring	Excellent	
Hospital	No		Welded	R	Berm	Good	
Lindley	No		Welded	R	Ring	Good	
Lynnwood (Lower)	No		Welded	R	Unknown	Fair	Possible settlement
Lynnwood (Upper)	No		Welded	R	Ring	Good	Possible settlement
Melrose	No		Welded	R	Berm	Fair	Reservoir age
Moyina Lower	No		Welded	R	Slab	Poor	Foundation failing
Moyina (Upper)	No		Welded	R	Berm	Good	
North	No		Riveted	R	Berm	Fair	Reservoir age, possible settlement
Ogden	No		Welded	R	Ring	Excellent	
Patterson #1	No		Welded	R	Berm	Good	Reservoir age, relocated in 1979
Patterson #2	No	X	Welded	F[c]	Ring	Good	
Prescott	Yes		Welded	F[c]	Slab	Excellent	
Tanglewood	No		Welded	R	Berm	Fair	
Uhrman	No	X	Welded	F[c]	Ring	Good	

a All tanks are constructed in steel. Tanks where the specific grade(s) of steel used are known are indicated with 'X'.

b F = Flexible; R = Rigid

c Range of allowable displacements for tanks with flexible pipe connections is not known

The International Building Code (IBC) 2012 is the governing code for new construction. The IBC references American Society of Civil Engineers (ASCE) 7 for seismic design. ASCE 7 in turn, specifies design of water tanks be performed per AWWA Standard D100 for welded steel potable water tanks. ASCE 7 and AWWA D100 are closely coordinated to avoid conflicts in design and loading requirements.

The maximum considered earthquake (MCE) used for the basis of evaluation of the assets was attributed to motions from the local faults in the Klamath Falls area as previously described in Section 4. The predicted short-period MCE spectral response acceleration (Class B Site) used for analysis varied between 0.93 g and 1.14 g, depending on the site's relation to the fault. The long-period MCE spectral response acceleration (Class B Site) used for analysis varied between 0.40 g and 0.47 g.

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Each tank was analyzed for seismic loads per the AWWA D100 Standard. Table 7 summarizes the criteria used for the analysis:

Table 7. Criteria for Structural Seismic Analysis

Maximum Credible Event	M 7.4 earthquake on the Klamath Graben Fault System
Site Classifications	All reservoir sites were classified as either Class B or C
Seismic Use Group Classification	Class III (Essential Facilities for Post-Earthquake Recovery)
Seismic Importance Factor (I_E)	1.5
Materials of Construction	All tanks were assumed to have been constructed with Class 2 materials with an $F_Y \geq 34{,}000$ psi.
Material Thickness	Based on ultrasonic testing of actual material thickness. No corrosion allowance was used.

Three of the unanchored tanks (Lindley, Lower Lynnwood, and North) analyzed for overturning were determined to be unstable during the seismic event and would require the addition of anchors or added perimeter weight for stabilization. The North tank was constructed in 1928. Remedial modifications to this reservoir are not recommended. Based on age and limited remaining service life, it is recommended that it be replaced. Compression in the reservoir wall shells of the unstable tanks could not be checked.

The Bowen and Prescott are the only tanks in the system that are mechanically anchored. The adequacy of the anchors could not be checked because of the absence of design details and material properties. However, it is likely that the anchors are adequate because they could yield, without failing, and still not allow the reservoir to fail. However, analysis of the Prescott tank indicates exceedance of allowable shell wall compression during the seismic design event. Failure in compression will result in buckling of the shell and failure of the reservoir. A remedial fix alternative would be to stiffen the shell near the base with stiffener plates welded to the reservoir. This would require a detailed analysis prior to implementation to determine the material properties for development of appropriate welding procedures.

Compressive stresses in the riveted tanks of Center East, Center West, and High Level tanks were found to be low. However, the AWWA D100 Standard for allowable compressive stress is not applicable to riveted joints. The riveted joints are lapped, which creates an eccentricity in the wall load path and the associated bending stress in the shell plates and reduces the buckling strength. The actual compression in the wall is low and has been assumed to likely be below the buckling threshold. However, these three tanks are all nearly 90 years old. As with the North tank, because of age and limited remaining service life, upgrades to these three assets is not recommended and should be a high priority for replacement because of their criticality in the storage system.

Only one tank (Uhrman) had enough freeboard to accommodate the predicted wave height during the MCE. For the remaining tanks, the upward pressure of a wave on the

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roof structure may result in damage, but would not make the reservoir unserviceable after the event. There are three options for addressing the inadequate freeboard: (1) do nothing and accept the potential damage; (2) lower the operating level of the tank to provide adequate freeboard that accounts for the calculated wave height; or (3) strengthen the roof to withstand sloshing uplift. Table 8 lists the operating water level adjustments for each tank.

Table 8. Seismic Retrofit Requirements

Reservoir	I/O Flexible Connection Deficiency			Freeboard Deficiency	Overturn Stability	Shell Compression	Sliding
	Upward (inches)	Downward (inches)	Horizontal (inches)	Required/Designed (ft.) (Deficiency (ft.)			
Basin View	--	--	--	3.0 / 2.0 (1)	No Uplift	OK	OK
Bowen	--	--	--	3.0 / 2.0 (1)	Anchored	OK	OK
Burns	--	--	--	3.7 / 2.0 (1.7)	No Uplift	OK	OK
Center East	1.0	1.0	2.0	3.3 / 0.25 (3.1)	No Uplift	Likely OK[a]	OK
Center West	1.0	1.0	2.0	3.3 / 0.25 (3.1)	No Uplift	Likely OK[a]	OK
High Level	1.0	1.0	2.0	2.9 / 0.5 (2.4)	No Uplift	Likely OK[a]	OK
Hilyard	--	--	--	3.3 / 2.0 (1.3)	Some Uplift[b]	OK	OK
Hospital	1.0	0.5	2.0	3.5 / 0.5 (3.0)	No Uplift	OK	OK
Lindley	1.0	0.5	0.5	3.5 / 1.0 (2.5)	Not Stable	Not Stable	OK
Lynnwood (Lower)	1.0	0.5	0.5	3.0 / 0.5 (2.5)	Not Stable	Not Stable	OK
Lynnwood (Upper)	1.0	0.5	0.5	3.25 / 1.0 (2.3)	Some Uplift[b]	OK	OK
Melrose	1.0	1.0	2.0	4.4 / 0.5 (3.9)	No Uplift	OK	OK
Moyina (Lower)	Recommended for removal from system						
Moyina (Upper)	4.0	0.5	2.0	2.4 / 0.0 (2.4)	Some Uplift[b]	OK	OK
North	1.0	0.5	0.5	3.1 / 0.5 (2.6)	Not Stable	Not Stable	OK
Ogdon	1.0	0.5	2.0	3.9 / 1.5 (2.4)	No Uplift	OK	OK
Patterson No.1	1.0	0.5	2.0	3.5 / 0.5 (3.0)	No Uplift	OK	OK
Patterson No.2	--	--	--	4.1 / 3.4 (0.7)	No Uplift	OK	OK
Prescott	--	--	--	4.0 / 2.0 (2.0)	Anchored	Failed	OK
Tanglewood	4.0	0.5	2.0	2.7 / 1.0 (1.7)	Some Uplift[b]	OK	OK
Uhrmann	--	--	--	3.3 / 3.4			

a Code allowable compression in reservoir wall shell does not apply to lapped riveted joints due to the eccentricity of this type of joint. Compression calculated is low and likely OK.

b During seismic event some uplift of the foundation is allowed and does not destabilize the reservoir provided wall shell compression is within limits.

Differential movement between the reservoir and pipes buried in the ground is likely to occur during a seismic event. Failure of the connection will make the reservoir unserviceable and could impact the surrounding service system by draining needed water from other tanks. The AWWA D100 standard requires flexible pipe to reservoir

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connections with minimum allowable displacements. These minimum allowable displacements are defined in Table 9.

Table 9. AWWA D100 Recommended Flexible Connection Displacements

Tank Type	Displacement Plane	Prescribed Displacement (inches)
Mechanically Anchored Reservoir	Upward	1
	Downward	0.5
	Horizontal	0.5
Self-Anchored	Upward, No Uplift	1
	Upward with Some Uplift	4
	Downward with Ring or Slab Foundation	0.5
	Downward with Berm Foundation	1
	Horizontal	2

Six of the tanks analyzed (Basin View, Bowen, Burns, Hilyard, Patterson No. 2, Uhrmann, and Prescott) have flexible piping connections. The allowable displacements for the flexible connections is not known, but based on asset age is assumed to be adequate. The remaining tanks should have flexible connections per the prescribed displacements listed in Table 8.

- Center East
- Center West
- High
- Hospital
- Lindley
- Lynnwood Lower
- Lynnwood Upper
- Moyina Lower
- Moyina Upper
- North
- Ogdon
- Patterson 1
- Tanglewood
- Melrose

Table 10 provides a summary of structural needs for each reservoir, options for addressing the needs, and associated costs. Where replacement is recommended, a like size facility has been assumed.

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Table 10. Summary of Structural Needs, Options, and Associated Costs

Reservoir	Deficiency	Option	Approximate Cost
Basin View	Inadequate Freeboard	Lower Operating Level 1 ft.	$0
		Strengthen Roof	$190,000
		Do Nothing	Possible Emergency Repair After Event
Bowen	Inadequate Freeboard	Lower Operating Level 1 ft.	$0
		Strengthen Roof	$161,000
		Do Nothing	Possible Emergency Repair After Event
Burns	Inadequate Freeboard	Lower Operating Level 1.7 ft.	$0
		Strengthen Roof	$250,000
		Do Nothing	Possible Emergency Repair After Event
Center East	Replace Reservoir	New 0.8 MG Steel Reservoir	$1,100,000
Center West	Replace Reservoir	New 0.8 MG Steel Reservoir	$1,100,000
High Level	Replace Reservoir	New 0.4 MG Steel Reservoir	$751,000
Hilyard	Inadequate Freeboard	Lower Operating Level 1.3 ft.	$0
		Strengthen Roof	$140,000
		Do Nothing	Possible Emergency Repair After Event
Hospital	Inadequate Freeboard	Lower Operating Level 3.0 ft.	$0
		Strengthen Roof	$235,000
		Do Nothing	Possible Emergency Repair After Event
	Rigid Pipe Connections	Add Flexible Connections	$184,000
		Do Nothing	Risk Failure
Lindley	Inadequate Freeboard	Lower Operating Level 2.5 ft.	$0
		Strengthen Roof	$137,000
		Do Nothing	Possible Emergency Repair After Event
	Unstable for Overturning	Lower Operating Level 2.5 ft.	$0
		Add Mechanical Anchors	$262,000
		Do Nothing	Risk Reservoir Failure
	Rigid Pipe Connections	Add Flexible Connections	$139,000
		Do Nothing	Risk Failure
Lower Lynnwood	Inadequate Freeboard	Lower Operating Level 2.5 ft.	$0
		Strengthen Roof	$134,000
		Do Nothing	Possible Repair Costs After Event
	Unstable for Overturning	Lower Operating Level 1.5 ft.	$0
		Add Perimeter Weight	$112,000
		Do Nothing	Risk Reservoir Failure
	Rigid Pipe Connections	Add Flexible Connections	$135,000
		Do Nothing	Risk Failure

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Reservoir	Deficiency	Option	Approximate Cost
Upper Lynnwood	Inadequate Freeboard	Lower Operating Level 2.1 ft.	$0
		Strengthen Roof	$112,000
		Do Nothing	Possible Emergency Repair After Event
	Rigid Pipe Connections	Add Flexible Connections	$135,000
		Do Nothing	Risk Failure
Lower Moyina	To Be Removed from Service		
Upper Moyina	Inadequate Freeboard	Lower Operating Level 2.4 ft.	$0
		Strengthen Roof	$192,000
		Do Nothing	Possible Emergency Repair After Event
Melrose	Inadequate Freeboard	Lower Operating Level 3.9 ft.	$0
		Strengthen Roof	$400,000
		Do Nothing	Possible Emergency Repair After Event
	Rigid Pipe Connections	Add Flexible Connections	$215,000
		Do Nothing	Risk Failure
North	Replace Reservoir	New 0.8 MG Steel Reservoir	$771,000
Ogdon	Inadequate Freeboard	Lower Operating Level 2.4 ft.	$0
		Strengthen Roof	$305,000
		Do Nothing	Possible Emergency Repair After Event
	Rigid Pipe Connections	Add Flexible Connections	$204,000
		Do Nothing	Risk Failure
Patterson No.1	Inadequate Freeboard	Lower Operating Level 3.0 ft.	$0
		Strengthen Roof	$235,000
		Do Nothing	Possible Emergency Repair After Event
	Rigid Pipe Connections	Add Flexible Connections	$192,000
		Do Nothing	Risk Failure
Patterson No.2	Inadequate Freeboard	Lower Operating Level 0.7 ft.	$0
		Strengthen Roof	$92,000
		Do Nothing	Possible Emergency Repair After Event
Prescott	Inadequate Freeboard	Lower Operating Level 2.0 ft.	$0
		Strengthen Roof	$264,000
		Do Nothing	Possible Emergency Repair After Event
	Compression at Base of Wall Too High	Lower Operating Level 7.0 ft.	$0
		Add Stiffener Plates at Base of Wall	$422,000
		Do Nothing	Risk Failure
Tanglewood	Inadequate Freeboard	Lower Operating Level 1.7 ft.	$0
		Strengthen Roof	$192,000
		Do Nothing	Possible Emergency Repair After Event
Uhrmann	No Deficiencies	NA	NA

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As Table 8 showed, each tank is structurally deficient in some manner ranging from operating level adjustment to inadequate foundations to potential buckling or overturning. Center East, Center West, North, Melrose, Tanglewood, and High are recommended for replacement because of the retrofit needs and their age; further investment in the existing assets simply cannot be financially justified. Melrose and Patterson No.1 tanks also have a limited remaining service and should be considered for replacement when practical. Lower Moyina is an asset that is inadequately designed, difficult to maintain, and unnecessary in terms of capacity. It is recommended for removal from the system, not replacement.

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Table 11. Structural Evaluation Summary and Recommendations

Reservoir	Structural Improvement								
	Install Flexible Connections	Address Freeboard Increase	Reinforce Shell Wall Against Buckling	Install Foundation Seals	Evaluate and Repair Foundation Undermining	Anchorage or Foundation Reinforcement	Determination of Settlement	Prevention of Eroded Material Against Foundation	Recommended for Replacement Based on Age
Basin View									
Bowen									
Burns									
Center East				NA					*
Center West				NA					*
High Level				NA					*
Hilyard									
Hospital				NA					
Lindley									
Lynnwood (Lower)				NA					
Lynnwood (Upper)									
Melrose				NA					*
Moyina (Lower)									
Moyina (Upper)				NA					
North				NA					*
Ogdon									
Patterson No.1				NA					
Patterson No.2									*
Prescott									
Tanglewood				NA					*
Uhrmann									

	Recommended
	Adequate
	Monitor
	Evaluate operational modifications

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SECTION 6.0 ASSET CONDITION AND COATING ASSESSMENT

The project's appurtenance, coating, and corrosion evaluations were conducted by field investigation and review of available dive video footage provided by the City. In addition to asset assessment, the field evaluations addressed general site conditions, adequacy of maintenance space, drainage, erosion, and all-season accessibility.

The inspection of tank appurtenances included a review of:

- External ladder
- Internal Ladder
- Roof safety railings
- Roof arrest system
- Shell manway access
- Silt stops
- Vents
- Vent screens
- Overflow piping
- Roof access hatch
- Roof drainage
- Roof water tightness
- Inlet/outlet
- Operational level gauge

Tank coating were evaluated for the following:

- Chalking
- Chipping
- Crevice corrosion
- Coating loss
- Cathodic protection
- Surface corrosion
- Organic material growth
- Ponding
- Pitting
- Rust staining
- Coating thickness
- Wall thickness
- Coating adhesion

6.1 Basis of Evaluation

The basis of evaluation for appurtenance and coatings condition guidance included industry standard subjective visual and objective field tests to evaluate coating condition and wall thickness, AWWA Standard D100 for Welded Carbon Steel Tanks, AWWA Manual M42 for Steel Water Storage Tanks, the Oregon State Department of Water Resource requirements for public water systems, and the Occupational Safety and Health Agency worker safety requirements.

The exterior visual coatings evaluation consisted of determining the overall condition of the coating and exposed steel that could be viewed from the ground level and roof surfaces, viewing the interior from the roof access hatch and observing specific coating and corrosion defects. The coating characteristics were subjectively evaluated in the following manner, depending on the characteristic:

Chalking

A slight deterioration of the topcoat, most often due to exposure to ultraviolet radiation. Chalking is a common occurrence associated with epoxy coatings and polyurethane's that do not contain UV protection. While chalking conditions result in a dulling of glossy surfaces, as long as adequate coating thickness is present corrosion protection of the underlying steel will be maintained.

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Chipping
Loss of small isolated areas of coating are typically a result of mechanical damage (rock damage from vandalism or from grass mowing operations). The location of damage will often result in the steel being exposed to the atmosphere with associated general surface corrosion observed at these sites. When discovered, these locations should be repaired in order to stop any further corrosion and associated unsightly rust staining.

Crevice Corrosion
The process of crevice corrosion is a result of differential oxygen concentration between adjacent surfaces. For example, in areas where roof plates overlap, a small crevice is formed where the area inside the crevice is quickly depleted of oxygen. Because of the construction geometry, oxygen is not readily replaced in these areas and they become anodic preferential to locations of high oxygen concentration, such as those areas immediately outside the crevice. By their nature, these locations are difficult to properly coat. Crevice corrosion can result in moderate to heavy rust staining and, in highly chlorinated water, will serve to accelerate the corrosion process.

General Coating Losses
As coatings age, they will deteriorate, losing thickness and protective qualities. General surface corrosion of the underlying steel often results in additional coating losses. As corrosion products accumulate at the edges of coating defects, pressure is exerted on the adjacent coating, which can then peel the coating from the surface.

General Surface Corrosion
General surface corrosion is a result of metal being exposed to a soil or water environment. Isolated anodic areas on the exposed steel will corrode preferential to cathodic locations. General surface corrosion typically will result in metal thickness losses on the order of 3 to 5 mils per year (1 inch = 1,000 mils) in the presence of potable water.

Organic Material Growth
Low-lying areas on the roof that allow water to collect and runoff will often create streaks down the side of the reservoir that support the accumulation of organic matter. If allowed to remain on the coated surfaces for extended periods of time, the material will deteriorate the coating, exposing the underlying steel to both moisture (from runoff) and atmospheric conditions. Power washing to remove this debris will extend the life of the coating.

Ponding
Ponding occurs at concavities on the roof surface where rainwater collects. Long-term standing water will eventually result in damage to the coating and subsequent exposure of the steel to water. General surface corrosion will then initiate, often resulting in additional damage to the coating as corrosion products separate the coating from the substrate. Once formed, these troughs are difficult to reverse.

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Pitting
Pitting is a result of concentrated corrosion at a specific location. Pitting damage is most often associated with dissimilar metal corrosion, such as what can occur when a small carbon steel area is electrically continuous with a large stainless steel surface (interior ladder) immersed in water.

Rust Staining
Rust staining occurs when corrosion products migrate down the wall surfaces. Rust staining is most prevalent on the interior of the tanks, particularly at areas of crevice corrosion. As corrosion occurs, iron oxide corrosion products will stain the surfaces below the area of metal loss causing discoloration of the coating. Typically, the coating is not detrimentally affected by the staining and is still able to maintain its protective qualities. However, staining does mask the underlying surfaces and any corrosion will likely go unnoticed.

Coating Thickness
Coating thickness measurements were made using a Defelsko Positector 6000 portable electromagnetic dry film thickness gauge. A total of 30 spot measurements were made on the exterior sidewalls, 20 spot measurements on the reservoir roof, and 10 spot measurements on interior surfaces that could be reached from the roof access hatch. Thickness range and average measured thickness for each of these surfaces are presented in this report.

Wall Thickness Measurements
Measurement of remaining steel wall thickness was performed using a General Electric model DM5E ultrasonic thickness gauge. This unit uses an echo-echo function that sends multiple signals through the transducer that eliminates the error associated with reading metal thickness through a coating. In this manner, remaining steel thickness can be measured without the need for removing the protective coating. Prior to each use, the gauge was calibrated using standard calibration blocks. In a couple of instances, the thickness of the reservoir bottom plates were not accessible for this type of testing. In these cases, a tape measure was used to estimate thickness. Thicknesses of the steel floor plate, individual sidewall courses, and the roof plates were measured.

Coating Adhesion Testing
General coating adhesion characteristics were performed in accordance with *ASTM D3359 – Standard Test Method for Measuring Adhesion by Tape Test, Method B – Cross Hatch.*

This test method involves creating a series of intersecting cuts on an exposed area of coating. Special adhesive tape is pressed down on the top of the cuts, and the tape is then removed by seizing the free end and rapidly pulling it off of the surface at as close to a 180-degree angle as possible. The coating is then classified in accordance with its adhesive characteristics.

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- 5B – The edges of the cuts are completely smooth; none of the squares of the lattice is detached.
- 4B – Small flakes of the coating are detached at intersections; less than 5 percent of the area is affected.
- 3B – Small flakes of the coating are detached along the edges and at the intersections of the cuts. The area affected is 5 to 15percent of the lattice.
- 2B – The coating has flaked along the edges and on parts of the squares. The area affected is 15 to 33 percent of the lattice.
- 1B – The coating has flaked along the edges of cuts in large ribbons, and whole squares have detached. The area affected is 35 to 65 percent of the lattice.
- 0B – Flaking and detachment worse than grade 1.

Because cross hatch testing is a destructive test resulting in damage to the coating, it was only performed on a few representative surfaces. For tanks that had sound coating, destructive testing was not completed. Also, for surfaces that had widespread coating delamination, this form of testing evaluation was not conducted.

Where applicable, in lieu of the cross hatch test, a knife test was used to evaluate the qualitative properties of the coating. A knife test is performed by inserting a sharp razor blade under the coating and lifting. The quantity of coating removed and type of peeling is evaluated. While still a destructive method of testing coating, a knife test results in less damage to sound coating.

Cathodic Protection System Testing

Six of the tanks use an impressed current cathodic protection (CP) system. The CP equipment consists of a hoop-type anode installed above the reservoir floor. An auto-potential rectifier uses the installed stationary copper copper-sulfate reference electrodes to adjust system current output to maintain a user-set electrical potential. In this manner, the submerged exposed steel surfaces receive protective current that stops the corrosion process. Each of these systems are inspected on an annual basis with the last testing conducted within the last few months. As such, our testing of the cathodic protection system was limited to measuring electrical potentials of the interior reservoir surfaces and recording rectifier output.

Protective Current Requirement Testing

For tanks that do not have a cathodic protection system, a portable battery and temporary anode were used to determine protective current requirements should it be desired to install corrosion control measures in the future. This type of testing involves applying a known current to the interior of the reservoir and measuring the change in resulting electrical potentials. This testing also provides a reasonable understanding of the quality of the submerged interior coating. With a poor coating, additional metal is

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exposed to the water. This in turn requires more cathodic protection current to provide corrosion control.

6.2 Summary of Findings

Table 12 provides a summary of the appurtenance features for each asset. Table 13 summarizes the assessment of the coatings and corrosion.

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Table 12. Tank Code Compliance for Appurtenances

ASSET	APPERTENANCE																					
	External Ladder	Internal Ladder	Roof Safety Railings	Roof Arrest System	Shell Manway Access		Roof Access Hatch			Silt Stop		Vents		Vent Screens		Overflow Piping		Watertight Roof		Drainage	Access	Inlet/ Outlet	Level Gauge
	OSHA	OSHA	OSHA	OSHA	OSHA	AWWA	OHA	OSHA	AWWA	OHA	AWWA	OHA	AWWA	OHA	AWWA	OHA	AWWA	OHA	AWWA	AWWA	AWWA	OHA	Not Required
Basin View				Not required in addition to safety railing or other personal fall protection										A	A								
Bowen													(24)	B,D	B,D								
Burns													(24)			%	%			(1)			
Center East					(3)	(3)	(10)	(23)	(23)				(24)					%, 8,9	%	(6)			
Center West					(3)	(3)							(24)			(11)				(6)			
High					(3)	(3)	(10)					(16)	(16)	E	E					(6)			
Hilyard																%	%						
Hospital						(4)		(23)	(23)			(17)	(24)			%	%						
Lindley	(13)		(15)			(12)							(24)	%	%	%	%				N (14)		
Lynnwood Lower						(4)		(23)	(23)			(16)	(24)	C	C					(7)			
Lynnwood Upper						(4)		(23)	(23)	N (5)	N (5)	%	%	F	F	(25)	(25)			(1)			
Melrose					(3)	(3)	N	(23)	(23)	%	%		(24)	C	C	%	%			(7)			
Moyina Lower	It is recommended that no further investment be made in this asset																						
Moyina Upper						(20)												(18)		(7)			
North	(22)	(22)			(3)	(3)	N	(23)	(23)				(24)	B,D	B,D	%	%			(7)	(14)		
Ogden			(26)			(20)	(19)					(16)	(24)			Y				(1)			
Patterson #1						(4)	(10)			%	%		(24)							(7)			
Patterson #2																							
Prescott																							
Tanglewood								(23)	(23)				(24)	C	C	(21)	(21)			(7)	(14)		
Uhrman																							

Comment codes:

1 Drainage not bad but could be improved
2 Not used
3 Only 1 shell manway having 20-inch diameter
4 Only 1 shell manway having 24-inch diameter
5 Appears to have holes at floor level per video
6 Poor drainage with debris up against tank
7 Poor drainage
8 Calking on steel roof plates around vent
9 Holes in telemetry box need to be plugged
10 Not sealed and size not code compliant
11 Inadequate repair at upper elbow
12 Two 24-inch diameter manways
13 Top rung above roof plate (tripping hazard)
14 Not graveled for all weather access
15 Could have larger working space
16 Does not prevent windblown rain and snow
17 Completely closed up with metal sheeting and non-functional
18 Conduit hole needs screened or plugged
19 Need hatch sealed on East roof manway
20 Only 1 shell manway having 30" diameter
21 Needs to have proper drainage away from tank
22 Ladder safety system required over 24'
23 Does not provide 30-inch obstruction-free headspace
24 Requires additional opening of 20 inches for use as vent
25 No flap secured barrier on outlet
26 Install side railing for added safety at ladder
A Needs 24-mesh insect screen
B Need bird and animal screen
C Should be galvanized for durability
D Screen needs repair
E Screen not fully covering opening
F Screens not adequately protecting tank
% Cannot locate or cannot visually inspect

	Absent
	Present
	Present, but inadequate, or incomplete

Table 13. Coatings Condition Assessment Summary

ASSET	Coatings								Cathodic Protection and Internal Coating	Priority Action	Notes
	External	Internal Roof	Internal Dry Sidewalls	Internal Submerged Sidewalls	Internal Surface Corrosion	External Coating Adherence	Dry Film Thickness Average Range (mils)	Wall Thickness Range (mils)			
Basin View						Well Adhered	9-11.1	241-247	Installed, but no power to site.	2 yrs.	• Install cathodic protection within next 2 years • Cleaning during next maintenance cycle.
Bowen						Well Adhered	7.0-10.4	185-500	Coating in good condition	low	• Caulking of crevice seams. • Cleaning during next maintenance cycle.
Burns						Well Adhered	6.6-11.9	180-256	Coating in good condition	low	• Caulking of crevice seams and cleaning during next maintenance cycle. • Repair coating spot damage.
Center East						Poor	2.9-9.5	178-1000	Coating is thin and inadequate	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
Center West						Poor	3.1-7.6	198-1000	Coating is thin and inadequate	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
High						Poor	1.7-4.0	188-1000	Coating is thin and inadequte	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
Hilyard						Well Adhered	6.6-18.6	117-318	Coating in good condition	3-5 yrs.	Inspect coating blistering during next maintenance cycle.
Hospital						Well Adhered	1.9-6.8	197-323	Coating is thin and inadequate	1-3 yrs.	• Coating removal, steel repair, and recoating may be warranted • Install cathodic protection
Lindley						Poor	2.7-16.2	186-246	Very poorly coated	2-5 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Coal tar coating should be removed and a new coating system should be installed. • Inspect steel surfaces. • Exterior coating should be removed and a new coating system applied. • Install cathodic protection.
Lynnwood Lower						Well Adhered	9.8-21.3	176-236	Coating in very good condition	1-3 yrs.	Minor maintenance and coating spot repair.
Lynnwood Upper						Well Adhered	9.9-17.9	172-242	Coating in very good condition	1-3 yrs.	Minor maintenance and coating spot repair
Melrose						Poor	1.4-6.9	188-381	Coating is thin and inadequate	5-7 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated. • Install cathodic protection.
Moyina Lower	It is recommended that no further investment be made in this asset										
Moyina Upper						Well Adhered	9.5-18.0	131-254	Coating in very good condition	1-3 yrs.	• Spot repair of coating. • Caulk roof lap joints and beam/roof plate gaps.
North						Poor	1.9-4.0	197-388	Coating is thin and inadequate	3-5 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated.
Ogden						Well Adhered	0.8-4.0	186-439	Coating is fair	7-10 yrs.	• Interior coating needs to be removed and all surfaces should be properly prepared and coated. • Exterior sidewalls should be over-coated.
Patterson #1						Poor	3.5-6.8	239-247	Coating is thin and inadequate	3-5 yrs.	• Interior/exterior coating to be removed and all surfaces should be properly prepared and coated.
Patterson #2						Well Adhered	5.9-12.4	234-373	Coating in good condition	1-3 yrs.	Caulk roof joints
Prescott						Well Adhered	6.7-18.9	180-632	Coating in good condition	1-3 yrs.	Coating spot repair and lap joins caulked
Tanglewood						Poor	0.8-12.0	194-259	Coating in good condition	3-5 yrs.	• Install cathodic protection • Exterior coating needs to be removed and all surfaces should be properly prepared and coated.
Uhrman						Well Adhered	6.0-11.2	236-373	Coating in good condition	Low	• Coating spot repair and lap joins caulked

	Good Condition
	Poor condition or absent requiring priority attention
	Adequate, requires attention @ next scheduled maintenance

SECTION 7.0 ASSESSMENT SUMMARY AND IMPROVEMENT COST ESTIMATES

The assessment activities of this project generated a comprehensive database of information. The individual issue summary tables presented in the previous sections identified subject specific needs regarding security improvements, asset condition, and seismic resiliency retrofits. Table 14 is a general summary based on category of improvements. Table 14 summarizes the specific recommended improvements system wide.

Tables 15 through 17 itemize the costs by asset and recommended improvement. Table 18 summarizes the cost for all recommended improvements compared to a replacement cost. Those highlighted in yellow indicate that the improvement/retrofit cost is within 20 percent of the replacement cost.

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Table 14. Recommended Improvements by Asset and Type

Asset	Seismic Improvements						Security Improvements														Condition/Coatings Improvements														Priority Facility	Secondary Priority Facility
	Anchoring/Foundation Improvements	Shell Wall Reinforcement	Install Flexible Connections	Foundation Seals	Determination of Settlement	Operational Adjustments to Provide Freeboard	Ladder Security Guard - Integrated	Ladder security guard - Hinged gate	Motion detection surveillance camera at top of roof access ladder	Motion detection illumination at top of roof access ladder	Security vent	Access hatch intrusion alarm	Intrusion activated actuated isolation valve	Security vehicle/pedestrian access gate	Security perimeter fencing	Locks for all vault ingress points	Concrete vault locking steel doors	Commercial grade steel door and locks on building ingress point	Internal security steel louvres on window ingress points	Steel roofs on tank operational buildings	Secure steel controls cabinet	External ladder	Internal ladder	Roof safety railings	Shell manway access	Roof access hatch	Silt stop	vents	Vent screens	Overflow piping	Watertight roof	Site drainage	Site access	Inlet/Outlet	Level Gauge (Not required)		
Basin View																																				X
Bowen																																				X
Burns																																				X
Center East																																			X	
Center West																																			X	
High																																			X	
Hilyard																																				X
Hospital																																				X
Lindley																																				X
Lynnwood Lower																																			X	
Lynnwood Upper																																				
Melrose																																				X
Moyina Lower	Recommended that no further investment be allocated to this asset.																																			
Moyina Upper																																				X
North																																			X	
Ogden																																				X
Patterson #1																																			X	
Patterson #2																																				X
Prescott																																			X	X
Tanglewood																																			X	X
Uhrman																																				X

	Requires improvement
	Adequate, but could be improved through maintenance/retrofit
	Acceptable, no improvement required at this time

Table 15. Asset Appurtenances Improvement Cost Estimate (2017 Dollars)

Asset	APPERTENANCE														
	External Ladder	Internal Ladder	Roof Safety Railings	Roof Arrest System	Shell Manway Access	Roof Access Hatch	Silt Stop	Vents	Vent Screens	Overflow	Drainage	Site Access	Inlet/Outlet	Level Gauage Not Required	TOTAL COST (1, 2)
Basin View	Included under Security improvements								$200				Included under Structural Improvements		$200
Bowen								$4,250	$200					$1,000	$5,450
Burns								$4,250		$500					$4,750
Center East			$6,500		$6,750	$4,500		$4,250			$3,000			$5,000	$30,000
Center West			$6,500		$6,750	$4,500		$4,250			$3,000			$5,000	$30,000
Lindley					$6,750			$4,250	$200	$500		$3,000		$5,000	$19,950
High			$6,500		$6,750	$4,500		$4,250	$200		$3,000			$5,000	$30,200
Hilyard										$500				$5,000	$5,500
Hospital			$6,500		$6,750	$4,500		$4,250		$500				$5,000	$27,500
Lynnwood Lower			$6,500		$6,750	$4,500		$4,250	$200		$3,000			$5,000	$30,200
Lynnwood Upper			$6,500		$6,750	$4,500	$750	$4,250	$200	$500				$5,000	$28,450
Melrose			$6,500		$6,750	$4,500	$1,500	$4,250	$200	$500	$3,000			$5,000	$32,200
Moyina Lower		Asset to be decommissioned												$0	$0
Moyina Upper					$6,750						$3,000			$5,000	$14,750
North		$850	$6,500		$6,750	$4,500		$4,250	$200	$500	$3,000	$3,000		$5,000	$35,400
Ogden			$2,500		$6,750		$1,500	$4,250						$5,000	$20,000
Patterson #1			$6,500		$6,750	$4,500	$1,500	$4,250			$3,000			$5,000	$31,500
Patterson #2														$5,000	$5,000
Prescott															$0
Tanglewood			$6,500			$4,500		$4,250	$200		$3,000	$3,000		$5,000	$26,450
Uhrman														$5,000	$5,000
TOTALS		**$850**	**$67,500**	**$0**	**$81,000**	**$45,000**	**$5,250**	**$59,500**	**$1,800**	**$3,500**	**$27,000**	**$9,000**		**$81,000**	**$382,500**

1. Costs noted herein are not "stand alone" prices. It is assumed that all improvements required herein will be made as part of an overall rehabilitation improvement project to the specific tank in question.
2. Most repairs required herein will damage the existing coatings and thus will require additional costs associated with recoating, together with cleaning, disinfecting, VOC testing and similar costs.

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Table 16. Asset Security Improvement Cost Estimate (2017 Dollars)

Asset	Security Element														Total Cost
	Surveillance		Water Quality Protection				Perimeter		Access and Operational						
	Motion Detection Camera	Motion Detection Illumination	Security Ladder	Security Vent	Hatch Intrusion Alarm	Intrusion Activated Isolation Valve	Security Access Gate	Security Fencing	Vaults Locks	Vault Doors, Lid, and Locks	Aluminum Man Doors and Locks	Security Window Bars	Steel Roofs	Steel Controls Cabinet	
Basin View	$4,300	$1,200		$11,400	$540	$25,000	$2,500	17,500	$300						$62,740
Bowen	$4,300	$1,200	$2,300		$540	$25,000	$2,500	31,500	$300						$67,640
Burns	$4,300	$1,200			$540	$25,000	$2,500	$25,000	$300						$58,840
Center East	$4,300	$1,200	$6,000	$11,400	$540	$25,000	$2,500	$30,000	$300	$5,000	$2,300	$1,000	$4,600		$94,140
Center West	$4,300	$1,200	$6,000	$11,400	$540	$25,000	$2,500		$300	$5,000	$2,300	$1,000	$4,600		$64,140
High	$4,300	$1,200	$6,000	$11,400	$540	$25,000	$2,500	$17,500	$300		$2,300	$1,000			$72,040
Hilyard	$4,300	$1,200			$540	$25,000	$2,500	$25,000							$59,080
Hospital	$4,300	$1,200	$2,300	$11,400	$540	$25,000	$2,500	$12,500							$59,740
Lindley	$4,300	$1,200	$2,300		$540	$25,000	$2,500	$17,500		$5,000					$58,340
Lynnwood Lower	$4,300	$1,200	$2,300		$540	$25,000	$2,500	$15,000	$300						$51,140
Lynnwood Upper	$4,300	$1,200	$2,300		$540	$25,000	$2,500	$13,750						$1,800	$51,390
Melrose	$4,300	$1,200	$5,000	$11,400	$540	$25,000	$2,500	$25,000			$2,300		$4,600		$81,840
Moyina Lower	Asset to be removed from service														
Moyina Upper	$4,300	$1,200	$6,000		$540	$25,000	$2,500	$15,000							$54,540
North	$4,300	$1,200	$7,500	$11,400	$540	$25,000	$2,500	$20,000			$2,300	$1,000	$4,600		$80,340
Ogden	$4,300	$1,200	$6,000		$540	$25,000	$2,500	$25,000	$300		$2,300	$1,000			$68,140
Patterson #1	$4,300	$1,200		$11,400	$540	$25,000	$2,500	$38,000	$300	$5,000					$90,540
Patterson #2	$4,300	$1,200	$6,000		$540	$25,000	$2,500		$300						$39,840
Prescott	$4,300	$1,200			$540	$25,000	$2,500	$16,250	$300						$50,090
Tanglewood	$4,300	$1,200	$6,000	$11,400	$540	$25,000	$2,500	$12,500						$1,800	$65,240
Uhrman	$4,300	$1,200			$540	$25,000	$2,500	$22,500	$300		$2,300				$58,640
Total Cost per Improvement	**$86,000**	**$24,000**	**$66,000**	**$102,600**	**$10,800**	**$500,000**	**$50,000**	**$379,500**	**$3,600**	**$20,000**	**$16,100**	**$5,000**	**$18,400**	**$3,600**	**$1,287,600**

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Table 17. Asset Coating and Structural Improvement Cost Estimate

Asset	COATINGS	STRUCTURAL							
	Recoat of Failed Coatings	Anchoring/ Foundation Improvements	Shell Wall Reinforcement	Install Flexible Connections	Foundation Seals	Determination of Settlement	Strengthen Roof	Structural TOTAL (Without operational modification)	Structural TOTAL (With operational modification)
Basin View	--	--	--	--	$5,000	--	$190,000	$195,000	$5,000
Bowen	--	--	--	--	$5,000	--	$161,000	$166,000	$5,000
Burns	--	--	--	--	$5,000	--	$250,000	$255,000	$5,000
Center East	$225,000	Replace Due to Age (with existing capacity)						$1,106,000	$1,106,000
Center West	$225,000	Replace Due to Age (with existing capacity)						$1,106,000	$1,106,000
High	$147,000	Replace Due to Age (with existing capacity)						$800,000	$800,000
Hilyard	--	--	--		$5,000	--	$140,000	$145,000	$5,000
Hospital	$87,750	--	--	$184,000	--	--	$235,000	$419,000	$184,000
Lindley	$171,500	$262,000	--	$139,000	$5,000	$2,500	$137,000	$545,500	$408,500
Lynnwood Lower	--	$112,000	--	$135,000	--	$2,500	$134,000	$383,500	$249,500
Lynnwood Upper	--	--	--	$135,000	$5,000	$2,500	$112,000	$254,500	$142,500
Melrose	$261,500	--	--	$215,000	--	--	$400,000	$615,000	$215,000
Moyina Lower	Asset to be decommissioned								
Moyina Upper	--	--	--	$135,000	--	--	$192,000	$327,000	$135,000
North	$170,500	Replace Due to Age (with existing capacity)						$800,000	$800,000
Ogden	--	--	--	$204,000	$5,000	--	$305,000	$514,000	$209,000
Patterson #1	$160,000	--	--	$192,000	--	--	$235,000	$427,000	$192,000
Patterson #2	--	--	--	--	$5,000	--	$92,000	$97,000	$5,000
Prescott	--	--	$422,000	--	$5,000	--	$264,000	$691,000	$427,000
Tanglewood	$121,000	--	--	--	--	--	$192,000	$192,000	$0
Uhrman	--	--	--	--	$5,000	--	--	$5,000	$5,000
TOTALS	**$1,569,250**	**$374,000**	**$422,000**	**$1,339,000**	**$50,000**	**$7,500**	**$3,039,000**	**$8,031,500**	**$4,997,500**

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Table 18. Summary of Improvement Costs by Category

Asset	Improvement Category				Total System Cost to Upgrade Existing Facilities[b,d]	Total System Cost to Upgrade or Replace with Like Capacity[c,d]	Total System Cost to Upgrade or Replace with Increased Capacity and (Decommissioning)[a,d]
	Structural[5]	Security	Coatings	Appurtenances			
Basin View	$5,000	$62,740		$200	$67,940	$67,940	$67,940
Bowen	$5,000	$67,640		$5,450	$78,090	$78,090	$78,090
Burns	$5,000	$58,840		$4,750	$68,590	$68,590	$68,590
Center #1	$1,000,000	$94,140	$225,000	$30,000	$1,618,968	$1,186,368	$5,439,408
Center #2	$1,000,000	$64,140	$225,000	$30,000	$1,618,968	$1,186,368	$5,439,408
High	$800,000	$72,040	$147,000	$19,950	$1,246,788	$986,328	$3,560,328
Hilyard	$5,000	$59,080		$500	$64,580	$64,580	$64,580
Hospital	$184,000	$59,740		$5,500	$249,240	$249,240	($249,240)
Lindley	$408,500	$58,340	$87,750	$27,500	$582,090	$985,608	$985,608
Lynnwood Lower	$249,500	$51,140	$171,500	$30,200	$502,340	$502,340	($502,340)
Lynnwood Upper	$142,500	$51,390		$28,450	$222,340	$637,308	$637,308
Melrose	$215,000	$81,840	$261,500	$32,200	$590,540	$1,223,568	($590,540)
Moyina Lower	--	--	--	--	--	--	--
Moyina Upper	$142,500	$54,540		$14,750	$211,790	$709,540	$709,540
North	$0	$80,340	$170,500	$35,400	$286,240	$1,303,488	($286,240)
Ogden	$209,000	$68,140		$20,000	$297,140	$297,140	$297,140
Patterson #1	$192,000	$90,540	$160,000	$31,500	$474,040	$859,140	($474,040)
Patterson #2	$5,000	$58,340		$5,000	$68,340	$68,340	$68,340
Prescott	$427,000	$50,090	$432,000	$0	$1,090,908	$1,090,908	$1,090,908
Tanglewood	$0	$65,240	$121,000	$26,450	$212,690	$822,440	$976,160
Uhrman	$5,000	$58,640		$5,000	$68,640	$68,640	$68,340
TOTAL	**$5,000,000**	**$1,306,940**	**$2,001,250**	**$352,800**	**$8,660,990**	**$12,349,746**	**$17,439,370**

a. Does not include cost of decommissioning or new land acquisition in the case of High Tank.
b. Does not include future replacement or O&M (scheduled recoating) costs except for Prescott due to the nature of the upgrades required.

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c. Does not include site improvements
d. Center 1, Center 2, High, North, Melrose, Lindley, Upper Lynnwood, and Prescott include 20% for design, permitting, and administration

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SECTION 8.0 SYSTEM RECONFIGURATION POTENTIAL ANALYSIS.

8.1 Introduction

The integrated, comprehensive, and long-term planning horizon of this assessment has provided an exceptional opportunity to assess asset upgrade needs and associated costs compared to replacement of multiple assets and reduction of the number of assets. The objective of eliminating assets is reducing capital, operation, and maintenance costs. The objective of the system reconfiguration was to identify opportunities for long-term optimization rather than a short-term fix.

Some of the City's tanks, while in seemingly good condition, are in excess of 70 years old and retrofitting simply may be more-costly than replacement. Additionally, the 2010 Water System Plan identified storage deficits in the near term and at build-out. With 21 smaller steel tanks, serving six pressure zones, there may be an opportunity to co-locate, combine, or increase storage at centralized sites rather than "like-for-like" replacement. If achievable, centralization would reduce operation and maintenance costs, simplify security, and provide facilities that are seismically resilient and more reliable in an emergency. Such opportunities would have capital cost, project prioritization, and planning implications. Therefore, doing the analysis in conjunction with this project provides the City a more complete picture of the opportunities and benefits available.

This evaluation only looks at the possibility of centralizing storage assets and increasing storage capacity. The capacity of booster pumping to fully implement these recommendations is outside of the scope of the project and was not included.

8.1.1 Current Conditions

The most recent system-wide evaluation of storage needs is the 2010 Water System Plan. That plan conducted an evaluation of the system based on 2010 needs, intermediate needs (time frame not defined), and at build-out. Table 18 summarizes the storage evaluation by pressure zone.

The summary shows that without additional storage, the system will be in a deficit storage capacity mode in seven of nine pressure zone, with 60 percent of the deficit occurring in Zone 1.

In addition to representing most of the storage deficit, four of the nine tanks in Zone 1 are the oldest in the system: both Center Tanks that serve to control the Conger Wells, North, and Melrose. These four tanks, with an average age of 86 years, average only 0.71 MG in capacity and 36 percent of total zone capacity.

Another feature of the storage system is that Patterson #2 has a capacity of 1.3 MG, but is operated at 0.9 MG to maintain an operating level equal to that of Patterson #1 with a capacity of 0.4 MG. If Patterson #1 were decommissioned, Patterson #2 could be operated at full capacity with no net storage loss.

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8.1.2 Approach

The water system currently operates in a manner controlled by water levels in the Center tanks. All water in Zones 2 through 5 and Zone 8 originates in Zone 1. When demand increases anywhere in the system, that demand is initially met from zone-specific storage. That demand, and resulting calls for water, ultimately cascade down to Zone 1 and the two Center Tanks. When the water level in the hydraulically connected Center tanks drops, the Conger Wells are sequentially engaged to meet demand. Once the wells are engaged, water is pumped directly into the distribution system and they remain in service until production exceeds demand and all system storage is replenished, ending with the Center East and West tanks. Because the wells pump directly into the distribution system at times of demand, all storage tanks float on the system until demand diminishes and filling begins.

Table 19. 2010 Water System Plan Storage Analysis Summary

Zone	Condition (in million gallons)								
	Current (2010)			Intermediate			Build-out		
	ADD	*Storage Needed*	*Post-credit Surplus/(Deficit)*	*ADD*	*Storage Needed*	*Post-credit Surplus/Deficit*	*ADD*	*Storage Needed*	*Post-credit Surplus/Deficit*
1	7.44	18.47	(2.11)	9.89	24.1	(4.92)	10.13	24.66	(5.20)
2	0.72	1.08	0.05	1.29	4.85	(0.27)	1.89	5.45	(0.57)
3	1.20	3.67	1.65	1.77	4.96	1.02	3.47	8.88	(0.95)
4	0.10	0.41	0.12	0.13	0.47	0.09	0.15	0.52	0.07
5	0.07	0.33	0.26	0.17	0.58	0.14	0.26	0.78	0.04
6	--	--	--	0.03	0.26	(0.22)	0.28	0.82	(0.50)
8	0.14	0.50	(0.05)	0.14	0.50	(0.05)	0.62	1.60	(0.60)
10	--	--	--	--	--	--	0.31	0.89	(0.53)
12	--	--	--	--	--	--	0.16	0.63	(0.45)

ADD = average daily demand
Zones 6, 10, and 12 are separate future zones within the Basin View pressure zone

A characteristic of the system that lends itself to operational simplification is that many of the tanks in a given zone are at similar elevations resulting in duplication in the system. For example, the nine tanks in Zone 1 vary in elevation only by 7 feet. In Zone 3, that variation is less than 1 foot across five of six tanks

The evaluation was conducted using the City's existing hydraulic model (InfoWater v.12.4). Within the model is the ability to take storage assets offline or modify the capacity. Therefore, using the existing model as a baseline, potential revised system scenarios were tested by removing given facilities while simultaneously increasing the capacity future potential facilities. The guidelines for the evaluation were:

- All system revisions would use existing storage sites. No new properties would be required.
- System revisions must at not reduce service pressure by more than 5 percent.

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- Resulting zone storage capacities must meet or exceed current capacities.
- Revised storage scenarios must address both current and future system needs.
- Revisions must result in a net reduction in operation and maintenance costs.

Facilities were selected and scenarios developed based on asset ages, cost to upgrade, and potential for long-term system enhancement. Based on these criteria the following facilities were evaluated:

- Replacement of Center East with increased capacity
- Replacement of Center West with increased capacity
- Replacement of High Tank with increased capacity
- Replacement of Tanglewood with like capacity
- Decommission of Lower Moyina
- Decommission of Lower Lynnwood
- Decommission of Patterson No. 1
- Decommission of Hospital

These tanks operate across differing pressure zones and, therefore, not all impact the operation of others. In order to assess the potential for these system optimization improvements, the following scenarios were developed to evaluate the modification and the impact on connected facilities. The modeling setting of each scenario is included as Appendix E.

Potential Configuration Change		Resulting Improvement	Change in Storage Capacity	Assets Removed from System
1	Replace High Level Tank with 3.0 MG tank	• New, larger High Level Tank	+2.1 MG to Zone 3	• Hospital
2	Replace both Center Tanks with two 5.0 MG tanks	• Two new, larger Center Tanks • High Level Booster Station reduced to 150 gpm	+7.18 MG to Zone 1	• North • Melrose • Lower Lynnwood • Melrose Booster
3	Decommission Patterson #1 and Lower Moyina	• Paterson #2 operating at capacity	-0.1 MG to Zone 3	• Patterson 1 • Lower Moyina
Results		Three new seismically resilient tanks More resilient Patterson #2 operating at capacity	9.26 MG additional storage	Six tanks and one booster station removed from system

8.1.3 Reconfiguration Scenario Results

The following is a description of the set-up and results of each of the three reconfiguration scenarios.

Scenario No. 1

Replace High Level Tank with 3.0 MG tank; remove Hospital Tank from system

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- *Initial* conditions @ High Level Reservoir:
  - Diameter = 55 feet (per GIS model)
  - Maximum level = 22.33 feet (per GIS model)
  - Resultant volume = ~400,000 gallons
- *Revised* conditions @ High Level Reservoir:
  - Diameter = 100 feet
  - Maximum level = 50 feet
  - Resultant volume =~3,000,000 gallons

Figure 1 shows the existing and reconfigured node pressures are virtually unchanged and where variation did occur the reconfiguration resulted in a slight increase. At no node in the Zone 3 did pressure decrease by more than 5 percent. At two location node pressure approach 20 psi and at one location pressure dropped below 20 psi. However, these pressures were low in the existing condition and not the result of the reconfiguration with Hospital Tank off-line. At thirteen nodes pressure increased by more than 5 percent. Node specific data is included in Appendix E.

Scenario #2

Replace Center East & West with two 5.0 MG tanks; remove North, Melrose, and Lower Lynnwood Tanks; remove Melrose Booster

- *Initial* conditions @ Center East & West tanks:
  - Diameter = 77 feet
  - Maximum level = 22.33 feet
  - Resultant volume = pi*(77ft/2)^2 * 22.33ft * 7.48 gal/cf = ~780,000 gallons
- *Revised* conditions @ Center East & West tanks:
  - Diameter = 130 feet
  - Maximum level = 50 feet
  - Resultant volume = pi(130ft/2)^2 * 50 * 7.48 gal/cf = ~5,000,000 Gallons

  Take North, Melrose and Lower Lynnwood tanks offline
  Take Melrose Booster Station offline
  Reduce pumping rate from High Level Booster Station to 150 gpm per pump

Figure 2 shows the existing and reconfigured node pressures were virtually unchanged. In this Zone 1 scenario slightly more than half (55 percent) of the nodes showed a decrease in pressure. However, only thirteen node locations showed a decrease greater than 5 percent. Of those thirteen nodes, none dropped below 36 psi. Within the zone five nodes showed a pressure less than 20 psi, however these pressures existed in the current configuration and were not the result of reconfiguration. Node specific data is included in Appendix E.

Scenario No. 3

Remove Patterson #1 and Lower Moyina Tanks

- *Initial* conditions:

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  - Patterson #2 operating capacity of 0.9 MG
  - Patterson #1 operating capacity of 0.4 MG
  - Lower Moyina assumed removed
- *Revised* conditions:
  - Patterson #2 operating capacity of 1.3 MG
  - Patterson #1 decommissioned
  - Lower Moyina decommissioned

The results of node pressure variation from the Scenario No. 3 configuration (Figure 3) shows virtually no change in Zone 3 node pressure. Thirty-three percent (70) nodes showed an increase in service pressure exceeding five percent. The average percent increase for those nodes was seven percent. Fifty-eight percent of the nodes showed no changes on service pressure. At two locations, pressures are shown to be below zero in both the existing and reconfigured scenario. Two more locations associated with pressure reducing valves showed pressures exceeding 350 psi also in both the existing condition and reconfigured scenario.

This conceptual investigation provided promising results regarding the reconfiguration of the storage system. While there were identified nodes of low pressure in both the existing and reconfigured scenarios, it is recommended that these nodes be further investigated. As is often the case, these nodes represent locations adjacent to tanks and pump stations that do not represent actual customer service pressures.

8.1.4 Reconfiguration Evaluation Conclusions

The reconfiguration modifications result in removing 8 of the 9 oldest tank assets in the system and replacing them with three higher capacity, seismically resilient facilities and providing for the Patterson #2 tank to be operated at capacity. Reconfiguration does not appear to negatively impact service pressures in the reconfigured zones. These modifications maintain storage redundancy and service pressures and increase storage capacity by 9.3 MG.

Based on build-out storage deficit scenarios of the recent water master plan, reconfiguration eliminates projected build-out pre-credit deficits in Zones 1 and 3.

Reconfiguration reduces the number of steel storage tanks in the system by 30 percent and provides the City with a seismically resilient system within 15 years.

Based on this conceptual reconfiguration analysis, it is recommended that the City conduct a more detailed study of the reconfigured system to determine the detailed piping and pumping modifications that will be required, and develop a plan for system reconfiguration concurrent with security, seismic resiliency, and condition upgrades.

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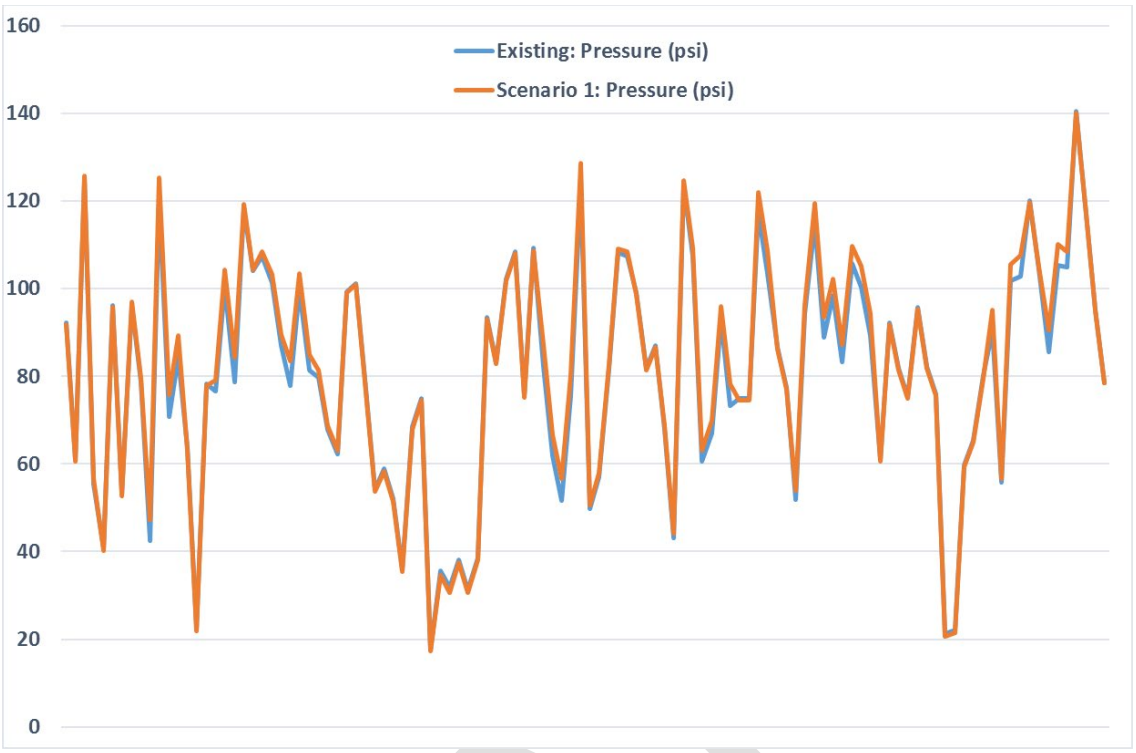


Figure 1. Reconfiguration Scenario No. 1 (Zone 3) node pressure comparison

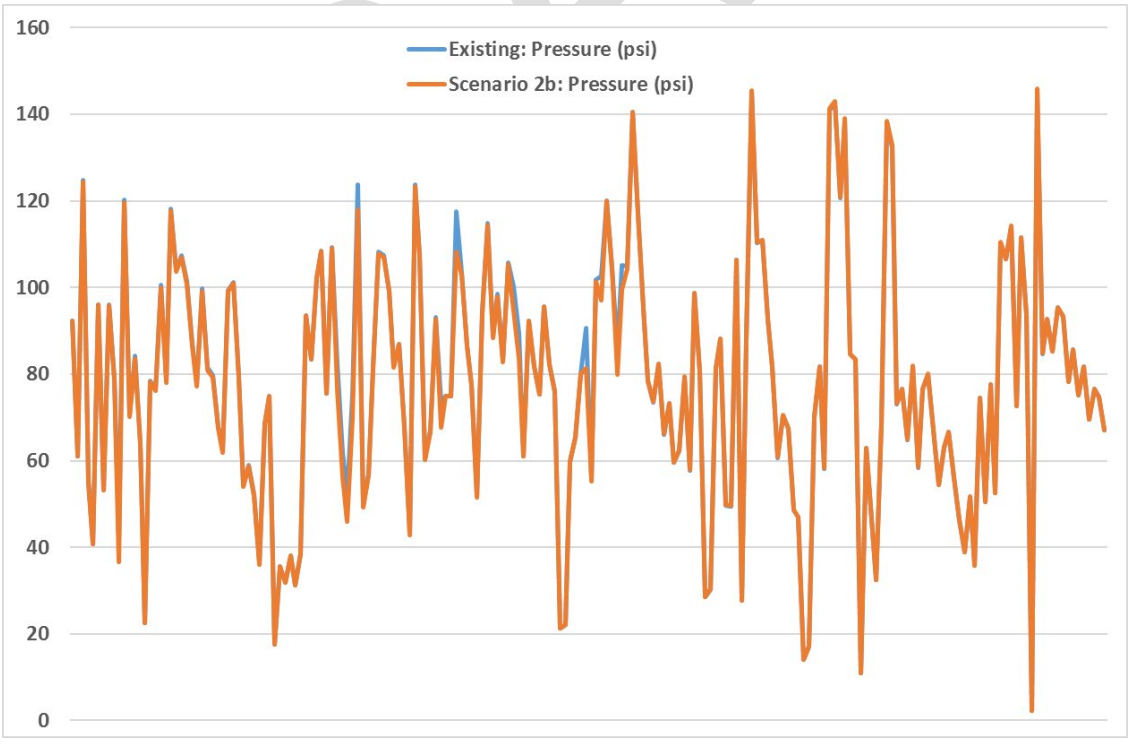


Figure 2. Reconfiguration Scenario No. 2 (Zone 1) node pressure comparison

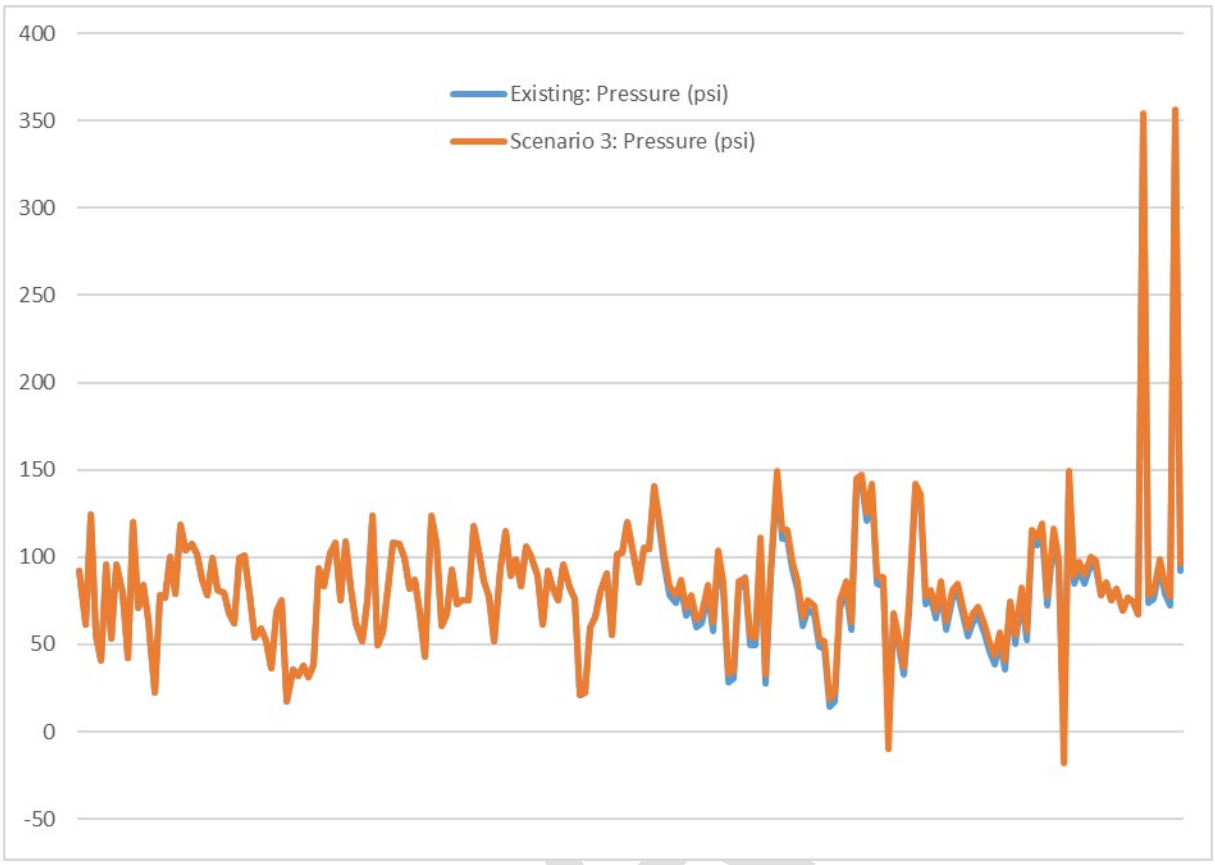


Figure 3. Reconfiguration Scenario No. 3 node pressure comparison

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SECTION 9.0 CONCLUSIONS, RECOMMENDATIONS AND 50-YEAR SEISMIC AND SECURITY VULNERABILITY AND CONDITION IMPROVEMENT PLAN

The purpose of this water distribution system analysis was to evaluate the seismic resiliency of the City's 21 water storage tanks, the security of each site relative to the City's objectives, the condition of each tank's interior and exterior coating, corrosion, and cathodic protection, and the general condition of each asset relative to OSHA, Oregon Department of Water Resources, and industry design standards.

Following an evaluation of the current conditions, this analysis identified the improvements necessary to bring the assets up to a standard outlined by the City and to develop costs for the necessary improvements. Finally, an improvement plan was developed using a 50-year planning horizon outlined by the Oregon Resiliency Plan for making water systems seismically resilient.

As has been presented in the preceding sections of this report, the state of the storage assets varies from excellent condition with only minor improvements to needs to be replaced. Table 19 summarizes the needs in general category terms and provides a comparative score based on the following color coding and scoring.

Based on the evaluations generally, and not surprisingly, it is the oldest tanks in the system that require the most attention. These include: Center East, Center West, High, North, and Melrose. Lower Moyina is not as old as the others, but it is simply a non-traditional design that is unmaintainable, unnecessary and failing in a number of areas has been recommended for removal. Lindley, while only halfway through it's useful life, has been identified as susceptible to overturn in the event of a seismic event. The Upper and Lower Lynnwood tanks have good coating but there are some concerns surrounding foundations and seismic resiliency that may cause these to rise on the list.

An unexpected result of the structural analysis is was that the Prescott tank's shell wall is under designed for current seismic code and under the design event could result in failure.

While no serious unauthorized intrusions have been reported, all site are in need of security upgrades to meet the City's objectives.

Based on facility age, remaining useful life, condition and cost to retrofit this evaluation has recommended the replacement of Center East, Center West, High, and Tanglewood tanks. However, instead of replacement of similar capacity tanks, a hydraulic analysis of the system has shown that replacing these assets with larger capacity tanks

- is more cost effective on a cost per gallon of storage basis,
- eliminates current storage deficits,
- provides excess storage capacity for future growth, and
- allows the further decommissioning of the Hospital, Patterson No. 1, Melrose, and North tanks

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Table 20. Summary of Structural, Security and Maintenance Needs

Asset	Security	Appurtenance Improvements	Coatings	Structural	Assessment Needs Score
North					20
High					20
Lindley					20
Moyina Lower					20
Center #1					18
Center #2					18
Melrose					18
Patterson #1					16
Hospital					16
Lynnwood Lower					15
Lynnwood Upper					15
Ogden					14
Tanglewood					14
Moyina Upper					8
Prescott					8
Uhrman					6
Basin View					6
Hilyard					6
Burns					5
Patterson #2					5
Bowen					3

	Condition	Score
	Requires improvement	5
	Adequate, but could be improved through maintenance/retrofit	3
	Acceptable, no improvement required at this time	0

While this analysis set out to develop a 50-year capital improvement plan, for achieving seismic resiliency the timing, need, and asset condition and age simply do not lend themselves to a planning horizon that long. As a result, most improvements are front loaded in the first 25 years.

Based on the evaluation of the water system's storage system to identify deficiencies, capital costs for asset replacement, asset condition and potential for system optimization it is recommended that the City undertake the following actions.

- Remove Lower Moyina Tank from service and make booster pump station improvements to pump directly to Upper Moyina.
- Seek potential outside funding support for Center East and West tanks based on their criticality to system functionality.

- Plan and prepare for the replacement of tanks with larger capacity facilities over the next 10 years in the following order: Center East, Center West, High Level, and Tanglewood,
- As the new facilities come online, remove North, Melrose, Patterson No.1, and Hospital Tanks from service.
- Proceed with system-wide surveillance improvements over the next five years.
- Install hatch intrusion-activated actuated outlet valves over the next 10 years on tanks with flexible joints.
- Install hatch intrusion-activated/actuated outlet valves on other tanks when flexible joints are installed.
- Establish and plan for a 30-year recoating schedule for all assets.
- Schedule a plan for replacement of Ogden, Upper and Lower Lynnwood, and Lindley as they reach their 100-year useful life.
- Beginning in 2020, allot $36,900 per year to perimeter fencing security improvements for a 10-year period.

To begin the process of upgrading, the storage system cost estimates identified for seismic retrofitting, security, and asset condition were organized based on asset criticality and the identified opportunities for system reconfiguration to develop a storage system capital improvement plan. Because the impetus for this project was originally seismic resiliency, the Oregon Resiliency Plan recommended a 50-year planning horizon to schedule recommended improvements. The recommended storage system capital improvement plan is presented as Table 20. The plan is designed so that at the end of the planning period, the City of Klamath Falls will own and operate a seismically resilient system-wide potable water storage system.

The plan addresses needs identified by this report, regular recommended 15-year tank recoating intervals, and replacement of tanks when they reach eighty years of service. The RED highlighted boxes indicate the replacement of the asset with the larger asset identified in the reconfiguration analysis. The GREEN highlighted boxes represent the recommended 30-year recoating.

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Table 21. Prioritized Seismic Resiliency, Security and Condition Improvement Plan

Asset	Improvement Period									
	2020-25	2026-30	2031-35	2036-40	2041-45	2046-50	2051-55	2056-60	2061-65	2066-70
Basin View	$0	$67,940	$246,300	$0	$0	$0	$0	$0	$445,600	$0
Replace										
Recoating			$246,300						$445,600	
Access/Operational Security		$300								
Surveillance		$5,500								
Water Quality Security		$36,940								
Perimeter Security		$20,000								
Appertenances		$200								
Structural Improvements		$5,000								
Bowen	$0	$78,090	$0	$0	$432,700	$0	$0	$0	$0	$782,500
Replace										
Recoating					$432,700					$782,500
Access/Operational Security		$300								
Surveillance		$5,500								
Water Quality Security		$27,840								
Perimeter Security		$34,000								
Appertenances		$5,450								
Structural Improvements		$5,000								
Burns	$0	$68,590	$552,500	$0	$0	$0	$0	$0	$1,000,100	$0
Replace										
Recoating			$552,500						$1,000,100	
Access/Operational Security		$300								
Surveillance		$5,500								
Water Quality Security		$25,540								
Perimeter Security		$27,500								
Appertenances		$4,750								
Structural Improvements		$5,000								
Center #1	$5,490,248	$0	$0	$0	$0	$1,000,000	$0	$0	$0	$0
Replace	$5,439,408									
Recoating						$1,000,000				
Access/Operational Security										
Surveillance	$5,500									
Water Quality Security	$27,840									
Perimeter Security	$17,500									
Appertenances										
Structural Improvements										
Center #2	$5,490,248	$0	$0	$0	$0	$1,000,000	$0	$0	$0	$0
Replace	$5,439,408									
Recoating						$1,000,000				
Access/Operational Security										
Surveillance	$5,500									
Water Quality Security	$27,840									
Perimeter Security	$17,500									
Appertenances										
Structural Improvements										
High	$0	$3,613,668	$0	$0	$0	$0	$0	$266,000	$0	$0
Replace		$3,560,328								
Recoating								$266,000		
Access/Operational Security										
Surveillance		$5,500								
Water Quality Security		$27,840								
Perimeter Security		$20,000								
Appertenances										
Structural Improvements										
Hilyard	$0	$64,580	$509,000	$0	$0	$0	$0	$0	$0	$0
Replace										
Recoating			$509,000							
Access/Operational Security		$540								
Surveillance		$5,500								
Water Quality Security		$25,540								
Perimeter Security		$27,500								
Appertenances		$500								
Structural Improvements		$5,000								
Hospital		**Decommission**								
Lindley	$0	$1,038,948	$0	$0	$0	$0	$0	$309,700	$0	$0
Replace		$985,608								
Recoating								$309,700		
Access/Operational Security										
Surveillance		$5,500								
Water Quality Security		$27,840								
Perimeter Security		$20,000								
Appertenances										
Structural Improvements										
Lynnwood Lower	**Decommission**									
Lynnwood Upper	$0	$676,980	$0	$0	$0	$0	$0	$215,500	$0	$0
Replace		$627,390								
Recoating								$215,500		
Access/Operational Security										
Surveillance		$5,500								
Water Quality Security		$27,840								
Perimeter Security		$16,250								
Appertenances										
Structural Improvements										
Moyina Lower	**Decommission**									

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Moyina Upper	$0	$54,540	$0	$709,540	$0	$0	$0	$0	$0	$215,000
Replace				$709,540						
Recoating										$215,000
Access/Operational Security										
Surveillance		$5,500								
Water Quality Security		$31,540								
Perimeter Security		$17,500								
Appertenances										
Structural Improvements										
Melrose	**Decommission**									
North	**Decommission**									
Ogden	$0	$297,140	$336,000	$0	$0	$0	$1,800,000	$0	$0	$0
Replace							$1,800,000			
Recoating			$336,000							
Access/Operational Security		$3,600								
Surveillance		$5,500								
Water Quality Security		$31,540								
Perimeter Security		$27,500								
Appertenances		$20,000								
Structural Improvements		$209,000								
Patterson #1	**Decommission**									
Patterson #2	$0	$68,840	$42,600	$0	$0	$0	$0	$0	$77,100	$0
Replace										
Recoating			$42,600						$77,100	
Access/Operational Security		$300								
Surveillance		$5,500								
Water Quality Security		$31,540								
Perimeter Security		$21,500								
Appertenances		$5,000								
Structural Improvements		$5,000								
Prescott	$0	$909,090	$0	$0	$0	$0	$0	$783,000	$0	$0
Replace										
Recoating		$432,000						$783,000		
Access/Operational Security		$300								
Surveillance		$5,500								
Water Quality Security		$25,540								
Perimeter Security		$18,750								
Appertenances										
Structural Improvements		$427,000								
Tanglewood	$0	$53,840	$976,160	$0	$0	$0	$0	$0	$1,000,000	$0
Replace			$976,160							
Recoating									$1,000,000	
Access/Operational Security		$1,800								
Surveillance		$5,500								
Water Quality Security		$31,540								
Perimeter Security		$15,000								
Appertenances										
Structural Improvements										
Uhrmann	$0	$68,340	$0	$380,000	$0	$0	$0	$0	$0	$617,000
Replace										
Recoating				$380,000						$617,000
Access/Operational Security		$2,300								
Surveillance		$5,500								
Water Quality Security		$25,540								
Perimeter Security		$25,000								
Appertenances		$5,000								
Structural Improvements		$5,000								
Subtotals										
Replacement	*$10,878,816*	*$5,173,326*	*$976,160*	*$709,540*	*$0*	*$0*	*$1,800,000*	*$0*	*$0*	*$0*
Recoating	*$0*	*$432,000*	*$1,686,400*	*$380,000*	*$432,700*	*$2,000,000*	*$0*	*$1,651,300*	*$2,522,800*	*$1,614,500*
Access/Operational Security	*$0*	*$14,700*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Surveillance (1)	*$11,000*	*$71,500*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Water Quality Security (2)	*$55,680*	*$376,620*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Perimeter Security/Gates	*$35,000*	*$290,500*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Appurtenance Improvements	*$0*	*$40,900*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
Structural Improvements	*$0*	*$666,000*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
TOTAL	**$10,980,496**	**$7,065,546**	**$2,662,560**	**$1,089,540**	**$432,700**	**$2,000,000**	**$1,800,000**	**$1,651,300**	**$2,522,800**	**$1,614,500**

1. Includes motion detection cameras and illumination
2. Includes security ladder, security vent, hatch intrusion alarm, access and operational, and intrusion activated isolation valve
3. Costs for replacement assets include 20% for design, permitting, and administration

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Appendix C. Conger Wellfield Condition Assessment

Appendix 2B Conger Wellfield Representative Condition Photo Log





























City of Klamath Falls 2020 Water Master Plan

Appendix D. Booster Station Condition Assessment

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: South 6th **Date Constructed:**

Location Description: 3700 block South 6th St

Capacity: 2000 gpm

Pump	**Size:**	**Manufacturer:**	**Age:**
1	1000 gpm	Westinghouse	
2	1000 gpm	General Electric	

Pumps From/To:

Operational Criticality: High Medium Low

Construction
Building: CMU
Roof: Metal

Condition
Building: Good

Roof: Good

Communications: Good

Doors: Steel hollow core with residential grade with large screen window

Windows: Fan in window, not secure

Pumps: Good

Security
Locks: Residential

Window Bars: Steel mesh on fan opening

Alarms: None

Surveillance: None

Overall Condition: Fair











City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Washburn **Date Constructed:**

Location Description: 2515 Hilyard Ave

Capacity: 9,300 gpm (Upgradeable to 12,400 gpm)

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	1500 – 3100	EO Master	
2	1500 – 3100	EO Master	
3	1500 – 3100	EO Master	

Pumps From/To:

Operational Criticality: High Medium Low

Construction
Building: Architectural Block

Roof: Metal Roof

Condition
Building: Excellent

Roof: Excellent

Communications: Yes

Doors: Steel commercial and
steel rolling door

Windows: Vent only

Pumps: Excellent

Security
Locks: Yes - Commercial

Window Bars: NA

Alarms: None

Surveillance: None

Overall Condition: Excellent

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Dayton **Date Constructed:**

Location Description: Dayton St/ Shasta Way

Capacity: 500 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	500	Berkeley	

Pumps From/To:

Operational Criticality: Medium



Construction
Building: CMU

Roof: Metal

Condition
Building: Good

Roof: Good



Communications: Yes

Doors: Steel commercial

Windows: None. Vent hole.

Pumps: Good

Security
Locks: Commercial

Window Bars: Vent screen. No windows.



Alarms: None

Surveillance: None

Overall Condition: Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Melrose **Date Constructed:**

Location Description: 2030 Melrose Street

Capacity: 650 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	650		

Pumps From/To: Melrose Tank

Operational Criticality: High





Construction
Building: CMU vault

Roof: Cover – hinged steel plate

Condition
Building: Vault Poor

Roof: Poor



Communications: @ Melrose Tank

Doors: None

Windows: None

Pumps: Could not view.
Based on other site elements pump condition would be suspect.



Security
Locks: None

Window Bars: NA

Alarms: None

Surveillance: None

Overall Condition: Poor

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Burns **Date Constructed:**

Location Description: Beverly Dr/ Foothills Blvd

Capacity: 1000 gpm

Pumps	**Number:**	**Size:**	**Manufacturer:**	**Age:**
	1	1000 gpm	Emerson	

Pumps From/To: Co-located with Beverley

Operational Criticality: High

Construction
Building: Hydronics Split Top Fiberglass Vault

Roof: Fiberglass



Condition
Building: Vault - Good

Roof: Good

Communications: Yes

Doors: Integrated Good

Windows: None



Pumps: Good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Very Good

2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Riverside **Date Constructed:**

Location Description: 800 block Riverside Dr

Capacity: 880 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	440 gpm	Baldor	
2	440 gpm	General Electric	

Pumps From/To:

Operational Criticality: High Medium Low

Construction
Building: CMU

Roof: Metal

Condition
Building: Good (fenced)

Roof: Good

Communications: Yes

Doors: Commercial

Windows: Two residential grade

Pumps: Fair









Security
Locks: Commercial grade

Window Bars: Screen

Alarms: None

Surveillance: None



Overall Condition: Good

City of Klamath Falls **Reviewer:** Murphy, B.

2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Lynnwood **Date Constructed:**

Location Description: Lower Lynnwood Reservoir

Capacity: 420 gpm

Number:	**Size:**	**Manufacturer:**	**Age:**
1	210 gpm	General Electric	
2	210 gpm	General Electric	

Pumps From/To:

Operational Criticality: Medium

Construction
Building: CMU

Roof: Metal

Condition
Building: Good

Roof: Good

Communications: Yes

Doors: Steel Commercial

Windows: One steel mesh secured externally

Pumps: Fair

Security
Locks: Commercial

Windows: External mesh

Alarms: None

Surveillance: None

Overall Condition: Fair









City of Klamath Falls **Reviewer:** Murphy, B.

2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: West Oregon **Date Constructed:**

Location Description: W Oregon Av / Harvard St

Capacity: 850 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	50 gpm	AO Smith	
2	200 gpm	US Electric	
3	600 gpm	US Electric	

Pumps From/To:

Operational Criticality: Low

Construction
Building: Hydronics split Top Vault

Roof: Fiberglass

Condition
Building: Very good

Roof: Very good

Communications: Yes

Doors: Very good

Windows: NA

Pumps: Fair





Security
Locks: Padlock

Windows: NA

Alarms: None

Surveillance: None

Overall Condition: Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Center **Date Constructed:**

Location Description: Center Reservoir

Capacity: 400 gpm

Pumps:	**Size:**	**Manufacturer:**	**Age:**
1	200 gpm	Century	
2	200 gpm	Century	

Pumps From/To:

Operational Criticality: Low

Construction
Building: Brick Masonry

Roof: Concrete, attached to tank

Condition
Building: Poor

Roof: Poor

Communications: Yes

Doors: Poor. Wood residential

Windows: None

Pumps: Fair

Security
Locks: Residential

Window: NA

Alarms: None

Surveillance: None











Overall Condition: Poor

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Sierra Heights **Date Constructed: 2008**

Location Description: Sierra Heights Blvd / Hilyard Ave

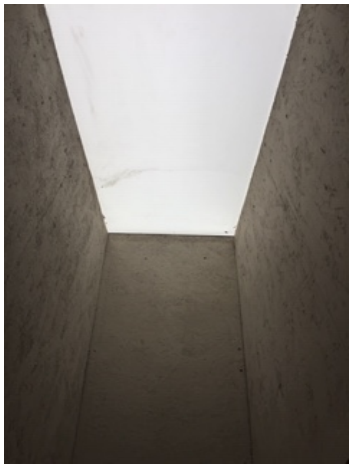
Capacity: 1240 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	10 – 50 gpm	Berkeley	
2	40 – 190 gpm	Berkeley	
3	1000 gpm	Berkeley	

Pumps From/To:

Operational Criticality: Low





Construction
Building: CMU

Roof: Metal

Condition
Building: Good

Roof: Good

Communications: Yes

Doors: Commercial Steel

Windows: None

Pumps: Good





Security
Locks: Commercial

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Excellent

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Birch **Date Constructed:**

Location Description: Birch St/ Delores St

Capacity: 520 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	260 gpm	General Electric	
2	260 gpm	General Electric	

Pumps From/To:

Operational Criticality: Low

Construction
Building: Brick Masonry

Roof: Metal Lift-off



Condition
Building: Good

Roof: Good

Communications: Yes



Doors: Commercial steel

Windows: Three windows steel plates in place of panes.

Pumps: Good

Security
Locks: Commercial

Window: Internally secured



Alarms: None

Surveillance: None

Overall Condition: Fair

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: High Level **Date Constructed:**

Location Description: Melrose Reservoir

Capacity: 660 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	225 gpm	Baldor	
2	435 gpm	General Electric	

Pumps From/To: Melrose Tank to High Level Tank

Operational Criticality: High

Construction
Building: Concrete

Roof: Concrete



Condition
Building: Poor

Roof: Poor

Communications: Yes

Doors: Good

Windows: Fair

Pumps: Good





Security
Locks: Residential steel with large vertical sliding window and screen

Window: Residential with external screen mesh

Alarms: None

Surveillance: None



Overall Condition: Poor

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Beverly **Date Constructed:**

Location Description: Beverly Dr/ Foothills Blvd

Capacity: 1500 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	750 gpm	Emerson	
2	750 gpm	Emerson	

Pumps From/To: Patterson

Operational Criticality: High



Construction
Building: Hydronics Split Top Fiberglass Vault

Roof: Fiberglass

Condition
Building: Vault - Good

Roof: Good

Communications: Yes

Doors: Integrated Good



Windows: None

Pumps: Good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Very Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Ogden **Date Constructed:**

Location Description: 1435 Ogden St

Capacity: 645 gpm

Pump	**Size:**	**Manufacturer:**	**Age:**
3	215 gpm	Baldor	
4	430 gpm	Baldor	

Pumps From/To:

Operational Criticality: High Medium Low

Construction
Building: Composite wood (currently being steel sided)

Roof: Metal





Condition
Building: Excellent

Roof: Excellent

Communications: Yes

Doors: Good – Steel commercial

Windows: Fan vent opening



Pumps: Good

Security
Locks: Commercial

Window: External steel mesh

Alarms: None

Surveillance: None



Overall Condition: Fair

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: ESI **Date Constructed:**

Location Description: ESI Way/ Harbor View St

Capacity: 1,810 gpm

Pump	**Size:**	**Manufacturer:**	**Age:**
1	10 – 60 gpm	Baldor	
2	60 – 250 gpm	Baldor	
3	1500 gpm	Us Electric (Fire flow)	

Pumps From/To:

Operational Criticality: Low (Only feeds ESI Manufacturing)

Construction
Building: Hydronics Fiberglass Vault

Roof: Fiberglass split top

Condition
Building: Very good

Roof: Very good

Communications: Yes

Doors: Integrated with roof

Windows: None

Pumps: Very good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Very Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Crown Ridge **Date Constructed:**

Location Description: 1807 Harmony Lane

Capacity: 760 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	160 gpm	Baldor	
2	600 gpm	Baldor	

Pumps From/To:

Operational Criticality: Low (Residential only with Quail Ridge)

Construction
Building: NA

Roof: Steel access hatch

Condition
Building: NA

Roof: Very good

Communications: Yes

Doors: Steel hinged hatch

Windows: None

Pumps: Very good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None











Overall Condition: Very Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Quail Ridge **Date Constructed:**

Location Description: Wade Circle / Eulalona Ct.

Capacity: 750 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	80 gpm	Baldor	
2	240 gpm	Baldor	
3	430 gpm	Baldor	

Pumps From/To:

Operational Criticality: Low (Residential only shared with Crown Ridge)

Construction
Building: NA

Roof: Steel access hatch

Condition
Building: NA

Roof: Very good

Communications: Yes

Doors: Steel hinged hatch

Windows: None

Pumps: Very good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None









Overall Condition: Very Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Havencrest **Date Constructed:**

Location Description: 5871 Havencrest Dr

Capacity: 750 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	150 gpm	AO Smith	
2	225 gpm	Lincoln Electric	
3	375 gpm	Lincoln Electric	

Pumps From/To:

Operational Criticality: High Medium Low

Construction
Building: Hydronics fiberglass vault

Roof: Fiberglass split top



Condition
Building: Very good

Roof: Good. Integrated split top

Communications: Yes



Doors: None

Windows: None

Pumps: Very good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Very Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Moyina **Date Constructed:**

Location Description: Lower Moyina Reservoir

Capacity: 750 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	500 gpm	Reliance	
2	250 gpm	Reliance	

Pumps From/To: Lower Moyina to Upper Moyina

Operational Criticality: High

Construction
Building: CMU

Roof: Metal lift-off



Condition
Building: Fair

Roof: Fair

Communications: Yes



Doors: Commercial Steel

Windows: None

Pumps: Good

Security
Locks: Commercial

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Fair

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Basin View **Date Constructed:**

Location Description: Patterson Reservoir

Capacity: 1500 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	750 gpm	Baldor	
2	750 gpm	Baldor	

Pumps From/To:

Operational Criticality: High Medium Low

Construction
Building: Hydronics fiberglass vault

Roof: Fiberglass split top

Condition
Building: Very good

Roof: Good. Integrated split top

Communications: Yes

Doors: None

Windows: None

Pumps: Very good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Very Good

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Pelican **Date Constructed: 2020**

Location Description:

Capacity: 3,000 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	1000 gpm	Baldor	
2	1000 gpm	Baldor	
3	1000 gpm	Baldor	

Pumps From/To:

Operational Criticality: High - Back-up generator





Construction
Building: Architectural Block

Roof: Metal

Condition
Building: New

Roof: New

Communications: Yes

Doors: New steel and steel roll-up

Windows: None

Pumps: New



Security
Locks: Commercial

Window: NA

Alarms: None

Surveillance: None



Overall Condition: Excellent

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Tanglewood **Date Constructed:**

Location Description: Laguna St/Old Fort Rd

Capacity: 3000 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	1000 gpm	Peerless	
2	1000 gpm	Peerless	
3	1000 gpm	Peerless	

Pumps From/To:

Operational Criticality: High Medium Low

Construction
Building: Brick Masonry

Roof: Concrete

Condition
Building: Fair

Roof: Fair

Communications: Yes

Doors: Steel commercial

Windows: Residential wood

Pumps: Fair

Security
Locks: Commercial

Window: External steel mesh on one side

Alarms: None

Surveillance: None









Overall Condition: Fair

City of Klamath Falls **Reviewer:** Murphy, B.
2019 Pump Station Conditional Assessment Evaluation Form **Date:** 7/10/19

Facility Name: Lyton **Date Constructed:**

Location Description:

Capacity: 1400 gpm

Pumps	**Size:**	**Manufacturer:**	**Age:**
1	700 gpm	US Electric	
2	700 gpm	US Electric	

Pumps From/To: Zone 1 to Zone 3



Operational Criticality: High

Construction
Building: Hydronics fiberglass vault

Roof: Fiberglass split top

Condition
Building: Very good

Roof: Good. Integrated split top

Communications: Yes



Doors: None

Windows: None

Pumps: Very good

Security
Locks: Padlock

Window: NA

Alarms: None

Surveillance: None

Overall Condition: Very Good

City of Klamath Falls 2020 Water Master Plan

Appendix E. Model Settings

E. Model Settings

Tank Settings							
ID (Char)	Type (Int)	Elevation (ft)	Minimum Level (ft)	Maximum Level (ft)	Initial Level (ft)	Diameter (ft)	Allow Overflow (Boolean)
T-ZN1-BOWEN	0: Cylindrical	4242	0	76.3	38.1	57	No
T-ZN1-BURNS	0: Cylindrical	4298	0	18.7	9.3	110	No
T-ZN1-CENTER-1	0: Cylindrical	4295	0	22.3	11.2	77	No
T-ZN1-CENTER-2	0: Cylindrical	4295	0	22.3	11.2	77	No
T-ZN1-HILYARD	0: Cylindrical	4286	0	33.3	16.7	73	No
T-ZN1-OGDEN	0: Cylindrical	4296	0	23.0	11.5	87	No
T-ZN2-LINDLEY	0: Cylindrical	4362	0	32.0	16.0	52	No
T-ZN2-PRESCOTT	0: Cylindrical	4303	0	100.0	73.0	50	No
T-ZN2-STEWART_LENOX	0: Cylindrical	4370	0	25.5	12.8	93	No
T-ZN2-UP_LYNNEWOOD	0: Cylindrical	4429	0	23.3	11.6	33	No
T-ZN3-HIGH_LEVEL	0: Cylindrical	4490	0	22.3	11.2	55	No
T-ZN3-PATTERSON-2	0: Cylindrical	4492	0	22.5	11.3	100	No
T-ZN3-URHMANN	0: Cylindrical	4482	0	30.4	15.2	86	No
T-ZN4-UPPER_MOYINA	0: Cylindrical	4553	0	23.0	11.5	46	No
T-ZN5-BASINVIEW	0: Cylindrical	4678	0	34.5	17.3	50.6	No
T-ZN8-TANGLEWOOD	0: Cylindrical	4979	0	23.5	11.8	46	No

Valve Settings				
ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting (Double)
PRV-HOS-PRV-2-ELD-A	0: Pressure Reducing Valve	4254	2	50
PRV-HOS-PRV-2-ELD-B	0: Pressure Reducing Valve	4264	4	46
PRV-HOS-PRV-2-ELD-C	0: Pressure Reducing Valve	4249	6	46
PRV-HOS-PRV-2-HWY-A	0: Pressure Reducing Valve	4185	8	74
PRV-HOS-PRV-OFR-A	0: Pressure Reducing Valve	4264	4	62
PRV-HOS-PRV-OFR-B	0: Pressure Reducing Valve	4284	4	48
PRV-PAT-FHH-A	0: Pressure Reducing Valve	4311	6	60
PRV-PAT-FHH-B	0: Pressure Reducing Valve	4305	6	60
PRV-PAT-KL-A	0: Pressure Reducing Valve	4232	6	84
PRV-PAT-PRV-MOY-A	0: Pressure Reducing Valve	4279	4	78
PRV-PAT-PRV-OGD-A	0: Pressure Reducing Valve	4286	2	72
PRV-SL-PRV-SL-A	0: Pressure Reducing Valve	4212	6	42
PRV-UM-PRV-3-A	0: Pressure Reducing Valve	4311	2	65
PRV-UM-PRV-3-B	0: Pressure Reducing Valve	4350	4	64
PRV_PRE_ZN1_1	0: Pressure Reducing Valve	4193	4	20

Pump Settings

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Constant Power (hp)	Shutoff Head (ft)	Design Head (ft)	Design Flow (gpm)	High Head (ft)	High Flow (gpm)
IMP-7004	1: Design Point Curve	4180	6	0	0	111	1000	0	0
IMP-7005	1: Design Point Curve	4280	8	0	0	111	1500	0	0
IMP-7006	1: Design Point Curve	4426	8	0	0	111	600	0	0
PELICAN_BOOSTER	3: Multiple Point Curve	100	12	0	0	310	1000	0	0
PU-BALSAM-1	1: Design Point Curve	4244	10	0	0	379	310	0	0
PU-BEVERLY-1	1: Design Point Curve	4193	4	0	0	285	750	0	0
PU-BEVERLY-2	1: Design Point Curve	4193	4	0	0	285	750	0	0
PU-BIRCH-1	2: Exponential 3-Point Curve	4212	2	0	300	270	200	220	270
PU-BIRCH-2	2: Exponential 3-Point Curve	4212	2	0	300	270	200	220	270
PU-BURNS-1	1: Design Point Curve	4192	6	0	0	120	1000	0	0
PU-CENTER-1	1: Design Point Curve	4297	2	0	90	70	200	52	250
PU-CENTER-2	1: Design Point Curve	4297	2	0	90	70	200	52	250
PU-CONGER-10	1: Design Point Curve	4094	10	0	0	266	3900	0	0
PU-CONGER-25	1: Design Point Curve	4094	10	0	0	246	5650	0	0
PU-CONGER-7	1: Design Point Curve	4094	10	0	0	239	1200	0	0
PU-CONGER-8	1: Design Point Curve	4094	10	0	0	270	1300	0	0
PU-CONGER-9	1: Design Point Curve	4094	10	0	0	295	2850	0	0
PU-DAYTON-1	1: Design Point Curve	4136	4	0	0	90	500	0	0
PU-DEBBIE-1	1: Design Point Curve	4190	10	0	0	366	525	0	0
PU-ESI-1	1: Design Point Curve	4364	3	0	0	81	60	0	0
PU-ESI-2	1: Design Point Curve	4364	3	0	0	81	250	0	0
PU-ESI-3	2: Exponential 3-Point Curve	4364	8	0	130	100	1500	80	1750
PU-HC-1	2: Exponential 3-Point Curve	4254	4	0	120	110	150	60	340
PU-HC-2	2: Exponential 3-Point Curve	4254	4	0	130	110	223	73	350
PU-HC-3	2: Exponential 3-Point Curve	4254	6	0	132	110	375	60	560
PU-HILYARD-1	1: Design Point Curve	4287	10	0	0	335	665	0	0
PU-HOMEDALE-1	1: Design Point Curve	4254	12	0	0	320	400	0	0
PU-LAGUNA-1	1: Design Point Curve	4286	7	0	0	708	1000	0	0
PU-LAGUNA-2	1: Design Point Curve	4286	7	0	0	708	1000	0	0
PU-LYTTON-1	1: Design Point Curve	4215	6	0	160	103	1200	90	1500
PU-LYTTON-2	1: Design Point Curve	4215	6	0	160	103	1200	90	1500
PU-MOYINA-1	1: Design Point Curve	4113	4	0	0	110	500	0	0
PU-MOYINA-2	1: Design Point Curve	4113	4	0	0	120	250	0	0
PU-OGDEN-1	1: Design Point Curve	4173	4	0	0	231	215	0	0
PU-OGDEN-2	1: Design Point Curve	4173	3	0	0	231	430	0	0
PU-PAT-1	2: Exponential 3-Point Curve	4492	5	0	260	197	750	130	1000
PU-PAT-2	2: Exponential 3-Point Curve	4492	5	0	260	197	750	130	1000
PU-QUAIL-RIDGE-1	2: Exponential 3-Point Curve	4388	8	0	170	145	430	100	670
PU-QUAIL-RIDGE-2	2: Exponential 3-Point Curve	4388	6	0	160	145	240	122	327

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Constant Power (hp)	Shutoff Head (ft)	Design Head (ft)	Design Flow (gpm)	High Head (ft)	High Flow (gpm)
PU-RIVERSIDE-1	1: Design Point Curve	4230	10	0	0	140	440	0	0
PU-RIVERSIDE-2	1: Design Point Curve	4091	3	0	0	140	440	0	0
PU-SIERRAHTS-1	1: Design Point Curve	4212	6	0	0	85	190	0	0
PU-SIERRAHTS-2	1: Design Point Curve	4212	6	0	0	85	50	0	0
PU-SIERRAHTS-3	1: Design Point Curve	4212	6	0	0	40	1000	0	0
PU-SOUTH-SIXTH-1	2: Exponential 3-Point Curve	4113	8	0	122	85	1000	46	1400
PU-SOUTH-SIXTH-2	2: Exponential 3-Point Curve	4113	8	0	130	88	1000	36	1400
PU-WASHBURN-1	3: Multiple Point Curve	4090	6	0	132	60	2700	34.7	2450
PU-WASHBURN-2	3: Multiple Point Curve	4091	10	0	0	88	4000	0	0
PU-WO-1	1: Design Point Curve	4224	2	0	0	111	50	0	0
PU-WO-2	1: Design Point Curve	4224	3	0	0	111	200	0	0
PU-WO-3	1: Design Point Curve	4224	5	0	0	111	600	0	0
PU-WOCUS-1	1: Design Point Curve	4188	10	0	0	400	750	0	0

Pipe Settings

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-BV-0001	1412	12	130	0	No
P-BV-0002	133	8	130	0	No
P-BV-0003	129	8	130	0	No
P-BV-0004	349	8	130	0	No
P-BV-0005	190	8	130	0	No
P-BV-0006	1992	12	130	0	No
P-BV-0007	887	12	130	0	No
P-BV-0008	662	12	130	0	No
P-BV-0009	512	12	130	0	No
P-BV-0010	184	8	130	0	No
P-BV-0011	31	8	130	0	No
P-BV-0012	703	8	130	0	No
P-BV-0013	70	5	130	0	No
P-BV-0014	80	5	130	0	No
P-CR-0003	1151	8	130	0	No
P-CR-0004	769	8	130	0	No
P-CR-0005	294	8	130	0	No
P-ESI-0001	195	12	130	0	No
P-ESI-0002	817	12	130	0	No
P-ESI-0003	10	3	130	0	No
P-ESI-0004	10	8	130	0	No
P-ESI-0005	10	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-FHH-0001	135	8	130	0	No
P-FHH-0002	209	8	130	0	No
P-FHH-0003	45	6	130	0	No
P-FHH-0004	274	8	125	0	No
P-FHH-0005	449	8	125	0	No
P-FHH-0006	345	4	125	0	No
P-FHH-0007	213	8	130		No
P-FHH-0008	940	8	130	0	No
P-FHH-0009	557	8	130	0	No
P-FHH-0010	400	8	130	0	No
P-FHH-0011	510	8	125		No
P-FHH-0012	850	8	125	0	No
P-FHH-0013	345	8	130	0	No
P-FHH-0014	282	8	130	0	No
P-FHH-0015	1540	8	130	0	No
P-FHH-0016	347	8	130	0	No
P-FHH-0017	673	8	130	0	No
P-FHH-0018	710	8	130	0	No
P-FHH-0019	333	8	130	0	No
P-FHH-0020	661	8	130	0	No
P-FHH-0021	379	8	130	0	No
P-FHH-0022	51	6	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-HC-0001	42	4	130	0	No
P-HC-0002	41	4	130	0	No
P-HC-0003	47	6	130	0	No
P-HC-0004	45	8	130	0	No
P-HC-0005	1128	8	130	0	No
P-HOS-0001	501	8	125		No
P-HOS-0002	149	2	130	0	No
P-HOS-0003	182	6	130	0	No
P-HOS-0004	134	6	130	0	No
P-HOS-0005	132	8	130	0	No
P-HOS-0007	254	10	130	0	No
P-HOS-0008	674	12	130	0	No
P-HOS-0009	543	8	125	0	No
P-HOS-0010	200	8	110	0	No
P-HOS-0011	6	8	130	0	No
P-HOS-0012	754	6	100	0	No
P-HOS-0013	140	6	120	0	No
P-HOS-0014	277	6	120	0	No
P-HOS-0015	374	8	120	0	No
P-HOS-0016	428	6	120	0	No
P-HOS-0017	271	8	120	0	No
P-HOS-0018	156	6	120	0	No
P-HOS-0019	274	6	100	0	No
P-HOS-0020	357	6	100	0	No
P-HOS-0021	320	6	120	0	No
P-HOS-0022	681	6	130	0	No
P-HOS-0023	405	6	130	0	No
P-HOS-0024	256	6	100	0	No
P-HOS-0025	1172	8	130	0	No
P-HOS-0026	189	6	130	0	No
P-HOS-0027	1634	8	130	0	No
P-HOS-0028	318	8	130	0	No
P-HOS-0029	437	8	130	0	No
P-HOS-0030	493	8	130	0	No
P-HOS-0031	1090	12	130		No
P-HOS-0032	1424	12	130	0	No
P-HOS-0033	3427	12	130	0	No
P-HOS-0034	298	8	110	0	No
P-HOS-0036	11	12	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-HOS-0037	12	2	130	0	No
P-HOS-0039	145	4	130	0	No
P-HOS-0040	10	3	130	0	No
P-HOS-0041	10	3	130	0	No
P-HOS-0042	10	3	130	0	No
P-HOS-0046	23	4	130	0	No
P-HOS-0047	1240	12	130	0	No
P-HOS-0049	29	6	110		No
P-HOS-0050	441	12	130	0	Yes
P-HOS-0051	440	10	120	0	Yes
P-HOS-0052	209	12	130	0	No
P-HOS-0053	313	2	100		No
P-HOS-0054	320	8	130		No
P-HOS-0055	268	8	125		No
P-HOS-0056	1430	8	125		No
P-HOS-0058	816	8	110	0	No
P-HOS-0059	279	8	110	0	No
P-HOS-0060	485	8	110		No
P-HOS-0061	364	8	110		No
P-HOS-0064	394	6	110	0	No
P-HOS-0065	52	8	125	0	No
P-HOS-0066	52	6	110		No
P-HOS-0069	122	4	100	0	No
P-HOS-0070	392	6	110		No
P-HOS-0071	432	8	125		No
P-HOS-0073	351	8	110		No
P-HOS-0074	269	8	125		No
P-HOS-0075	256	8	125		No
P-HOS-0077	525	6	110	0	No
P-HOS-0078	260	6	110	0	No
P-HOS-0082	26	6	125		No
P-HOS-0085	373	8	130		No
P-HOS-0086	563	8	130	0	No
P-HOS-0087	19	6	110	0	No
P-HOS-0088	2139	6	110		No
P-HOS-0089	460	6	130	0	No
P-HOS-0090	168	6	130	0	No
P-HOS-0091	489	8	120	0	No
P-HOS-0092	23	8	110	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-HOS-0093	1211	8	125	0	No
P-HOS-0095	689	8	130	0	No
P-HOS-0096	1109	8	130	0	No
P-HOS-0097	7	12	130	0	No
P-HOS-0098	252	8	130	0	No
P-HOS-0099	618	8	130	0	No
P-HOS-0100	7	8	130	0	No
P-HOS-0101	940	8	110	0	No
P-HOS-0101-1	67	8	110	0	No
P-HOS-0102	441	8	130	0	No
P-HOS-0103	461	8	130	0	No
P-HOS-0104	1986	12	130		No
P-HOS-0105	230	12	130	0	No
P-HOS-0106	235	8	110	0	No
P-HOS-0107	432	8	130	0	No
P-HOS-0108	1114	2	100	0	No
P-HOS-0109	274	8	125	0	No
P-HOS-0110	431	8	130	0	No
P-HOS-0112	321	6	110		No
P-HOS-0113	1082	8	130	0	No
P-HOS-0114	417	2	120	0	No
P-HOS-0115	501	6	110		No
P-HOS-0116	403	6	110		No
P-HOS-0119	494	6	110		No
P-HOS-0121	836	8	110	0	No
P-HOS-0122	490	8	110		No
P-HOS-0123	541	8	110	0	No
P-HOS-0124	1383	8	120	0	No
P-HOS-0125	15	8	110		No
P-HOS-0126	307	8	110		No
P-HOS-0127	971	12	110		No
P-HOS-0128	695	12	130	0	No
P-HOS-0129	2857	12	130	0	No
P-HOS-0130	2515	12	130	0	No
P-HOS-0131	2128	12	120	0	No
P-HOS-0134	834	10	110	0	No
P-HOS-0135	996	8	110		No
P-HOS-0136	182	8	110	0	No
P-HOS-0137	346	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-HOS-0138	981	8	120		No
P-HOS-0139	223	8	110	0	No
P-HOS-0140	1109	6	125		No
P-HOS-0141	150	8	125		No
P-HOS-0142	579	12	125		No
P-HOS-0143	1837	12	130	0	No
P-HOS-0144	543	12	130	0	No
P-HOS-0145	336	12	130		No
P-HOS-0146	817	10	110	0	No
P-IMP-1	161	8	130	0	No
P-IMP-10	206	8	130	0	No
P-IMP-100	437	8	130	0	No
P-IMP-101	76	8	130	0	No
P-IMP-102	121	8	130	0	No
P-IMP-103	375	8	130	0	No
P-IMP-104	432	8	130	0	No
P-IMP-109	425	8	130	0	No
P-IMP-11	371	8	130	0	No
P-IMP-110	1137	8	130	0	No
P-IMP-111	453	8	130	0	No
P-IMP-112	420	8	130	0	No
P-IMP-113	641	8	130	0	No
P-IMP-116	478	8	130	0	No
P-IMP-117	374	8	130	0	No
P-IMP-118	1153	8	130	0	No
P-IMP-119	373	8	130	0	No
P-IMP-12	454	8	130	0	No
P-IMP-120	25	8	130	0	No
P-IMP-121	394	8	130	0	No
P-IMP-122	394	8	130	0	No
P-IMP-123	248	8	130	0	No
P-IMP-124	214	8	130	0	No
P-IMP-125	491	8	130	0	No
P-IMP-126	308	8	130	0	No
P-IMP-127	325	8	130	0	No
P-IMP-128	464	12	130	0	No
P-IMP-129	197	12	130	0	No
P-IMP-13	406	8	130	0	No
P-IMP-130	641	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-132	1558	12	130	0	No
P-IMP-133	1162	10	130	0	No
P-IMP-134	368	10	130	0	No
P-IMP-135	1822	10	130	0	No
P-IMP-136	449	10	130	0	No
P-IMP-137	40	10	130	0	No
P-IMP-138	242	10	130	0	No
P-IMP-139	1152	10	130	0	No
P-IMP-14	386	8	130	0	No
P-IMP-140	817	10	130	0	No
P-IMP-141	1264	10	130	0	No
P-IMP-142	850	10	130	0	No
P-IMP-143	108	12	130	0	No
P-IMP-144	2596	12	130	0	No
P-IMP-145	686	12	130	0	No
P-IMP-146	65	12	130	0	No
P-IMP-148	63	12	130	0	No
P-IMP-149	73	8	130	0	No
P-IMP-15	388	8	130	0	No
P-IMP-150	66	8	130	0	No
P-IMP-153	1641	8	130	0	No
P-IMP-156	636	6	130	0	No
P-IMP-157	1311	8	130	0	No
P-IMP-16	689	8	130	0	No
P-IMP-160	189	8	130	0	No
P-IMP-161	292	8	130	0	No
P-IMP-162	97	12	130	0	No
P-IMP-163	1087	12	130	0	No
P-IMP-164	726	12	130	0	No
P-IMP-165	286	8	130	0	No
P-IMP-166	621	8	130	0	No
P-IMP-167	563	12	130	0	No
P-IMP-168	290	8	130	0	No
P-IMP-169	1313	12	130	0	No
P-IMP-170	1158	12	130	0	No
P-IMP-172	402	10	130	0	No
P-IMP-173	218	10	130	0	No
P-IMP-174	1682	10	130	0	No
P-IMP-175	485	10	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-176	162	8	130	0	No
P-IMP-177	108	8	130	0	No
P-IMP-178	107	8	130	0	No
P-IMP-179	289	8	130	0	No
P-IMP-180	547	8	130	0	No
P-IMP-181	346	8	130	0	No
P-IMP-183	1050	8	130	0	No
P-IMP-184	56	8	130	0	No
P-IMP-185	55	8	130	0	No
P-IMP-186	86	8	130	0	No
P-IMP-187	281	8	130	0	No
P-IMP-19	417	8	130	0	No
P-IMP-190	1022	8	130	0	No
P-IMP-191	518	8	130	0	No
P-IMP-192	653	8	130	0	No
P-IMP-193	65	8	130	0	No
P-IMP-194	956	8	130	0	No
P-IMP-195	478	8	130	0	No
P-IMP-196	71	8	130	0	No
P-IMP-197	26	8	130	0	No
P-IMP-198	23	8	130	0	No
P-IMP-199	48	8	130	0	No
P-IMP-2	346	8	130	0	No
P-IMP-20	367	8	130	0	No
P-IMP-200	284	8	130	0	No
P-IMP-201	180	8	130	0	No
P-IMP-202	1190	8	130	0	No
P-IMP-21	713	8	130	0	No
P-IMP-210	316	8	130	0	No
P-IMP-211	349	8	130	0	No
P-IMP-216	1108	8	130	0	No
P-IMP-217	231	8	130	0	No
P-IMP-218	189	8	130	0	No
P-IMP-219	157	8	130	0	No
P-IMP-22	755	8	130	0	No
P-IMP-220	358	8	130	0	No
P-IMP-221	385	8	130	0	No
P-IMP-222	182	8	130	0	No
P-IMP-223	236	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-224	494	8	130	0	No
P-IMP-225	373	8	130	0	No
P-IMP-226	332	8	130	0	No
P-IMP-227	296	8	130	0	No
P-IMP-228	135	8	130	0	No
P-IMP-229	276	12	130	0	No
P-IMP-230	38	12	130	0	No
P-IMP-231	178	12	130	0	No
P-IMP-232	328	12	130	0	No
P-IMP-233	176	12	130	0	No
P-IMP-24	835	8	130	0	No
P-IMP-240	77	12	130	0	No
P-IMP-241	62	8	130	0	No
P-IMP-242	289	8	130	0	No
P-IMP-243	366	8	130	0	No
P-IMP-244	549	8	130	0	No
P-IMP-245	67	8	130	0	No
P-IMP-246	238	12	130	0	No
P-IMP-247	237	8	130	0	No
P-IMP-248	105	8	130	0	No
P-IMP-25	104	8	130	0	No
P-IMP-250	400	12	130	0	No
P-IMP-259	44	8	130	0	No
P-IMP-26	411	8	130	0	No
P-IMP-260	306	8	130	0	No
P-IMP-261	694	8	130	0	No
P-IMP-262	311	8	130	0	No
P-IMP-263	89	12	130	0	No
P-IMP-264	300	8	130	0	No
P-IMP-265	364	8	130	0	No
P-IMP-266	551	8	130	0	No
P-IMP-267	458	8	130	0	No
P-IMP-268	80	8	130	0	No
P-IMP-269	203	8	130	0	No
P-IMP-270	658	8	130	0	No
P-IMP-271	211	8	130	0	No
P-IMP-272	716	8	130	0	No
P-IMP-273	384	8	130	0	No
P-IMP-275	314	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-276	954	8	130	0	No
P-IMP-277	1335	8	130	0	No
P-IMP-278	1185	8	130	0	No
P-IMP-280	821	8	130	0	No
P-IMP-281	747	8	130	0	No
P-IMP-282	520	8	130	0	No
P-IMP-283	562	8	130	0	No
P-IMP-285	563	8	130	0	No
P-IMP-289	892	8	130	0	No
P-IMP-29	162	8	130	0	No
P-IMP-290	598	8	130	0	No
P-IMP-293	114	8	130	0	No
P-IMP-294	123	8	130	0	No
P-IMP-295	486	8	130	0	No
P-IMP-296	872	8	130	0	No
P-IMP-297	491	8	130	0	No
P-IMP-298	343	8	130	0	No
P-IMP-299	761	8	130	0	No
P-IMP-3	342	8	130	0	No
P-IMP-30	944	8	130	0	No
P-IMP-300	374	8	130	0	No
P-IMP-301	1140	8	130	0	No
P-IMP-302	669	8	130	0	No
P-IMP-303	249	8	130	0	No
P-IMP-304	340	8	130	0	No
P-IMP-306	525	8	130	0	No
P-IMP-307	892	8	130	0	No
P-IMP-308	726	8	130	0	No
P-IMP-309	417	8	130	0	No
P-IMP-31	408	8	130	0	No
P-IMP-310	458	8	130	0	No
P-IMP-311	348	8	130	0	No
P-IMP-312	384	8	130	0	No
P-IMP-313	661	8	130	0	No
P-IMP-314	391	8	130	0	No
P-IMP-315	342	8	130	0	No
P-IMP-317	531	8	130	0	No
P-IMP-318	940	8	130	0	No
P-IMP-319	1007	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-32	357	12	130	0	No
P-IMP-320	500	8	130	0	No
P-IMP-321	241	8	130	0	No
P-IMP-322	788	8	130	0	No
P-IMP-324	279	8	130	0	No
P-IMP-325	577	8	130	0	No
P-IMP-326	847	8	130	0	No
P-IMP-327	761	8	130	0	No
P-IMP-328	471	8	130	0	No
P-IMP-329	832	8	12	0	No
P-IMP-33	821	8	130	0	No
P-IMP-330	123	8	130	0	No
P-IMP-332	406	8	130	0	No
P-IMP-333	1438	8	130	0	No
P-IMP-334	202	8	130	0	No
P-IMP-335	330	8	130	0	No
P-IMP-336	553	8	130	0	No
P-IMP-337	488	8	130	0	No
P-IMP-338	289	8	130	0	No
P-IMP-339	209	8	130	0	No
P-IMP-34	428	8	130	0	No
P-IMP-340	542	8	130	0	No
P-IMP-342	725	8	130	0	No
P-IMP-343	490	8	130	0	No
P-IMP-345	379	8	130	0	No
P-IMP-346	347	8	130	0	No
P-IMP-347	386	8	130	0	No
P-IMP-348	203	8	130	0	No
P-IMP-349	801	8	130	0	No
P-IMP-35	38	12	130	0	No
P-IMP-350	798	8	130	0	No
P-IMP-352	683	8	130	0	No
P-IMP-353	129	8	130	0	No
P-IMP-354	488	8	130	0	No
P-IMP-355	351	8	130	0	No
P-IMP-356	474	8	130	0	No
P-IMP-357	372	8	130	0	No
P-IMP-358	230	8	130	0	No
P-IMP-359	282	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-36	583	8	130	0	No
P-IMP-360	258	8	130	0	No
P-IMP-361	316	8	130	0	No
P-IMP-362	772	8	130	0	No
P-IMP-363	240	8	130	0	No
P-IMP-364	250	8	130	0	No
P-IMP-365	759	8	130	0	No
P-IMP-366	439	8	130	0	No
P-IMP-367	219	12	130	0	No
P-IMP-368	374	8	130	0	No
P-IMP-369	289	12	130	0	No
P-IMP-37	257	8	130	0	No
P-IMP-370	298	12	130	0	No
P-IMP-371	544	8	130	0	No
P-IMP-372	955	8	130	0	No
P-IMP-373	769	8	130	0	No
P-IMP-374	485	8	130	0	No
P-IMP-375	370	8	130	0	No
P-IMP-376	358	8	130	0	No
P-IMP-377	406	8	130	0	No
P-IMP-378	1174	8	130	0	No
P-IMP-379	436	8	130	0	No
P-IMP-38	407	8	130	0	No
P-IMP-381	68	8	130	0	No
P-IMP-382	365	8	130	0	No
P-IMP-383	707	8	130	0	No
P-IMP-384	553	8	130	0	No
P-IMP-385	824	8	130	0	No
P-IMP-386	765	8	130	0	No
P-IMP-387	436	8	130	0	No
P-IMP-388	618	8	130	0	No
P-IMP-389	546	8	130	0	No
P-IMP-39	835	8	130	0	No
P-IMP-390	285	8	130	0	No
P-IMP-391	187	8	130	0	No
P-IMP-392	436	8	130	0	No
P-IMP-399	419	8	130	0	No
P-IMP-4	1383	8	130	0	No
P-IMP-40	291	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-407	1039	12	130	0	No
P-IMP-408	312	12	130	0	No
P-IMP-409	59	12	130	0	No
P-IMP-41	188	8	130	0	No
P-IMP-410	279	12	130	0	No
P-IMP-411	413	8	130	0	No
P-IMP-412	352	8	130	0	No
P-IMP-413	376	8	130	0	No
P-IMP-414	209	8	130	0	No
P-IMP-415	742	8	130	0	No
P-IMP-416	70	8	130	0	No
P-IMP-417	405	8	130	0	No
P-IMP-418	241	8	130	0	No
P-IMP-419	400	8	120	0	No
P-IMP-42	507	8	130	0	No
P-IMP-420	100	8	130	0	No
P-IMP-421	454	8	130	0	No
P-IMP-422	428	8	130	0	No
P-IMP-424	238	8	130	0	No
P-IMP-425	404	8	130	0	No
P-IMP-426	699	8	130	0	No
P-IMP-427	161	8	130	0	No
P-IMP-428	135	8	130	0	No
P-IMP-429	797	8	130	0	No
P-IMP-43	228	8	130	0	No
P-IMP-430	28	8	130	0	No
P-IMP-431	38	8	130	0	No
P-IMP-432	250	12	130	0	No
P-IMP-433	37	12	130	0	No
P-IMP-434	582	12	130	0	No
P-IMP-435	298	8	130	0	No
P-IMP-436	80	12	130	0	No
P-IMP-438	229	8	130	0	No
P-IMP-439	1124	8	130	0	No
P-IMP-44	502	8	130	0	No
P-IMP-440	1545	8	130	0	No
P-IMP-441	304	8	130	0	No
P-IMP-442	3013	12	130	0	No
P-IMP-443	109	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-444	555	8	130	0	No
P-IMP-445	748	8	130	0	No
P-IMP-446	1599	8	130	0	No
P-IMP-45	325	8	130	0	No
P-IMP-454	607	10	130	0	No
P-IMP-456	43	6	130	0	No
P-IMP-457	304	8	130	0	No
P-IMP-458	166	12	130	0	No
P-IMP-459	143	12	130	0	No
P-IMP-46	367	8	130	0	No
P-IMP-460	281	12	130	0	Yes
P-IMP-466	373	8	130	0	No
P-IMP-467	203	8	130	0	No
P-IMP-468	996	8	130	0	No
P-IMP-469	371	8	130	0	No
P-IMP-47	445	8	130	0	No
P-IMP-470	1152	8	130	0	No
P-IMP-471	437	8	130	0	No
P-IMP-472	724	8	130	0	No
P-IMP-473	437	8	130	0	No
P-IMP-474	438	8	130	0	No
P-IMP-475	653	8	130	0	No
P-IMP-476	319	8	130	0	No
P-IMP-477	1098	8	130	0	No
P-IMP-478	338	8	130	0	No
P-IMP-479	353	8	130	0	No
P-IMP-48	439	8	130	0	No
P-IMP-480	496	8	130	0	No
P-IMP-481	1474	8	130	0	No
P-IMP-482	173	8	130	0	No
P-IMP-484	168	8	130	0	No
P-IMP-485	490	8	130	0	No
P-IMP-486	313	8	130	0	No
P-IMP-487	556	8	130	0	No
P-IMP-488	257	8	130	0	No
P-IMP-493	375	8	130	0	No
P-IMP-494	220	8	130	0	No
P-IMP-497	680	8	130	0	No
P-IMP-499	114	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-IMP-5	499	8	130	0	No
P-IMP-50	371	8	130	0	No
P-IMP-500	212	8	130	0	No
P-IMP-51	778	8	130	0	No
P-IMP-52	715	8	130	0	No
P-IMP-53	619	8	130	0	No
P-IMP-54	140	12	130	0	No
P-IMP-55	321	8	130	0	No
P-IMP-56	147	12	130	0	No
P-IMP-57	357	12	130	0	No
P-IMP-58	315	12	130	0	No
P-IMP-59	327	12	130	0	No
P-IMP-6	813	8	130	0	No
P-IMP-60	330	12	130	0	No
P-IMP-61	323	12	130	0	No
P-IMP-62	372	12	130	0	No
P-IMP-63	263	12	130	0	No
P-IMP-64	165	12	130	0	No
P-IMP-65	362	12	130	0	No
P-IMP-66	719	12	130	0	No
P-IMP-67	46	12	130	0	No
P-IMP-68	668	12	130	0	No
P-IMP-69	514	12	130	0	No
P-IMP-7	507	8	130	0	No
P-IMP-70	442	12	130	0	No
P-IMP-71	734	12	130	0	No
P-IMP-72	154	12	130	0	No
P-IMP-76	343	8	130	0	No
P-IMP-8	509	8	130	0	No
P-IMP-85	649	12	130	0	No
P-IMP-87	194	8	130	0	No
P-IMP-88	392	8	130	0	No
P-IMP-89	367	8	130	0	No
P-IMP-9	1169	8	130	0	No
P-IMP-90	48	8	130	0	No
P-IMP-91	398	8	130	0	No
P-IMP-92	647	8	130	0	No
P-IMP-93	716	8	130	0	No
P-IMP-99	797	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-KL-0001	146	6	130	0	No
P-KL-0002	919	8	130	0	No
P-KL-0003	140	8	130	0	No
P-KL-0004	481	8	130	0	No
P-KL-0005	780	8	130	0	No
P-KL-0006	251	8	130	0	No
P-KL-0007	100	8	130	0	No
P-KL-0008	193	8	130	0	No
P-PAT-0001	963	6	130	0	No
P-PAT-0002	1331	8	130	0	No
P-PAT-0003	170	6	130	0	No
P-PAT-0004	423	6	130	0	No
P-PAT-0005	549	6	120	0	No
P-PAT-0006	563	8	130	0	No
P-PAT-0007	663	8	130	0	No
P-PAT-0008	987	8	130	0	No
P-PAT-0009	294	8	130	0	No
P-PAT-0010	197	6	130	0	No
P-PAT-0012	788	4	130	0	No
P-PAT-0013	102	6	130	0	No
P-PAT-0014	108	6	120	0	No
P-PAT-0015	1074	8	130	0	No
P-PAT-0016	7	6	130	0	No
P-PAT-0018	912	8	120	0	No
P-PAT-0019	252	8	130	0	No
P-PAT-0021	10	4	130	0	No
P-PAT-0022	10	4	130	0	No
P-PAT-0024	36	4	130	0	No
P-PAT-0025	40	4	130	0	No
P-PAT-0026	39	6	130	0	No
P-PAT-0027	243	6	130	0	No
P-PAT-0028	29	4	130	0	No
P-PAT-0029	34	4	130	0	No
P-PAT-0030	20	4	130	0	No
P-PAT-0031	16	3	130	0	No
P-PAT-0032	44	6	130	0	No
P-PAT-0035	1097	12	125		No
P-PAT-0036	101	8	125	0	No
P-PAT-0037	266	8	130		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-PAT-0038	747	8	125		No
P-PAT-0039	330	6	110	0	No
P-PAT-0040	126	12	130	0	No
P-PAT-0041	512	8	125		No
P-PAT-0042	1296	4	100		No
P-PAT-0043	408	6	110		No
P-PAT-0044	336	6	110		No
P-PAT-0045	1246	12	125	0	No
P-PAT-0046	872	12	130		No
P-PAT-0047	712	8	125		No
P-PAT-0048	340	8	130		No
P-PAT-0049	549	8	125		No
P-PAT-0052	648	4	110	0	No
P-PAT-0053	256	12	125		No
P-PAT-0054	244	12	125		No
P-PAT-0058	363	6	130		No
P-PAT-0062	81	8	130	0	No
P-PAT-0063	578	6	125		No
P-PAT-0064	275	6	125		No
P-PAT-0065	337	12	125		No
P-PAT-0066	113	12	125		No
P-PAT-0067	428	12	125		No
P-PAT-0068	245	12	125		No
P-PAT-0069	853	6	130		No
P-PAT-0070	156	8	125		No
P-PAT-0071	243	8	125	0	No
P-PAT-0072	703	8	125		No
P-PAT-0073	985	12	130	0	No
P-PAT-0074	175	6	130	0	No
P-PAT-0075	531	12	130	0	No
P-PAT-0076	512	12	125	0	No
P-PAT-0077	1140	12	130	0	No
P-PAT-0078	290	8	130	0	No
P-PAT-0079	289	8	130	0	No
P-PAT-0080	179	8	130	0	No
P-PAT-0081	186	12	125		No
P-PAT-0082	300	12	125		No
P-PAT-0083	791	12	125		No
P-PAT-0084	1063	12	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-PAT-0085	67	12	130	0	No
P-PAT-0086	241	12	125	0	No
P-PAT-0087	682	12	125	0	No
P-PAT-0088	279	6	130	0	No
P-PAT-0090	841	8	130	0	No
P-PAT-0091	408	8	130	0	No
P-PAT-0092	316	12	125		No
P-PAT-0093	534	6	130	0	No
P-PAT-0094	296	6	130	0	No
P-PAT-0095	21	8	130	0	No
P-PAT-0096	2293	12	130	0	No
P-PAT-0097	856	12	130	0	No
P-PAT-0098	2295	12	130	0	No
P-PAT-0099	13	6	110		No
P-PAT-0100	396	12	125	0	No
P-PAT-0101	415	8	130		No
P-PAT-0104	643	6	130		No
P-PAT-0105	69	5	130	0	No
P-PAT-0106	58	5	130	0	No
P-PAT-0107	43	6	130	0	No
P-PRE-0001	292	6	130		No
P-PRE-0009	294	4	100	0	No
P-PRE-0012	555	10	100	0	No
P-PRE-0014	542	10	130		No
P-PRE-0019	256	6	130	0	No
P-PRE-0020	256	10	100	0	No
P-PRE-0022	281	10	130	0	No
P-PRE-0023	551	12	100	0	No
P-PRE-0024	335	6	125		No
P-PRE-0025	291	6	130	0	No
P-PRE-0028	271	8	130	0	No
P-PRE-0031	407	6	110		No
P-PRE-0035	188	12	130	0	No
P-PRE-0036	231	12	130	0	No
P-PRE-0038	183	6	130	0	No
P-PRE-0041	615	6	125	0	No
P-PRE-0044	132	6	120	0	No
P-PRE-0046	232	6	120	0	No
P-PRE-0047	349	4	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-PRE-0048	549	10	100	0	No
P-PRE-0052	28	6	120	0	No
P-PRE-0053	584	6	120	0	No
P-PRE-0054	317	6	120	0	No
P-PRE-0055	589	6	120	0	No
P-PRE-0056	320	6	120	0	No
P-PRE-0057	315	6	120	0	No
P-PRE-0059	276	6	130	0	No
P-PRE-0060	1045	12	130	0	No
P-PRE-0061	8	6	130	0	No
P-PRE-0062	14	6	130	0	No
P-PRE-0064	712	6	125		No
P-PRE-0067	736	12	130	0	No
P-PRE-0068	519	12	130	0	No
P-PRE-0069	300	12	130	0	No
P-PRE-0070	147	12	130		No
P-PRE-0071	42	8	125	0	No
P-PRE-0072	365	12	130	0	No
P-PRE-0073	97	4	100	0	No
P-PRE-0076	311	6	100	0	No
P-PRE-0078	333	6	130		No
P-PRE-0081	254	4	100		No
P-PRE-0084	71	6	125		No
P-PRE-0086	526	4	100		No
P-PRE-0087	251	6	125		No
P-PRE-0088	336	2	100		No
P-PRE-0090	243	6	130		No
P-PRE-0091	35	6	110		No
P-PRE-0099	415	4	100		No
P-PRE-0103	326	6	130		No
P-PRE-0104	343	6	130		No
P-PRE-0105	222	6	125		No
P-PRE-0109	308	6	125		No
P-PRV-2-ELD-0001	186	4	100	0	No
P-PRV-2-ELD-0002	328	4	100	0	No
P-PRV-2-ELD-0003	181	6	110	0	No
P-PRV-2-ELD-0005	302	6	110		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-PRV-2-ELD-0007	294	4	100		No
P-PRV-2-ELD-0008	432	4	100		No
P-PRV-2-ELD-0009	200	8	110		No
P-PRV-2-ELD-0011	266	4	100	0	No
P-PRV-2-ELD-0012	325	4	100		No
P-PRV-2-ELD-0013	359	6	110	0	No
P-PRV-2-ELD-0016	849	8	110		No
P-PRV-2-ELD-0017	127	8	125	0	No
P-PRV-2-ELD-0018	731	6	125		No
P-PRV-2-ELD-0020	342	6	110		No
P-PRV-2-ELD-0023	271	8	110		No
P-PRV-2-ELD-0024	44	8	110		No
P-PRV-2-ELD-0025	240	8	110	0	No
P-PRV-2-ELD-0026	143	2	130	0	No
P-PRV-2-ELD-0027	158	6	130	0	No
P-PRV-2-OGD-0001	49	6	130	0	No
P-PRV-2-OGD-0002	1063	6	130	0	No
P-PRV-2-OGD-0003	275	6	125	0	No
P-PRV-2-OGD-0004	258	6	125	0	No
P-PRV-2-OGD-0005	398	6	120	0	No
P-PRV-2-OGD-0006	507	6	120	0	No
P-PRV-2-OGD-0007	228	6	120	0	No
P-PRV-2-OGD-0008	48	6	130	0	No
P-PRV-3-UMO-0003	582	4	130		No
P-PRV-3-UMO-0006	262	4	130	0	No
P-PRV-3-UMO-0007	120	4	130		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-PRV-3-UMO-0008	484	4	130	0	No
P-PRV-HWY-0001	250	8	130	0	No
P-PRV-HWY-0002	88	8	130	0	No
P-PRV-HWY-0003	729	8	130	0	No
P-PRV-HWY-0004	34	6	130	0	No
P-PRV-HWY-0005	2	6	130	0	No
P-PRV-HWY-0006	131	6	100	0	No
P-PRV-HWY-0007	443	12	130	0	No
P-PRV-HWY-0008	378	12	130	0	No
P-PRV-HWY-0010	247	6	130		No
P-PRV-HWY-0011	32	8	110		No
P-PRV-HWY-0012	42	8	100	0	No
P-PRV-HWY-0013	250	8	130	0	No
P-PRV-HWY-0014	227	8	130	0	No
P-PRV-HWY-0015	250	8	130	0	No
P-PRV-HWY-0016	249	8	130	0	No
P-PRV-HWY-0017	246	8	130	0	No
P-PRV-HWY-0018	228	8	130	0	No
P-PRV-HWY-0019	11	6	130	0	No
P-PRV-HWY-0020	729	6	130	0	No
P-PRV-HWY-0021	2	6	130	0	No
P-PRV-HWY-0022	729	6	130	0	No
P-PRV-HWY-0023	218	12	110	0	No
P-PRV-HWY-0024	395	8	130	0	No
P-PRV-HWY-0025	41	4	130	0	No
P-PRV-HWY-0026	697	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-PRV-HWY-0027	656	8	100	0	No
P-PRV-HWY-0028	600	6	130		No
P-PRV-HWY-0029	53	4	100	0	No
P-PRV-MOY-0005	174	4	100		No
P-PRV-MOY-0008	402	2	100		No
P-PRV-MOY-0009	804	2	100	0	No
P-PRV-MOY-0010	1430	2	100		No
P-PRV-MOY-0011	781	4	100		No
P-PRV-MOY-0012	173	4	100	0	No
P-PRV-MOY-0013	377	4	125	0	No
P-PRV-MOY-0014	676	2	100	0	No
P-PRV-MOY-0015	92	4	100		No
P-PRV-OFR-0001	263	8	130	0	No
P-PRV-OFR-0002	401	8	130	0	No
P-PRV-OFR-0003	133	4	130	0	No
P-PRV-OFR-0006	456	8	130		No
P-PRV-OFR-0007	13	6	100	0	No
P-PRV-OFR-0008	101	4	100	0	No
P-PRV-OFR-0009	357	8	130	0	No
P-PRV-SL-0002	47	2	100	0	No
P-PRV-SL-0003	1045	8	130		No
P-PRV-SL-0004	206	3	130	0	No
P-PRV-SL-0005	29	8	130		No
P-PRV-SL-0007	101	4	130		No
P-PRV-SL-0008	732	2	130		No
P-PRV-SL-0009	807	4	130		No
P-PRV-SL-0010	255	4	130		No
P-PRV-SL-0011	305	4	130		No
P-PRV-SL-0012	655	2	100		No
P-PRV-SL-0013	177	2	100		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-PRV-SL-0014	516	3	130		No
P-PRV-SL-0015	296	2	100		No
P-PRV-SL-0017	1404	2	100	0	No
P-PRV-SL-0018	179	8	130	0	No
P-SH-0001	628	12	130	0	No
P-SH-0002	360	6	130	0	No
P-SH-0003	367	6	130	0	No
P-SH-0004	377	12	130	0	No
P-SH-0005	295	12	130	0	No
P-SH-0006	10	6	130	0	No
P-SH-0007	443	12	130	0	No
P-SH-0008	146	12	130	0	No
P-SH-0009	10	6	130	0	No
P-SH-0010	10	6	130	0	No
P-SH-0100	204	8	130	0	No
P-SH-0110	198	8	130	0	No
P-SH-0115	245	8	130	0	No
P-SH-0120	351	8	130	0	No
P-SH-0130	282	8	130	0	No
P-SH-0135	428	8	130	0	No
P-SL-0001	4	2	100	0	No
P-SL-0002	22	10	130	0	No
P-SL-0003	63	10	130	0	No
P-SL-0004	53	10	130	0	No
P-SL-0005	43	10	130	0	No
P-SL-0007	687	8	130	0	No
P-SL-0008	365	12	130	0	No
P-SL-0009	525	8	100	0	No
P-SL-0010	371	2	100		No
P-SL-0011	68	8	130		No
P-SL-0012	387	12	130	0	No
P-SL-0013	654	2	100		No
P-SL-0014	1495	2	100		No
P-SL-0015	705	2	100		No
P-SL-0016	691	2	100		No
P-SL-0018	434	4	130		No
P-SL-0019	353	4	130		No
P-SL-0020	322	2	100		No
P-SL-0021	275	2	100		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-SL-0022	369	3	130		No
P-SL-0023	541	2	100		No
P-SL-0024	625	8	130	0	No
P-SL-0025	1758	8	130	0	No
P-SL-0026	341	2	100		No
P-SL-0027	246	8	130	0	No
P-SL-0028	225	8	130		No
P-SL-0031	379	6	130		No
P-SL-0032	356	8	130		No
P-SL-0033	746	12	100	0	No
P-SL-0034	751	12	130	0	No
P-SL-0035	749	2	100	0	No
P-SL-0036	725	2	100		No
P-SL-0037	330	2	100		No
P-SL-0038	205	8	130	0	No
P-SL-0039	778	8	130	0	No
P-SL-0040	589	8	130	0	No
P-SL-0041	1122	8	130	0	No
P-SL-0042	327	8	130		No
P-SL-0043	1299	8	130	0	No
P-SL-0044	1317	2	130	0	No
P-SL-0045	352	2	100		No
P-SL-0046	451	6	130	0	No
P-SL-0047	1316	2	100	0	No
P-SL-0048	715	8	130	0	No
P-SL-0049	268	8	130	0	No
P-SL-0050	633	4	100	0	No
P-SL-0052	373	2	100		No
P-SL-0053	841	2	100		No
P-SL-0054	138	8	130	0	No
P-SL-0055	134	8	130	0	No
P-SL-0056	667	12	130	0	No
P-SL-0058	6	8	130		No
P-SL-0059	839	2	100	0	No
P-SL-0060	285	8	130		No
P-SL-0061	480	6	130		No
P-SL-0062	348	2	100		No
P-SL-0063	25	2	130	0	No
P-SL-0064	673	4	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-SL-0065	1290	2	130	0	No
P-SL-0066	361	2	100		No
P-SL-0067	24	12	130	0	No
P-SL-0068	589	2	100		No
P-SL-0069	407	12	100	0	No
P-SL-0070	56	8	130		No
P-SL-0071	18	8	130	0	No
P-SL-0072	445	8	130	0	No
P-SL-0073	15	8	130	0	No
P-SL-0092	983	8	130	0	No
P-SL-0093	296	6	130	0	No
P-SL-0094	670	6	130	0	No
P-SL-0095	668	3	130	0	No
P-SL-0099	432	6	120	0	No
P-SL-0100	25	6	130	0	No
P-SL-0101	433	6	130	0	No
P-SL-0102	687	12	130	0	No
P-SL-0103	1153	6	130	0	No
P-SL-0105	434	8	135	0	No
P-SL-0108	24	8	110	0	No
P-SL-0109	759	6	130	0	No
P-SL-0111	785	6	130	0	No
P-SL-0112	289	4	125	0	No
P-SL-0113	894	16	130	0	No
P-SL-0114	2009	12	120	0	Yes
P-SL-0115	1257	12	130	0	No
P-SL-0116	1119	12	130	0	No
P-SL-0117	839	12	130	0	No
P-SL-0118	2571	12	130	0	No
P-SL-0119	30	6	125	0	No
P-SL-0121	1628	16	130	0	No
P-SL-0122	5481	16	130	0	No
P-SL-0123	407	6	125		No
P-SL-0124	968	6	125		No
P-SL-0125	675	6	125		No
P-SL-0126	1523	8	125	0	No
P-SL-0127	705	8	125	0	No
P-SL-0129	399	8	120	0	No
P-SL-0130	891	12	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-SL-0131	678	12	130	0	No
P-SL-0132	1694	6	130	0	No
P-SL-0133	746	12	130	0	No
P-SL-0134	1186	6	130	0	No
P-SL-0135	599	8	130	0	No
P-SL-0136	547	8	130	0	No
P-SL-0137	587	8	130	0	No
P-SL-0138	768	6	130	0	No
P-SL-0139	654	4	100	0	No
P-SL-0140	577	8	130		No
P-SL-0144	358	6	130		No
P-SL-0146	568	10	130	0	No
P-SL-0147	461	4	130	0	No
P-TW-0001	420	10	130	0	No
P-TW-0002	899	10	130	0	No
P-TW-0003	9111	10	110	0	No
P-TW-0004	4262	10	130	0	No
P-TW-0005	729	8	100	0	No
P-TW-0006	810	8	130	0	No
P-TW-0007	2623	8	130	0	No
P-TW-0008	942	8	130	0	No
P-TW-0009	819	8	130	0	No
P-TW-0010	56	7	130	0	No
P-TW-0011	43	7	130	0	No
P-TW-0028	1346	10	130	0	No
P-UL-0004	24	6	130		No
P-UL-0009	411	6	130		No
P-UL-0010	763	6	130		No
P-UL-0011	384	6	130		No
P-UL-0012	312	6	130		No
P-UL-0016	540	6	125		No
P-UM-0001	535	4	130		No
P-UM-0003	342	6	130		No
P-UM-0004	38	4	130		No
P-UM-0005	369	6	110		No
P-UM-0006	785	6	100	0	No
P-UM-0008	877	4	130		No
P-UM-0010	45	4	130		No
P-UM-0011	345	6	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-UM-0012	536	6	100	0	No
P-UM-0016	24	4	130	0	No
P-UM-0017	40	4	130	0	No
P-UM-0018-1	471	6	130		No
P-UM-0019	729	6	130	0	No
P-UM-0021	746	6	130		No
P-UM-0022	54	6	130	0	No
P-UM-0024	796	6	130		No
P-UM-0026	356	4	100		No
P-UM-0027	606	4	100		No
P-UM-0031	330	6	130		No
P-WO-0001	161	6	130	0	No
P-WO-0002	454	6	120	0	No
P-WO-0003	605	8	130	0	No
P-WO-0004	96	6	120	0	No
P-WO-0005	112	6	120	0	No
P-WO-0006	76	4	100	0	No
P-WO-0007	53	6	125		No
P-WO-0008	147	6	130	0	No
P-WO-0010	287	4	100	0	No
P-WO-0011	259	6	125	0	No
P-WO-0012	286	6	125	0	No
P-WO-0013	506	8	130	0	No
P-WO-0014	649	6	130	0	No
P-WO-0015	160	6	125	0	No
P-WO-0016	370	6	125		No
P-WO-0017	391	6	125		No
P-WO-0018	259	6	125		No
P-WO-0019	120	2	130	0	No
P-WO-0020	92	3	130	0	No
P-WO-0021	113	5	130	0	No
P-ZN1-0001	9	6	125		No
P-ZN1-0002	383	6	125		No
P-ZN1-0005	915	6	125	0	No
P-ZN1-0006	402	6	110		No
P-ZN1-0007	365	6	110		No
P-ZN1-0008	686	4	100		No
P-ZN1-0010	216	6	100	0	No
P-ZN1-0011	346	2	100		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0012	1064	2	100		No
P-ZN1-0013	305	2	100		No
P-ZN1-0014	24	16	130	0	No
P-ZN1-0015	307	6	110	0	No
P-ZN1-0016	1478	16	130	0	No
P-ZN1-0017	1155	16	130	0	No
P-ZN1-0018	231	8	110		No
P-ZN1-0019	1126	4	100		No
P-ZN1-0020	1373	12	125		No
P-ZN1-0022	804	6	110	0	No
P-ZN1-0024	1451	6	125	0	No
P-ZN1-0025	1249	12	125	0	No
P-ZN1-0026	739	6	125		No
P-ZN1-0027	2464	8	130	0	No
P-ZN1-0028	8	12	125		No
P-ZN1-0029	1262	6	110		No
P-ZN1-0030	336	6	110		No
P-ZN1-0031	498	6	110		No
P-ZN1-0032	296	12	130	0	No
P-ZN1-0035	323	12	125	0	No
P-ZN1-0036	1306	6	125		No
P-ZN1-0037	446	6	110	0	No
P-ZN1-0038	47	3	120	0	No
P-ZN1-0039	363	6	110	0	No
P-ZN1-0040	228	6	125	0	No
P-ZN1-0041	508	12	130	0	No
P-ZN1-0042	411	12	130	0	No
P-ZN1-0043	1453	12	130	0	No
P-ZN1-0044	711	6	125		No
P-ZN1-0045	1040	6	120	0	No
P-ZN1-0046	217	4	100	0	No
P-ZN1-0047	123	12	130		No
P-ZN1-0048	412	8	110		No
P-ZN1-0049	241	12	125	0	No
P-ZN1-0050	291	6	125		No
P-ZN1-0051	464	16	110	0	No
P-ZN1-0052	382	6	125		No
P-ZN1-0053	263	12	125	0	No
P-ZN1-0054	806	6	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0055	1525	8	130		No
P-ZN1-0056	326	12	125	0	No
P-ZN1-0057	135	6	125		No
P-ZN1-0058	392	8	130		No
P-ZN1-0059	9	10	100	0	No
P-ZN1-0060	331	8	130		No
P-ZN1-0061	1063	6	125		No
P-ZN1-0062	206	12	125	0	No
P-ZN1-0063	282	12	125		No
P-ZN1-0065	279	12	125		No
P-ZN1-0067	563	8	125		No
P-ZN1-0068	545	8	125		No
P-ZN1-0069	34	6	100	0	No
P-ZN1-0070	291	6	125		No
P-ZN1-0071	220	12	120	0	No
P-ZN1-0072	281	6	125		No
P-ZN1-0073	394	12	130	0	Yes
P-ZN1-0074	292	6	125		No
P-ZN1-0075	451	8	130	0	No
P-ZN1-0076	279	6	125		No
P-ZN1-0077	279	8	125		No
P-ZN1-0078	11	12	130	0	No
P-ZN1-0079	531	6	125		No
P-ZN1-0080	876	12	125	0	No
P-ZN1-0081	186	12	125	0	No
P-ZN1-0082	673	12	125		No
P-ZN1-0083	230	6	125		No
P-ZN1-0084	194	8	125	0	No
P-ZN1-0085	125	12	125		No
P-ZN1-0086	337	6	125	0	No
P-ZN1-0087	496	12	125		No
P-ZN1-0088	357	8	125		No
P-ZN1-0089	497	12	125		No
P-ZN1-0090	474	12	125		No
P-ZN1-0091	306	6	130	0	No
P-ZN1-0092	577	12	125	0	No
P-ZN1-0093	246	12	125		No
P-ZN1-0094	327	12	125		No
P-ZN1-0095	444	12	125	0	No
P-ZN1-0096	303	8	125		No
P-ZN1-0097	259	6	125		No
P-ZN1-0099	263	6	125		No
P-ZN1-0100	398	6	125		No
P-ZN1-0101	136	8	125	0	No
P-ZN1-0102	234	6	125	0	No
P-ZN1-0103	185	12	130		No
P-ZN1-0104	351	6	125	0	No
P-ZN1-0105	268	8	125	0	No
P-ZN1-0106	376	6	125	0	No
P-ZN1-0107	175	8	125		No
P-ZN1-0108	543	8	110	0	No
P-ZN1-0109	977	6	125		No
P-ZN1-0110	713	6	125		No
P-ZN1-0111	84	16	110	0	No
P-ZN1-0112	281	8	125		No
P-ZN1-0113	353	8	125		No
P-ZN1-0114	1147	12	125	0	No
P-ZN1-0115	444	6	125		No
P-ZN1-0116	376	8	125		No
P-ZN1-0117	31	2	100	0	No
P-ZN1-0118	1048	8	125		No
P-ZN1-0119	551	12	120		No
P-ZN1-0120	68	8	110	0	No
P-ZN1-0121	273	6	125		No
P-ZN1-0122	274	6	125		No
P-ZN1-0123	322	16	110	0	No
P-ZN1-0124	845	6	125		No
P-ZN1-0125	270	12	125		No
P-ZN1-0126	378	16	110	0	No
P-ZN1-0127	578	6	125		No
P-ZN1-0128	313	12	125		No
P-ZN1-0129	1525	12	125		No
P-ZN1-0130	1169	8	125	0	No
P-ZN1-0131	326	16	130	0	No
P-ZN1-0132	1324	12	125		No
P-ZN1-0133	872	12	130	0	No
P-ZN1-0134	1797	8	125		No
P-ZN1-0135	988	6	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0136	156	12	130	0	No
P-ZN1-0137	354	6	125		No
P-ZN1-0138	47	8	125		No
P-ZN1-0139	263	12	125		No
P-ZN1-0140	41	12	125		No
P-ZN1-0141	23	12	125		No
P-ZN1-0142	86	12	125		No
P-ZN1-0143	43	12	125	0	No
P-ZN1-0144	256	6	125		No
P-ZN1-0145	175	6	125		No
P-ZN1-0146	350	12	125	0	No
P-ZN1-0147	705	6	110	0	No
P-ZN1-0148	283	8	125	0	No
P-ZN1-0149	278	8	125		No
P-ZN1-0150	286	8	125		No
P-ZN1-0151	141	10	100	0	No
P-ZN1-0152	370	8	125		No
P-ZN1-0153	279	8	125		No
P-ZN1-0154	1808	6	125	0	No
P-ZN1-0155	815	8	125	0	No
P-ZN1-0156	789	12	125	0	No
P-ZN1-0157	376	6	125		No
P-ZN1-0158	365	4	130	0	No
P-ZN1-0159	1450	8	125	0	No
P-ZN1-0160	403	12	125		No
P-ZN1-0161	798	12	125	0	No
P-ZN1-0162	202	12	125	0	No
P-ZN1-0163	164	8	125		No
P-ZN1-0164	129	8	125		No
P-ZN1-0165	577	6	125		No
P-ZN1-0166	892	6	110	0	No
P-ZN1-0167	400	12	125	0	No
P-ZN1-0168	961	8	130		No
P-ZN1-0169	1029	8	125		No
P-ZN1-0170	1511	6	110	0	No
P-ZN1-0172	882	8	110	0	No
P-ZN1-0173	262	8	110	0	No
P-ZN1-0174	160	6	125	0	No
P-ZN1-0175	885	8	110	0	No
P-ZN1-0176	261	6	125		No
P-ZN1-0177	912	6	130	0	No
P-ZN1-0178	350	8	130		No
P-ZN1-0179	222	6	125		No
P-ZN1-0180	1867	12	130		No
P-ZN1-0181	384	4	100	0	No
P-ZN1-0182	353	6	125		No
P-ZN1-0183	460	6	125		No
P-ZN1-0185	214	8	125		No
P-ZN1-0186	308	8	125		No
P-ZN1-0187	601	8	110	0	No
P-ZN1-0188	331	8	125		No
P-ZN1-0189	980	6	125		No
P-ZN1-0190	102	12	110	0	No
P-ZN1-0191	315	6	100	0	No
P-ZN1-0192	806	8	125		No
P-ZN1-0193	97	6	130	0	No
P-ZN1-0194	217	8	125		No
P-ZN1-0195	1344	12	110	0	No
P-ZN1-0196	233	8	125		No
P-ZN1-0198	862	6	125		No
P-ZN1-0199	259	8	125		No
P-ZN1-0200	269	6	125		No
P-ZN1-0201	1056	6	125		No
P-ZN1-0202	424	8	110	0	No
P-ZN1-0203	453	6	125		No
P-ZN1-0204	287	6	125		No
P-ZN1-0205	262	12	130	0	No
P-ZN1-0206	283	6	125		No
P-ZN1-0207	464	6	125		No
P-ZN1-0208	290	8	125	0	No
P-ZN1-0209	299	6	125		No
P-ZN1-0210	733	12	125		No
P-ZN1-0211	1156	6	125		No
P-ZN1-0212	47	6	125		No
P-ZN1-0213	382	4	130		No
P-ZN1-0214	522	8	130		No
P-ZN1-0215	592	8	125		No
P-ZN1-0216	393	6	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0217	451	6	125		No
P-ZN1-0218	1344	8	110	0	No
P-ZN1-0219	572	8	125		No
P-ZN1-0220	235	8	125		No
P-ZN1-0221	326	6	110	0	No
P-ZN1-0222	756	6	125		No
P-ZN1-0223	383	8	130	0	No
P-ZN1-0224	1019	8	125		No
P-ZN1-0225	280	12	110	0	No
P-ZN1-0226	334	6	125	0	No
P-ZN1-0227	80	12	110	0	No
P-ZN1-0228	299	12	110	0	No
P-ZN1-0229	892	6	125		No
P-ZN1-0230	340	6	125		No
P-ZN1-0231	2938	12	130	0	No
P-ZN1-0232	366	6	125		No
P-ZN1-0233	339	6	125		No
P-ZN1-0234	1714	12	130	0	No
P-ZN1-0235	1259	6	125	0	No
P-ZN1-0236	241	6	125	0	No
P-ZN1-0237	346	6	125	0	No
P-ZN1-0238	640	12	130	0	No
P-ZN1-0239	669	6	125		No
P-ZN1-0240	400	12	110	0	No
P-ZN1-0241	250	6	125	0	No
P-ZN1-0242	257	6	130	0	No
P-ZN1-0243	919	6	125	0	No
P-ZN1-0244	206	6	125		No
P-ZN1-0245	771	6	125	0	No
P-ZN1-0246	2644	16	130	0	No
P-ZN1-0247	24	10	130	0	No
P-ZN1-0248	545	4	100	0	No
P-ZN1-0249	704	6	100	0	No
P-ZN1-0250	51	6	110	0	No
P-ZN1-0252	309	10	130	0	No
P-ZN1-0253	393	6	125		No
P-ZN1-0254	1161	6	110		No
P-ZN1-0255	200	8	110		No
P-ZN1-0256	839	12	110		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0257	377	12	130	0	No
P-ZN1-0258	1270	16	130	0	No
P-ZN1-0259	381	16	130	0	No
P-ZN1-0260	2456	16	130	0	No
P-ZN1-0261	746	12	125		No
P-ZN1-0262	1624	16	130	0	No
P-ZN1-0263	232	12	130		No
P-ZN1-0264	252	16	130		No
P-ZN1-0265	929	16	130		No
P-ZN1-0266	686	8	125		No
P-ZN1-0267	335	8	125		No
P-ZN1-0268	1704	6	125		No
P-ZN1-0269	771	12	125		No
P-ZN1-0270	308	12	125		No
P-ZN1-0271	267	8	125	0	No
P-ZN1-0272	182	8	130	0	No
P-ZN1-0273	271	8	125	0	No
P-ZN1-0274	267	8	125	0	No
P-ZN1-0275	151	8	130	0	No
P-ZN1-0276	303	8	130	0	No
P-ZN1-0277	736	8	125		No
P-ZN1-0278	421	8	130	0	No
P-ZN1-0279	768	6	125		No
P-ZN1-0280	109	8	130	0	No
P-ZN1-0281	785	6	125		No
P-ZN1-0282	74	12	130	0	No
P-ZN1-0283	67	12	130	0	Yes
P-ZN1-0284	385	6	125		No
P-ZN1-0285	225	8	130	0	No
P-ZN1-0286	280	6	125		No
P-ZN1-0287	355	6	125		No
P-ZN1-0288	191	8	130	0	No
P-ZN1-0289	272	8	125		No
P-ZN1-0290	272	8	125		No
P-ZN1-0291	175	8	130	0	No
P-ZN1-0292	268	8	125		No
P-ZN1-0293	976	8	125		No
P-ZN1-0294	10	6	100	0	No
P-ZN1-0295	269	8	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0296	277	8	125		No
P-ZN1-0298	399	8	125		No
P-ZN1-0299	68	12	120	0	Yes
P-ZN1-0300	1040	6	125		No
P-ZN1-0301	569	8	110	0	No
P-ZN1-0302	83	6	125		No
P-ZN1-0303	1108	6	125		No
P-ZN1-0304	441	8	125		No
P-ZN1-0305	273	8	125		No
P-ZN1-0306	12	8	130	0	No
P-ZN1-0306A	283	6	120	0	No
P-ZN1-0307	301	12	125		No
P-ZN1-0308	2412	12	125		No
P-ZN1-0309	19	8	130	0	No
P-ZN1-0310	20	12	125	0	No
P-ZN1-0311	1135	8	125		No
P-ZN1-0312	153	8	110	0	No
P-ZN1-0313	909	6	125		No
P-ZN1-0314	607	8	125		No
P-ZN1-0315	654	8	125		No
P-ZN1-0317	264	6	130	0	No
P-ZN1-0318	527	6	125		No
P-ZN1-0319	318	6	130	0	No
P-ZN1-0320	628	6	110		No
P-ZN1-0322	6	6	100	0	No
P-ZN1-0323	871	6	125		No
P-ZN1-0324	19	6	110	0	No
P-ZN1-0325	303	6	125		No
P-ZN1-0326	670	6	125		No
P-ZN1-0327	1154	6	130		No
P-ZN1-0328	830	6	110	0	No
P-ZN1-0329	349	6	110		No
P-ZN1-0330	567	6	110		No
P-ZN1-0331	460	6	125		No
P-ZN1-0332	556	6	125		No
P-ZN1-0334	249	6	125		No
P-ZN1-0335	722	6	125		No
P-ZN1-0336	407	4	100		No
P-ZN1-0337	396	12	125	0	No
P-ZN1-0338	444	12	125		No
P-ZN1-0339	889	12	125		No
P-ZN1-0340	4	8	120	0	No
P-ZN1-0341	1323	12	110	0	No
P-ZN1-0342	488	6	120	0	No
P-ZN1-0343	1329	6	130		No
P-ZN1-0344	438	12	130		No
P-ZN1-0345	197	12	120	0	No
P-ZN1-0346	417	10	110		No
P-ZN1-0347	441	8	110	0	No
P-ZN1-0349	745	8	130		No
P-ZN1-0350	53	8	125	0	No
P-ZN1-0351	754	12	125	0	No
P-ZN1-0352	1451	8	130		No
P-ZN1-0353	1102	16	130	0	No
P-ZN1-0354	703	16	130	0	No
P-ZN1-0355	676	8	130	0	No
P-ZN1-0356	724	12	110	0	No
P-ZN1-0357	401	6	125		No
P-ZN1-0358	1041	16	110		No
P-ZN1-0359	22	8	130	0	No
P-ZN1-0360	469	12	110		No
P-ZN1-0361	976	8	130		No
P-ZN1-0362	196	8	130	0	No
P-ZN1-0363	596	16	110		No
P-ZN1-0364	462	8	130	0	No
P-ZN1-0365	241	12	130	0	No
P-ZN1-0366	41	12	120	0	No
P-ZN1-0367	644	8	130	0	No
P-ZN1-0368	686	12	110		No
P-ZN1-0369	601	12	125		No
P-ZN1-0370	973	12	120	0	No
P-ZN1-0371	29	16	110		No
P-ZN1-0372	459	12	120	0	No
P-ZN1-0373	1316	8	110		No
P-ZN1-0374	180	8	130	0	No
P-ZN1-0375	605	8	130	0	No
P-ZN1-0376	2159	8	115	0	No
P-ZN1-0377	149	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0378	425	8	130	0	No
P-ZN1-0379	2125	16	110	0	No
P-ZN1-0380	512	12	120	0	No
P-ZN1-0381	182	8	130	0	No
P-ZN1-0382	285	16	130		No
P-ZN1-0383	253	8	130	0	No
P-ZN1-0384	873	16	110	0	No
P-ZN1-0385	117	8	130	0	No
P-ZN1-0386	418	12	125	0	No
P-ZN1-0387	420	12	120	0	No
P-ZN1-0388	29	6	120	0	No
P-ZN1-0389	754	8	110		No
P-ZN1-0390	571	16	130	0	No
P-ZN1-0391	179	6	120	0	No
P-ZN1-0392	258	16	130	0	No
P-ZN1-0393	290	16	130	0	No
P-ZN1-0394	26	6	120	0	No
P-ZN1-0395	336	16	130	0	No
P-ZN1-0396	643	8	110		No
P-ZN1-0397	320	12	130	0	No
P-ZN1-0398	1741	8	110		No
P-ZN1-0399	253	8	130	0	No
P-ZN1-0400	1101	12	130	0	No
P-ZN1-0401	264	8	130	0	No
P-ZN1-0402	71	8	110		No
P-ZN1-0403	980	12	120	0	No
P-ZN1-0404	27	8	130	0	No
P-ZN1-0405	388	12	120	0	No
P-ZN1-0406	434	6	110	0	No
P-ZN1-0407	733	8	130	0	No
P-ZN1-0408	140	8	125		No
P-ZN1-0409	411	8	125		No
P-ZN1-0410	266	8	130	0	No
P-ZN1-0411	278	6	125		No
P-ZN1-0412	28	12	120		No
P-ZN1-0413	227	8	120	0	No
P-ZN1-0414	595	12	120		No
P-ZN1-0415	554	8	130	0	No
P-ZN1-0416	286	10	120	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0417	434	8	130	0	No
P-ZN1-0418	513	14	130	0	No
P-ZN1-0419	14	8	120	0	No
P-ZN1-0420	1608	12	130	0	No
P-ZN1-0421	145	12	130	0	No
P-ZN1-0422	294	16	130	0	No
P-ZN1-0423	364	12	125	0	No
P-ZN1-0424	327	8	110		No
P-ZN1-0425	842	16	130	0	No
P-ZN1-0426	692	8	110		No
P-ZN1-0427	299	8	110		No
P-ZN1-0428	125	16	130	0	No
P-ZN1-0430	455	6	100	0	No
P-ZN1-0431	504	6	100	0	No
P-ZN1-0432	32	12	120		No
P-ZN1-0433	333	12	120		No
P-ZN1-0434	557	6	100	0	No
P-ZN1-0435	593	8	110		No
P-ZN1-0436	481	12	125	0	No
P-ZN1-0437	221	12	125	0	No
P-ZN1-0438	603	6	100	0	No
P-ZN1-0439	1055	8	110	0	No
P-ZN1-0440	339	8	110	0	No
P-ZN1-0441	309	6	110	0	No
P-ZN1-0443	316	8	120	0	No
P-ZN1-0445	284	6	110		No
P-ZN1-0446	601	8	120	0	No
P-ZN1-0447	327	8	130		No
P-ZN1-0448	352	16	110	0	No
P-ZN1-0449	268	12	120		No
P-ZN1-0450	610	8	110		No
P-ZN1-0451	3676	10	130	0	No
P-ZN1-0452	12	8	110		No
P-ZN1-0453	325	8	110	0	No
P-ZN1-0454	406	10	120	0	No
P-ZN1-0455	272	8	110		No
P-ZN1-0457	290	6	100	0	No
P-ZN1-0458	675	16	130	0	No
P-ZN1-0459	299	16	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0460	614	6	100	0	No
P-ZN1-0461	269	16	130	0	No
P-ZN1-0462	549	12	110	0	No
P-ZN1-0463	853	12	125		No
P-ZN1-0464	321	16	130	0	No
P-ZN1-0465	110	6	100	0	No
P-ZN1-0466	136	16	130	0	No
P-ZN1-0467	335	16	130	0	No
P-ZN1-0468	475	8	130	0	No
P-ZN1-0469	162	16	130		No
P-ZN1-0470	117	16	130		No
P-ZN1-0471	1645	8	120	0	No
P-ZN1-0472	270	16	130	0	No
P-ZN1-0473	1014	16	130	0	No
P-ZN1-0474	906	8	130	0	No
P-ZN1-0475	53	16	130		No
P-ZN1-0476	851	12	125	0	No
P-ZN1-0477	302	6	110		No
P-ZN1-0478	267	6	110		No
P-ZN1-0479	324	6	110		No
P-ZN1-0480	41	6	100	0	No
P-ZN1-0481	273	6	110		No
P-ZN1-0482	681	6	110		No
P-ZN1-0483	678	6	110		No
P-ZN1-0484	679	6	110		No
P-ZN1-0486	21	4	100		No
P-ZN1-0487	287	6	110		No
P-ZN1-0488	33	6	130		No
P-ZN1-0489	320	6	110		No
P-ZN1-0490	565	6	110		No
P-ZN1-0491	275	16	130	0	No
P-ZN1-0492	423	12	120		No
P-ZN1-0493	678	8	110		No
P-ZN1-0494	305	8	130		No
P-ZN1-0495	388	6	125		No
P-ZN1-0496	335	8	110		No
P-ZN1-0497	651	20	130		No
P-ZN1-0498	460	4	100	0	No
P-ZN1-0499	326	8	130		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0500	354	8	130	0	No
P-ZN1-0501	315	8	130	0	No
P-ZN1-0502	530	12	125		No
P-ZN1-0503	270	8	110		No
P-ZN1-0504	288	8	110		No
P-ZN1-0505	6	6	110		No
P-ZN1-0506	624	4	100		No
P-ZN1-0507	737	4	100		No
P-ZN1-0508	851	6	110		No
P-ZN1-0509	322	12	130	0	No
P-ZN1-0510	262	6	130		No
P-ZN1-0511	553	8	125		No
P-ZN1-0512	269	16	130	0	No
P-ZN1-0513	4	8	110		No
P-ZN1-0514	26	6	100	0	No
P-ZN1-0515	235	8	130		No
P-ZN1-0516	331	6	125		No
P-ZN1-0517	665	12	120		No
P-ZN1-0518	290	6	125	0	No
P-ZN1-0519	331	8	125		No
P-ZN1-0520	999	12	125	0	No
P-ZN1-0521	310	8	110		No
P-ZN1-0522	1298	2	100	0	No
P-ZN1-0523	496	12	130	0	No
P-ZN1-0524	794	12	130		No
P-ZN1-0525	3	10	130	0	No
P-ZN1-0526	695	10	130	0	No
P-ZN1-0527	12	12	130	0	No
P-ZN1-0528	327	10	100	0	No
P-ZN1-0528A	303	6	110		No
P-ZN1-0528B	390	8	130	0	No
P-ZN1-0529	229	10	130		No
P-ZN1-0530	31	12	130	0	No
P-ZN1-0531	131	10	130		No
P-ZN1-0532	1312	12	125	0	No
P-ZN1-0533	22	2	100		No
P-ZN1-0534	293	10	100	0	No
P-ZN1-0535	17	12	125	0	No
P-ZN1-0536	771	8	100	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0537	900	8	100		No
P-ZN1-0538	82	12	110	0	No
P-ZN1-0539	607	8	125	0	No
P-ZN1-0540	26	8	125	0	No
P-ZN1-0541	618	12	120		No
P-ZN1-0542	1320	16	110		No
P-ZN1-0543	121	8	125	0	No
P-ZN1-0544	451	16	110	0	No
P-ZN1-0545	4	12	100	0	Yes
P-ZN1-0546	573	12	130	0	No
P-ZN1-0547	113	6	110		No
P-ZN1-0548	12	12	130	0	No
P-ZN1-0549	841	6	110		No
P-ZN1-0550	1	4	100		No
P-ZN1-0553	1172	6	110	0	No
P-ZN1-0554	291	6	110		No
P-ZN1-0555	39	12	130	0	No
P-ZN1-0556	1391	12	130	0	No
P-ZN1-0557	362	6	110		No
P-ZN1-0558	30	8	130	0	No
P-ZN1-0559	315	8	110		No
P-ZN1-0560	272	6	110		No
P-ZN1-0561	143	8	130		No
P-ZN1-0562	526	8	130		No
P-ZN1-0563	287	8	130		No
P-ZN1-0564	84	8	125		No
P-ZN1-0565	272	6	110		No
P-ZN1-0566	299	6	110		No
P-ZN1-0567	51	6	125		No
P-ZN1-0568	305	8	110	0	No
P-ZN1-0569	313	8	110		No
P-ZN1-0570	92	6	110	0	No
P-ZN1-0571	276	8	110		No
P-ZN1-0572	424	12	130	0	No
P-ZN1-0573	623	6	110		No
P-ZN1-0574	916	6	125		No
P-ZN1-0575	317	8	130		No
P-ZN1-0576	322	6	110		No
P-ZN1-0577	122	16	130		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0578	642	6	110		No
P-ZN1-0579	351	6	110		No
P-ZN1-0580	1185	12	125	0	No
P-ZN1-0581	303	6	110		No
P-ZN1-0582	104	6	110		No
P-ZN1-0583	131	12	130		No
P-ZN1-0584	425	6	110		No
P-ZN1-0585	611	6	110	0	No
P-ZN1-0586	333	6	110		No
P-ZN1-0587	5	12	100	0	No
P-ZN1-0588	598	6	110		No
P-ZN1-0590	472	12	125	0	No
P-ZN1-0591	312	6	130		No
P-ZN1-0594	1742	12	125	0	No
P-ZN1-0597	684	8	125	0	No
P-ZN1-0598	323	6	110		No
P-ZN1-0599	1155	12	120		No
P-ZN1-0600	32	6	130	0	No
P-ZN1-0601	715	10	125	0	No
P-ZN1-0602	317	6	110		No
P-ZN1-0604	534	6	110		No
P-ZN1-0605	545	10	110	0	No
P-ZN1-0606	487	12	130	0	No
P-ZN1-0607	502	6	125		No
P-ZN1-0608	749	12	120		No
P-ZN1-0609	387	4	100		No
P-ZN1-0610	537	8	125	0	No
P-ZN1-0613	48	10	120	0	No
P-ZN1-0614	578	8	110		No
P-ZN1-0615	766	8	130	0	No
P-ZN1-0616	703	8	130	0	No
P-ZN1-0617	612	8	130		No
P-ZN1-0618	80	12	100	0	No
P-ZN1-0619	435	12	120		No
P-ZN1-0620	1600	8	130	0	No
P-ZN1-0621	1267	8	125	0	No
P-ZN1-0622	1370	8	130	0	No
P-ZN1-0624	753	12	120	0	No
P-ZN1-0629	693	6	125	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0631	971	12	110	0	Yes
P-ZN1-0634	841	12	130	0	No
P-ZN1-0635	817	12	130	0	No
P-ZN1-0636	191	8	130	0	No
P-ZN1-0637	443	8	130	0	No
P-ZN1-0640	460	12	120		No
P-ZN1-0641	341	6	125	0	No
P-ZN1-0642	144	6	100	0	No
P-ZN1-0643	822	6	125	0	No
P-ZN1-0644	404	6	125	0	No
P-ZN1-0645	238	16	130	0	No
P-ZN1-0646	732	10	120	0	No
P-ZN1-0649	527	6	120	0	No
P-ZN1-0650	898	16	120	0	No
P-ZN1-0651	1002	6	120	0	No
P-ZN1-0652	644	4	100	0	No
P-ZN1-0653	27	16	130		No
P-ZN1-0655	445	6	125		No
P-ZN1-0657	213	4	100		No
P-ZN1-0658	323	6	100	0	No
P-ZN1-0662	2994	8	110		No
P-ZN1-0663	24	8	100		No
P-ZN1-0664	275	8	100	0	No
P-ZN1-0665	42	6	110	0	No
P-ZN1-0666	662	8	100	0	No
P-ZN1-0668	1035	12	100	0	No
P-ZN1-0669	751	8	130	0	No
P-ZN1-0670	8	12	130	0	No
P-ZN1-0671	477	12	120		No
P-ZN1-0672	511	10	120	0	No
P-ZN1-0673	621	8	100	0	No
P-ZN1-0675	217	6	120	0	No
P-ZN1-0677	1574	8	130	0	No
P-ZN1-0678	374	6	125	0	No
P-ZN1-0679	418	10	125	0	No
P-ZN1-0680	375	10	125	0	No
P-ZN1-0681	647	4	100		No
P-ZN1-0683	594	12	120	0	No
P-ZN1-0684	796	12	125	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0686	10	6	130	0	No
P-ZN1-0687	314	12	120		No
P-ZN1-0689	102	2	100	0	No
P-ZN1-0691	689	6	120	0	No
P-ZN1-0692	35	16	130	0	No
P-ZN1-0693	342	6	120	0	No
P-ZN1-0694	816	12	120	0	No
P-ZN1-0695	162	12	130	0	No
P-ZN1-0697	1284	12	120		No
P-ZN1-0698	623	4	100		No
P-ZN1-0699	235	8	120	0	No
P-ZN1-0706	1683	6	125		No
P-ZN1-0712	294	4	100	0	No
P-ZN1-0715	362	6	130	0	No
P-ZN1-0716	228	6	130	0	No
P-ZN1-0717	1564	8	110		No
P-ZN1-0719	960	4	100		No
P-ZN1-0720	184	12	110	0	No
P-ZN1-0722	494	4	100		No
P-ZN1-0723	382	12	130	0	No
P-ZN1-0724	986	10	110		No
P-ZN1-0725	666	12	125	0	No
P-ZN1-0726	318	6	110		No
P-ZN1-0727	297	12	120		No
P-ZN1-0728	390	12	120	0	No
P-ZN1-0729	659	20	130	0	No
P-ZN1-0730	322	6	110		No
P-ZN1-0731	51	20	130		No
P-ZN1-0732	318	12	120		No
P-ZN1-0733	460	4	100	0	No
P-ZN1-0734	460	3	100	0	No
P-ZN1-0736	523	6	125		No
P-ZN1-0737	407	6	100	0	No
P-ZN1-0738	54	6	125		No
P-ZN1-0739	223	16	130	0	No
P-ZN1-0741	410	12	110	0	No
P-ZN1-0742	2167	6	125	0	No
P-ZN1-0743	166	6	125		No
P-ZN1-0744	21	6	110	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0745	2153	6	110	0	No
P-ZN1-0747	1507	12	100	0	No
P-ZN1-0748	468	6	110	0	No
P-ZN1-0749	536	12	125	0	No
P-ZN1-0750	3634	12	125	0	No
P-ZN1-0751	647	12	125	0	No
P-ZN1-0752	583	6	125		No
P-ZN1-0753	131	20	130		No
P-ZN1-0754	73	16	130	0	No
P-ZN1-0755	304	20	130		No
P-ZN1-0756	69	16	130		No
P-ZN1-0757	50	16	130		No
P-ZN1-0758	15	6	100	0	No
P-ZN1-0759	377	6	125		No
P-ZN1-0760	193	8	120	0	No
P-ZN1-0761	141	16	130	0	No
P-ZN1-0762	51	16	130	0	No
P-ZN1-0763	426	6	120	0	No
P-ZN1-0764	1141	16	130	0	No
P-ZN1-0766	300	12	130	0	No
P-ZN1-0768	606	12	130	0	No
P-ZN1-0769	928	12	130	0	No
P-ZN1-0771	1676	8	130	0	No
P-ZN1-0772	395	6	125	0	No
P-ZN1-0774	875	8	110	0	No
P-ZN1-0775	320	6	100	0	No
P-ZN1-0776	257	12	120	0	No
P-ZN1-0777	1169	8	110	0	No
P-ZN1-0778	378	12	130	0	No
P-ZN1-0779	440	12	125	0	No
P-ZN1-0780	122	8	125	0	No
P-ZN1-0781	250	4	120	0	No
P-ZN1-0782	397	6	120	0	No
P-ZN1-0783	817	6	130	0	No
P-ZN1-0784	382	12	120		No
P-ZN1-0785	502	6	125	0	No
P-ZN1-0787	269	8	110		No
P-ZN1-0789	322	12	130	0	No
P-ZN1-0790	1882	16	130		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0791	448	12	130	0	No
P-ZN1-0793	345	12	130	0	No
P-ZN1-0794	343	12	120		No
P-ZN1-0795	1351	4	100		No
P-ZN1-0797	283	8	130		No
P-ZN1-0798	267	8	130		No
P-ZN1-0798B	554	8	130		No
P-ZN1-0798C	427	8	130	0	No
P-ZN1-0799	191	10	130	0	No
P-ZN1-0800	283	12	125		No
P-ZN1-0801	63	4	120	0	No
P-ZN1-0804	567	16	120		No
P-ZN1-0805	595	4	125	0	No
P-ZN1-0806	1365	12	125		No
P-ZN1-0807	281	6	125		No
P-ZN1-0808	225	12	130	0	No
P-ZN1-0810	55	6	100	0	No
P-ZN1-0811	1945	2	100		No
P-ZN1-0813	2083	6	110		No
P-ZN1-0814	16	4	100		No
P-ZN1-0815	880	10	130	0	No
P-ZN1-0816	659	6	110		No
P-ZN1-0817	71	8	130	0	No
P-ZN1-0818	1235	6	110		No
P-ZN1-0820	281	6	110		No
P-ZN1-0822	417	10	125	0	No
P-ZN1-0824	361	10	125	0	No
P-ZN1-0825	17	4	110	0	No
P-ZN1-0826	120	4	120	0	No
P-ZN1-0827	107	4	120	0	No
P-ZN1-0830	125	6	130	0	No
P-ZN1-0832	611	6	110		No
P-ZN1-0833	887	12	120	0	No
P-ZN1-0836	1096	8	125		No
P-ZN1-0837	402	4	100		No
P-ZN1-0839	1651	12	120	0	No
P-ZN1-0840	395	6	125		No
P-ZN1-0841	383	12	110	0	No
P-ZN1-0842	321	6	110		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0843	478	6	110		No
P-ZN1-0845	1988	4	100		No
P-ZN1-0846	43	8	100	0	No
P-ZN1-0847	1173	4	100		No
P-ZN1-0849	249	6	125		No
P-ZN1-0850	720	3	130	0	No
P-ZN1-0851	6	8	130	0	No
P-ZN1-0852	6	8	130	0	No
P-ZN1-0853	9	8	130	0	No
P-ZN1-0854	9	8	130	0	No
P-ZN1-0855	81	7	130	0	No
P-ZN1-0856	92	7	130	0	No
P-ZN1-0856A	1269	8	125	0	No
P-ZN1-0857	10	12	130	0	No
P-ZN1-0858	10	12	130	0	No
P-ZN1-0859	124	2	130	0	No
P-ZN1-0860	101	3	130	0	No
P-ZN1-0861	121	5	130	0	No
P-ZN1-0862	307	6	120	0	No
P-ZN1-0863	458	6	120	0	No
P-ZN1-0864	72	8	110	0	No
P-ZN1-0865	640	6	120	0	No
P-ZN1-0866	422	6	120	0	No
P-ZN1-0867	660	6	120	0	No
P-ZN1-0868	1129	8	120	0	No
P-ZN1-0869	33	8	120	0	No
P-ZN1-0870	415	12	120	0	No
P-ZN1-0871	447	6	120	0	No
P-ZN1-0872	43	8	120	0	No
P-ZN1-0873	41	8	120	0	No
P-ZN1-0873A	1098	8	130	0	No
P-ZN1-0874	662	12	130	0	No
P-ZN1-0875	230	6	120	0	No
P-ZN1-0876	746	6	120	0	No
P-ZN1-0877	445	6	130	0	No
P-ZN1-0878	472	6	120	0	No
P-ZN1-0879	908	8	110	0	No
P-ZN1-0880	553	12	130	0	No
P-ZN1-0881	45	6	100	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0882	213	6	120	0	No
P-ZN1-0883	101	6	130	0	No
P-ZN1-0884	930	8	130	0	No
P-ZN1-0885	265	8	120	0	No
P-ZN1-0886	912	8	120	0	No
P-ZN1-0887	552	8	120	0	No
P-ZN1-0888	217	8	120	0	No
P-ZN1-0889	2	8	110	0	No
P-ZN1-0890	375	12	130	0	No
P-ZN1-0891	404	6	120	0	No
P-ZN1-0892	177	12	130	0	No
P-ZN1-0893	47	6	100	0	No
P-ZN1-0894	162	6	130	0	No
P-ZN1-0896	1126	8	130	0	No
P-ZN1-0897	1046	6	120	0	No
P-ZN1-0898	70	8	120	0	No
P-ZN1-0899	1294	6	120	0	No
P-ZN1-0900	205	8	130	0	No
P-ZN1-0901	38	6	100	0	No
P-ZN1-0902	442	12	120	0	No
P-ZN1-0903	673	12	125	0	No
P-ZN1-0905	986	12	120	0	No
P-ZN1-0905-2	297	12	120	0	No
P-ZN1-0905-3	269	12	120	0	No
P-ZN1-0906	232	8	130	0	No
P-ZN1-0907	333	8	120	0	No
P-ZN1-0908	14	8	130	0	No
P-ZN1-0909	270	12	130	0	No
P-ZN1-0910	659	12	110	0	No
P-ZN1-0911	1352	8	110	0	No
P-ZN1-0912	611	8	130	0	No
P-ZN1-0913	40	8	130	0	No
P-ZN1-0914	163	8	130	0	No
P-ZN1-0915	193	12	130	0	No
P-ZN1-0916	437	8	130	0	No
P-ZN1-0917	517	8	130	0	No
P-ZN1-0918	494	12	120	0	No
P-ZN1-0919	587	8	130	0	No
P-ZN1-0920	67	8	120	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0921	382	6	120	0	No
P-ZN1-0922	753	8	130	0	No
P-ZN1-0923	711	8	130	0	No
P-ZN1-0924	453	8	130	0	No
P-ZN1-0925	707	8	130	0	No
P-ZN1-0926	183	8	130	0	No
P-ZN1-0927	462	8	130	0	No
P-ZN1-0928	171	6	130	0	No
P-ZN1-0929	223	6	130	0	No
P-ZN1-0930	173	6	120	0	No
P-ZN1-0931	215	8	130	0	No
P-ZN1-0932	231	6	120	0	No
P-ZN1-0933	142	8	130	0	No
P-ZN1-0934	158	8	130	0	No
P-ZN1-0935	330	8	120	0	No
P-ZN1-0937	1230	8	130	0	No
P-ZN1-0938	224	6	130	0	No
P-ZN1-0939	120	8	130	0	No
P-ZN1-0940	467	8	130	0	No
P-ZN1-0941	153	6	125	0	No
P-ZN1-0942	154	6	120	0	No
P-ZN1-0943	688	8	130	0	No
P-ZN1-0944	858	6	120	0	No
P-ZN1-0945	558	6	120	0	No
P-ZN1-0947	598	6	120	0	No
P-ZN1-0948	265	8	120	0	No
P-ZN1-0949	175	6	120	0	No
P-ZN1-0952	504	6	120	0	No
P-ZN1-0953	399	12	130	0	No
P-ZN1-0954	238	8	130	0	No
P-ZN1-0955	417	6	130	0	No
P-ZN1-0956	224	8	130	0	No
P-ZN1-0957	668	8	130	0	No
P-ZN1-0958	712	8	130	0	No
P-ZN1-0959	530	8	130	0	No
P-ZN1-0960	431	8	130	0	No
P-ZN1-0961	230	8	130	0	No
P-ZN1-0962	425	8	130	0	No
P-ZN1-0963	46	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-0964	1081	8	130	0	No
P-ZN1-0965	477	8	130	0	No
P-ZN1-0966	849	6	130	0	No
P-ZN1-0967	490	6	130	0	No
P-ZN1-0968	158	8	120	0	No
P-ZN1-0969	298	6	120	0	No
P-ZN1-0970	146	8	130	0	No
P-ZN1-0971	294	6	130	0	No
P-ZN1-0972	962	8	130	0	No
P-ZN1-0973	831	8	130	0	No
P-ZN1-0974	229	8	120	0	No
P-ZN1-0975	583	6	120	0	No
P-ZN1-0976	771	6	130	0	No
P-ZN1-0977	651	8	130	0	No
P-ZN1-0978	1597	8	120	0	No
P-ZN1-0979	104	6	120	0	No
P-ZN1-0980	1413	6	130	0	No
P-ZN1-0981	410	10	120	0	No
P-ZN1-0982	8	12	130	0	No
P-ZN1-0983	223	12	120	0	No
P-ZN1-0984	1844	16	130	0	No
P-ZN1-0985	218	16	130	0	No
P-ZN1-0986	404	6	120	0	No
P-ZN1-0987	483	6	100	0	No
P-ZN1-0988	48	6	100	0	No
P-ZN1-0989	472	6	100	0	No
P-ZN1-0990	277	6	100	0	No
P-ZN1-0991	554	6	100	0	No
P-ZN1-0992	1054	6	100	0	No
P-ZN1-0993	167	6	100	0	No
P-ZN1-0994	174	6	130	0	No
P-ZN1-0995	142	8	120	0	No
P-ZN1-0996	245	10	100	0	No
P-ZN1-0997	586	6	100	0	No
P-ZN1-0998	440	6	100	0	No
P-ZN1-0999	407	8	110	0	No
P-ZN1-1000	673	6	110	0	No
P-ZN1-1001	484	8	120	0	No
P-ZN1-1002	2479	10	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1003	178	6	100	0	No
P-ZN1-1004	385	16	130	0	No
P-ZN1-1005	813	6	100	0	No
P-ZN1-1006	573	16	130	0	No
P-ZN1-1007	395	10	120	0	No
P-ZN1-1008	356	6	100	0	No
P-ZN1-1009	791	16	130	0	No
P-ZN1-1010	186	8	130	0	No
P-ZN1-1011	268	8	120	0	No
P-ZN1-1012	1511	12	120	0	No
P-ZN1-1013	348	6	100	0	No
P-ZN1-1016	275	4	130	0	No
P-ZN1-1017	290	4	130	0	No
P-ZN1-1019	265	6	100	0	No
P-ZN1-1020	465	8	100	0	No
P-ZN1-1021	59	6	110	0	No
P-ZN1-1022	350	6	100	0	No
P-ZN1-1023	345	8	110	0	No
P-ZN1-1024	499	8	110	0	No
P-ZN1-1025	521	6	100	0	No
P-ZN1-1026	351	8	120	0	No
P-ZN1-1027	152	8	100	0	No
P-ZN1-1028	650	8	100	0	No
P-ZN1-1029	140	8	110	0	No
P-ZN1-1030	256	6	130	0	No
P-ZN1-1031	803	6	100	0	No
P-ZN1-1032	339	6	120	0	No
P-ZN1-1033	29	6	130	0	No
P-ZN1-1034	323	8	130	0	No
P-ZN1-1035	296	6	130	0	No
P-ZN1-1036	241	6	100	0	No
P-ZN1-1037	179	6	100	0	No
P-ZN1-1038	408	6	100	0	No
P-ZN1-1039	233	8	130	0	No
P-ZN1-1040	4	8	100	0	Yes
P-ZN1-1041	1350	12	130	0	No
P-ZN1-1042	40	16	130	0	No
P-ZN1-1043	32	12	100	0	No
P-ZN1-1044	28	12	100	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1045	2647	12	130	0	No
P-ZN1-1046	441	8	130	0	No
P-ZN1-1047	2960	8	130	0	No
P-ZN1-1048	116	12	130	0	No
P-ZN1-1049	56	12	130	0	No
P-ZN1-1050	969	12	130	0	No
P-ZN1-1051	671	12	130	0	No
P-ZN1-1052	342	8	130	0	No
P-ZN1-1053	709	8	130	0	No
P-ZN1-1054	890	12	130	0	No
P-ZN1-1055	176	10	130	0	No
P-ZN1-1056	657	16	120	0	No
P-ZN1-1057	511	8	130	0	No
P-ZN1-1058	313	4	110	0	No
P-ZN1-1059	180	6	110	0	No
P-ZN1-1061	277	2	110	0	No
P-ZN1-1062	366	6	110	0	No
P-ZN1-1063	635	4	100	0	No
P-ZN1-1064	623	4	100	0	No
P-ZN1-1065	10	4	130	0	No
P-ZN1-1066	10	4	130	0	No
P-ZN1-1067	17	12	130	0	No
P-ZN1-1068	15	2	130	0	No
P-ZN1-1069	208	12	130	0	No
P-ZN1-1070	107	6	130	0	No
P-ZN1-1071	65	6	130	0	No
P-ZN1-1072	27	2	130	0	No
P-ZN1-1073	25	2	130	0	No
P-ZN1-1074	27	2	130	0	No
P-ZN1-1075	22	2	130	0	No
P-ZN1-1076	10	12	120	0	No
P-ZN1-1077	76	12	120	0	No
P-ZN1-1078	10	16	130	0	No
P-ZN1-1079	38	16	130	0	No
P-ZN1-1080	20	12	120	0	No
P-ZN1-1081	101	12	130	0	No
P-ZN1-1082	17	16	130	0	No
P-ZN1-1083	13	16	130	0	No
P-ZN1-1084	14	12	120	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1085	37	12	130	0	No
P-ZN1-1087	6	4	130	0	No
P-ZN1-1088	6	4	130	0	No
P-ZN1-1093	30	10	130	0	No
P-ZN1-1094	287	10	130	0	No
P-ZN1-1097	24	6	130	0	No
P-ZN1-1098	28	6	130	0	No
P-ZN1-1102	17	4	130	0	No
P-ZN1-1103	15	3	130	0	No
P-ZN1-1104	1245	12	130		No
P-ZN1-1105	1389	12	120	0	No
P-ZN1-1106	351	12	110	0	No
P-ZN1-1107	1419	12	110	0	No
P-ZN1-1108	84	12	125		No
P-ZN1-1109	1048	8	110	0	No
P-ZN1-1110	543	12	120	0	No
P-ZN1-1111	358	8	110	0	No
P-ZN1-1114	993	10	110	0	No
P-ZN1-1115	638	10	110	0	No
P-ZN1-1116	1249	8	130	0	No
P-ZN1-1117	1347	8	130	0	No
P-ZN1-1118	659	12	125		No
P-ZN1-1119	1307	8	130	0	No
P-ZN1-1120	1324	4	100		No
P-ZN1-1121	1227	10	110		No
P-ZN1-1122	637	2	100		No
P-ZN1-1123	1335	6	130		No
P-ZN1-1124	646	6	125		No
P-ZN1-1125	443	6	125		No
P-ZN1-1126	210	6	125		No
P-ZN1-1127	391	6	125		No
P-ZN1-1128	962	8	100	0	No
P-ZN1-1129	645	12	125		No
P-ZN1-1130	450	12	125		No
P-ZN1-1131	1291	2	100		No
P-ZN1-1132	353	6	130	0	No
P-ZN1-1133	338	8	110		No
P-ZN1-1134	651	6	125		No
P-ZN1-1135	635	2	100		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1136	1584	2	100		No
P-ZN1-1137	557	2	100		No
P-ZN1-1138	776	2	100		No
P-ZN1-1139	384	8	110		No
P-ZN1-1140	326	12	120		No
P-ZN1-1141	682	12	110	0	No
P-ZN1-1142	2645	2	100		No
P-ZN1-1143	13	12	110	0	No
P-ZN1-1144	77	12	110	0	No
P-ZN1-1145	2057	8	100	0	No
P-ZN1-1146	539	12	130		No
P-ZN1-1147	485	12	130		No
P-ZN1-1148	266	6	130	0	No
P-ZN1-1149	96	8	110		No
P-ZN1-1150	483	8	130		No
P-ZN1-1151	1292	6	110		No
P-ZN1-1152	475	6	110		No
P-ZN1-1153	1406	6	110		No
P-ZN1-1154	282	12	130		No
P-ZN1-1155	263	12	130		No
P-ZN1-1157	1007	6	125		No
P-ZN1-1158	537	6	110		No
P-ZN1-1158A	433	8	130	0	No
P-ZN1-1159	1592	8	130	0	Yes
P-ZN1-1160	541	8	130		No
P-ZN1-1161	1360	2	100		No
P-ZN1-1162	47	8	130	0	No
P-ZN1-1163	82	16	130	0	No
P-ZN1-1164	718	8	125		No
P-ZN1-1170	691	4	100		No
P-ZN1-1171	522	8	110		No
P-ZN1-1172	78	16	130	0	No
P-ZN1-1173	828	8	110		No
P-ZN1-1174	435	6	110		No
P-ZN1-1175	318	6	125		No
P-ZN1-1176	459	4	100		No
P-ZN1-1177	52	12	120		No
P-ZN1-1178	758	4	100		No
P-ZN1-1179	318	4	100		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1180	324	4	100		No
P-ZN1-1181	318	4	100		No
P-ZN1-1182	331	8	130	0	No
P-ZN1-1183	381	12	120		No
P-ZN1-1184	460	12	120		No
P-ZN1-1185	763	12	120		No
P-ZN1-1186	322	4	100		No
P-ZN1-1187	761	4	100		No
P-ZN1-1188	320	12	120		No
P-ZN1-1189	327	12	120		No
P-ZN1-1191	322	6	110		No
P-ZN1-1193	404	10	110		No
P-ZN1-1194	322	12	120		No
P-ZN1-1195	318	12	120		No
P-ZN1-1196	760	4	100		No
P-ZN1-1197	319	6	110		No
P-ZN1-1198	644	6	125		No
P-ZN1-1199	406	4	100		No
P-ZN1-1201	939	6	125		No
P-ZN1-1202	461	4	100		No
P-ZN1-1203	293	8	130	0	No
P-ZN1-1204	889	10	110		No
P-ZN1-1208	196	4	100		No
P-ZN1-1209	410	4	100		No
P-ZN1-1210	324	8	120	0	No
P-ZN1-1211	101	8	125		No
P-ZN1-1212	274	12	130	0	No
P-ZN1-1213	201	12	130	0	No
P-ZN1-1214	201	12	100	0	No
P-ZN1-1218	128	8	110	0	No
P-ZN1-1219	268	4	100		No
P-ZN1-1220	462	6	110		No
P-ZN1-1221	427	6	110		No
P-ZN1-1222	320	4	100		No
P-ZN1-1226	174	8	130	0	No
P-ZN1-1227	14	12	120		No
P-ZN1-1228	932	8	110		No
P-ZN1-1229	264	12	120		No
P-ZN1-1231	296	6	110		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1232	1873	16	130	0	No
P-ZN1-1233	428	16	130	0	No
P-ZN1-1234	362	16	130	0	No
P-ZN1-1235	856	12	120	0	No
P-ZN1-1236	242	8	110		No
P-ZN1-1237	241	12	125	0	No
P-ZN1-1238	14	8	125		No
P-ZN1-1239	232	6	100		No
P-ZN1-1240	296	10	100		No
P-ZN1-1241	240	10	130		No
P-ZN1-1242	255	10	100	0	No
P-ZN1-1243	551	10	125	0	No
P-ZN1-1244	79	12	125		No
P-ZN1-1245	1337	10	110	0	No
P-ZN1-1246	24	8	125		No
P-ZN1-1247	420	8	125		No
P-ZN1-1248	663	8	125		No
P-ZN1-1251	541	8	125	0	No
P-ZN1-1252	123	10	120	0	No
P-ZN1-1253	318	4	125	0	No
P-ZN1-1257	346	6	110		No
P-ZN1-1259	2261	12	130	0	No
P-ZN1-1260	666	12	110		No
P-ZN1-1261	28	8	130		No
P-ZN1-1262	2177	12	130		No
P-ZN1-1263	337	6	110	0	No
P-ZN1-1264	659	6	110		No
P-ZN1-1266	484	8	125	0	No
P-ZN1-1267	116	12	130		No
P-ZN1-1268	1288	2	100	0	No
P-ZN1-1269	60	12	130		No
P-ZN1-1270	1130	8	125	0	No
P-ZN1-1272	297	12	110	0	No
P-ZN1-1277	583	8	110		No
P-ZN1-1278	272	12	125	0	No
P-ZN1-1279	338	8	130	0	No
P-ZN1-1280	649	8	125	0	No
P-ZN1-1281	358	8	125	0	No
P-ZN1-1282	312	8	130	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1283	534	8	125	0	No
P-ZN1-1284	178	6	130		No
P-ZN1-1286	328	6	130		No
P-ZN1-1289	709	6	125	0	No
P-ZN1-1290	1832	8	130		No
P-ZN1-1291	951	8	130	0	No
P-ZN1-1294	440	4	120	0	No
P-ZN1-1295	156	8	110	0	No
P-ZN1-1296	316	4	100	0	No
P-ZN1-1297	641	12	120		No
P-ZN1-1298	392	8	125	0	No
P-ZN1-1299	1352	12	125		No
P-ZN1-1300	1087	2	100		No
P-ZN1-1301	353	12	125		No
P-ZN1-1302	1416	12	125	0	No
P-ZN1-1303	112	12	125	0	No
P-ZN1-1304	210	12	130		No
P-ZN1-1305	299	8	110	0	No
P-ZN1-1306	1269	12	125		No
P-ZN1-1307	623	12	130	0	No
P-ZN1-1308	213	12	130	0	No
P-ZN1-1309	564	8	130		No
P-ZN1-1310	4	12	130	0	No
P-ZN1-1311	642	12	130	0	No
P-ZN1-1312	229	8	125		No
P-ZN1-1313	1001	6	125		No
P-ZN1-1314	2702	8	110		No
P-ZN1-1315	612	8	130	0	No
P-ZN1-1316	1355	6	110		No
P-ZN1-1317	95	8	110		No
P-ZN1-1318	1282	12	130		No
P-ZN1-1319	2162	12	130		No
P-ZN1-1320	674	16	130		No
P-ZN1-1321	122	12	125	0	No
P-ZN1-1322	296	12	120		No
P-ZN1-1323	1269	12	120		No
P-ZN1-1324	1530	12	120		No
P-ZN1-1325	1153	12	130	0	No
P-ZN1-1326	234	12	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1327	1181	12	130	0	No
P-ZN1-1328	330	12	110	0	No
P-ZN1-1328-2	460	12	110	0	No
P-ZN1-1329	638	4	100		No
P-ZN1-1330	2686	2	100	0	No
P-ZN1-1332	332	4	100	0	No
P-ZN1-1333	411	8	110	0	No
P-ZN1-1334	468	8	110	0	No
P-ZN1-1335	1028	12	130	0	No
P-ZN1-1336	697	6	125		No
P-ZN1-1337	383	6	125		No
P-ZN1-1338	475	4	100		No
P-ZN1-1339	209	12	125		No
P-ZN1-1340	794	12	125		No
P-ZN1-1341	738	12	120		No
P-ZN1-1342	45	12	120		No
P-ZN1-1343	685	12	120		No
P-ZN1-1344	63	12	125		No
P-ZN1-1345	1343	12	125		No
P-ZN1-1346	64	8	130		No
P-ZN1-1347	1798	8	130		No
P-ZN1-1348	665	4	100		No
P-ZN1-1349	60	6	110		No
P-ZN1-1350	641	6	110	0	No
P-ZN1-1351	661	6	100	0	No
P-ZN1-1352	357	4	100		No
P-ZN1-1354	1342	12	130	0	No
P-ZN1-1355	33	12	120	0	No
P-ZN1-1356	468	6	110	0	No
P-ZN1-1357	104	6	110	0	No
P-ZN1-1358	472	12	110	0	No
P-ZN1-1359	479	12	125		No
P-ZN1-1360	897	8	130		No
P-ZN1-1361	222	10	110	0	No
P-ZN1-1362	1292	8	125		No
P-ZN1-1363	430	10	110	0	No
P-ZN1-1364	246	12	120		No
P-ZN1-1365	6	12	120	0	No
P-ZN1-1366	6	12	120	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1367	169	4	100		No
P-ZN1-1370	1409	4	100	0	No
P-ZN1-1371	91	12	120		No
P-ZN1-1372	30	16	130		No
P-ZN1-1373	548	12	120		No
P-ZN1-1374	973	8	110		No
P-ZN1-1375	394	6	110		No
P-ZN1-1376	461	8	110		No
P-ZN1-1377	755	8	110		No
P-ZN1-1378	119	12	125	0	No
P-ZN1-1379	661	12	125	0	No
P-ZN1-1380	1281	4	100		No
P-ZN1-1382	318	16	110	0	No
P-ZN1-1383	766	20	130	0	No
P-ZN1-1384	454	12	130	0	No
P-ZN1-1385	125	12	120	0	No
P-ZN1-1386	324	6	110		No
P-ZN1-1387	580	8	110		No
P-ZN1-1388	441	6	110		No
P-ZN1-1389	2253	6	110		No
P-ZN1-1390	1307	12	130	0	No
P-ZN1-1391	323	12	130	0	No
P-ZN1-1392	65	6	110		No
P-ZN1-1393	676	6	110		No
P-ZN1-1394	288	8	110		No
P-ZN1-1395	83	8	110		No
P-ZN1-1397	1918	4	100		No
P-ZN1-1399	360	4	100		No
P-ZN1-1400	825	12	120	0	No
P-ZN1-1401	69	6	110	0	No
P-ZN1-1402	14	12	125		No
P-ZN1-1403	60	12	125	0	No
P-ZN1-1404	187	12	125		No
P-ZN1-1405	2085	2	100	0	No
P-ZN1-1408	145	12	125	0	No
P-ZN1-1411	14	8	110	0	No
P-ZN1-1412	501	6	120	0	No
P-ZN1-1414	940	12	125		No
P-ZN1-1415	425	8	110	0	No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1416	53	10	130	0	No
P-ZN1-1417	413	12	125	0	No
P-ZN1-1418	352	4	125	0	No
P-ZN1-1419	382	12	125	0	No
P-ZN1-1420	35	10	110	0	No
P-ZN1-1422	507	10	110		No
P-ZN1-1423	387	10	125	0	No
P-ZN1-1425	39	4	100		No
P-ZN1-1427	61	8	130		No
P-ZN1-1428	508	12	100	0	No
P-ZN1-1429	363	4	100		No
P-ZN1-1431	314	6	130		No
P-ZN1-1432	207	6	125		No
P-ZN1-1433	366	16	100	0	No
P-ZN1-1435	1004	16	130	0	No
P-ZN1-1435A	677	16	100	0	No
P-ZN1-1436	290	6	110		No
P-ZN1-1439	618	4	110		No
P-ZN1-1440	200	4	100		No
P-ZN1-1441	2	10	130		No
P-ZN1-1442	6	10	130		No
P-ZN1-1443	19	10	100	0	No
P-ZN1-1444	685	6	125		No
P-ZN1-1445	31	6	130		No
P-ZN1-1446	241	8	110		No
P-ZN1-1447	149	8	110	0	No
P-ZN1-1448	111	4	100		No
P-ZN1-1449	276	6	110		No
P-ZN1-1450	605	4	100	0	No
P-ZN1-1452	301	6	110		No
P-ZN1-1453	326	8	130		No
P-ZN1-1454	255	8	130		No
P-ZN1-1455	273	4	100		No
P-ZN1-1457	767	16	110	0	No
P-ZN1-1458	291	16	110	0	No
P-ZN1-1459	180	6	110	0	No
P-ZN1-1460	324	6	110		No
P-ZN1-1461	266	6	110		No
P-ZN1-1462	482	10	110		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1463	44	8	110		No
P-ZN1-1464	26	16	130		No
P-ZN1-1465	300	16	110	0	No
P-ZN1-1466	40	8	110		No
P-ZN1-1467	631	8	110		No
P-ZN1-1468	337	16	130	0	No
P-ZN1-1469	293	8	110		No
P-ZN1-1470	317	6	110		No
P-ZN1-1471	351	6	110		No
P-ZN1-1472	283	6	110		No
P-ZN1-1473	253	6	110		No
P-ZN1-1474	317	6	110		No
P-ZN1-1475	353	12	130	0	No
P-ZN1-1476	394	10	110	0	No
P-ZN1-1477	528	12	130	0	No
P-ZN1-1478	254	6	110		No
P-ZN1-1479	192	6	110		No
P-ZN1-1480	832	4	100		No
P-ZN1-1481	319	8	110		No
P-ZN1-1482	338	8	110	0	No
P-ZN1-1483	288	6	110		No
P-ZN1-1484	925	4	100		No
P-ZN1-1485	333	8	110		No
P-ZN1-1486	295	12	120		No
P-ZN1-1487	245	8	110		No
P-ZN1-1488	311	8	110		No
P-ZN1-1489	34	4	100		No
P-ZN1-1490	316	4	100		No
P-ZN1-1491	660	4	100		No
P-ZN1-1492	51	4	100		No
P-ZN1-1493	397	4	100	0	No
P-ZN1-1494	799	6	125	0	No
P-ZN1-1496	11	6	125	0	No
P-ZN1-1498	539	12	100	0	No
P-ZN1-1498-01	260	12	100	0	No
P-ZN1-1499	385	12	100	0	No
P-ZN1-1501	316	8	110		No
P-ZN1-1502	313	4	100		No
P-ZN1-1503	229	6	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1504	183	4	100	0	No
P-ZN1-1505	312	4	100	0	No
P-ZN1-1506	93	4	100		No
P-ZN1-1507	137	12	130	0	No
P-ZN1-1508	64	8	110		No
P-ZN1-1509	273	6	110		No
P-ZN1-1510	194	12	130	0	No
P-ZN1-1511	394	12	120	0	No
P-ZN1-1512	629	12	130	0	No
P-ZN1-1514	195	6	110		No
P-ZN1-1517	435	6	110	0	No
P-ZN1-1518	595	6	120	0	No
P-ZN1-1519	423	4	120	0	No
P-ZN1-1521	320	12	120	0	No
P-ZN1-1523	527	12	130	0	No
P-ZN1-1524	721	12	130		No
P-ZN1-1525	1478	8	130	0	No
P-ZN1-1526	450	16	120	0	No
P-ZN1-1527	1236	6	110	0	No
P-ZN1-1532	269	8	125	0	No
P-ZN1-1534	861	6	125		No
P-ZN1-1535	1226	12	130	0	No
P-ZN1-1536	54	8	110		No
P-ZN1-1537	260	4	100		No
P-ZN1-1538	755	6	110		No
P-ZN1-1539	3	6	110		No
P-ZN1-1540	261	8	130		No
P-ZN1-1541	38	4	100		No
P-ZN1-1542	359	8	130		No
P-ZN1-1543	125	8	110		No
P-ZN1-1545	315	8	110		No
P-ZN1-1546	735	8	110		No
P-ZN1-1547	204	6	110		No
P-ZN1-1548	36	6	110		No
P-ZN1-1549	192	12	110	0	No
P-ZN1-1550	37	8	110		No
P-ZN1-1551	111	6	110		No
P-ZN1-1552	778	6	125		No
P-ZN1-1555	248	4	100		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1556	147	6	125		No
P-ZN1-1557	228	6	110	0	No
P-ZN1-1561	272	6	110		No
P-ZN1-1562	185	8	125	0	No
P-ZN1-1563	221	6	125		No
P-ZN1-1567	460	8	110	0	No
P-ZN1-1568	395	8	110	0	No
P-ZN1-1569	826	6	120	0	No
P-ZN1-1570	666	6	125	0	No
P-ZN1-1571	370	4	100	0	No
P-ZN1-1572	360	4	100		No
P-ZN1-1573	299	8	125		No
P-ZN1-1574	994	8	125	0	No
P-ZN1-1575	208	4	100		No
P-ZN1-1576	40	20	130		No
P-ZN1-1577	201	12	130	0	No
P-ZN1-1578	511	20	130	0	No
P-ZN1-1579	3823	16	130		No
P-ZN1-1580	583	16	130		No
P-ZN1-1581	1118	12	120		No
P-ZN1-1582	14	8	125		No
P-ZN1-1583	334	8	125	0	No
P-ZN1-1584	433	8	125	0	No
P-ZN1-1587	723	4	125	0	No
P-ZN1-1588	127	4	100	0	No
P-ZN1-1589	288	4	100	0	No
P-ZN1-1590	792	4	100		No
P-ZN1-1591	232	8	125		No
P-ZN1-1592	175	6	125		No
P-ZN1-1593	62	12	125	0	No
P-ZN1-1594	740	6	125		No
P-ZN1-1595	436	8	125		No
P-ZN1-1596	518	12	120	0	No
P-ZN1-1597	291	8	125		No
P-ZN1-1598	353	12	125		No
P-ZN1-1599	584	6	125		No
P-ZN1-1600	463	6	125		No
P-ZN1-1601	728	6	125		No
P-ZN1-1602	989	6	125		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1603	282	6	125		No
P-ZN1-1604	583	8	125		No
P-ZN1-1605	855	8	125		No
P-ZN1-1606	279	6	125		No
P-ZN1-1607	720	6	125		No
P-ZN1-1608	791	6	125		No
P-ZN1-1609	954	6	125		No
P-ZN1-1610	280	6	125		No
P-ZN1-1611	782	6	125	0	No
P-ZN1-1612	507	6	125		No
P-ZN1-1613	820	6	125		No
P-ZN1-1614	412	6	110		No
P-ZN1-1615	141	6	110		No
P-ZN1-1616	285	4	100		No
P-ZN1-1617	2672	4	100		No
P-ZN1-1619	486	6	125	0	No
P-ZN1-1620	109	8	125		No
P-ZN1-1622	757	8	125		No
P-ZN1-1623	274	12	125		No
P-ZN1-1624	18	12	120		No
P-ZN1-1625	758	12	130	0	No
P-ZN1-1628	1361	8	125		No
P-ZN1-1629	448	12	120		No
P-ZN1-1630	223	12	120		No
P-ZN1-1631	63	4	110	0	No
P-ZN1-1632	1094	12	130	0	No
P-ZN1-1633	259	6	125		No
P-ZN1-1635	408	6	100	0	No
P-ZN1-1635-2	37	6	100	0	No
P-ZN1-1636	1672	8	100	0	No
P-ZN1-1637	326	6	125		No
P-ZN1-1638	221	12	125		No
P-ZN1-1639	524	6	125		No
P-ZN1-1640	1337	12	110		No
P-ZN1-1641	712	6	110	0	Yes
P-ZN1-1642	473	8	130		No
P-ZN1-1643	269	8	125		No
P-ZN1-1644	1023	8	125		No
P-ZN1-1645	386	8	130		No

ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)	Minor Loss (Double)	Check Valve (Boolean)
P-ZN1-1646	277	12	130	0	No
P-ZN1-1647	362	12	130	0	No
P-ZN1-1648	542	6	125		No
P-ZN1-1649	360	6	110	0	No
P-ZN1-1650	1517	6	125	0	No
P-ZN1-1651	681	4	100		No
P-ZN1-1652	625	6	110	0	No
P-ZN1-1653	685	6	110	0	No
P-ZN1-1655	357	6	110		No
P-ZN1-1656	335	6	110		No
P-ZN1-1659	676	4	100		No
P-ZN1-1660	394	12	120		No
P-ZN1-1661	356	12	120		No
P-ZN1-1662	10	12	130	0	No
P-ZN1-1663	10	12	130	0	No
P-ZN1-1664	228	20	130	0	No
P-ZN1-1665	15	20	130	0	No
P-ZN1-1666	266	20	130	0	No
P-ZN1-1667	287	12	130	0	No
P-ZN1-1668	297	12	130	0	No
P-ZN1-1680	1365	12	130	0	No
P-ZN1-1795	10	6	130	0	No
P-ZN1-1796	10	6	130	0	No
P-ZN1-1801	943	16	130		No
P-ZN1-1804	10	6	130	0	No
P-ZN1-1805	10	6	130	0	No
P-ZN1-4000	58	16	125	0	No
P-ZN1-4001	1019	16	125	0	No
P-ZN1-4002	911	16	130	0	No
P-ZN1-4004	4647	16	130	0	No
P-ZN1-4006	338	4	100		No
P-ZN1-4009	422	8	130	0	No
P-ZN1-4011	142	8	130	0	No
P-ZN1-4012	711	8	130	0	No
P-ZN1-4013	417	12	125	0	No
P-ZN1-4014	1340	12	125	0	No
P-ZN1-4016	2209	12	120	0	No
P-ZN1-4018	229	8	130	0	No
P-ZN1-4020	680	12	125	0	No
P-ZN1-4021	1065	4	125	0	No
P-ZN1-4022	806	8	100	0	No
P-ZN4-0001	274	8	130	0	No
P-ZN4-0002	797	8	130	0	No
P-ZN4-0003	181	8	130	0	No
P-ZN4-0004	857	8	130	0	No
P-ZN4-0005	300	8	130	0	No
P-ZN4-0006	441	6	125	0	No
P-ZN4-0007	690	8	130	0	No
P-ZN4-0008	97	6	130	0	No
P-ZN4-0009	92	8	130	0	No
P1029	483	8	130	0	No
P1031	374	8	130	0	No
P1033	652	12	130	0	No
P1035	290	12	130	0	No
P1037	550	12	130	0	No
P1043	1479	6	110	0	No
P1059	1830	16	120	0	No
P1065	401	10	125		No
P1071	30	12	130	0	No
P1071-2	902	12	130	0	No
P1073	1336	16	120	0	No
P1075	352	8	110		No
P1077	340	12	100	0	No
P1079	560	12	100	0	No
P1083	1148	8	110	0	No
P1085	136	8	130	0	No
P1087-1	498	8	110	0	No
P1089-2	138	4	130	0	No
PN1-1328-3	521	12	110	0	No

Appendix F. Existing System Pressures at Peak-Hour Demand

F. Existing System Pressures at Peak-Hour Demand

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-CR-0001	Crown Ridge	4436	42.8	95
J-CR-0002	Crown Ridge	4417	21.0	103
J-CR-0003	Crown Ridge	4422	11.2	101
J-CR-0004	Crown Ridge	4444	10.0	92
J-CR-0005	Crown Ridge	4435	10.3	95
J-CR-0006	Crown Ridge	4439	4.5	94
J-CR-0007	Crown Ridge	4415	0.0	104
J-CR-0008	Crown Ridge	4396	18.3	113
J-ESI-0001	ESI	4369	0.0	113
J-ESI-0002	ESI	4388	94.5	104
J-ESI-0003	ESI	4354	0.0	119
J-FHH-0001	Foothill_Homedale	4289	7.7	69
J-FHH-0002	Foothill_Homedale	4270	18.0	77
J-FHH-0003	Foothill_Homedale	4285	43.1	71
J-FHH-0004	Foothill_Homedale	4232	20.6	94
J-FHH-0005	Foothill_Homedale	4252	18.7	85
J-FHH-0006	Foothill_Homedale	4296	12.0	66
J-FHH-0007	Foothill_Homedale	4266	22.1	79
J-FHH-0008	Foothill_Homedale	4257	5.3	83
J-FHH-0009	Foothill_Homedale	4310	11.7	60
J-FHH-0010	Foothill_Homedale	4307	0.0	61
J-FHH-0011	Foothill_Homedale	4279	4.0	73
J-FHH-0012	Foothill_Homedale	4256	0.0	83
J-FHH-0013	Foothill_Homedale	4306	0.0	62
J-FHH-0014	Foothill_Homedale	4236	10.5	92
J-FHH-0015	Foothill_Homedale	4249	51.8	86
J-FHH-0016	Foothill_Homedale	4248	2.1	87
J-FHH-0017	Foothill_Homedale	4300	0.0	65
J-FHH-0018	Foothill_Homedale	4301	7.2	64
J-HC-0001	Havencrest	4417	30.8	96
J-HC-0002	Havencrest	4396	10.9	105
J-KL-0001	Katie Lane	4232	3.2	84
J-KL-0002	Katie Lane	4232	5.3	84
J-KL-0003	Katie Lane	4233	6.5	84
J-KL-0004	Katie Lane	4234	18.5	83
J-KL-0005	Katie Lane	4212	0.0	93
J-KL-0006	Katie Lane	4202	41.6	97
J-SL-0063	Lindley	4138	0.4	106
J-SL-0064	Lindley	4147	27.1	101
J-SL-0065	Lindley	4124	0.0	112
J-SL-0066	Lindley	4184	97.2	85
J-SL-0067	Lindley	4216	16.2	71
J-SL-0068	Lindley	4235	12.9	63
J-SL-0069	Lindley	4232	16.7	64
J-SL-0070	Lindley	4221	0.0	71
J-SL-0071	Lindley	4214	0.0	73
J-SL-0072	Lindley	4260	0.0	52
J-SL-0073	Lindley	4239	38.3	61
J-SL-0074	Lindley	4213	22.0	72
J-SL-0075	Lindley	4233	1.5	64
J-SL-0076	Lindley	4188	2.8	84
J-SL-0077	Lindley	4185	13.0	85
J-SL-0078	Lindley	4154	16.7	98
J-SL-0079	Lindley	4148	9.5	101
J-SL-0080	Lindley	4105	3.1	120
J-SL-0081	Lindley	4108	13.4	119
J-SL-0082	Lindley	4204	24.5	77
J-SL-0083	Lindley	4151	6.5	100
J-SL-0084	Lindley	4146	0.0	102
J-SL-0085	Lindley	4134	0.0	107
J-SL-0086	Lindley	4217	32.8	71
J-SL-0087	Lindley	4195	14.0	81
J-SL-0088	Lindley	4098	14.4	122
J-SL-0089	Lindley	4284	2.8	42
J-SL-0090	Lindley	4236	3.2	63
J-SL-0091	Lindley	4180	11.5	87

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-SL-0092	Lindley	4210	12.6	74
J-SL-0093	Lindley	4173	0.0	90
J-SL-0094	Lindley	4149	8.0	100
J-SL-0095	Lindley	4188	3.5	84
J-SL-0096	Lindley	4272	0.9	48
J-SL-0097	Lindley	4203	8.6	77
J-SL-0098	Lindley	4227	3.3	66
J-SL-0099	Lindley	4146	4.4	102
J-SL-0100	Lindley	4138	0.0	106
J-SL-0101	Lindley	4130	0.0	109
J-SL-0102	Lindley	4224	5.7	68
J-SL-0103	Lindley	4231	2.4	65
J-SL-0104	Lindley	4218	1.5	70
J-SL-0105	Lindley	4209	2.7	74
J-SL-0106	Lindley	4203	0.0	78
J-SL-0107	Lindley	4188	6.0	84
J-SL-0108	Lindley	4166	0.0	93
J-PAT-0001	Patterson	4232	6.0	115
J-PAT-0002	Patterson	4281	11.3	91
J-PAT-0003	Patterson	4321	1.4	77
J-PAT-0004	Patterson	4332	36.2	71
J-PAT-0005	Patterson	4311	10.0	79
J-PAT-0006	Patterson	4349	30.8	64
J-PAT-0007	Patterson	4332	18.8	70
J-PAT-0008	Patterson	4372	8.2	59
J-PAT-0009	Patterson	4368	0.0	62
J-PAT-0010	Patterson	4326	0.0	79
J-PAT-0011	Patterson	4376	16.8	57
J-PAT-0012	Patterson	4274	12.9	97
J-PAT-0013	Patterson	4315	1.7	77
J-PAT-0014	Patterson	4435	27.8	25
J-PAT-0015	Patterson	4431	3.6	26
J-PAT-0016	Patterson	4313	13.1	78
J-PAT-0017	Patterson	4357	14.6	80
J-PAT-0018	Patterson	4396	5.6	49
J-PAT-0019	Patterson	4393	3.2	49
J-PAT-0020	Patterson	4255	0.0	102
J-PAT-0021	Patterson	4437	29.6	24
J-PAT-0022	Patterson	4298	2.1	86
J-PAT-0023	Patterson	4187	3.5	145

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PAT-0024	Patterson	4247	0.0	108
J-PAT-0025	Patterson	4246	0.4	109
J-PAT-0026	Patterson	4288	0.0	91
J-PAT-0027	Patterson	4314	25.7	79
J-PAT-0028	Patterson	4367	4.7	60
J-PAT-0029	Patterson	4344	1.0	70
J-PAT-0030	Patterson	4350	0.0	67
J-PAT-0031	Patterson	4391	0.0	48
J-PAT-0032	Patterson	4394	0.5	46
J-PAT-0033	Patterson	4470	45.7	14
J-PAT-0034	Patterson	4463	0.0	17
J-PAT-0035	Patterson	4346	16.3	70
J-PAT-0036	Patterson	4321	0.0	81
J-PAT-0037	Patterson	4378	0.0	58
J-PAT-0038	Patterson	4211	4.5	141
J-PAT-0039	Patterson	4197	0.0	143
J-PAT-0040	Patterson	4244	0.0	121
J-PAT-0041	Patterson	4227	18.9	139
J-PAT-0042	Patterson	4306	5.0	82
J-PAT-0043	Patterson	4310	2.3	82
J-PAT-0044	Patterson	4426	0.0	11
J-PAT-0045	Patterson	4356	9.1	60
J-PAT-0046	Patterson	4394	5.2	49
J-PAT-0047	Patterson	4426	0.0	29
J-PAT-0048	Patterson	4343	16.1	66
J-PAT-0049	Patterson	4223	16.0	139
J-PAT-0050	Patterson	4236	12.4	133
J-PAT-0051	Patterson	4342	12.8	73
J-PAT-0052	Patterson	4334	7.1	76
J-PAT-0053	Patterson	4361	6.5	64
J-PAT-0054	Patterson	4322	10.0	81
J-PAT-0055	Patterson	4373	18.1	58
J-PAT-0056	Patterson	4326	24.6	75
J-PAT-0057	Patterson	4318	20.4	79
J-PAT-0058	Patterson	4348	15.0	66
J-PAT-0059	Patterson	4377	3.2	53
J-PAT-0060	Patterson	4357	8.1	62
J-PAT-0061	Patterson	4349	21.5	65
J-PAT-0062	Patterson	4373	0.0	55
J-PAT-0063	Patterson	4396	1.5	45

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PAT-0064	Patterson	4413	7.2	38
J-PAT-0065	Patterson	4383	37.0	50
J-PAT-0066	Patterson	4420	16.0	34
J-PAT-0067	Patterson	4389	12.0	67
J-PAT-0068	Patterson	4386	7.0	49
J-PAT-0069	Patterson	4322	14.7	74
J-PAT-0070	Patterson	4381	15.9	51
J-PAT-0071	Patterson	4247	0.0	108
J-PAT-0072	Patterson	4256	0.0	104
J-PAT-0073	Patterson	4238	0.2	112
J-PAT-0074	Patterson	4333	36.0	69
J-PAT-0075	Patterson	4243	0.0	108
J-PAT-0076	Patterson	4286	0.0	92
J-PAT-0077	Patterson	4445	0.0	2
J-PAT-0078	Patterson	4212	0.0	146
J-PAT-0079	Patterson	4314	6.0	84
J-PAT-0080	Patterson	4288	8.8	91
J-PAT-0081	Patterson	4306	2.0	84
J-PAT-0082	Patterson	4280	0.0	91
J2572	Prescott	4202	5.1	74
J-PRE-0001	Prescott	4269	3.7	27
J-PRE-0002	Prescott	4252	4.2	35
J-PRE-0003	Prescott	4250	2.1	35
J-PRE-0004	Prescott	4243	5.9	39
J-PRE-0005	Prescott	4277	3.3	25
J-PRE-0006	Prescott	4306	3.5	12
J-PRE-0007	Prescott	4303	4.1	15
J-PRE-0008	Prescott	4290	2.6	23
J-PRE-0009	Prescott	4282	0.0	26
J-PRE-0010	Prescott	4291	3.4	21
J-PRE-0011	Prescott	4213	3.1	68
J-PRE-0012	Prescott	4206	2.7	45
J-PRE-0013	Prescott	4218	1.2	72
J-PRE-0014	Prescott	4224	1.5	70
J-PRE-0015	Prescott	4247	21.3	53
J-PRE-0016	Prescott	4258	1.8	50
J-PRE-0017	Prescott	4284	3.0	24
J-PRE-0018	Prescott	4290	12.6	36
J-PRE-0019	Prescott	4254	3.8	52
J-PRE-0020	Prescott	4300	0.2	17

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0021	Prescott	4265	5.7	33
J-PRE-0022	Prescott	4241	4.2	30
J-PRE-0023	Prescott	4255	7.2	55
J-PRE-0024	Prescott	4230	15.3	64
J-PRE-0025	Prescott	4248	3.0	57
J-PRE-0026	Prescott	4234	4.0	60
J-PRE-0027	Prescott	4261	33.8	48
J-PRE-0028	Prescott	4240	5.9	34
J-PRE-0029	Prescott	4237	7.6	32
J-PRE-0030	Prescott	4244	9.9	58
J-PRE-0031	Prescott	4223	0.0	65
J-PRE-0032	Prescott	4263	3.4	48
J-PRE-0033	Prescott	4202	1.5	48
J-PRE-0034	Prescott	4243	7.2	33
J-PRE-0035	Prescott	4236	7.3	28
J-PRE-0036	Prescott	4306	2.3	31
J-PRE-0037	Prescott	4242	4.2	57
J-PRE-0038	Prescott	4184	0.0	82
J-PRE-0039	Prescott	4224	10.9	70
J-PRE-0040	Prescott	4232	33.0	66
J-PRE-0041	Prescott	4250	3.5	58
J-PRE-0042	Prescott	4258	0.0	55
J-PRE-0043	Prescott	4263	1.5	53
J-PRE-0044	Prescott	4289	3.9	43
J-PRE-0045	Prescott	4272	1.0	49
J-PRE-0046	Prescott	4256	3.5	56
J-PRE-0047	Prescott	4246	1.1	60
J-PRE-0048	Prescott	4269	9.9	51
J-PRE-0049	Prescott	4271	0.6	51
J-PRE-0050	Prescott	4232	3.1	65
J-PRE-0051	Prescott	4249	6.6	57
J-PRE-0052	Prescott	4259	14.9	49
J-PRE-0053	Prescott	4279	1.6	41
J-PRE-0054	Prescott	4265	4.5	47
J-PRE-0055	Prescott	4229	6.6	62
J-PRE-0056	Prescott	4233	6.4	63
J-PRE-0057	Prescott	4311	1.2	33
J-PRE-0058	Prescott	4313	2.2	32
J-PRE-0059	Prescott	4257	0.6	55
J-PRE-0060	Prescott	4248	6.2	54

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0061	Prescott	4268	7.4	45
J-PRE-0062	Prescott	4218	8.8	39
J-PRE-0063	Prescott	4230	4.4	41
J-PRE-0064	Prescott	4256	10.8	32
J-PRE-0065	Prescott	4246	4.6	58
J-PRE-0066	Prescott	4232	1.9	68
J-PRE-0067	Prescott	4298	1.8	39
J-PRE-0068	Prescott	4299	13.9	38
J-PRE-0069	Prescott	4257	7.3	50
J-PRE-0070	Prescott	4261	5.4	48
J-PRE-0071	Prescott	4186	12.9	81
J-PRE-0072	Prescott	4194	4.0	77
J-PRE-0073	Prescott	4196	10.5	76
J-PRE-0074	Prescott	4280	0.9	42
J-PRE-0075	Prescott	4269	3.9	51
J-PRE-0076	Prescott	4212	14.3	42
J-PRE-0077	Prescott	4269	2.2	50
J-PRE-0078	Prescott	4253	6.3	57
J-PRE-0079	Prescott	4254	13.5	57
J-PRE-0080	Prescott	4206	15.6	77
J-PRE-0081	Prescott	4202	0.3	79
J-PRE-0082	Prescott	4211	7.6	72
J-PRE-0083	Prescott	4243	3.3	30
J-PRE-0084	Prescott	4250	6.9	58
J-PRE-0085	Prescott	4242	13.6	29
J-PRE-0086	Prescott	4210	6.2	39
J-PRE-0087	Prescott	4300	1.3	17
J-PRE-0088	Prescott	4256	3.5	37
J-PRE-0089	Prescott	4220	3.3	79
J-PRV-2-OGD-0001	PRV_Ogden	4266	2.0	81
J-PRV-2-OGD-0002	PRV_Ogden	4281	77.5	74
J-PRV-2-OGD-0003	PRV_Ogden	4255	4.5	85
J-PRV-2-OGD-0004	PRV_Ogden	4266	4.5	81
J-PRV-2-OGD-0005	PRV_Ogden	4242	5.9	91
J-PRV-2-OGD-0006	PRV_Ogden	4236	11.9	94
J-PRV-2-OGD-0007	PRV_Ogden	4250	3.8	87
J-PRV-2-OGD-0008	PRV_Ogden	4282	2.2	74
J-PRV-MOY-0001	PRV-13	4276	1.6	79
J-PRV-MOY-0002	PRV-13	4298	11.7	61
J-PRV-MOY-0003	PRV-13	4269	16.7	61
J-PRV-MOY-0004	PRV-13	4281	19.3	61
J-PRV-MOY-0005	PRV-13	4268	25.5	74
J-PRV-MOY-0006	PRV-13	4295	8.8	63
J-PRV-MOY-0007	PRV-13	4255	19.5	73
J-PRV-MOY-0008	PRV-13	4248	8.3	85
J-PRV-MOY-0009	PRV-13	4269	2.3	82
J-PRV-MOY-0010	PRV-13	4274	3.4	77
J-PRV-MOY-0011	PRV-13	4292	8.1	66
J-PRV-MOY-0012	PRV-13	4293	1.4	65
J-PRV-MOY-0013	PRV-13	4275	9.3	75
J-PRV-MOY-0014	PRV-13	4239	13.8	90
J-PRV-MOY-0015	PRV-13	4278	0.0	78
J-PRV-2-ELD-0001	PRV-2	4229	6.7	55
J-PRV-2-ELD-0002	PRV-2	4248	10.7	46
J-PRV-2-ELD-0003	PRV-2	4226	1.5	56
J-PRV-2-ELD-0004	PRV-2	4252	19.6	45
J-PRV-2-ELD-0005	PRV-2	4218	10.6	59
J-PRV-2-ELD-0006	PRV-2	4232	17.5	59
J-PRV-2-ELD-0007	PRV-2	4228	9.8	55
J-PRV-2-ELD-0008	PRV-2	4218	13.4	59
J-PRV-2-ELD-0009	PRV-2	4231	16.8	54
J-PRV-2-ELD-0010	PRV-2	4219	17.4	60
J-PRV-2-ELD-0011	PRV-2	4202	10.1	72

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-2-ELD-0012	PRV-2	4219	27.8	64
J-PRV-2-ELD-0013	PRV-2	4208	27.8	64
J-PRV-2-ELD-0014	PRV-2	4192	6.3	72
J-PRV-2-ELD-0015	PRV-2	4200	1.3	69
J-PRV-2-ELD-0016	PRV-2	4224	0.9	57
J-PRV-2-ELD-0017	PRV-2	4203	11.9	68
J-PRV-2-ELD-0018	PRV-2	4240	41.8	55
J-PRV-2-ELD-0019	PRV-2	4215	2.5	61
J-PRV-2-ELD-0020	PRV-2	4253	20.6	50
J-PRV-2-ELD-0021	PRV-2	4238	25.7	51
J-PRV-2-ELD-0022	PRV-2	4250	12.2	46
J-PRE-1254	PRV-2-HWY	4195	0.0	69
J-PRV-HWY-0001	PRV-2-HWY	4234	37.6	53
J-PRV-HWY-0002	PRV-2-HWY	4218	3.9	59
J-PRV-HWY-0003	PRV-2-HWY	4216	3.0	60
J-PRV-HWY-0004	PRV-2-HWY	4243	5.2	49
J-PRV-HWY-0005	PRV-2-HWY	4238	4.1	51
J-PRV-HWY-0006	PRV-2-HWY	4222	2.4	58
J-PRV-HWY-0007	PRV-2-HWY	4191	13.6	71
J-PRV-HWY-0008	PRV-2-HWY	4233	0.6	53
J-PRV-HWY-0009	PRV-2-HWY	4206	2.3	65
J-PRV-HWY-0011	PRV-2-HWY	4184	15.0	74
J-PRV-HWY-0012	PRV-2-HWY	4234	0.0	53
J-PRV-HWY-0013	PRV-2-HWY	4217	0.4	60
J-PRV-HWY-0014	PRV-2-HWY	4221	5.0	58
J-PRV-HWY-0015	PRV-2-HWY	4216	11.5	60
J-PRV-HWY-0016	PRV-2-HWY	4238	3.8	51

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-HWY-0017	PRV-2-HWY	4241	23.1	50
J-PRV-HWY-0018	PRV-2-HWY	4216	0.0	60
J-PRV-HWY-0019	PRV-2-HWY	4222	2.0	58
J-PRV-HWY-0020	PRV-2-HWY	4233	0.5	53
J-PRV-HWY-0021	PRV-2-HWY	4238	2.8	51
J-PRV-HWY-0022	PRV-2-HWY	4189	0.0	72
J-PRV-3-UMO-0001	PRV-3	4285	17.7	90
J-PRV-3-UMO-0002	PRV-3	4317	20.0	78
J-PRV-3-UMO-0003	PRV-3	4300	7.4	85
J-PRV-3-UMO-0004	PRV-3	4324	62.9	74
J-PRV-3-UMO-0005	PRV-3	4309	0.0	81
J-PRV-3-UMO-0006	PRV-3	4337	5.7	69
J-PRV-3-UMO-0007	PRV-3	4321	0.0	76
J-PRV-3-UMO-0008	PRV-3	4325	0.0	74
J-PRV-3-UMO-0009	PRV-3	4343	2.7	67
J-PRV-OFR-0001	PRV-6	4264	8.9	57
J-PRV-OFR-0002	PRV-6	4248	9.5	63
J-PRV-OFR-0003	PRV-6	4225	16.3	73
J-PRV-OFR-0004	PRV-6	4185	3.9	91
J-PRV-OFR-0005	PRV-6	4210	17.8	80
J-PRV-OFR-0006	PRV-6	4198	17.8	85
J-PRV-OFR-0007	PRV-6	4231	9.0	71
J-PRV-OFR-0008	PRV-6	4254	6.4	61
J-SH-0001	Sierra Heights	4232	6.5	71
J-SH-0002	Sierra Heights	4212	0.0	80
J-SH-0003	Sierra Heights	4225	14.2	74
J-SH-0004	Sierra Heights	4250	23.3	63
J-SH-0005	Sierra Heights	4252	25.8	62
J-SH-0006	Sierra Heights	4242	26.0	67

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-SH-0007	Sierra Heights	4262	14.9	58
J-SH-0008	Sierra Heights	4274	19.5	53
J-SH-0100	Sierra Heights	4282	1.0	49
J-SH-0105	Sierra Heights	4282	1.9	49
J-SH-0110	Sierra Heights	4268	14.1	55
J-SH-115	Sierra Heights	4248	0.0	64
J-SH-120	Sierra Heights	4271	0.0	54
J-SH-125	Sierra Heights	4246	1.4	65
J-SL-0001	Stewart_Lenox	4225	0.2	70
J-SL-0002	Stewart_Lenox	4186	0.0	99
J-SL-0003	Stewart_Lenox	4214	4.4	75
J-SL-0004	Stewart_Lenox	4190	0.0	86
J-SL-0005	Stewart_Lenox	4246	3.2	61
J-SL-0006	Stewart_Lenox	4227	0.6	69
J-SL-0007	Stewart_Lenox	4220	5.2	72
J-SL-0008	Stewart_Lenox	4212	3.7	76
J-SL-0009	Stewart_Lenox	4247	0.6	61
J-SL-0010	Stewart_Lenox	4199	5.0	87
J-SL-0011	Stewart_Lenox	4200	8.1	81
J-SL-0012	Stewart_Lenox	4227	13.6	70
J-SL-0013	Stewart_Lenox	4220	2.5	73
J-SL-0014	Stewart_Lenox	4178	29.1	91
J-SL-0015	Stewart_Lenox	4188	0.0	86
J-SL-0016	Stewart_Lenox	4178	0.2	91
J-SL-0017	Stewart_Lenox	4183	0.7	88
J-SL-0018	Stewart_Lenox	4228	9.2	69
J-SL-0019	Stewart_Lenox	4242	2.9	63
J-SL-0020	Stewart_Lenox	4248	8.5	60
J-SL-0021	Stewart_Lenox	4236	3.7	65
J-SL-0022	Stewart_Lenox	4189	8.5	97
J-SL-0023	Stewart_Lenox	4198	7.6	93
J-SL-0024	Stewart_Lenox	4192	4.3	84
J-SL-0025	Stewart_Lenox	4187	12.9	96
J-SL-0026	Stewart_Lenox	4188	0.0	96
J-SL-0027	Stewart_Lenox	4226	3.8	76
J-SL-0028	Stewart_Lenox	4238	1.3	70
J-SL-0029	Stewart_Lenox	4232	4.8	67
J-SL-0030	Stewart_Lenox	4234	1.3	66
J-SL-0031	Stewart_Lenox	4276	8.5	46
J-SL-0032	Stewart_Lenox	4198	5.0	82

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-SL-0033	Stewart_Lenox	4247	0.0	61
J-SL-0034	Stewart_Lenox	4187	0.0	87
J-SL-0035	Stewart_Lenox	4182	3.1	89
J-SL-0036	Stewart_Lenox	4210	3.0	77
J-SL-0037	Stewart_Lenox	4181	5.1	89
J-SL-0038	Stewart_Lenox	4185	6.1	87
J-SL-0039	Stewart_Lenox	4224	3.8	71
J-SL-0040	Stewart_Lenox	4189	3.6	86
J-SL-0041	Stewart_Lenox	4249	0.0	60
J-SL-0042	Stewart_Lenox	4242	3.1	63
J-SL-0043	Stewart_Lenox	4247	3.2	61
J-SL-0044	Stewart_Lenox	4226	6.7	70
J-SL-0045	Stewart_Lenox	4228	6.6	69
J-SL-0046	Stewart_Lenox	4241	0.0	63
J-SL-0047	Stewart_Lenox	4210	0.0	76
J-SL-0048	Stewart_Lenox	4209	1.5	77
J-SL-0049	Stewart_Lenox	4235	4.5	66
J-SL-0050	Stewart_Lenox	4219	4.9	73
J-SL-0051	Stewart_Lenox	4227	1.3	69
J-SL-0052	Stewart_Lenox	4188	0.0	99
J-SL-0053	Stewart_Lenox	4211	0.1	76
J-SL-0111	Stewart_Lenox	4215	0.9	80
J-SL-0112	Stewart_Lenox	4259	6.1	61
J-PRV-SL-0001	Stewart_Lenox_PRV	4118	10.0	82
J-PRV-SL-0002	Stewart_Lenox_PRV	4215	0.0	40
J-PRV-SL-0003	Stewart_Lenox_PRV	4212	2.3	42
J-PRV-SL-0004	Stewart_Lenox_PRV	4134	7.5	75
J-PRV-SL-0005	Stewart_Lenox_PRV	4225	2.3	36
J-PRV-SL-0006	Stewart_Lenox_PRV	4216	1.0	40
J-PRV-SL-0007	Stewart_Lenox_PRV	4230	0.5	34
J-PRV-SL-0008	Stewart_Lenox_PRV	4204	1.1	45
J-PRV-SL-0009	Stewart_Lenox_PRV	4141	2.4	72
J-PRV-SL-0010	Stewart_Lenox_PRV	4126	3.1	79
J-PRV-SL-0011	Stewart_Lenox_PRV	4145	4.1	70

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-SL-0012	Stewart_Lenox_PRV	4157	8.2	65
J-PRV-SL-0013	Stewart_Lenox_PRV	4114	67.3	84
J-PRV-SL-0014	Stewart_Lenox_PRV	4117	0.2	83
J-PRV-SL-0015	Stewart_Lenox_PRV	4114	0.0	84
J-PRV-SL-0016	Stewart_Lenox_PRV	4213	0.4	41
J-PRV-SL-0017	Stewart_Lenox_PRV	4214	0.0	41
J-TW-0001	Tanglewood	4549	0.0	191
J-TW-0002	Tanglewood	4183	0.0	350
J-TW-0003	Tanglewood	4820	20.5	74
J-TW-0004	Tanglewood	4814	43.8	76
J-TW-0005	Tanglewood	4772	4.4	94
J-TW-0006	Tanglewood	4807	21.2	79
J-TW-0007	Tanglewood	4822	4.2	73
J-TW-0008	Tanglewood	4179	11.7	351
J-TW-0019	Tanglewood	4777	2.2	92
J-UL-0001	Upper Lynnewood	4296	4.9	62
J-UL-0002	Upper Lynnewood	4295	14.1	62
J-UL-0003	Upper Lynnewood	4306	13.3	58
J-UL-0004	Upper Lynnewood	4269	0.6	74
J-UL-0005	Upper Lynnewood	4259	6.5	78
J-UL-0006	Upper Lynnewood	4230	48.7	91
J-UL-0007	Upper Lynnewood	4228	8.5	91
J-UL-0008	Upper Lynnewood	4230	10.7	91
J-UL-0009	Upper Lynnewood	4270	4.9	73
J-UL-0010	Upper Lynnewood	4262	3.1	77
J-UL-0011	Upper Lynnewood	4283	3.8	68
J-UL-0012	Upper Lynnewood	4212	6.0	99
J-UL-0013	Upper Lynnewood	4289	0.0	65
J2578	Upper Moyina	4372	0.0	76
J-UM-0001	Upper Moyina	4417	9.1	55
J-UM-0002	Upper Moyina	4353	13.1	83
J-UM-0003	Upper Moyina	4364	13.9	56
J-UM-0004	Upper Moyina	4429	15.9	49
J-UM-0005	Upper Moyina	4417	7.5	54
J-UM-0006	Upper Moyina	4369	16.7	76
J-UM-0007	Upper Moyina	4434	5.2	55
J-UM-0008	Upper Moyina	4362	25.4	81
J-UM-0009	Upper Moyina	4360	31.5	81
J-UM-0010	Upper Moyina	4384	31.8	71
J-UM-0011	Upper Moyina	4485	0.0	34
J-UM-0012	Upper Moyina	4375	15.2	73
J-UM-0013	Upper Moyina	4401	31.0	62
J-UM-0014	Upper Moyina	4400	30.5	65
J-UM-0015	Upper Moyina	4446	25.2	45
J-UM-0016	Upper Moyina	4353	6.9	83
J-UM-0017	Upper Moyina	4419	15.7	54
J-UM-0018	Upper Moyina	4377	10.3	72
J-UM-0019	Upper Moyina	4437	3.9	53
J-UM-0020	Upper Moyina	4458	0.0	46
J-UM-0021	Upper Moyina	4336	19.0	91
J-UM-0022	Upper Moyina	4356	1.3	83
J-HOS-0001	URH-HOSP-HLVL	4292	0.0	90
J-HOS-0002	URH-HOSP-HLVL	4364	0.0	58
J-HOS-0003	URH-HOSP-HLVL	4213	0.0	119
J-HOS-0004	URH-HOSP-HLVL	4373	11.5	50
J-HOS-0005	URH-HOSP-HLVL	4409	76.3	37
J-HOS-0006	URH-HOSP-HLVL	4281	13.6	92
J-HOS-0007	URH-HOSP-HLVL	4380	2.2	50
J-HOS-0008	URH-HOSP-HLVL	4279	5.6	91
J-HOS-0009	URH-HOSP-HLVL	4319	0.0	73
J-HOS-0010	URH-HOSP-HLVL	4410	30.0	38
J-HOS-0011	URH-HOSP-HLVL	4224	5.3	118
J-HOS-0012	URH-HOSP-HLVL	4338	3.1	68
J-HOS-0013	URH-HOSP-HLVL	4307	15.9	82
J-HOS-0014	URH-HOSP-HLVL	4356	19.4	60
J-HOS-0015	URH-HOSP-HLVL	4451	0.0	19
J-HOS-0016	URH-HOSP-HLVL	4322	7.8	74
J-HOS-0017	URH-HOSP-HLVL	4324	14.8	71
J-HOS-0018	URH-HOSP-HLVL	4269	1.7	95
J-HOS-0019	URH-HOSP-HLVL	4320	4.4	77
J-HOS-0020	URH-HOSP-HLVL	4228	2.5	113
J-HOS-0021	URH-HOSP-HLVL	4261	6.9	99
J-HOS-0022	URH-HOSP-HLVL	4253	6.9	102
J-HOS-0023	URH-HOSP-HLVL	4267	7.2	96
J-HOS-0024	URH-HOSP-HLVL	4300	18.8	81
J-HOS-0025	URH-HOSP-HLVL	4322	9.9	77
J-HOS-0026	URH-HOSP-HLVL	4271	5.5	94

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-HOS-0027	URH-HOSP-HLVL	4313	12.2	76
J-HOS-0028	URH-HOSP-HLVL	4317	31.0	74
J-HOS-0029	URH-HOSP-HLVL	4344	14.5	62
J-HOS-0030	URH-HOSP-HLVL	4357	1.1	57
J-HOS-0031	URH-HOSP-HLVL	4273	34.6	95
J-HOS-0032	URH-HOSP-HLVL	4269	5.0	97
J-HOS-0033	URH-HOSP-HLVL	4320	0.0	75
J-HOS-0034	URH-HOSP-HLVL	4378	0.3	51
J-HOS-0035	URH-HOSP-HLVL	4367	10.4	55
J-HOS-0036	URH-HOSP-HLVL	4383	4.4	48
J-HOS-0037	URH-HOSP-HLVL	4420	29.6	34
J-HOS-0038	URH-HOSP-HLVL	4345	0.0	65
J-HOS-0039	URH-HOSP-HLVL	4330	0.0	72
J-HOS-0040	URH-HOSP-HLVL	4462	0.0	15
J-HOS-0041	URH-HOSP-HLVL	4422	0.0	34
J-HOS-0042	URH-HOSP-HLVL	4431	0.0	30
J-HOS-0043	URH-HOSP-HLVL	4415	2.2	35
J-HOS-0044	URH-HOSP-HLVL	4431	8.3	28
J-HOS-0045	URH-HOSP-HLVL	4414	16.8	35
J-HOS-0046	URH-HOSP-HLVL	4287	21.1	89
J-HOS-0047	URH-HOSP-HLVL	4311	0.0	81
J-HOS-0048	URH-HOSP-HLVL	4268	0.3	100
J-HOS-0049	URH-HOSP-HLVL	4254	0.0	106
J-HOS-0050	URH-HOSP-HLVL	4333	0.0	73
J-HOS-0051	URH-HOSP-HLVL	4252	0.0	107
J-HOS-0052	URH-HOSP-HLVL	4322	21.6	79
J-HOS-0053	URH-HOSP-HLVL	4369	63.5	58
J-HOS-0054	URH-HOSP-HLVL	4388	37.6	48
J-HOS-0055	URH-HOSP-HLVL	4337	31.4	71
J-HOS-0056	URH-HOSP-HLVL	4225	7.1	119
J-HOS-0057	URH-HOSP-HLVL	4386	4.4	44
J-HOS-0058	URH-HOSP-HLVL	4369	4.7	51
J-HOS-0059	URH-HOSP-HLVL	4312	11.7	76
J-HOS-0060	URH-HOSP-HLVL	4251	6.1	103
J-HOS-0061	URH-HOSP-HLVL	4253	13.4	102
J-HOS-0062	URH-HOSP-HLVL	4274	91.3	95
J-HOS-0063	URH-HOSP-HLVL	4314	9.4	78
J-HOS-0064	URH-HOSP-HLVL	4302	0.4	83
J-HOS-0065	URH-HOSP-HLVL	4344	13.8	62
J-HOS-0066	URH-HOSP-HLVL	4401	9.7	37
J-HOS-0067	URH-HOSP-HLVL	4385	0.0	117
J-HOS-0068	URH-HOSP-HLVL	4253	17.0	102
J-HOS-0069	URH-HOSP-HLVL	4361	9.8	55
J-HOS-0070	URH-HOSP-HLVL	4346	11.1	62
J-HOS-0071	URH-HOSP-HLVL	4286	15.8	88
J-HOS-0072	URH-HOSP-HLVL	4338	0.0	70
J-HOS-0073	URH-HOSP-HLVL	4334	54.2	72
J-HOS-0074	URH-HOSP-HLVL	4334	0.0	72
J-HOS-0075	URH-HOSP-HLVL	4249	10.8	115
J-HOS-0076	URH-HOSP-HLVL	4263	35.2	101
J-HOS-0077	URH-HOSP-HLVL	4303	6.3	83
J-HOS-0078	URH-HOSP-HLVL	4324	14.0	73
J-HOS-0079	URH-HOSP-HLVL	4381	53.5	46
J-HOS-0080	URH-HOSP-HLVL	4283	16.9	89
J-HOS-0081	URH-HOSP-HLVL	4236	58.6	111
J-HOS-0082	URH-HOSP-HLVL	4296	54.2	85
J-HOS-0083	URH-HOSP-HLVL	4274	7.5	93
J-HOS-0084	URH-HOSP-HLVL	4309	11.3	78
J-HOS-0085	URH-HOSP-HLVL	4257	22.2	101
J-HOS-0086	URH-HOSP-HLVL	4276	0.0	96
J-HOS-0087	URH-HOSP-HLVL	4301	0.0	86
J-HOS-0088	URH-HOSP-HLVL	4364	0.0	58
J-HOS-0089	URH-HOSP-HLVL	4292	3.4	90
J-HOS-0090	URH-HOSP-HLVL	4316	0.8	79
J-HOS-0091	URH-HOSP-HLVL	4331	1.1	73
J-HOS-0092	URH-HOSP-HLVL	4284	0.0	93
J-HOS-0093	URH-HOSP-HLVL	4315	6.1	80
J-HOS-0094	URH-HOSP-HLVL	4328	0.0	73
J-HOS-0095	URH-HOSP-HLVL	4454	3.7	18
J-HOS-0096	URH-HOSP-HLVL	4452	0.0	19
J-HOS-0097	URH-HOSP-HLVL	4365	9.6	56
J-HOS-0098	URH-HOSP-HLVL	4352	157.5	60
J-HOS-0099	URH-HOSP-HLVL	4318	25.1	76
J-HOS-0100	URH-HOSP-HLVL	4311	0.3	88
J-HOS-0101	URH-HOSP-HLVL	4372	2.7	50
J-HOS-0102	URH-HOSP-HLVL	4266	5.6	96
J-HOS-0103	URH-HOSP-HLVL	4274	15.2	98
J-HOS-0104	URH-HOSP-HLVL	4227	0.0	117
J-HOS-0105	URH-HOSP-HLVL	4260	12.7	100
J-HOS-0106	URH-HOSP-HLVL	4314	27.6	82

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-HOS-0107	URH-HOSP-HLVL	4268	5.7	101
J-HOS-0108	URH-HOSP-HLVL	4259	1.3	99
J-HOS-0109	URH-HOSP-HLVL	4187	0.0	138
J-WO-0001	West Oregon	4226	2.0	89
J-WO-0002	West Oregon	4209	6.8	97
J-WO-0003	West Oregon	4224	15.0	90
J-WO-0004	West Oregon	4238	25.7	84
J-WO-0005	West Oregon	4223	5.0	91
J-WO-0006	West Oregon	4230	9.4	88
J-WO-0007	West Oregon	4268	3.6	71
J-WO-0008	West Oregon	4219	2.5	92
J-WO-0009	West Oregon	4213	2.7	95
J-WO-0010	West Oregon	4194	5.4	103
J-WO-0011	West Oregon	4242	16.2	82
J-WO-0012	West Oregon	4244	2.9	82
J-WO-0013	West Oregon	4247	3.5	80
HYD1005	Zone-1	4090	0.0	87
HYD1006	Zone-1	4090	0.0	87
HYD1167	Zone-1	4097	0.0	80
HYD1168	Zone-1	4097	11.7	81
HYD148	Zone-1	4122	0.0	66
HYD157	Zone-1	4174	0.0	43
HYD494	Zone-1	4172	9.3	51
HYD595	Zone-1	4428	0.0	29
J2554	Zone-1	4184	7.0	45
J2556	Zone-1	4188	0.9	43
J2558	Zone-1	4220	0.0	29
J2560	Zone-1	4200	18.9	38
J2564	Zone-1	4164	37.7	53
J2566	Zone-1	4174	5.4	50
J2568	Zone-1	4198	2.0	39
J2570	Zone-1	4100	22.0	79
J-ZN1-0001	Zone-1	4197	0.0	32
J-ZN1-0002	Zone-1	4250	2.9	23
J-ZN1-0003	Zone-1	4092	88.0	81
J-ZN1-0004	Zone-1	4092	4.7	66
J-ZN1-0005	Zone-1	4146	3.9	57
J-ZN1-0006	Zone-1	4145	7.0	56
J-ZN1-0007	Zone-1	4144	0.6	57
J-ZN1-0008	Zone-1	4239	0.4	27

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0009	Zone-1	4153	0.3	63
J-ZN1-0010	Zone-1	4148	25.3	65
J-ZN1-0011	Zone-1	4251	0.0	22
J-ZN1-0012	Zone-1	4179	18.4	52
J-ZN1-0013	Zone-1	4194	0.0	40
J-ZN1-0014	Zone-1	4150	2.0	58
J-ZN1-0015	Zone-1	4183	5.5	44
J-ZN1-0016	Zone-1	4175	21.0	54
J-ZN1-0017	Zone-1	4186	15.7	49
J-ZN1-0018	Zone-1	4111	7.7	59
J-ZN1-0019	Zone-1	4114	0.0	58
J-ZN1-0020	Zone-1	4122	5.9	55
J-ZN1-0021	Zone-1	4187	10.8	49
J-ZN1-0022	Zone-1	4122	32.4	56
J-ZN1-0023	Zone-1	4125	148.5	55
J-ZN1-0024	Zone-1	4146	0.0	51
J-ZN1-0025	Zone-1	4147	0.0	50
J-ZN1-0026	Zone-1	4096	10.1	58
J-ZN1-0027	Zone-1	4123	4.2	53
J-ZN1-0028	Zone-1	4138	0.3	46
J-ZN1-0029	Zone-1	4208	19.8	40
J-ZN1-0030	Zone-1	4144	4.1	60
J-ZN1-0031	Zone-1	4145	16.8	54
J-ZN1-0032	Zone-1	4136	10.2	58
J-ZN1-0033	Zone-1	4157	11.4	60
J-ZN1-0034	Zone-1	4108	7.2	64
J-ZN1-0035	Zone-1	4108	10.9	81
J-ZN1-0036	Zone-1	4092	1.4	65
J-ZN1-0037	Zone-1	4104	7.4	73
J-ZN1-0038	Zone-1	4104	2.0	74
J-ZN1-0039	Zone-1	4226	37.1	33
J-ZN1-0040	Zone-1	4100	10.3	75
J-ZN1-0041	Zone-1	4100	11.4	75
J-ZN1-0042	Zone-1	4104	3.9	74
J-ZN1-0043	Zone-1	4100	17.7	75
J-ZN1-0044	Zone-1	4098	6.3	78
J-ZN1-0045	Zone-1	4110	17.7	71
J-ZN1-0046	Zone-1	4144	13.0	60
J-ZN1-0047	Zone-1	4168	0.1	55
J-ZN1-0048	Zone-1	4140	12.4	61

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0049	Zone-1	4138	18.2	62
J-ZN1-0050	Zone-1	4138	29.9	62
J-ZN1-0051	Zone-1	4142	11.5	62
J-ZN1-0052	Zone-1	4142	7.3	63
J-ZN1-0053	Zone-1	4140	9.7	65
J-ZN1-0054	Zone-1	4145	4.3	61
J-ZN1-0055	Zone-1	4180	16.9	47
J-ZN1-0056	Zone-1	4143	1.2	67
J-ZN1-0057	Zone-1	4178	0.0	50
J-ZN1-0058	Zone-1	4143	9.6	66
J-ZN1-0059	Zone-1	4156	43.6	61
J-ZN1-0060	Zone-1	4270	0.0	18
J-ZN1-0061	Zone-1	4205	5.5	37
J-ZN1-0062	Zone-1	4174	9.3	50
J-ZN1-0063	Zone-1	4114	0.0	81
J-ZN1-0064	Zone-1	4114	0.0	80
J-ZN1-0065	Zone-1	4182	11.7	48
J-ZN1-0066	Zone-1	4096	62.3	80
J-ZN1-0067	Zone-1	4116	39.8	68
J-ZN1-0068	Zone-1	4185	13.1	46
J-ZN1-0069	Zone-1	4154	18.7	60
J-ZN1-0070	Zone-1	4140	10.1	66
J-ZN1-0071	Zone-1	4134	78.1	68
J-ZN1-0072	Zone-1	4148	0.4	64
J-ZN1-0073	Zone-1	4140	9.4	66
J-ZN1-0074	Zone-1	4152	30.7	63
J-ZN1-0075	Zone-1	4152	5.8	61
J-ZN1-0076	Zone-1	4142	9.3	65
J-ZN1-0077	Zone-1	4150	13.9	64
J-ZN1-0078	Zone-1	4151	6.1	61
J-ZN1-0079	Zone-1	4137	3.8	67
J-ZN1-0080	Zone-1	4138	10.6	66
J-ZN1-0081	Zone-1	4135	11.4	68
J-ZN1-0082	Zone-1	4141	9.7	65
J-ZN1-0083	Zone-1	4169	40.1	56
J-ZN1-0084	Zone-1	4137	6.0	67
J-ZN1-0085	Zone-1	4092	0.0	86
J-ZN1-0086	Zone-1	4124	0.0	72
J-ZN1-0087	Zone-1	4112	0.4	77
J-ZN1-0088	Zone-1	4134	2.1	71
J-ZN1-0089	Zone-1	4096	4.8	79
J-ZN1-0090	Zone-1	4186	12.6	48
J-ZN1-0091	Zone-1	4142	0.1	47
J-ZN1-0092	Zone-1	4114	40.4	67
J-ZN1-0093	Zone-1	4176	9.4	53
J-ZN1-0094	Zone-1	4148	2.1	56
J-ZN1-0095	Zone-1	4148	0.0	56
J-ZN1-0096	Zone-1	4175	0.0	51
J-ZN1-0097	Zone-1	4173	4.2	51
J-ZN1-0098	Zone-1	4136	2.5	34
J-ZN1-0099	Zone-1	4139	8.7	70
J-ZN1-0100	Zone-1	4254	2.3	21
J-ZN1-0101	Zone-1	4257	0.0	20
J-ZN1-0102	Zone-1	4174	2.7	51
J-ZN1-0103	Zone-1	4155	6.3	61
J-ZN1-0104	Zone-1	4144	13.4	64
J-ZN1-0105	Zone-1	4121	2.7	68
J-ZN1-0106	Zone-1	4152	20.6	60
J-ZN1-0107	Zone-1	4159	35.2	58
J-ZN1-0108	Zone-1	4122	0.8	77
J-ZN1-0109	Zone-1	4217	1.3	33
J-ZN1-0110	Zone-1	4192	13.6	43
J-ZN1-0111	Zone-1	4184	8.0	46
J-ZN1-0112	Zone-1	4182	9.0	47
J-ZN1-0113	Zone-1	4180	6.7	48
J-ZN1-0114	Zone-1	4193	2.0	42
J-ZN1-0115	Zone-1	4192	5.7	43
J-ZN1-0116	Zone-1	4166	4.3	52
J-ZN1-0117	Zone-1	4168	5.7	51
J-ZN1-0118	Zone-1	4164	4.3	53
J-ZN1-0119	Zone-1	4166	4.1	52
J-ZN1-0120	Zone-1	4167	22.0	52
J-ZN1-0121	Zone-1	4170	7.5	50
J-ZN1-0122	Zone-1	4164	11.5	53
J-ZN1-0123	Zone-1	4162	8.9	54
J-ZN1-0124	Zone-1	4144	5.4	63
J-ZN1-0125	Zone-1	4151	8.8	59
J-ZN1-0126	Zone-1	4141	13.9	65
J-ZN1-0127	Zone-1	4149	27.6	59
J-ZN1-0128	Zone-1	4138	14.2	63

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0129	Zone-1	4140	18.9	62
J-ZN1-0130	Zone-1	4134	8.6	65
J-ZN1-0131	Zone-1	4144	15.8	60
J-ZN1-0132	Zone-1	4142	16.4	61
J-ZN1-0133	Zone-1	4150	9.5	59
J-ZN1-0134	Zone-1	4136	16.5	64
J-ZN1-0135	Zone-1	4133	7.9	65
J-ZN1-0136	Zone-1	4145	18.4	61
J-ZN1-0137	Zone-1	4151	8.0	58
J-ZN1-0138	Zone-1	4148	25.2	59
J-ZN1-0139	Zone-1	4142	20.9	61
J-ZN1-0140	Zone-1	4134	20.4	62
J-ZN1-0141	Zone-1	4140	5.7	61
J-ZN1-0142	Zone-1	4136	12.1	63
J-ZN1-0143	Zone-1	4144	13.8	60
J-ZN1-0144	Zone-1	4139	14.3	58
J-ZN1-0145	Zone-1	4134	13.2	61
J-ZN1-0146	Zone-1	4150	15.5	58
J-ZN1-0147	Zone-1	4144	14.1	60
J-ZN1-0148	Zone-1	4146	16.7	60
J-ZN1-0149	Zone-1	4134	15.0	61
J-ZN1-0150	Zone-1	4155	3.3	56
J-ZN1-0151	Zone-1	4168	1.4	45
J-ZN1-0152	Zone-1	4160	37.8	49
J-ZN1-0153	Zone-1	4150	0.0	53
J-ZN1-0154	Zone-1	4139	5.5	58
J-ZN1-0155	Zone-1	4134	15.1	60
J-ZN1-0156	Zone-1	4136	18.3	59
J-ZN1-0157	Zone-1	4138	26.1	58
J-ZN1-0158	Zone-1	4140	9.8	58
J-ZN1-0159	Zone-1	4140	26.5	58
J-ZN1-0160	Zone-1	4143	17.0	56
J-ZN1-0161	Zone-1	4144	19.5	56
J-ZN1-0162	Zone-1	4146	5.9	55
J-ZN1-0163	Zone-1	4154	10.9	51
J-ZN1-0164	Zone-1	4194	0.0	45
J-ZN1-0165	Zone-1	4177	0.5	51
J-ZN1-0166	Zone-1	4169	8.3	53
J-ZN1-0167	Zone-1	4159	31.3	49
J-ZN1-0168	Zone-1	4090	2.1	81
J-ZN1-0169	Zone-1	4173	26.1	43
J-ZN1-0170	Zone-1	4158	0.0	50
J-ZN1-0171	Zone-1	4120	9.7	67
J-ZN1-0172	Zone-1	4120	7.9	67
J-ZN1-0173	Zone-1	4122	12.6	66
J-ZN1-0174	Zone-1	4118	37.8	68
J-ZN1-0175	Zone-1	4118	13.7	68
J-ZN1-0176	Zone-1	4118	7.7	68
J-ZN1-0177	Zone-1	4114	16.0	69
J-ZN1-0178	Zone-1	4265	7.9	17
J-ZN1-0179	Zone-1	4112	28.6	70
J-ZN1-0180	Zone-1	4107	0.0	72
J-ZN1-0181	Zone-1	4112	65.7	70
J-ZN1-0182	Zone-1	4112	7.9	70
J-ZN1-0183	Zone-1	4116	53.8	68
J-ZN1-0184	Zone-1	4112	8.9	70
J-ZN1-0185	Zone-1	4166	1.0	46
J-ZN1-0186	Zone-1	4164	1.3	47
J-ZN1-0187	Zone-1	4160	1.0	49
J-ZN1-0188	Zone-1	4152	0.0	52
J-ZN1-0189	Zone-1	4236	21.8	28
J-ZN1-0190	Zone-1	4160	3.6	49
J-ZN1-0191	Zone-1	4167	3.9	46
J-ZN1-0192	Zone-1	4198	17.7	44
J-ZN1-0193	Zone-1	4108	41.8	72
J-ZN1-0194	Zone-1	4206	2.2	40
J-ZN1-0195	Zone-1	4189	7.5	48
J-ZN1-0196	Zone-1	4175	2.0	54
J-ZN1-0197	Zone-1	4172	11.6	44
J-ZN1-0198	Zone-1	4120	9.6	66
J-ZN1-0199	Zone-1	4155	22.5	62
J-ZN1-0200	Zone-1	4116	8.0	56
J-ZN1-0201	Zone-1	4098	18.6	60
J-ZN1-0202	Zone-1	4134	0.0	49
J-ZN1-0203	Zone-1	4110	34.1	49
J-ZN1-0204	Zone-1	4118	8.1	67
J-ZN1-0205	Zone-1	4095	2.2	62
J-ZN1-0206	Zone-1	4098	102.3	61
J-ZN1-0207	Zone-1	4095	0.1	54
J-ZN1-0208	Zone-1	4100	2.7	53

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0209	Zone-1	4117	12.2	68
J-ZN1-0210	Zone-1	4181	20.5	49
J-ZN1-0211	Zone-1	4095	21.6	80
J-ZN1-0212	Zone-1	4091	9.4	86
J-ZN1-0213	Zone-1	4116	7.6	69
J-ZN1-0214	Zone-1	4092	6.8	84
J-ZN1-0215	Zone-1	4094	1.1	82
J-ZN1-0216	Zone-1	4096	23.5	81
J-ZN1-0217	Zone-1	4158	0.0	55
J-ZN1-0218	Zone-1	4164	3.2	52
J-ZN1-0219	Zone-1	4114	5.0	69
J-ZN1-0220	Zone-1	4141	0.0	57
J-ZN1-0221	Zone-1	4094	13.5	81
J-ZN1-0222	Zone-1	4096	14.0	80
J-ZN1-0223	Zone-1	4090	0.0	82
J-ZN1-0224	Zone-1	4121	19.8	66
J-ZN1-0225	Zone-1	4088	0.0	82
J-ZN1-0226	Zone-1	4090	0.0	82
J-ZN1-0227	Zone-1	4088	0.0	83
J-ZN1-0228	Zone-1	4175	13.0	48
J-ZN1-0229	Zone-1	4122	18.1	66
J-ZN1-0230	Zone-1	4214	11.0	32
J-ZN1-0231	Zone-1	4232	15.8	30
J-ZN1-0232	Zone-1	4136	19.5	59
J-ZN1-0233	Zone-1	4218	3.0	31
J-ZN1-0234	Zone-1	4231	1.5	25
J-ZN1-0235	Zone-1	4224	4.4	28
J-ZN1-0236	Zone-1	4246	2.6	18
J-ZN1-0237	Zone-1	4224	1.1	28
J-ZN1-0238	Zone-1	4139	2.7	58
J-ZN1-0239	Zone-1	4164	0.0	52
J-ZN1-0240	Zone-1	4108	2.9	65
J-ZN1-0241	Zone-1	4112	0.9	63
J-ZN1-0242	Zone-1	4219	3.1	30
J-ZN1-0243	Zone-1	4138	0.0	58
J-ZN1-0244	Zone-1	4140	5.5	63
J-ZN1-0245	Zone-1	4162	2.8	44
J-ZN1-0246	Zone-1	4150	0.0	53
J-ZN1-0247	Zone-1	4140	18.2	63
J-ZN1-0248	Zone-1	4162	2.3	53
J-ZN1-0249	Zone-1	4184	3.6	47
J-ZN1-0250	Zone-1	4196	3.0	43
J-ZN1-0251	Zone-1	4097	0.0	87
J-ZN1-0252	Zone-1	4134	12.5	65
J-ZN1-0253	Zone-1	4189	3.5	49
J-ZN1-0254	Zone-1	4149	3.6	58
J-ZN1-0255	Zone-1	4102	1.1	76
J-ZN1-0256	Zone-1	4118	12.8	59
J-ZN1-0257	Zone-1	4112	44.8	70
J-ZN1-0258	Zone-1	4122	3.6	57
J-ZN1-0259	Zone-1	4110	21.0	71
J-ZN1-0260	Zone-1	4110	43.6	71
J-ZN1-0261	Zone-1	4109	17.5	72
J-ZN1-0262	Zone-1	4224	25.9	32
J-ZN1-0263	Zone-1	4108	8.0	72
J-ZN1-0264	Zone-1	4108	9.5	72
J-ZN1-0265	Zone-1	4108	13.3	72
J-ZN1-0266	Zone-1	4110	7.9	71
J-ZN1-0267	Zone-1	4110	12.4	71
J-ZN1-0268	Zone-1	4110	5.5	71
J-ZN1-0269	Zone-1	4112	14.2	70
J-ZN1-0270	Zone-1	4112	9.9	70
J-ZN1-0271	Zone-1	4108	57.6	72
J-ZN1-0272	Zone-1	4108	7.8	72
J-ZN1-0273	Zone-1	4207	10.9	39
J-ZN1-0274	Zone-1	4108	12.2	72
J-ZN1-0275	Zone-1	4109	4.1	71
J-ZN1-0276	Zone-1	4109	7.2	71
J-ZN1-0277	Zone-1	4110	14.8	71
J-ZN1-0278	Zone-1	4110	5.8	71
J-ZN1-0279	Zone-1	4110	4.1	71
J-ZN1-0280	Zone-1	4112	8.9	70
J-ZN1-0281	Zone-1	4114	16.0	69
J-ZN1-0282	Zone-1	4113	17.1	70
J-ZN1-0283	Zone-1	4114	35.5	69
J-ZN1-0284	Zone-1	4108	11.6	72
J-ZN1-0285	Zone-1	4108	14.1	72
J-ZN1-0286	Zone-1	4110	9.6	71
J-ZN1-0287	Zone-1	4110	11.6	71
J-ZN1-0288	Zone-1	4104	0.7	74

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0289	Zone-1	4107	49.5	73
J-ZN1-0290	Zone-1	4104	5.4	74
J-ZN1-0291	Zone-1	4102	10.3	75
J-ZN1-0292	Zone-1	4104	6.5	74
J-ZN1-0293	Zone-1	4106	11.5	73
J-ZN1-0294	Zone-1	4098	10.6	77
J-ZN1-0295	Zone-1	4096	7.2	77
J-ZN1-0296	Zone-1	4101	6.0	75
J-ZN1-0297	Zone-1	4099	11.6	76
J-ZN1-0298	Zone-1	4100	11.7	76
J-ZN1-0299	Zone-1	4098	20.5	77
J-ZN1-0300	Zone-1	4099	9.1	76
J-ZN1-0301	Zone-1	4098	5.0	78
J-ZN1-0302	Zone-1	4104	2.8	74
J-ZN1-0303	Zone-1	4108	13.1	72
J-ZN1-0304	Zone-1	4109	12.5	72
J-ZN1-0305	Zone-1	4104	2.2	74
J-ZN1-0306	Zone-1	4116	5.9	69
J-ZN1-0306A	Zone-1	4124	5.8	65
J-ZN1-0306B	Zone-1	4144	6.9	57
J-ZN1-0307	Zone-1	4098	10.6	78
J-ZN1-0308	Zone-1	4097	6.1	79
J-ZN1-0309	Zone-1	4100	14.6	79
J-ZN1-0310	Zone-1	4100	13.0	79
J-ZN1-0311	Zone-1	4096	23.4	80
J-ZN1-0312	Zone-1	4094	6.5	82
J-ZN1-0313	Zone-1	4286	0.0	9
J-ZN1-0314	Zone-1	4096	6.2	79
J-ZN1-0315	Zone-1	4096	2.4	80
J-ZN1-0316	Zone-1	4090	0.1	82
J-ZN1-0317	Zone-1	4090	9.1	82
J-ZN1-0318	Zone-1	4092	2.0	81
J-ZN1-0319	Zone-1	4102	4.3	75
J-ZN1-0320	Zone-1	4100	1.7	75
J-ZN1-0321	Zone-1	4104	0.0	74
J-ZN1-0322	Zone-1	4102	12.0	75
J-ZN1-0323	Zone-1	4159	34.4	57
J-ZN1-0324	Zone-1	4100	2.5	76
J-ZN1-0325	Zone-1	4090	0.0	81
J-ZN1-0326	Zone-1	4088	0.0	82

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0327	Zone-1	4089	69.6	81
J-ZN1-0328	Zone-1	4198	0.0	41
J-ZN1-0329	Zone-1	4098	7.1	76
J-ZN1-0330	Zone-1	4103	0.0	74
J-ZN1-0331	Zone-1	4105	0.0	73
J-ZN1-0332	Zone-1	4103	0.8	74
J-ZN1-0333	Zone-1	4103	26.5	74
J-ZN1-0334	Zone-1	4104	10.1	74
J-ZN1-0335	Zone-1	4102	13.1	75
J-ZN1-0336	Zone-1	4102	18.0	75
J-ZN1-0337	Zone-1	4102	10.3	75
J-ZN1-0338	Zone-1	4102	15.5	75
J-ZN1-0339	Zone-1	4198	0.0	41
J-ZN1-0340	Zone-1	4179	0.0	49
J-ZN1-0341	Zone-1	4198	0.0	41
J-ZN1-0342	Zone-1	4197	0.0	41
J-ZN1-0343	Zone-1	4104	12.3	74
J-ZN1-0344	Zone-1	4104	21.1	74
J-ZN1-0345	Zone-1	4102	2.7	74
J-ZN1-0346	Zone-1	4104	14.2	74
J-ZN1-0347	Zone-1	4107	18.8	72
J-ZN1-0348	Zone-1	4109	23.1	72
J-ZN1-0349	Zone-1	4106	29.4	73
J-ZN1-0350	Zone-1	4104	26.1	73
J-ZN1-0351	Zone-1	4102	9.8	75
J-ZN1-0352	Zone-1	4110	9.0	71
J-ZN1-0353	Zone-1	4110	0.0	71
J-ZN1-0354	Zone-1	4110	8.1	71
J-ZN1-0355	Zone-1	4110	27.4	71
J-ZN1-0356	Zone-1	4108	19.5	72
J-ZN1-0357	Zone-1	4114	12.6	69
J-ZN1-0358	Zone-1	4124	11.3	65
J-ZN1-0359	Zone-1	4120	18.9	66
J-ZN1-0360	Zone-1	4102	88.8	74
J-ZN1-0361	Zone-1	4116	14.2	68
J-ZN1-0362	Zone-1	4104	7.8	73
J-ZN1-0363	Zone-1	4104	3.8	73
J-ZN1-0364	Zone-1	4108	51.9	71
J-ZN1-0365	Zone-1	4115	13.1	68
J-ZN1-0366	Zone-1	4107	6.7	73

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0367	Zone-1	4115	28.0	71
J-ZN1-0368	Zone-1	4110	19.4	73
J-ZN1-0369	Zone-1	4100	6.4	77
J-ZN1-0370	Zone-1	4115	28.4	70
J-ZN1-0371	Zone-1	4119	39.1	68
J-ZN1-0372	Zone-1	4128	12.0	64
J-ZN1-0373	Zone-1	4101	2.6	76
J-ZN1-0374	Zone-1	4100	0.0	51
J-ZN1-0375	Zone-1	4096	4.9	80
J-ZN1-0376	Zone-1	4096	31.0	80
J-ZN1-0377	Zone-1	4098	20.7	79
J-ZN1-0378	Zone-1	4098	5.3	80
J-ZN1-0379	Zone-1	4108	13.0	74
J-ZN1-0380	Zone-1	4092	11.1	82
J-ZN1-0381	Zone-1	4092	32.0	82
J-ZN1-0382	Zone-1	4122	2.1	77
J-ZN1-0383	Zone-1	4120	0.0	78
J-ZN1-0384	Zone-1	4116	0.8	80
J-ZN1-0385	Zone-1	4098	6.6	78
J-ZN1-0386	Zone-1	4098	2.3	78
J-ZN1-0387	Zone-1	4096	0.0	80
J-ZN1-0388	Zone-1	4099	0.0	79
J-ZN1-0389	Zone-1	4100	13.2	78
J-ZN1-0390	Zone-1	4100	9.0	79
J-ZN1-0391	Zone-1	4092	0.3	84
J-ZN1-0392	Zone-1	4092	10.2	84
J-ZN1-0393	Zone-1	4094	17.6	83
J-ZN1-0394	Zone-1	4091	1.7	86
J-ZN1-0395	Zone-1	4091	0.0	86
J-ZN1-0396	Zone-1	4094	9.3	83
J-ZN1-0397	Zone-1	4093	1.9	83
J-ZN1-0398	Zone-1	4093	19.0	83
J-ZN1-0399	Zone-1	4092	14.9	88
J-ZN1-0400	Zone-1	4092	38.1	42
J-ZN1-0401	Zone-1	4090	8.8	50
J-ZN1-0402	Zone-1	4090	5.8	43
J-ZN1-0403	Zone-1	4092	27.4	49
J-ZN1-0404	Zone-1	4096	0.2	54
J-ZN1-0405	Zone-1	4094	1.5	55
J-ZN1-0406	Zone-1	4094	0.9	55
J-ZN1-0407	Zone-1	4092	0.1	76
J-ZN1-0408	Zone-1	4091	2.4	66
J-ZN1-0409	Zone-1	4091	0.0	80
J-ZN1-0410	Zone-1	4092	17.8	81
J-ZN1-0411	Zone-1	4093	0.0	82
J-ZN1-0412	Zone-1	4099	54.3	81
J-ZN1-0413	Zone-1	4094	14.4	82
J-ZN1-0414	Zone-1	4104	0.0	83
J-ZN1-0415	Zone-1	4094	0.7	62
J-ZN1-0416	Zone-1	4096	14.5	62
J-ZN1-0417	Zone-1	4092	1.2	67
J-ZN1-0418	Zone-1	4094	1.2	62
J-ZN1-0419	Zone-1	4092	2.5	66
J-ZN1-0420	Zone-1	4092	0.0	67
J-ZN1-0421	Zone-1	4092	1.2	66
J-ZN1-0422	Zone-1	4093	2.0	67
J-ZN1-0423	Zone-1	4092	0.0	67
J-ZN1-0424	Zone-1	4092	4.6	67
J-ZN1-0425	Zone-1	4094	0.1	76
J-ZN1-0426	Zone-1	4093	0.0	72
J-ZN1-0427	Zone-1	4092	0.0	72
J-ZN1-0428	Zone-1	4182	0.4	47
J-ZN1-0429	Zone-1	4093	27.0	69
J-ZN1-0430	Zone-1	4104	10.2	77
J-ZN1-0431	Zone-1	4106	5.5	76
J-ZN1-0432	Zone-1	4112	14.7	73
J-ZN1-0433	Zone-1	4106	3.9	75
J-ZN1-0434	Zone-1	4106	3.0	74
J-ZN1-0435	Zone-1	4099	6.9	78
J-ZN1-0436	Zone-1	4099	0.4	78
J-ZN1-0437	Zone-1	4093	5.5	82
J-ZN1-0438	Zone-1	4102	13.3	76
J-ZN1-0439	Zone-1	4106	1.1	72
J-ZN1-0440	Zone-1	4094	1.2	79
J-ZN1-0441	Zone-1	4236	10.2	23
J-ZN1-0442	Zone-1	4206	10.8	36
J-ZN1-0443	Zone-1	4159	5.4	56
J-ZN1-0444	Zone-1	4121	6.9	72
J-ZN1-0445	Zone-1	4107	11.2	78
J-ZN1-0446	Zone-1	4108	22.9	76

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0447	Zone-1	4237	1.4	20
J-ZN1-0448	Zone-1	4125	3.9	69
J-ZN1-0449	Zone-1	4117	7.2	73
J-ZN1-0450	Zone-1	4114	1.9	73
J-ZN1-0451	Zone-1	4109	14.2	75
J-ZN1-0452	Zone-1	4185	13.8	50
J-ZN1-0453	Zone-1	4251	1.1	21
J-ZN1-0454	Zone-1	4225	18.4	31
J-ZN1-0455	Zone-1	4182	11.2	49
J-ZN1-0456	Zone-1	4145	5.7	64
J-ZN1-0457	Zone-1	4106	15.2	79
J-ZN1-0458	Zone-1	4267	3.7	15
J-ZN1-0459	Zone-1	4282	4.1	9
J-ZN1-0460	Zone-1	4290	0.0	6
J-ZN1-0461	Zone-1	4103	9.0	85
J-ZN1-0462	Zone-1	4099	0.0	87
J-ZN1-0463	Zone-1	4198	12.1	43
J-ZN1-0464	Zone-1	4185	16.1	48
J-ZN1-0465	Zone-1	4166	14.3	55
J-ZN1-0466	Zone-1	4178	0.0	38
J-ZN1-0467	Zone-1	4139	34.2	66
J-ZN1-0468	Zone-1	4172	4.3	55
J-ZN1-0469	Zone-1	4150	22.4	65
J-ZN1-0470	Zone-1	4223	19.7	31
J-ZN1-0471	Zone-1	4190	11.6	45
J-ZN1-0472	Zone-1	4117	4.1	75
J-ZN1-0473	Zone-1	4098	27.2	84
J-ZN1-0474	Zone-1	4120	27.8	70
J-ZN1-0475	Zone-1	4130	3.5	66
J-ZN1-0476	Zone-1	4111	3.8	73
J-ZN1-0477	Zone-1	4200	0.0	27
J-ZN1-0478	Zone-1	4102	13.4	76
J-ZN1-0479	Zone-1	4098	1.1	78
J-ZN1-0480	Zone-1	4102	7.4	75
J-ZN1-0481	Zone-1	4159	9.2	61
J-ZN1-0482	Zone-1	4262	1.0	18
J-ZN1-0483	Zone-1	4194	0.0	30
J-ZN1-0484	Zone-1	4190	2.2	48
J-ZN1-0485	Zone-1	4187	11.3	49
J-ZN1-0486	Zone-1	4176	15.2	54

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0487	Zone-1	4217	4.9	36
J-ZN1-0488	Zone-1	4202	6.1	40
J-ZN1-0489	Zone-1	4205	24.4	38
J-ZN1-0490	Zone-1	4178	13.0	49
J-ZN1-0491	Zone-1	4182	5.1	48
J-ZN1-0492	Zone-1	4181	11.3	47
J-ZN1-0493	Zone-1	4146	154.3	46
J-ZN1-0494	Zone-1	4202	5.4	38
J-ZN1-0495	Zone-1	4208	4.2	35
J-ZN1-0496	Zone-1	4215	6.2	32
J-ZN1-0497	Zone-1	4244	1.7	19
J-ZN1-0498	Zone-1	4273	0.9	7
J-ZN1-0499	Zone-1	4219	3.3	30
J-ZN1-0500	Zone-1	4214	2.7	32
J-ZN1-0501	Zone-1	4219	4.7	30
J-ZN1-0502	Zone-1	4134	35.7	49
J-ZN1-0503	Zone-1	4213	9.4	31
J-ZN1-0504	Zone-1	4215	11.8	30
J-ZN1-0505	Zone-1	4114	16.0	71
J-ZN1-0506	Zone-1	4111	12.6	70
J-ZN1-0507	Zone-1	4104	7.4	74
J-ZN1-0508	Zone-1	4109	2.8	70
J-ZN1-0509	Zone-1	4126	7.1	68
J-ZN1-0510	Zone-1	4138	2.5	63
J-ZN1-0511	Zone-1	4130	6.0	66
J-ZN1-0512	Zone-1	4132	5.8	65
J-ZN1-0513	Zone-1	4153	0.0	40
J-ZN1-0514	Zone-1	4114	0.6	73
J-ZN1-0515	Zone-1	4121	9.4	70
J-ZN1-0516	Zone-1	4150	12.6	58
J-ZN1-0517	Zone-1	4122	10.7	70
J-ZN1-0518	Zone-1	4136	5.5	64
J-ZN1-0519	Zone-1	4141	2.7	62
J-ZN1-0520	Zone-1	4172	4.3	48
J-ZN1-0521	Zone-1	4140	11.5	62
J-ZN1-0522	Zone-1	4148	12.3	59
J-ZN1-0523	Zone-1	4211	2.5	31
J-ZN1-0524	Zone-1	4164	2.1	53
J-ZN1-0525	Zone-1	4104	26.4	61
J-ZN1-0526	Zone-1	4227	0.7	24

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0527	Zone-1	4162	3.8	53
J-ZN1-0528	Zone-1	4146	4.5	60
J-ZN1-0528A	Zone-1	4162	9.4	53
J-ZN1-0529	Zone-1	4160	0.0	54
J-ZN1-0530	Zone-1	4160	6.1	54
J-ZN1-0531	Zone-1	4162	0.1	53
J-ZN1-0532	Zone-1	4152	4.2	56
J-ZN1-0533	Zone-1	4164	3.3	51
J-ZN1-0534	Zone-1	4141	1.7	61
J-ZN1-0535	Zone-1	4196	7.9	42
J-ZN1-0536	Zone-1	4137	0.0	55
J-ZN1-0537	Zone-1	4207	16.3	37
J-ZN1-0538	Zone-1	4225	16.8	29
J-ZN1-0539	Zone-1	4192	12.9	44
J-ZN1-0540	Zone-1	4206	7.6	37
J-ZN1-0541	Zone-1	4220	7.4	31
J-ZN1-0542	Zone-1	4162	25.2	56
J-ZN1-0543	Zone-1	4147	2.3	61
J-ZN1-0544	Zone-1	4164	3.3	54
J-ZN1-0545	Zone-1	4194	7.2	40
J-ZN1-0546	Zone-1	4150	13.0	49
J-ZN1-0547	Zone-1	4179	8.1	47
J-ZN1-0548	Zone-1	4207	8.6	35
J-ZN1-0549	Zone-1	4158	0.0	55
J-ZN1-0550	Zone-1	4150	9.7	59
J-ZN1-0551	Zone-1	4156	6.3	56
J-ZN1-0552	Zone-1	4153	4.3	57
J-ZN1-0553	Zone-1	4149	5.2	59
J-ZN1-0554	Zone-1	4148	51.4	59
J-ZN1-0555	Zone-1	4148	22.1	59
J-ZN1-0556	Zone-1	4152	9.3	57
J-ZN1-0557	Zone-1	4161	10.5	45
J-ZN1-0558	Zone-1	4148	21.8	59
J-ZN1-0559	Zone-1	4149	5.2	59
J-ZN1-0560	Zone-1	4192	16.4	40
J-ZN1-0561	Zone-1	4167	0.7	51
J-ZN1-0562	Zone-1	4185	13.4	43
J-ZN1-0563	Zone-1	4204	10.7	35
J-ZN1-0564	Zone-1	4216	3.0	30
J-ZN1-0565	Zone-1	4191	4.1	40

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0566	Zone-1	4142	0.0	53
J-ZN1-0567	Zone-1	4167	3.3	51
J-ZN1-0568	Zone-1	4181	20.0	45
J-ZN1-0569	Zone-1	4166	3.7	52
J-ZN1-0570	Zone-1	4178	15.9	47
J-ZN1-0571	Zone-1	4216	2.3	31
J-ZN1-0572	Zone-1	4176	0.0	48
J-ZN1-0573	Zone-1	4209	8.0	35
J-ZN1-0574	Zone-1	4233	0.0	24
J-ZN1-0575	Zone-1	4143	0.8	53
J-ZN1-0576	Zone-1	4217	2.2	31
J-ZN1-0577	Zone-1	4163	0.7	55
J-ZN1-0578	Zone-1	4218	9.8	31
J-ZN1-0579	Zone-1	4224	0.0	28
J-ZN1-0580	Zone-1	4234	4.6	24
J-ZN1-0581	Zone-1	4193	0.2	39
J-ZN1-0582	Zone-1	4167	0.0	42
J-ZN1-0583	Zone-1	4154	22.0	55
J-ZN1-0584	Zone-1	4221	12.8	23
J-ZN1-0585	Zone-1	4172	18.7	44
J-ZN1-0586	Zone-1	4180	10.9	43
J-ZN1-0587	Zone-1	4218	37.3	24
J-ZN1-0588	Zone-1	4133	20.6	61
J-ZN1-0589	Zone-1	4118	9.4	69
J-ZN1-0590	Zone-1	4153	8.4	53
J-ZN1-0591	Zone-1	4165	12.4	46
J-ZN1-0592	Zone-1	4114	5.3	65
J-ZN1-0593	Zone-1	4187	6.9	36
J-ZN1-0594	Zone-1	4209	14.0	26
J-ZN1-0595	Zone-1	4141	0.0	54
J-ZN1-0596	Zone-1	4204	7.0	38
J-ZN1-0597	Zone-1	4205	6.0	38
J-ZN1-0598	Zone-1	4207	3.3	37
J-ZN1-0599	Zone-1	4116	17.4	62
J-ZN1-0600	Zone-1	4184	2.1	47
J-ZN1-0601	Zone-1	4291	0.0	5
J-ZN1-0602	Zone-1	4160	16.6	47
J-ZN1-0603	Zone-1	4156	8.9	53
J-ZN1-0604	Zone-1	4150	3.4	55
J-ZN1-0605	Zone-1	4166	14.8	48

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0606	Zone-1	4158	5.0	54
J-ZN1-0607	Zone-1	4165	9.9	50
J-ZN1-0608	Zone-1	4122	11.9	58
J-ZN1-0609	Zone-1	4157	17.5	53
J-ZN1-0610	Zone-1	4160	8.3	51
J-ZN1-0611	Zone-1	4179	3.6	44
J-ZN1-0612	Zone-1	4187	9.9	41
J-ZN1-0613	Zone-1	4156	7.6	54
J-ZN1-0614	Zone-1	4170	26.3	45
J-ZN1-0615	Zone-1	4142	12.3	65
J-ZN1-0616	Zone-1	4092	1.0	66
J-ZN1-0617	Zone-1	4145	2.1	61
J-ZN1-0618	Zone-1	4118	15.2	59
J-ZN1-0619	Zone-1	4163	12.3	48
J-ZN1-0620	Zone-1	4140	14.6	58
J-ZN1-0621	Zone-1	4140	2.8	68
J-ZN1-0622	Zone-1	4109	27.4	81
J-ZN1-0623	Zone-1	4104	25.3	82
J-ZN1-0624	Zone-1	4096	7.2	88
J-ZN1-0625	Zone-1	4100	24.5	85
J-ZN1-0626	Zone-1	4100	23.8	65
J-ZN1-0627	Zone-1	4101	7.2	64
J-ZN1-0628	Zone-1	4148	1.4	61
J-ZN1-0629	Zone-1	4110	5.6	59
J-ZN1-0630	Zone-1	4151	12.7	59
J-ZN1-0631	Zone-1	4148	9.5	61
J-ZN1-0632	Zone-1	4152	1.0	59
J-ZN1-0633	Zone-1	4112	1.3	63
J-ZN1-0634	Zone-1	4113	25.0	62
J-ZN1-0635	Zone-1	4090	0.0	82
J-ZN1-0636	Zone-1	4090	0.0	82
J-ZN1-0637	Zone-1	4092	3.7	81
J-ZN1-0638	Zone-1	4092	0.5	81
J-ZN1-0639	Zone-1	4091	5.0	81
J-ZN1-0640	Zone-1	4089	0.9	82
J-ZN1-0641	Zone-1	4112	23.1	62
J-ZN1-0642	Zone-1	4095	0.5	79
J-ZN1-0643	Zone-1	4215	0.0	30
J-ZN1-0644	Zone-1	4116	26.0	60
J-ZN1-0645	Zone-1	4118	22.5	59
J-ZN1-0646	Zone-1	4104	41.2	62
J-ZN1-0647	Zone-1	4194	6.5	43
J-ZN1-0648	Zone-1	4116	11.9	56
J-ZN1-0650	Zone-1	4184	18.8	46
J-ZN1-0651	Zone-1	4121	12.6	54
J-ZN1-0652	Zone-1	4173	12.9	50
J-ZN1-0653	Zone-1	4147	10.2	62
J-ZN1-0654	Zone-1	4148	16.1	61
J-ZN1-0655	Zone-1	4160	19.9	55
J-ZN1-0656	Zone-1	4137	12.7	66
J-ZN1-0657	Zone-1	4134	17.1	66
J-ZN1-0658	Zone-1	4138	24.5	70
J-ZN1-0659	Zone-1	4094	51.2	77
J-ZN1-0660	Zone-1	4169	2.9	51
J-ZN1-0661	Zone-1	4123	4.7	53
J-ZN1-0662	Zone-1	4198	7.7	41
J-ZN1-0663	Zone-1	4094	3.4	77
J-ZN1-0664	Zone-1	4096	22.3	76
J-ZN1-0665	Zone-1	4094	3.6	78
J-ZN1-0666	Zone-1	4104	3.8	73
J-ZN1-0667	Zone-1	4094	46.1	75
J-ZN1-0668	Zone-1	4110	0.0	68
J-ZN1-0669	Zone-1	4118	119.4	55
J-ZN1-0670	Zone-1	4186	0.0	42
J-ZN1-0671	Zone-1	4098	31.3	79
J-ZN1-0672	Zone-1	4098	27.5	79
J-ZN1-0673	Zone-1	4096	21.6	80
J-ZN1-0674	Zone-1	4100	30.0	78
J-ZN1-0675	Zone-1	4098	13.0	79
J-ZN1-0676	Zone-1	4098	11.4	79
J-ZN1-0677	Zone-1	4106	51.6	61
J-ZN1-0678	Zone-1	4099	3.8	78
J-ZN1-0679	Zone-1	4100	21.3	78
J-ZN1-0680	Zone-1	4102	9.6	77
J-ZN1-0681	Zone-1	4100	2.2	78
J-ZN1-0682	Zone-1	4102	46.5	71
J-ZN1-0683	Zone-1	4098	5.6	74
J-ZN1-0684	Zone-1	4146	9.8	66
J-ZN1-0685	Zone-1	4161	18.3	60
J-ZN1-0686	Zone-1	4115	11.8	57

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0687	Zone-1	4150	13.1	65
J-ZN1-0688	Zone-1	4190	15.7	45
J-ZN1-0689	Zone-1	4182	13.2	48
J-ZN1-0690	Zone-1	4171	11.1	54
J-ZN1-0691	Zone-1	4228	19.3	31
J-ZN1-0692	Zone-1	4179	10.6	51
J-ZN1-0693	Zone-1	4194	15.4	43
J-ZN1-0694	Zone-1	4185	5.9	45
J-ZN1-0695	Zone-1	4119	9.0	56
J-ZN1-0696	Zone-1	4199	4.1	43
J-ZN1-0697	Zone-1	4197	6.5	41
J-ZN1-0698	Zone-1	4096	19.7	63
J-ZN1-0699	Zone-1	4129	0.1	50
J-ZN1-0700	Zone-1	4097	10.8	62
J-ZN1-0701	Zone-1	4100	10.8	61
J-ZN1-0702	Zone-1	4098	13.1	62
J-ZN1-0703	Zone-1	4100	11.4	63
J-ZN1-0704	Zone-1	4101	14.2	63
J-ZN1-0705	Zone-1	4103	7.5	62
J-ZN1-0706	Zone-1	4108	10.9	59
J-ZN1-0707	Zone-1	4099	14.3	64
J-ZN1-0708	Zone-1	4101	6.1	61
J-ZN1-0709	Zone-1	4098	8.5	63
J-ZN1-0710	Zone-1	4096	10.4	54
J-ZN1-0711	Zone-1	4096	13.6	64
J-ZN1-0712	Zone-1	4092	11.3	66
J-ZN1-0713	Zone-1	4122	5.9	57
J-ZN1-0714	Zone-1	4125	3.3	57
J-ZN1-0715	Zone-1	4158	22.0	49
J-ZN1-0716	Zone-1	4111	5.3	69
J-ZN1-0717	Zone-1	4111	12.6	67
J-ZN1-0718	Zone-1	4138	6.6	59
J-ZN1-0719	Zone-1	4117	1.3	60
J-ZN1-0720	Zone-1	4115	20.1	60
J-ZN1-0721	Zone-1	4097	1.5	55
J-ZN1-0722	Zone-1	4162	7.7	53
J-ZN1-0723	Zone-1	4200	3.8	35
J-ZN1-0724	Zone-1	4201	2.8	35
J-ZN1-0725	Zone-1	4172	0.6	54
J-ZN1-0726	Zone-1	4090	0.0	82
J-ZN1-0727	Zone-1	4090	0.0	82
J-ZN1-0728	Zone-1	4090	2920.4	67
J-ZN1-0729	Zone-1	4214	1.5	29
J-ZN1-0730	Zone-1	4225	0.6	27
J-ZN1-0731	Zone-1	4161	6.3	55
J-ZN1-0732	Zone-1	4196	1.4	42
J-ZN1-0733	Zone-1	4097	7.0	61
J-ZN1-0734	Zone-1	4291	0.0	9
J-ZN1-0735	Zone-1	4218	5.7	32
J-ZN1-0736	Zone-1	4222	8.4	31
J-ZN1-0737	Zone-1	4246	2.9	41
J-ZN1-0738	Zone-1	4212	7.2	34
J-ZN1-0739	Zone-1	4221	3.8	30
J-ZN1-0740	Zone-1	4104	5.4	55
J-ZN1-0741	Zone-1	4220	3.3	31
J-ZN1-0743	Zone-1	4120	6.4	68
J-ZN1-0744	Zone-1	4092	1.6	82
J-ZN1-0745	Zone-1	4092	3.5	82
J-ZN1-0746	Zone-1	4109	18.2	74
J-ZN1-0747	Zone-1	4121	12.3	40
J-ZN1-0748	Zone-1	4220	7.2	31
J-ZN1-0749	Zone-1	4124	39.7	53
J-ZN1-0750	Zone-1	4098	66.2	54
J-ZN1-0751	Zone-1	4220	15.2	23
J-ZN1-0752	Zone-1	4162	17.5	49
J-ZN1-0753	Zone-1	4139	6.5	36
J-ZN1-0754	Zone-1	4098	3.9	52
J-ZN1-0755	Zone-1	4098	17.0	54
J-ZN1-0756	Zone-1	4213	3.1	32
J-ZN1-0757	Zone-1	4215	1.5	30
J-ZN1-0758	Zone-1	4217	3.5	29
J-ZN1-0759	Zone-1	4223	1.9	28
J-ZN1-0760	Zone-1	4190	8.0	42
J-ZN1-0761	Zone-1	4106	18.7	51
J-ZN1-0762	Zone-1	4186	7.8	43
J-ZN1-0763	Zone-1	4163	9.1	53
J-ZN1-0764	Zone-1	4146	31.8	60
J-ZN1-0765	Zone-1	4151	7.8	58
J-ZN1-0766	Zone-1	4199	14.6	35
J-ZN1-0767	Zone-1	4110	9.0	49

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0768	Zone-1	4120	8.9	44
J-ZN1-0769	Zone-1	4185	0.0	35
J-ZN1-0770	Zone-1	4178	6.5	49
J-ZN1-0771	Zone-1	4165	45.7	54
J-ZN1-0772	Zone-1	4180	21.3	49
J-ZN1-0773	Zone-1	4100	15.4	76
J-ZN1-0774	Zone-1	4092	9.1	81
J-ZN1-0775	Zone-1	4116	30.6	46
J-ZN1-0776	Zone-1	4102	6.4	77
J-ZN1-0777	Zone-1	4097	9.4	80
J-ZN1-0778	Zone-1	4096	11.9	81
J-ZN1-0779	Zone-1	4109	6.6	72
J-ZN1-0780	Zone-1	4140	11.0	63
J-ZN1-0781	Zone-1	4141	6.2	65
J-ZN1-0782	Zone-1	4143	13.1	64
J-ZN1-0783	Zone-1	4176	2.1	51
J-ZN1-0784	Zone-1	4162	29.1	57
J-ZN1-0785	Zone-1	4178	39.7	50
J-ZN1-0786	Zone-1	4204	6.3	38
J-ZN1-0787	Zone-1	4122	47.4	44
J-ZN1-0788	Zone-1	4175	67.3	52
J-ZN1-0789	Zone-1	4168	4.5	55
J-ZN1-0790	Zone-1	4115	0.5	80
J-ZN1-0791	Zone-1	4105	112.6	47
J-ZN1-0792	Zone-1	4104	21.0	48
J-ZN1-0793	Zone-1	4111	20.9	45
J-ZN1-0794	Zone-1	4111	0.1	83
J-ZN1-0795	Zone-1	4128	11.2	75
J-ZN1-0796	Zone-1	4132	0.0	73
J-ZN1-0797	Zone-1	4098	0.7	79
J-ZN1-0798	Zone-1	4100	0.0	58
J-ZN1-0799	Zone-1	4106	25.5	72
J-ZN1-0800	Zone-1	4098	13.5	75
J-ZN1-0801	Zone-1	4092	2.4	92
J-ZN1-0802	Zone-1	4092	0.0	42
J-ZN1-0803	Zone-1	4096	58.5	60
J-ZN1-0804	Zone-1	4096	4.4	62
J-ZN1-0805	Zone-1	4137	2.2	55
J-ZN1-0806	Zone-1	4149	10.0	50
J-ZN1-0807	Zone-1	4128	28.5	54

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0808	Zone-1	4098	108.5	58
J-ZN1-0809	Zone-1	4096	0.0	86
J-ZN1-0810	Zone-1	4098	3.7	78
J-ZN1-0811	Zone-1	4094	2.2	74
J-ZN1-0812	Zone-1	4094	0.0	73
J-ZN1-0813	Zone-1	4092	0.3	67
J-ZN1-0814	Zone-1	4094	27.4	66
J-ZN1-0815	Zone-1	4136	17.3	72
J-ZN1-0816	Zone-1	4254	8.4	22
J-ZN1-0817	Zone-1	4299	0.0	5
J-ZN1-0818	Zone-1	4098	47.1	54
J-ZN1-0819	Zone-1	4162	2.5	58
J-ZN1-0820	Zone-1	4289	0.3	5
J-ZN1-0821	Zone-1	4156	0.0	58
J-ZN1-0822	Zone-1	4149	0.0	61
J-ZN1-0823	Zone-1	4098	49.5	55
J-ZN1-0824	Zone-1	4164	1.4	54
J-ZN1-0825	Zone-1	4199	2.7	39
J-ZN1-0826	Zone-1	4202	7.6	37
J-ZN1-0827	Zone-1	4178	8.8	47
J-ZN1-0828	Zone-1	4195	2.9	40
J-ZN1-0829	Zone-1	4194	7.6	40
J-ZN1-0830	Zone-1	4186	2.2	45
J-ZN1-0831	Zone-1	4179	2.8	48
J-ZN1-0832	Zone-1	4211	5.1	34
J-ZN1-0833	Zone-1	4099	9.8	55
J-ZN1-0834	Zone-1	4214	0.0	29
J-ZN1-0835	Zone-1	4197	6.6	42
J-ZN1-0836	Zone-1	4227	3.7	27
J-ZN1-0837	Zone-1	4136	23.5	73
J-ZN1-0838	Zone-1	4215	3.0	37
J-ZN1-0839	Zone-1	4192	1.0	47
J-ZN1-0840	Zone-1	4242	5.0	25
J-ZN1-0841	Zone-1	4134	6.4	65
J-ZN1-0842	Zone-1	4111	9.0	74
J-ZN1-0843	Zone-1	4106	1.6	79
J-ZN1-0844	Zone-1	4100	0.6	80
J-ZN1-0845	Zone-1	4150	0.0	65
J-ZN1-0846	Zone-1	4094	2.5	80
J-ZN1-0847	Zone-1	4092	0.9	80

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0848	Zone-1	4090	0.0	81
J-ZN1-0849	Zone-1	4110	0.7	70
J-ZN1-0850	Zone-1	4108	8.0	72
J-ZN1-0851	Zone-1	4103	8.8	77
J-ZN1-0852	Zone-1	4104	22.9	76
J-ZN1-0853	Zone-1	4093	0.2	77
J-ZN1-0854	Zone-1	4093	0.0	79
J-ZN1-0855	Zone-1	4110	5.2	69
J-ZN1-0856	Zone-1	4144	15.2	67
J-ZN1-0857	Zone-1	4140	3.9	57
J-ZN1-0858	Zone-1	4154	0.6	52
J-ZN1-0859	Zone-1	4152	2.9	49
J-ZN1-0860	Zone-1	4175	5.6	39
J-ZN1-0861	Zone-1	4200	8.5	28
J-ZN1-0862	Zone-1	4163	0.9	44
J-ZN1-0863	Zone-1	4158	4.4	46
J-ZN1-0864	Zone-1	4151	6.6	49
J-ZN1-0865	Zone-1	4137	0.5	55
J-ZN1-0866	Zone-1	4118	15.8	61
J-ZN1-0867	Zone-1	4146	40.6	66
J-ZN1-0868	Zone-1	4137	13.4	58
J-ZN1-0869	Zone-1	4183	9.0	44
J-ZN1-0870	Zone-1	4088	0.0	83
J-ZN1-0871	Zone-1	4088	0.0	83
J-ZN1-0872	Zone-1	4088	0.5	83
J-ZN1-0873	Zone-1	4088	0.0	83
J-ZN1-0874	Zone-1	4214	9.3	30
J-ZN1-0875	Zone-1	4238	3.9	22
J-ZN1-0876	Zone-1	4231	4.3	25
J-ZN1-0877	Zone-1	4245	2.2	20
J-ZN1-0878	Zone-1	4226	2.2	27
J-ZN1-0879	Zone-1	4287	1.9	6
J-ZN1-0880	Zone-1	4092	0.0	73
J-ZN1-0881	Zone-1	4094	10.4	63
J-ZN1-0882	Zone-1	4144	15.0	55
J-ZN1-0883	Zone-1	4110	1.5	69
J-ZN1-0884	Zone-1	4114	8.7	58
J-ZN1-0885	Zone-1	4144	8.7	67
J-ZN1-0886	Zone-1	4096	12.1	62
J-ZN1-0887	Zone-1	4092	0.0	73
J-ZN1-0888	Zone-1	4090	0.0	82
J-ZN1-0889	Zone-1	4094	0.0	82
J-ZN1-0890	Zone-1	4169	2.4	55
J-ZN1-0891	Zone-1	4178	0.5	50
J-ZN1-0892	Zone-1	4194	13.7	43
J-ZN1-0893	Zone-1	4182	12.7	48
J-ZN1-0894	Zone-1	4203	2.7	39
J-ZN1-0895	Zone-1	4182	0.2	47
J-ZN1-0896	Zone-1	4182	1.0	47
J-ZN1-0897	Zone-1	4098	19.1	79
J-ZN1-0898	Zone-1	4096	10.2	80
J-ZN1-0899	Zone-1	4100	6.9	50
J-ZN1-0900	Zone-1	4104	0.0	48
J-ZN1-0901	Zone-1	4092	24.7	92
J-ZN1-0902	Zone-1	4090	15.9	87
J-ZN1-0903	Zone-1	4098	3.5	80
J-ZN1-0904	Zone-1	4104	8.1	73
J-ZN1-0905	Zone-1	4167	4.1	52
J-ZN1-0906	Zone-1	4149	12.4	59
J-ZN1-0907	Zone-1	4163	2.6	53
J-ZN1-0908	Zone-1	4144	9.6	61
J-ZN1-0909	Zone-1	4121	3.5	66
J-ZN1-0910	Zone-1	4110	12.2	71
J-ZN1-0911	Zone-1	4093	0.0	81
J-ZN1-0912	Zone-1	4092	6.5	81
J-ZN1-0913	Zone-1	4092	0.1	81
J-ZN1-0914	Zone-1	4093	0.0	80
J-ZN1-0915	Zone-1	4093	0.0	81
J-ZN1-0916	Zone-1	4100	0.0	76
J-ZN1-0917	Zone-1	4102	1.7	75
J-ZN1-0918	Zone-1	4098	11.5	78
J-ZN1-0919	Zone-1	4097	19.8	80
J-ZN1-0920	Zone-1	4104	2.0	74
J-ZN1-0921	Zone-1	4114	0.0	81
J-ZN1-0922	Zone-1	4122	15.5	76
J-ZN1-0923	Zone-1	4179	3.1	37
J-ZN1-0924	Zone-1	4164	3.1	54
J-ZN1-0925	Zone-1	4198	4.9	36
J-ZN1-0926	Zone-1	4223	4.7	22
J-ZN1-0927	Zone-1	4180	0.0	50

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0928	Zone-1	4179	48.9	50
J-ZN1-0929	Zone-1	4182	8.9	49
J-ZN1-0930	Zone-1	4090	0.0	82
J-ZN1-0931	Zone-1	4090	12.7	82
J-ZN1-0932	Zone-1	4088	0.0	83
J-ZN1-0933	Zone-1	4153	9.7	58
J-ZN1-0934	Zone-1	4088	0.0	82
J-ZN1-0935	Zone-1	4151	0.0	59
J-ZN1-0936	Zone-1	4098	0.9	54
J-ZN1-0937	Zone-1	4247	0.3	18
J-ZN1-0938	Zone-1	4234	0.3	24
J-ZN1-0939	Zone-1	4137	7.5	53
J-ZN1-0940	Zone-1	4151	3.1	59
J-ZN1-0941	Zone-1	4181	1.8	48
J-ZN1-0942	Zone-1	4170	0.0	52
J-ZN1-0943	Zone-1	4161	0.0	56
J-ZN1-0944	Zone-1	4212	0.0	38
J-ZN1-0945	Zone-1	4290	0.0	6
J-ZN1-0946	Zone-1	4095	64.0	59
J-ZN1-0947	Zone-1	4250	8.2	10
J-ZN1-0948	Zone-1	4250	7.8	23
J-ZN1-0949	Zone-1	4210	3.8	33
J-ZN1-0950	Zone-1	4215	2.6	30
J-ZN1-0951	Zone-1	4158	8.8	46
J-ZN1-0952	Zone-1	4142	22.2	53
J-ZN1-0953	Zone-1	4102	8.2	63
J-ZN1-0954	Zone-1	4104	36.4	63
J-ZN1-0955	Zone-1	4090	0.0	73
J-ZN1-0956	Zone-1	4094	0.4	81
J-ZN1-0957	Zone-1	4098	2.7	78
J-ZN1-0958	Zone-1	4097	1.1	79
J-ZN1-0959	Zone-1	4098	0.0	88
J-ZN1-0960	Zone-1	4095	26.4	89
J-ZN1-0961	Zone-1	4098	0.3	88
J-ZN1-0962	Zone-1	4100	0.0	87
J-ZN1-0963	Zone-1	4103	1.4	85
J-ZN1-0964	Zone-1	4093	0.0	90
J-ZN1-0965	Zone-1	4095	0.0	89
J-ZN1-0966	Zone-1	4170	8.1	52
J-ZN1-0967	Zone-1	4090	2.7	93
J-ZN1-0968	Zone-1	4110	1.4	71
J-ZN1-0969	Zone-1	4090	1.3	82
J-ZN1-0970	Zone-1	4104	1.8	72
J-ZN1-0971	Zone-1	4108	16.5	70
J-ZN1-0972	Zone-1	4123	22.6	65
J-ZN1-0973	Zone-1	4152	9.9	59
J-ZN1-0974	Zone-1	4204	12.3	37
J-ZN1-0975	Zone-1	4125	0.0	69
J-ZN1-0976	Zone-1	4178	10.2	45
J-ZN1-0977	Zone-1	4094	13.9	81
J-ZN1-0978	Zone-1	4092	0.0	62
J-ZN1-0979	Zone-1	4096	0.3	67
J-ZN1-0980	Zone-1	4178	0.0	49
J-ZN1-0981	Zone-1	4178	0.0	49
J-ZN1-0982	Zone-1	4156	220.6	57
J-ZN1-0983	Zone-1	4096	1.9	58
J-ZN1-0984	Zone-1	4102	23.4	77
J-ZN1-0985	Zone-1	4125	46.2	64
J-ZN1-0986	Zone-1	4102	7.2	75
J-ZN1-0988	Zone-1	4175	0.4	47
J-ZN1-0989	Zone-1	4175	2.7	47
J-ZN1-0990	Zone-1	4156	0.0	62
J-ZN1-0991	Zone-1	4161	1.9	60
J-ZN1-0992	Zone-1	4150	7.0	65
J-ZN1-0993	Zone-1	4150	5.7	65
J-ZN1-0994	Zone-1	4150	7.3	65
J-ZN1-0995	Zone-1	4140	43.1	68
J-ZN1-0996	Zone-1	4140	1.2	66
J-ZN1-0997	Zone-1	4092	2.1	84
J-ZN1-0998	Zone-1	4094	20.4	82
J-ZN1-0999	Zone-1	4134	8.6	61
J-ZN1-1000	Zone-1	4184	24.9	35
J-ZN1-1001	Zone-1	4168	44.7	42
J-ZN1-1002	Zone-1	4201	13.2	27
J-ZN1-1003	Zone-1	4118	0.9	69
J-ZN1-1004	Zone-1	4112	52.3	71
J-ZN1-1005	Zone-1	4112	16.1	69
J-ZN1-1006	Zone-1	4118	8.8	66
J-ZN1-1007	Zone-1	4155	14.5	51
J-ZN1-1008	Zone-1	4150	13.1	53

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1009	Zone-1	4150	2.9	53
J-ZN1-1010	Zone-1	4188	37.1	37
J-ZN1-1011	Zone-1	4152	0.0	54
J-ZN1-1012	Zone-1	4154	0.0	53
J-ZN1-1013	Zone-1	4184	6.8	45
J-ZN1-1014	Zone-1	4166	7.8	53
J-ZN1-1015	Zone-1	4225	9.4	29
J-ZN1-1016	Zone-1	4219	2.3	36
J-ZN1-1017	Zone-1	4250	1.5	22
J-ZN1-1018	Zone-1	4169	2.8	57
J-ZN1-1019	Zone-1	4148	7.6	66
J-ZN1-1020	Zone-1	4130	0.0	66
J-ZN1-1021	Zone-1	4195	3.3	38
J-ZN1-1022	Zone-1	4092	1.9	80
J-ZN1-1023	Zone-1	4090	0.0	81
J-ZN1-1024	Zone-1	4090	0.0	81
J-ZN1-1025	Zone-1	4119	21.7	63
J-ZN1-1026	Zone-1	4120	2.7	63
J-ZN1-1027	Zone-1	4119	2.6	63
J-ZN1-1028	Zone-1	4122	0.0	62
J-ZN1-1029	Zone-1	4108	4.6	65
J-ZN1-1030	Zone-1	4106	0.3	65
J-ZN1-1031	Zone-1	4110	4.2	64
J-ZN1-1032	Zone-1	4106	2.9	65
J-ZN1-1033	Zone-1	4149	20.7	50
J-ZN1-1034	Zone-1	4164	1.3	43
J-ZN1-1035	Zone-1	4120	1.4	56
J-ZN1-1036	Zone-1	4129	7.9	52
J-ZN1-1037	Zone-1	4175	13.9	54
J-ZN1-1038	Zone-1	4162	7.5	59
J-ZN1-1039	Zone-1	4158	12.1	61
J-ZN1-1040	Zone-1	4160	0.0	60
J-ZN1-1041	Zone-1	4159	7.9	61
J-ZN1-1042	Zone-1	4150	0.3	65
J-ZN1-1043	Zone-1	4151	4.4	64
J-ZN1-1044	Zone-1	4138	24.6	35
J-ZN1-1045	Zone-1	4140	10.3	34
J-ZN1-1046	Zone-1	4112	27.3	58
J-ZN1-1047	Zone-1	4104	1.3	53
J-ZN1-1048	Zone-1	4109	21.6	51
J-ZN1-1049	Zone-1	4120	49.5	53
J-ZN1-1050	Zone-1	4122	8.8	52
J-ZN1-1051	Zone-1	4092	8.8	66
J-ZN1-1052	Zone-1	4095	19.4	65
J-ZN1-1053	Zone-1	4094	24.2	64
J-ZN1-1054	Zone-1	4092	1.8	65
J-ZN1-1055	Zone-1	4092	2.5	67
J-ZN1-1056	Zone-1	4094	12.0	66
J-ZN1-1057	Zone-1	4108	5.4	81
J-ZN1-1058	Zone-1	4094	3.2	53
J-ZN1-1059	Zone-1	4094	2.7	53
J-ZN1-1060	Zone-1	4098	12.4	55
J-ZN1-1061	Zone-1	4100	2.5	54
J-ZN1-1062	Zone-1	4100	4.7	53
J-ZN1-1063	Zone-1	4101	18.3	53
J-ZN1-1064	Zone-1	4099	23.3	54
J-ZN1-1065	Zone-1	4148	28.1	59
J-ZN1-1066	Zone-1	4146	18.0	60
J-ZN1-1067	Zone-1	4209	4.6	40
J-ZN1-1068	Zone-1	4186	2.8	48
J-ZN1-1069	Zone-1	4191	2.5	46
J-ZN1-1070	Zone-1	4168	5.5	50
J-ZN1-1071	Zone-1	4176	17.4	49
J-ZN1-1072	Zone-1	4176	24.1	49
J-ZN1-1073	Zone-1	4166	8.8	53
J-ZN1-1074	Zone-1	4182	1.0	46
J-ZN1-1075	Zone-1	4173	10.4	51
J-ZN1-1076	Zone-1	4161	37.7	56
J-ZN1-1077	Zone-1	4172	27.8	52
J-ZN1-1078	Zone-1	4172	14.6	51
J-ZN1-1079	Zone-1	4174	64.2	47
J-ZN1-1080	Zone-1	4178	11.3	50
J-ZN1-1081	Zone-1	4092	2.2	82
J-ZN1-1082	Zone-1	4092	7.8	82
J-ZN1-1083	Zone-1	4094	0.0	81
J-ZN1-1084	Zone-1	4173	5.1	48
J-ZN1-1085	Zone-1	4090	14.8	87
J-ZN1-1086	Zone-1	4090	0.1	87
J-ZN1-1087	Zone-1	4091	1.1	86
J-ZN1-1088	Zone-1	4090	27.8	88

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1089	Zone-1	4090	5.4	88
J-ZN1-1090	Zone-1	4171	4.1	49
J-ZN1-1091	Zone-1	4092	2.4	86
J-ZN1-1092	Zone-1	4088	0.0	88
J-ZN1-1093	Zone-1	4093	0.3	83
J-ZN1-1094	Zone-1	4094	15.7	81
J-ZN1-1095	Zone-1	4092	0.4	82
J-ZN1-1096	Zone-1	4092	7.0	82
J-ZN1-1097	Zone-1	4100	45.9	78
J-ZN1-1098	Zone-1	4100	17.1	78
J-ZN1-1099	Zone-1	4189	22.8	41
J-ZN1-1100	Zone-1	4098	1.0	79
J-ZN1-1101	Zone-1	4100	0.0	78
J-ZN1-1102	Zone-1	4100	0.0	78
J-ZN1-1103	Zone-1	4099	4.3	78
J-ZN1-1104	Zone-1	4126	7.3	64
J-ZN1-1105	Zone-1	4125	0.0	65
J-ZN1-1106	Zone-1	4122	10.6	66
J-ZN1-1107	Zone-1	4130	79.2	62
J-ZN1-1108	Zone-1	4119	9.1	67
J-ZN1-1109	Zone-1	4120	13.6	67
J-ZN1-1110	Zone-1	4204	3.6	35
J-ZN1-1111	Zone-1	4138	11.8	63
J-ZN1-1112	Zone-1	4138	10.9	63
J-ZN1-1113	Zone-1	4138	23.5	63
J-ZN1-1114	Zone-1	4157	18.1	58
J-ZN1-1115	Zone-1	4177	12.8	49
J-ZN1-1116	Zone-1	4156	25.3	58
J-ZN1-1117	Zone-1	4156	22.4	58
J-ZN1-1118	Zone-1	4154	3.5	59
J-ZN1-1119	Zone-1	4204	1.2	35
J-ZN1-1120	Zone-1	4162	19.0	56
J-ZN1-1121	Zone-1	4163	19.5	55
J-ZN1-1122	Zone-1	4166	17.3	54
J-ZN1-1123	Zone-1	4170	7.0	52
J-ZN1-1124	Zone-1	4164	10.5	55
J-ZN1-1125	Zone-1	4166	9.2	54
J-ZN1-1126	Zone-1	4168	1.4	51
J-ZN1-1127	Zone-1	4170	3.1	51
J-ZN1-1128	Zone-1	4165	3.5	51

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1129	Zone-1	4216	7.6	30
J-ZN1-1130	Zone-1	4153	1.9	57
J-ZN1-1131	Zone-1	4154	8.6	56
J-ZN1-1132	Zone-1	4158	0.0	55
J-ZN1-1133	Zone-1	4162	6.0	53
J-ZN1-1134	Zone-1	4162	20.7	48
J-ZN1-1135	Zone-1	4172	2.4	44
J-ZN1-1136	Zone-1	4171	4.1	44
J-ZN1-1137	Zone-1	4205	1.6	34
J-ZN1-1138	Zone-1	4178	0.0	41
J-ZN1-1139	Zone-1	4175	3.3	42
J-ZN1-1140	Zone-1	4168	13.0	45
J-ZN1-1141	Zone-1	4156	11.9	50
J-ZN1-1142	Zone-1	4159	2.3	49
J-ZN1-1143	Zone-1	4149	5.6	53
J-ZN1-1144	Zone-1	4151	3.5	53
J-ZN1-1145	Zone-1	4107	35.2	72
J-ZN1-1146	Zone-1	4208	13.6	33
J-ZN1-1147	Zone-1	4108	16.6	72
J-ZN1-1148	Zone-1	4108	8.1	72
J-ZN1-1149	Zone-1	4100	7.4	75
J-ZN1-1150	Zone-1	4101	18.1	75
J-ZN1-1151	Zone-1	4110	2.6	71
J-ZN1-1152	Zone-1	4110	0.2	69
J-ZN1-1153	Zone-1	4211	9.9	32
J-ZN1-1154	Zone-1	4110	0.0	69
J-ZN1-1155	Zone-1	4104	9.2	74
J-ZN1-1156	Zone-1	4110	2.7	69
J-ZN1-1157	Zone-1	4109	6.5	72
J-ZN1-1158	Zone-1	4117	12.6	68
J-ZN1-1159	Zone-1	4117	5.1	68
J-ZN1-1160	Zone-1	4139	17.6	59
J-ZN1-1161	Zone-1	4108	29.8	72
J-ZN1-1162	Zone-1	4109	13.1	71
J-ZN1-1163	Zone-1	4104	0.0	74
J-ZN1-1164	Zone-1	4105	20.3	73
J-ZN1-1165	Zone-1	4106	10.9	73
J-ZN1-1166	Zone-1	4108	25.9	72
J-ZN1-1167	Zone-1	4108	6.2	72
J-ZN1-1168	Zone-1	4110	25.7	71

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1169	Zone-1	4108	21.2	72
J-ZN1-1170	Zone-1	4110	13.4	71
J-ZN1-1171	Zone-1	4108	34.5	72
J-ZN1-1172	Zone-1	4220	9.3	28
J-ZN1-1173	Zone-1	4106	0.0	73
J-ZN1-1174	Zone-1	4106	0.0	73
J-ZN1-1175	Zone-1	4106	0.0	73
J-ZN1-1176	Zone-1	4137	13.1	59
J-ZN1-1177	Zone-1	4138	19.0	58
J-ZN1-1178	Zone-1	4136	19.4	59
J-ZN1-1179	Zone-1	4168	30.1	45
J-ZN1-1180	Zone-1	4165	47.5	47
J-ZN1-1181	Zone-1	4220	5.4	28
J-ZN1-1182	Zone-1	4164	0.0	47
J-ZN1-1183	Zone-1	4158	11.2	50
J-ZN1-1184	Zone-1	4176	2.6	42
J-ZN1-1185	Zone-1	4159	4.1	49
J-ZN1-1186	Zone-1	4166	1.2	46
J-ZN1-1187	Zone-1	4168	25.6	45
J-ZN1-1188	Zone-1	4149	7.1	54
J-ZN1-1189	Zone-1	4152	3.2	52
J-ZN1-1190	Zone-1	4148	0.0	54
J-ZN1-1191	Zone-1	4109	10.2	71
J-ZN1-1192	Zone-1	4207	7.2	34
J-ZN1-1193	Zone-1	4109	7.2	72
J-ZN1-1194	Zone-1	4107	18.4	72
J-ZN1-1195	Zone-1	4104	28.6	73
J-ZN1-1196	Zone-1	4105	11.5	73
J-ZN1-1197	Zone-1	4105	17.6	73
J-ZN1-1198	Zone-1	4104	12.6	74
J-ZN1-1199	Zone-1	4102	0.2	75
J-ZN1-1200	Zone-1	4088	0.0	82
J-ZN1-1201	Zone-1	4090	0.0	81
J-ZN1-1202	Zone-1	4208	8.4	33
J-ZN1-1203	Zone-1	4090	0.0	81
J-ZN1-1204	Zone-1	4090	27.1	81
J-ZN1-1205	Zone-1	4086	0.0	83
J-ZN1-1206	Zone-1	4089	2.2	81
J-ZN1-1207	Zone-1	4094	1.9	80
J-ZN1-1208	Zone-1	4090	0.0	82
J-ZN1-1209	Zone-1	4089	0.2	82
J-ZN1-1210	Zone-1	4093	0.0	80
J-ZN1-1211	Zone-1	4090	0.0	82
J-ZN1-1212	Zone-1	4205	13.2	34
J-ZN1-1213	Zone-1	4089	0.0	82
J-ZN1-1214	Zone-1	4088	0.0	83
J-ZN1-1215	Zone-1	4089	3.8	82
J-ZN1-1216	Zone-1	4090	36.3	82
J-ZN1-1217	Zone-1	4090	0.0	82
J-ZN1-1218	Zone-1	4090	0.0	82
J-ZN1-1219	Zone-1	4090	0.0	82
J-ZN1-1220	Zone-1	4090	0.0	82
J-ZN1-1221	Zone-1	4090	0.0	82
J-ZN1-1222	Zone-1	4090	0.0	82
J-ZN1-1223	Zone-1	4090	0.0	82
J-ZN1-1224	Zone-1	4090	0.0	82
J-ZN1-1225	Zone-1	4090	0.0	82
J-ZN1-1226	Zone-1	4090	0.0	82
J-ZN1-1227	Zone-1	4090	0.0	82
J-ZN1-1228	Zone-1	4089	0.0	82
J-ZN1-1229	Zone-1	4090	0.0	82
J-ZN1-1230	Zone-1	4089	0.0	82
J-ZN1-1231	Zone-1	4089	0.0	82
J-ZN1-1232	Zone-1	4088	0.0	83
J-ZN1-1233	Zone-1	4084	0.0	84
J-ZN1-1234	Zone-1	4090	0.0	82
J-ZN1-1235	Zone-1	4089	0.0	82
J-ZN1-1236	Zone-1	4090	0.0	82
J-ZN1-1237	Zone-1	4088	0.0	83
J-ZN1-1238	Zone-1	4088	0.2	82
J-ZN1-1239	Zone-1	4088	0.0	83
J-ZN1-1240	Zone-1	4088	1.6	83
J-ZN1-1241	Zone-1	4174	15.8	49
J-ZN1-1242	Zone-1	4294	0.0	7
J-ZN1-1243	Zone-1	4285	0.0	9
J-ZN1-1244	Zone-1	4162	0.0	58
J-ZN1-1245	Zone-1	4223	0.0	27
J-ZN1-1246	Zone-1	4297	0.0	2
J-ZN1-1247	Zone-1	4215	0.0	28
J-ZN1-1248	Zone-1	4174	3.6	39

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1249	Zone-1	4197	0.0	29
J-ZN1-1250	Zone-1	4111	0.0	83
J-ZN1-1251	Zone-1	4111	0.1	45
J-ZN1-1252	Zone-1	4092	0.0	42
J-ZN1-1253	Zone-1	4092	2.0	92
J-ZN1-1258	Zone-1	4175	0.3	52
J-ZN1-1280	Zone-1	4091	0.0	62
J-ZN1-1281	Zone-1	4111	8.5	63
J-ZN1-1436	Zone-1	4178	2.6	48
J-ZN1-4005	Zone-1	4192	12.3	40
J-ZN1-4007	Zone-1	4186	6.0	43
J-ZN1-4008	Zone-1	4230	3.1	24
J-ZN1-4013	Zone-1	4096	6.2	80
J-ZN1-4015	Zone-1	4088	0.0	83
J-ZN1-4017	Zone-1	4088	13.2	83
P-ZN1-0798A	Zone-1	4170	12.0	51

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
P-ZN1-0798B	Zone-1	4172	14.2	50
P-ZN1-0856B	Zone-1	4162	55.6	59
HYDRANT597	Zone-3	4426	81.8	30
J-BV-0001	Zone-5	4546	13.0	66
J-BV-0002	Zone-5	4401	7.8	129
J-BV-0003	Zone-5	4442	20.9	111
J-BV-0004	Zone-5	4460	0.0	103
J-BV-0005	Zone-5	4547	0.0	66
J-BV-0006	Zone-5	4543	0.0	67
J-BV-0007	Zone-5	4486	26.4	92
J-BV-0008	Zone-5	4548	6.7	65
J-BV-0009	Zone-5	4503	6.1	85
J-BV-0010	Zone-5	4494	0.0	89
J-BV5-0001	Zone-5	4590	0.0	47
J-BV5-0004	Zone-5	4493	0.0	93

Appendix G. Existing System Fire Flow at Maximum-Day Demand

G. Existing System Fire Flow at Maximum-Day Demand

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-CR-0002	Crown Ridge	4417	13.1	2035
J-CR-0004	Crown Ridge	4444	6.3	1786
J-CR-0003	Crown Ridge	4422	7.0	2457
J-CR-0001	Crown Ridge	4436	26.8	2212
J-CR-0008	Crown Ridge	4396	11.4	2244
J-CR-0005	Crown Ridge	4435	6.4	2323
J-CR-0006	Crown Ridge	4439	2.8	2237
J-CR-0007	Crown Ridge	4415	0.0	2317
J-ESI-0002	ESI	4388	59.1	2338
J-ESI-0003	ESI	4354	0.0	2374
J-ESI-0001	ESI	4369	0.0	2365
J-FHH-0005	Foothill_Homedale	4252	11.7	2183
J-FHH-0009	Foothill_Homedale	4310	7.3	644
J-FHH-0016	Foothill_Homedale	4248	1.3	3804
J-FHH-0008	Foothill_Homedale	4257	3.3	4412
J-FHH-0006	Foothill_Homedale	4296	7.5	4014
J-FHH-0002	Foothill_Homedale	4270	11.2	4113
J-FHH-0007	Foothill_Homedale	4266	13.8	3987
J-FHH-0004	Foothill_Homedale	4232	12.9	4509
J-FHH-0017	Foothill_Homedale	4300	0.0	4094
J-FHH-0018	Foothill_Homedale	4301	4.5	3933
J-FHH-0003	Foothill_Homedale	4285	26.9	3542
J-FHH-0001	Foothill_Homedale	4289	4.8	3426
J-FHH-0015	Foothill_Homedale	4249	32.4	4153
J-FHH-0010	Foothill_Homedale	4307	0.0	3451
J-FHH-0011	Foothill_Homedale	4279	2.5	3670
J-FHH-0012	Foothill_Homedale	4256	0.0	3696
J-FHH-0013	Foothill_Homedale	4306	0.0	3163
J-FHH-0014	Foothill_Homedale	4236	6.5	4181
J-HC-0002	Havencrest	4396	6.8	1194
J-HC-0001	Havencrest	4417	19.2	1229
J-KL-0002	Katie Lane	4232	3.3	2681
J-KL-0006	Katie Lane	4202	26.0	2613
J-KL-0001	Katie Lane	4232	2.0	3294
J-KL-0003	Katie Lane	4233	4.0	2978
J-KL-0004	Katie Lane	4234	11.5	2906
J-KL-0005	Katie Lane	4212	0.0	2882
J-SL-0085	Lindley	4134	0.0	1857
J-SL-0087	Lindley	4195	8.7	462
J-SL-0081	Lindley	4108	8.4	4894
J-SL-0072	Lindley	4260	0.0	918
J-SL-0086	Lindley	4217	20.5	1088
J-SL-0082	Lindley	4204	15.3	1175
J-SL-0089	Lindley	4284	1.7	441
J-SL-0064	Lindley	4147	17.0	1535
J-SL-0104	Lindley	4218	0.9	699
J-SL-0105	Lindley	4209	1.7	1300
J-SL-0107	Lindley	4188	3.8	4382
J-SL-0093	Lindley	4173	0.0	1536
J-SL-0067	Lindley	4216	10.1	1966
J-SL-0083	Lindley	4151	4.1	2208
J-SL-0079	Lindley	4148	6.0	4126
J-SL-0073	Lindley	4239	24.0	1395
J-SL-0077	Lindley	4185	8.1	4411
J-SL-0090	Lindley	4236	2.0	689
J-SL-0075	Lindley	4233	0.9	2639
J-SL-0088	Lindley	4098	9.0	1663
J-SL-0068	Lindley	4235	8.1	1540
J-SL-0092	Lindley	4210	7.9	1045
J-SL-0080	Lindley	4105	1.9	5393
J-SL-0074	Lindley	4213	13.8	5290
J-SL-0078	Lindley	4154	10.4	4530
J-SL-0091	Lindley	4180	7.2	1093
J-SL-0069	Lindley	4232	10.4	1679

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-SL-0076	Lindley	4188	1.7	7696
J-SL-0108	Lindley	4166	0.0	1566
J-SL-0063	Lindley	4138	0.3	2464
J-SL-0071	Lindley	4214	0.0	12408
J-SL-0084	Lindley	4146	0.0	1985
J-SL-0065	Lindley	4124	0.0	5702
J-SL-0066	Lindley	4184	60.8	2044
J-SL-0070	Lindley	4221	0.0	7064
J-SL-0102	Lindley	4224	3.6	787
J-SL-0103	Lindley	4231	1.5	728
J-SL-0106	Lindley	4203	0.0	6839
J-SL-0094	Lindley	4149	5.0	4361
J-SL-0095	Lindley	4188	2.2	9081
J-SL-0096	Lindley	4272	0.5	11340
J-SL-0097	Lindley	4203	5.4	1039
J-SL-0098	Lindley	4227	2.0	738
J-SL-0099	Lindley	4146	2.7	2657
J-SL-0100	Lindley	4138	0.0	2480
J-SL-0101	Lindley	4130	0.0	2788
J-PAT-0017	Patterson	4357	9.1	254
J-PAT-0023	Patterson	4187	2.2	3341
J-PAT-0050	Patterson	4236	7.7	1826
J-PAT-0053	Patterson	4361	4.1	1497
J-PAT-0054	Patterson	4322	6.2	2056
J-PAT-0055	Patterson	4373	11.3	1347
J-PAT-0057	Patterson	4318	12.7	2351
J-PAT-0060	Patterson	4357	5.1	2207
J-PAT-0064	Patterson	4413	4.5	1496
J-PAT-0066	Patterson	4420	10.0	662
J-PAT-0067	Patterson	4389	7.5	270
J-PAT-0071	Patterson	4247	0.0	3853
J-PAT-0072	Patterson	4256	0.0	3290
J-PAT-0073	Patterson	4238	0.1	2492
J-PAT-0074	Patterson	4333	22.5	1134
J-PAT-0075	Patterson	4243	0.0	1369
J-PAT-0033	Patterson	4470	28.6	28
J-PAT-0035	Patterson	4346	10.2	6327
J-PAT-0015	Patterson	4431	2.2	198
J-PAT-0002	Patterson	4281	7.1	1451

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PAT-0021	Patterson	4437	18.5	174
J-PAT-0043	Patterson	4310	1.4	2722
J-PAT-0009	Patterson	4368	0.0	5126
J-PAT-0028	Patterson	4367	2.9	6019
J-PAT-0004	Patterson	4332	22.6	2093
J-PAT-0036	Patterson	4321	0.0	6484
J-PAT-0019	Patterson	4393	2.0	2360
J-PAT-0029	Patterson	4344	0.6	6943
J-PAT-0018	Patterson	4396	3.5	2893
J-PAT-0037	Patterson	4378	0.0	4819
J-PAT-0020	Patterson	4255	0.0	1471
J-PAT-0038	Patterson	4211	2.8	6244
J-PAT-0030	Patterson	4350	0.0	7229
J-PAT-0008	Patterson	4372	5.1	3346
J-PAT-0010	Patterson	4326	0.0	6535
J-PAT-0026	Patterson	4288	0.0	3981
J-PAT-0005	Patterson	4311	6.3	1948
J-PAT-0001	Patterson	4232	3.7	3900
J-PAT-0013	Patterson	4315	1.1	1733
J-PAT-0014	Patterson	4435	17.4	187
J-PAT-0031	Patterson	4391	0.0	7507
J-PAT-0007	Patterson	4332	11.8	1116
J-PAT-0027	Patterson	4314	16.1	3882
J-PAT-0012	Patterson	4274	8.1	3945
J-PAT-0016	Patterson	4313	8.2	1472
J-PAT-0003	Patterson	4321	0.9	3900
J-PAT-0044	Patterson	4426	0.0	0
J-PAT-0032	Patterson	4394	0.3	3554
J-PAT-0042	Patterson	4306	3.1	2157
J-PAT-0034	Patterson	4463	0.0	0
J-PAT-0022	Patterson	4298	1.3	2667
J-PAT-0011	Patterson	4376	10.5	3099
J-PAT-0006	Patterson	4349	19.2	1220
J-PAT-0041	Patterson	4227	11.8	5844
J-PAT-0077	Patterson	4445	0.0	0
J-PAT-0082	Patterson	4280	0.0	1146
J-PAT-0079	Patterson	4314	3.7	5524
J-PAT-0080	Patterson	4288	5.5	3836
J-PAT-0076	Patterson	4286	0.0	3980

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PAT-0078	Patterson	4212	0.0	5986
J-PAT-0081	Patterson	4306	1.3	2668
J-PAT-0040	Patterson	4244	0.0	6506
J-PAT-0039	Patterson	4197	0.0	6874
J-PAT-0024	Patterson	4247	0.0	3919
J-PAT-0025	Patterson	4246	0.3	3878
J-PAT-0049	Patterson	4223	10.0	5974
J-PAT-0051	Patterson	4342	8.0	5858
J-PAT-0052	Patterson	4334	4.4	3016
J-PAT-0056	Patterson	4326	15.4	2929
J-PAT-0058	Patterson	4348	9.4	3220
J-PAT-0059	Patterson	4377	2.0	3162
J-PAT-0061	Patterson	4349	13.4	2890
J-PAT-0062	Patterson	4373	0.0	2492
J-PAT-0063	Patterson	4396	1.0	3810
J-PAT-0065	Patterson	4383	23.1	1691
J-PAT-0068	Patterson	4386	4.4	1499
J-PAT-0069	Patterson	4322	9.2	1553
J-PAT-0070	Patterson	4381	9.9	3671
J-PAT-0045	Patterson	4356	5.7	875
J-PAT-0046	Patterson	4394	3.2	3202
J-PAT-0047	Patterson	4426	0.0	214
J-PAT-0048	Patterson	4343	10.0	1549
J-PRE-0056	Prescott	4233	4.0	2164
J-PRE-0048	Prescott	4269	6.2	725
J-PRE-0057	Prescott	4311	0.8	494
J-PRE-0010	Prescott	4291	2.1	95
J-PRE-0046	Prescott	4256	2.2	1201
J-PRE-0055	Prescott	4229	4.1	387
J-PRE-0044	Prescott	4289	2.4	65
J-PRE-0053	Prescott	4279	1.0	348
J-PRE-0038	Prescott	4184	0.0	646
J-PRE-0024	Prescott	4230	9.6	435
J-PRE-0003	Prescott	4250	1.3	420
J-PRE-0058	Prescott	4313	1.4	440
J-PRE-0006	Prescott	4306	2.2	2
J-PRE-0045	Prescott	4272	0.7	922
J-PRE-0050	Prescott	4232	1.9	1233
J-PRE-0065	Prescott	4246	2.9	2008

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRE-0070	Prescott	4261	3.4	323
J-PRE-0072	Prescott	4194	2.5	603
J-PRE-0073	Prescott	4196	6.6	581
J-PRE-0086	Prescott	4210	3.9	565
J-PRE-0088	Prescott	4256	2.2	375
J-PRE-0019	Prescott	4254	2.4	994
J-PRE-0078	Prescott	4253	3.9	1075
J-PRE-0030	Prescott	4244	6.2	1392
J-PRE-0039	Prescott	4224	6.8	3782
J-PRE-0029	Prescott	4237	4.8	584
J-PRE-0032	Prescott	4263	2.1	765
J-PRE-0011	Prescott	4213	2.0	1251
J-PRE-0062	Prescott	4218	5.5	1136
J-PRE-0060	Prescott	4248	3.9	678
J-PRE-0047	Prescott	4246	0.7	5096
J-PRE-0013	Prescott	4218	0.7	5212
J-PRE-0028	Prescott	4240	3.7	624
J-PRE-0059	Prescott	4257	0.4	3225
J-PRE-0008	Prescott	4290	1.6	122
J-PRE-0002	Prescott	4252	2.6	464
J-PRE-0035	Prescott	4236	4.5	992
J-PRE-0036	Prescott	4306	1.4	840
J-PRE-0026	Prescott	4234	2.5	981
J-PRE-0033	Prescott	4202	0.9	835
J-PRE-0005	Prescott	4277	2.1	173
J-PRE-0025	Prescott	4248	1.8	5094
J-PRE-0034	Prescott	4243	4.5	533
J-PRE-0042	Prescott	4258	0.0	4134
J-PRE-0063	Prescott	4230	2.8	504
J-PRE-0007	Prescott	4303	2.5	2
J-PRE-0051	Prescott	4249	4.1	7432
J-PRE-0040	Prescott	4232	20.6	4088
J-PRE-0014	Prescott	4224	1.0	7168
J-PRE-0023	Prescott	4255	4.5	1806
J-PRE-0022	Prescott	4241	2.6	701
J-PRE-0009	Prescott	4282	0.0	172
J-PRE-0031	Prescott	4223	0.0	1065
J-PRE-0061	Prescott	4268	4.6	496
J-PRE-0049	Prescott	4271	0.3	1301

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRE-0012	Prescott	4206	1.7	1164
J-PRE-0027	Prescott	4261	21.1	750
J-PRE-0021	Prescott	4265	3.6	315
J-PRE-0001	Prescott	4269	2.3	227
J-PRE-0054	Prescott	4265	2.8	984
J-PRE-0043	Prescott	4263	0.9	4143
J-PRE-0064	Prescott	4256	6.7	380
J-PRE-0004	Prescott	4243	3.7	570
J-PRE-0052	Prescott	4259	9.3	942
J-PRE-0041	Prescott	4250	2.2	4070
J-PRE-0037	Prescott	4242	2.6	723
J-PRE-0089	Prescott	4220	2.0	6728
J-PRE-0015	Prescott	4247	13.3	1111
J-PRE-0016	Prescott	4258	1.1	1006
J-PRE-0020	Prescott	4300	0.2	28
J-PRE-0066	Prescott	4232	1.2	6551
J-PRE-0067	Prescott	4298	1.1	2485
J-PRE-0068	Prescott	4299	8.7	1166
J-PRE-0069	Prescott	4257	4.5	353
J-PRE-0071	Prescott	4186	8.0	662
J-PRE-0085	Prescott	4242	8.5	677
J-PRE-0087	Prescott	4300	0.8	28
J-PRE-0017	Prescott	4284	1.8	150
J-PRE-0018	Prescott	4290	7.9	407
J-PRE-0074	Prescott	4280	0.5	9264
J-PRE-0075	Prescott	4269	2.4	3779
J-PRE-0076	Prescott	4212	8.9	1256
J-PRE-0077	Prescott	4269	1.4	991
J-PRE-0079	Prescott	4254	8.4	1552
J-PRE-0080	Prescott	4206	9.8	3599
J-PRE-0081	Prescott	4202	0.2	3559
J-PRE-0082	Prescott	4211	4.8	500
J-PRE-0083	Prescott	4243	2.0	477
J-PRE-0084	Prescott	4250	4.3	3826
J2572	Prescott	4202	3.2	585
J-PRV-2-OGD-0001	PRV_Ogden	4266	1.3	1277
J-PRV-2-OGD-0003	PRV_Ogden	4255	2.8	1072
J-PRV-2-OGD-0004	PRV_Ogden	4266	2.8	1130
J-PRV-2-OGD-0005	PRV_Ogden	4242	3.7	1065
J-PRV-2-OGD-0006	PRV_Ogden	4236	7.5	983
J-PRV-2-OGD-0007	PRV_Ogden	4250	2.4	1216
J-PRV-2-OGD-0002	PRV_Ogden	4281	48.5	2876
J-PRV-2-OGD-0008	PRV_Ogden	4282	1.4	3094
J-PRV-MOY-0009	PRV-13	4269	1.5	684
J-PRV-MOY-0003	PRV-13	4269	10.5	52
J-PRV-MOY-0006	PRV-13	4295	5.5	276
J-PRV-MOY-0012	PRV-13	4293	0.9	312
J-PRV-MOY-0005	PRV-13	4268	15.9	293
J-PRV-MOY-0007	PRV-13	4255	12.2	104
J-PRV-MOY-0008	PRV-13	4248	5.2	299
J-PRV-MOY-0010	PRV-13	4274	2.1	545
J-PRV-MOY-0002	PRV-13	4298	7.3	205
J-PRV-MOY-0004	PRV-13	4281	12.0	99
J-PRV-MOY-0014	PRV-13	4239	8.6	336
J-PRV-MOY-0011	PRV-13	4292	5.1	344
J-PRV-MOY-0001	PRV-13	4276	1.0	924
J-PRV-MOY-0015	PRV-13	4278	0.0	1056
J-PRV-MOY-0013	PRV-13	4275	5.8	453
J-PRV-2-ELD-0015	PRV-2	4200	0.8	463
J-PRV-2-ELD-0014	PRV-2	4192	3.9	441
J-PRV-2-ELD-0011	PRV-2	4202	6.3	889
J-PRV-2-ELD-0002	PRV-2	4248	6.7	906
J-PRV-2-ELD-0013	PRV-2	4208	17.4	535
J-PRV-2-ELD-0012	PRV-2	4219	17.4	729

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-2-ELD-0022	PRV-2	4250	7.6	551
J-PRV-2-ELD-0003	PRV-2	4226	1.0	1556
J-PRV-2-ELD-0010	PRV-2	4219	10.9	723
J-PRV-2-ELD-0007	PRV-2	4228	6.1	1372
J-PRV-2-ELD-0006	PRV-2	4232	10.9	864
J-PRV-2-ELD-0001	PRV-2	4229	4.2	2400
J-PRV-2-ELD-0008	PRV-2	4218	8.4	1779
J-PRV-2-ELD-0017	PRV-2	4203	7.4	751
J-PRV-2-ELD-0009	PRV-2	4231	10.5	1049
J-PRV-2-ELD-0004	PRV-2	4252	12.2	1153
J-PRV-2-ELD-0018	PRV-2	4240	26.1	1509
J-PRV-2-ELD-0016	PRV-2	4224	0.6	1633
J-PRV-2-ELD-0020	PRV-2	4253	12.9	2095
J-PRV-2-ELD-0021	PRV-2	4238	16.0	2403
J-PRV-2-ELD-0005	PRV-2	4218	6.6	2343
J-PRV-2-ELD-0019	PRV-2	4215	1.6	1578
J-PRE-1254	PRV-2-HWY	4195	0.0	1367
J-PRV-HWY-0009	PRV-2-HWY	4206	1.5	1583
J-PRV-HWY-0011	PRV-2-HWY	4184	9.4	1705
J-PRV-HWY-0013	PRV-2-HWY	4217	0.3	1505
J-PRV-HWY-0014	PRV-2-HWY	4221	3.1	1567
J-PRV-HWY-0017	PRV-2-HWY	4241	14.5	1350
J-PRV-HWY-0018	PRV-2-HWY	4216	0.0	1616
J-PRV-HWY-0019	PRV-2-HWY	4222	1.3	1589
J-PRV-HWY-0021	PRV-2-HWY	4238	1.7	1456
J-PRV-HWY-0008	PRV-2-HWY	4233	0.3	1568

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-HWY-0007	PRV-2-HWY	4191	8.5	4770
J-PRV-HWY-0001	PRV-2-HWY	4234	23.5	1609
J-PRV-HWY-0022	PRV-2-HWY	4189	0.0	4965
J-PRV-HWY-0002	PRV-2-HWY	4218	2.4	1634
J-PRV-HWY-0003	PRV-2-HWY	4216	1.8	1637
J-PRV-HWY-0004	PRV-2-HWY	4243	3.3	1366
J-PRV-HWY-0005	PRV-2-HWY	4238	2.5	1460
J-PRV-HWY-0006	PRV-2-HWY	4222	1.5	1593
J-PRV-HWY-0012	PRV-2-HWY	4234	0.0	1567
J-PRV-HWY-0015	PRV-2-HWY	4216	7.2	1612
J-PRV-HWY-0016	PRV-2-HWY	4238	2.4	1388
J-PRV-HWY-0020	PRV-2-HWY	4233	0.3	1457
J-PRV-3-UMO-0005	PRV-3	4309	0.0	501
J-PRV-3-UMO-0002	PRV-3	4317	12.5	617
J-PRV-3-UMO-0006	PRV-3	4337	3.5	624
J-PRV-3-UMO-0004	PRV-3	4324	39.3	636
J-PRV-3-UMO-0003	PRV-3	4300	4.6	621
J-PRV-3-UMO-0001	PRV-3	4285	11.1	1490
J-PRV-3-UMO-0007	PRV-3	4321	0.0	511
J-PRV-3-UMO-0008	PRV-3	4325	0.0	503
J-PRV-3-UMO-0009	PRV-3	4343	1.7	630
J-PRV-OFR-0005	PRV-6	4210	11.2	705
J-PRV-OFR-0007	PRV-6	4231	5.6	664
J-PRV-OFR-0002	PRV-6	4248	5.9	651
J-PRV-OFR-0001	PRV-6	4264	5.6	729
J-PRV-OFR-0004	PRV-6	4185	2.4	746

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-OFR-0003	PRV-6	4225	10.2	738
J-PRV-OFR-0008	PRV-6	4254	4.0	578
J-PRV-OFR-0006	PRV-6	4198	11.1	730
J-SH-0001	Sierra Heights	4232	4.0	2095
J-SH-0007	Sierra Heights	4262	9.3	1047
J-SH-0008	Sierra Heights	4274	12.2	904
J-SH-0100	Sierra Heights	4282	0.7	1065
J-SH-0105	Sierra Heights	4282	1.2	1048
J-SH-0110	Sierra Heights	4268	8.8	1443
J-SH-120	Sierra Heights	4271	0.0	1169
J-SH-125	Sierra Heights	4246	0.9	1451
J-SH-0004	Sierra Heights	4250	14.6	1975
J-SH-0005	Sierra Heights	4252	16.1	1882
J-SH-0006	Sierra Heights	4242	16.2	2043
J-SH-0002	Sierra Heights	4212	0.0	2651
J-SH-0003	Sierra Heights	4225	8.9	2440
J-SH-115	Sierra Heights	4248	0.0	1653
J-SL-0016	Stewart_Lenox	4178	0.1	3417
J-SL-0051	Stewart_Lenox	4227	0.8	86
J-SL-0005	Stewart_Lenox	4246	2.0	68
J-SL-0023	Stewart_Lenox	4198	4.7	1950
J-SL-0026	Stewart_Lenox	4188	0.0	2288
J-SL-0046	Stewart_Lenox	4241	0.0	62
J-SL-0002	Stewart_Lenox	4186	0.0	2029
J-SL-0003	Stewart_Lenox	4214	2.8	2429
J-SL-0111	Stewart_Lenox	4215	0.6	440
J-SL-0052	Stewart_Lenox	4188	0.0	2336
J-SL-0012	Stewart_Lenox	4227	8.5	4017
J-SL-0010	Stewart_Lenox	4199	3.1	2767
J-SL-0004	Stewart_Lenox	4190	0.0	3747
J-SL-0015	Stewart_Lenox	4188	0.0	2770
J-SL-0024	Stewart_Lenox	4192	2.7	1868
J-SL-0006	Stewart_Lenox	4227	0.4	4353
J-SL-0032	Stewart_Lenox	4198	3.1	267
J-SL-0008	Stewart_Lenox	4212	2.3	224
J-SL-0036	Stewart_Lenox	4210	1.9	247
J-SL-0007	Stewart_Lenox	4220	3.3	478
J-SL-0044	Stewart_Lenox	4226	4.2	573
J-SL-0049	Stewart_Lenox	4235	2.8	147
J-SL-0009	Stewart_Lenox	4247	0.4	4052
J-SL-0013	Stewart_Lenox	4220	1.6	4195
J-SL-0014	Stewart_Lenox	4178	18.2	3957
J-SL-0050	Stewart_Lenox	4219	3.0	836
J-SL-0011	Stewart_Lenox	4200	5.1	4819
J-SL-0018	Stewart_Lenox	4228	5.7	4672
J-SL-0019	Stewart_Lenox	4242	1.8	4826
J-SL-0020	Stewart_Lenox	4248	5.3	5180
J-SL-0021	Stewart_Lenox	4236	2.3	212
J-SL-0022	Stewart_Lenox	4189	5.3	2371
J-SL-0025	Stewart_Lenox	4187	8.0	2509
J-SL-0027	Stewart_Lenox	4226	2.4	1825
J-SL-0028	Stewart_Lenox	4238	0.8	1323
J-SL-0029	Stewart_Lenox	4232	3.0	3807
J-SL-0030	Stewart_Lenox	4234	0.8	3650
J-SL-0031	Stewart_Lenox	4276	5.3	35
J-SL-0033	Stewart_Lenox	4247	0.0	4298
J-SL-0034	Stewart_Lenox	4187	0.0	4171
J-SL-0035	Stewart_Lenox	4182	2.0	4691
J-SL-0037	Stewart_Lenox	4181	3.2	4675
J-SL-0038	Stewart_Lenox	4185	3.8	2468
J-SL-0039	Stewart_Lenox	4224	2.4	563
J-SL-0040	Stewart_Lenox	4189	2.2	238
J-SL-0041	Stewart_Lenox	4249	0.0	4353
J-SL-0042	Stewart_Lenox	4242	1.9	4838
J-SL-0043	Stewart_Lenox	4247	2.0	4148
J-SL-0053	Stewart_Lenox	4211	0.1	1326
J-SL-0045	Stewart_Lenox	4228	4.1	4750
J-SL-0048	Stewart_Lenox	4209	0.9	1343
J-SL-0047	Stewart_Lenox	4210	0.0	1497
J-SL-0001	Stewart_Lenox	4225	0.1	619
J-SL-0017	Stewart_Lenox	4183	0.4	4456
J-SL-0112	Stewart_Lenox	4259	3.8	540
J-PRV-SL-0004	Stewart_Lenox_PRV	4134	4.7	151
J-PRV-SL-0003	Stewart_Lenox_PRV	4212	1.4	53
J-PRV-SL-0007	Stewart_Lenox_PRV	4230	0.3	194

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-SL-0008	Stewart_Lenox_PRV	4204	0.7	264
J-PRV-SL-0010	Stewart_Lenox_PRV	4126	1.9	74
J-PRV-SL-0013	Stewart_Lenox_PRV	4114	42.1	1136
J-PRV-SL-0015	Stewart_Lenox_PRV	4114	0.0	282
J-PRV-SL-0002	Stewart_Lenox_PRV	4215	0.0	948
J-PRV-SL-0005	Stewart_Lenox_PRV	4225	1.4	653
J-PRV-SL-0006	Stewart_Lenox_PRV	4216	0.7	270
J-PRV-SL-0009	Stewart_Lenox_PRV	4141	1.5	1099
J-PRV-SL-0011	Stewart_Lenox_PRV	4145	2.5	169
J-PRV-SL-0012	Stewart_Lenox_PRV	4157	5.1	116
J-PRV-SL-0014	Stewart_Lenox_PRV	4117	0.1	1097
J-PRV-SL-0016	Stewart_Lenox_PRV	4213	0.3	958
J-PRV-SL-0017	Stewart_Lenox_PRV	4214	0.0	960
J-PRV-SL-0001	Stewart_Lenox_PRV	4118	6.3	343
J-TW-0002	Tanglewood	4183	0.0	2744
J-TW-0008	Tanglewood	4179	7.3	2727
J-TW-0001	Tanglewood	4549	0.0	3424
J-TW-0019	Tanglewood	4777	1.4	3809
J-TW-0003	Tanglewood	4820	12.8	5306
J-TW-0004	Tanglewood	4814	27.4	3035
J-TW-0005	Tanglewood	4772	2.7	3040
J-TW-0007	Tanglewood	4822	2.6	2538
J-TW-0006	Tanglewood	4807	13.3	2806
J-UL-0003	Upper Lynnewood	4306	8.3	885
J-UL-0007	Upper Lynnewood	4228	5.3	1110
J-UL-0012	Upper Lynnewood	4212	3.8	1175
J-UL-0004	Upper Lynnewood	4269	0.4	1721
J-UL-0002	Upper Lynnewood	4295	8.8	1199
J-UL-0011	Upper Lynnewood	4283	2.4	1191
J-UL-0006	Upper Lynnewood	4230	30.4	1389
J-UL-0001	Upper Lynnewood	4296	3.0	1662
J-UL-0009	Upper Lynnewood	4270	3.1	1740
J-UL-0008	Upper Lynnewood	4230	6.7	1565
J-UL-0010	Upper Lynnewood	4262	1.9	1388
J-UL-0005	Upper Lynnewood	4259	4.1	1611
J-UL-0013	Upper Lynnewood	4289	0.0	1487
J-UM-0010	Upper Moyina	4384	19.9	500
J-UM-0004	Upper Moyina	4429	9.9	177
J-UM-0005	Upper Moyina	4417	4.7	212
J-UM-0015	Upper Moyina	4446	15.8	422
J-UM-0008	Upper Moyina	4362	15.9	706
J-UM-0014	Upper Moyina	4400	19.1	672
J-UM-0002	Upper Moyina	4353	8.2	419
J-UM-0013	Upper Moyina	4401	19.4	289
J-UM-0011	Upper Moyina	4485	0.0	1591
J-UM-0006	Upper Moyina	4369	10.4	387
J-UM-0003	Upper Moyina	4364	8.7	637
J-UM-0001	Upper Moyina	4417	5.7	313
J-UM-0009	Upper Moyina	4360	19.7	616
J-UM-0012	Upper Moyina	4375	9.5	384
J-UM-0021	Upper Moyina	4336	11.9	550
J-UM-0022	Upper Moyina	4356	0.8	664
J-UM-0020	Upper Moyina	4458	0.0	2028
J-UM-0007	Upper Moyina	4434	3.2	1282
J-UM-0016	Upper Moyina	4353	4.3	415
J-UM-0017	Upper Moyina	4419	9.8	307
J-UM-0018	Upper Moyina	4377	6.4	378
J-UM-0019	Upper Moyina	4437	2.5	1067
J2578	Upper Moyina	4372	0.0	534
J-HOS-0056	URH-HOSP-HLVL	4225	4.4	144
J-HOS-0009	URH-HOSP-HLVL	4319	0.0	1421
J-HOS-0051	URH-HOSP-HLVL	4252	0.0	3738
J-HOS-0057	URH-HOSP-HLVL	4386	2.7	863
J-HOS-0108	URH-HOSP-HLVL	4259	0.8	1169
J-HOS-0091	URH-HOSP-HLVL	4331	0.7	1775
J-HOS-0092	URH-HOSP-HLVL	4284	0.0	1973
J-HOS-0093	URH-HOSP-HLVL	4315	3.8	1732
J-HOS-0094	URH-HOSP-HLVL	4328	0.0	3104
J-HOS-0095	URH-HOSP-HLVL	4454	2.3	2
J-HOS-0096	URH-HOSP-HLVL	4452	0.0	0
J-HOS-0098	URH-HOSP-HLVL	4352	98.4	995

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0099	URH-HOSP-HLVL	4318	15.7	2715
J-HOS-0062	URH-HOSP-HLVL	4274	57.1	2311
J-HOS-0064	URH-HOSP-HLVL	4302	0.3	3090
J-HOS-0065	URH-HOSP-HLVL	4344	8.6	1090
J-HOS-0066	URH-HOSP-HLVL	4401	6.1	839
J-HOS-0068	URH-HOSP-HLVL	4253	10.6	1860
J-HOS-0082	URH-HOSP-HLVL	4296	33.9	1862
J-HOS-0084	URH-HOSP-HLVL	4309	7.1	1451
J-HOS-0074	URH-HOSP-HLVL	4334	0.0	3328
J-HOS-0078	URH-HOSP-HLVL	4324	8.7	2570
J-HOS-0028	URH-HOSP-HLVL	4317	19.4	1968
J-HOS-0058	URH-HOSP-HLVL	4369	2.9	1295
J-HOS-0052	URH-HOSP-HLVL	4322	13.5	2559
J-HOS-0026	URH-HOSP-HLVL	4271	3.4	3239
J-HOS-0054	URH-HOSP-HLVL	4388	23.5	237
J-HOS-0038	URH-HOSP-HLVL	4345	0.0	4838
J-HOS-0061	URH-HOSP-HLVL	4253	8.4	2879
J-HOS-0020	URH-HOSP-HLVL	4228	1.6	2708
J-HOS-0023	URH-HOSP-HLVL	4267	4.5	2776
J-HOS-0036	URH-HOSP-HLVL	4383	2.7	3555
J-HOS-0034	URH-HOSP-HLVL	4378	0.2	3234
J-HOS-0030	URH-HOSP-HLVL	4357	0.7	1127
J-HOS-0008	URH-HOSP-HLVL	4279	3.5	2708
J-HOS-0032	URH-HOSP-HLVL	4269	3.1	3844
J-HOS-0047	URH-HOSP-HLVL	4311	0.0	6311
J-HOS-0060	URH-HOSP-HLVL	4251	3.8	3165
J-HOS-0045	URH-HOSP-HLVL	4414	10.5	1589
J-HOS-0044	URH-HOSP-HLVL	4431	5.2	1516
J-HOS-0011	URH-HOSP-HLVL	4224	3.3	5081
J-HOS-0006	URH-HOSP-HLVL	4281	8.5	3633
J-HOS-0042	URH-HOSP-HLVL	4431	0.0	8121
J-HOS-0029	URH-HOSP-HLVL	4344	9.1	1632
J-HOS-0053	URH-HOSP-HLVL	4369	39.7	1331
J-HOS-0040	URH-HOSP-HLVL	4462	0.0	0
J-HOS-0027	URH-HOSP-HLVL	4313	7.6	2456
J-HOS-0022	URH-HOSP-HLVL	4253	4.3	2762
J-HOS-0025	URH-HOSP-HLVL	4322	6.2	6225
J-HOS-0039	URH-HOSP-HLVL	4330	0.0	6807
J-HOS-0049	URH-HOSP-HLVL	4254	0.0	5434

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0021	URH-HOSP-HLVL	4261	4.3	3443
J-HOS-0024	URH-HOSP-HLVL	4300	11.7	2474
J-HOS-0037	URH-HOSP-HLVL	4420	18.5	2856
J-HOS-0010	URH-HOSP-HLVL	4410	18.7	201
J-HOS-0035	URH-HOSP-HLVL	4367	6.5	3719
J-HOS-0033	URH-HOSP-HLVL	4320	0.0	4394
J-HOS-0048	URH-HOSP-HLVL	4268	0.2	5528
J-HOS-0012	URH-HOSP-HLVL	4338	1.9	2871
J-HOS-0031	URH-HOSP-HLVL	4273	21.6	4431
J-HOS-0046	URH-HOSP-HLVL	4287	13.2	3855
J-HOS-0007	URH-HOSP-HLVL	4380	1.4	3135
J-HOS-0059	URH-HOSP-HLVL	4312	7.3	2262
J-HOS-0055	URH-HOSP-HLVL	4337	19.6	383
J-HOS-0043	URH-HOSP-HLVL	4415	1.4	2107
J-HOS-0050	URH-HOSP-HLVL	4333	0.0	3369
J-HOS-0041	URH-HOSP-HLVL	4422	0.0	6789
J-HOS-0101	URH-HOSP-HLVL	4372	1.7	1234
J-HOS-0105	URH-HOSP-HLVL	4260	8.0	3355
J-HOS-0102	URH-HOSP-HLVL	4266	3.5	2813
J-HOS-0106	URH-HOSP-HLVL	4314	17.3	1184
J-HOS-0103	URH-HOSP-HLVL	4274	9.5	320
J-HOS-0100	URH-HOSP-HLVL	4311	0.2	2462
J-HOS-0104	URH-HOSP-HLVL	4227	0.0	5629
J-HOS-0107	URH-HOSP-HLVL	4268	3.6	738
J-HOS-0001	URH-HOSP-HLVL	4292	0.0	4450
J-HOS-0002	URH-HOSP-HLVL	4364	0.0	2778
J-HOS-0109	URH-HOSP-HLVL	4187	0.0	4424
J-HOS-0003	URH-HOSP-HLVL	4213	0.0	2519
J-HOS-0013	URH-HOSP-HLVL	4307	9.9	3128
J-HOS-0004	URH-HOSP-HLVL	4373	7.2	1233
J-HOS-0005	URH-HOSP-HLVL	4409	47.7	2160
J-HOS-0014	URH-HOSP-HLVL	4356	12.1	3856
J-HOS-0015	URH-HOSP-HLVL	4451	0.0	108
J-HOS-0016	URH-HOSP-HLVL	4322	4.9	4351
J-HOS-0017	URH-HOSP-HLVL	4324	9.3	1982
J-HOS-0018	URH-HOSP-HLVL	4269	1.0	3148
J-HOS-0019	URH-HOSP-HLVL	4320	2.7	5416
J-HOS-0088	URH-HOSP-HLVL	4364	0.0	2780
J-HOS-0089	URH-HOSP-HLVL	4292	2.1	2148

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0090	URH-HOSP-HLVL	4316	0.5	2106
J-HOS-0097	URH-HOSP-HLVL	4365	6.0	3711
J-HOS-0063	URH-HOSP-HLVL	4314	5.9	4079
J-HOS-0067	URH-HOSP-HLVL	4385	0.0	2343
J-HOS-0069	URH-HOSP-HLVL	4361	6.1	1799
J-HOS-0070	URH-HOSP-HLVL	4346	6.9	2065
J-HOS-0071	URH-HOSP-HLVL	4286	9.9	2669
J-HOS-0081	URH-HOSP-HLVL	4236	36.6	4076
J-HOS-0083	URH-HOSP-HLVL	4274	4.7	2336
J-HOS-0085	URH-HOSP-HLVL	4257	13.9	3424
J-HOS-0086	URH-HOSP-HLVL	4276	0.0	377
J-HOS-0087	URH-HOSP-HLVL	4301	0.0	344
J-HOS-0072	URH-HOSP-HLVL	4338	0.0	292
J-HOS-0073	URH-HOSP-HLVL	4334	33.9	3439
J-HOS-0075	URH-HOSP-HLVL	4249	6.7	2718
J-HOS-0076	URH-HOSP-HLVL	4263	22.0	5069
J-HOS-0077	URH-HOSP-HLVL	4303	3.9	3596
J-HOS-0079	URH-HOSP-HLVL	4381	33.4	1443
J-HOS-0080	URH-HOSP-HLVL	4283	10.6	2492
J-WO-0010	West Oregon	4194	3.4	1067
J-WO-0008	West Oregon	4219	1.5	609
J-WO-0009	West Oregon	4213	1.7	972
J-WO-0007	West Oregon	4268	2.3	1053
J-WO-0002	West Oregon	4209	4.3	1104
J-WO-0004	West Oregon	4238	16.1	931
J-WO-0006	West Oregon	4230	5.9	1077
J-WO-0003	West Oregon	4224	9.4	1008
J-WO-0005	West Oregon	4223	3.1	1104
J-WO-0013	West Oregon	4247	2.2	1206
J-WO-0001	West Oregon	4226	1.3	1090
J-WO-0011	West Oregon	4242	10.1	1083
J-WO-0012	West Oregon	4244	1.8	1106
J-ZN1-0642	Zone-1	4095	0.3	2071
J-ZN1-0010	Zone-1	4148	15.8	1838
J-ZN1-0542	Zone-1	4162	15.7	802
J-ZN1-0365	Zone-1	4115	8.2	628
J-ZN1-0197	Zone-1	4172	7.2	2078
J-ZN1-0541	Zone-1	4220	4.6	565
J-ZN1-0359	Zone-1	4120	11.8	1272

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0833	Zone-1	4099	6.1	2618
J-ZN1-0363	Zone-1	4104	2.4	904
J-ZN1-0820	Zone-1	4289	0.2	0
J-ZN1-0555	Zone-1	4148	13.8	1211
J-ZN1-0800	Zone-1	4098	8.4	268
J-ZN1-0748	Zone-1	4220	4.5	2475
J-ZN1-0408	Zone-1	4091	1.5	2425
J-ZN1-0424	Zone-1	4092	2.9	2081
J-ZN1-0190	Zone-1	4160	2.2	1441
J-ZN1-0371	Zone-1	4119	24.5	1113
J-ZN1-0747	Zone-1	4121	7.7	37
J-ZN1-0247	Zone-1	4140	11.3	1301
J-ZN1-0303	Zone-1	4108	8.2	479
J-ZN1-0373	Zone-1	4101	1.6	567
J-ZN1-0827	Zone-1	4178	5.5	388
J-ZN1-0519	Zone-1	4141	1.7	2567
J-ZN1-0169	Zone-1	4173	16.3	1059
J-ZN1-0487	Zone-1	4217	3.0	860
J-ZN1-0332	Zone-1	4103	0.5	915
J-ZN1-0385	Zone-1	4098	4.1	2360
J-ZN1-0477	Zone-1	4200	0.0	2226
J-ZN1-0640	Zone-1	4089	0.6	1826
J-ZN1-0370	Zone-1	4115	17.8	1288
J-ZN1-0182	Zone-1	4112	4.9	3147
J-ZN1-0229	Zone-1	4122	11.3	1563
J-ZN1-0832	Zone-1	4211	3.2	1065
J-ZN1-0383	Zone-1	4120	0.0	4296
J-ZN1-0368	Zone-1	4110	12.1	968
J-ZN1-0113	Zone-1	4180	4.2	1001
J-ZN1-0148	Zone-1	4146	10.4	4123
J-ZN1-0286	Zone-1	4110	6.0	1829
J-ZN1-0470	Zone-1	4223	12.3	883
J-ZN1-0759	Zone-1	4223	1.2	832
J-ZN1-0162	Zone-1	4146	3.7	1983
J-ZN1-0009	Zone-1	4153	0.2	1765
J-ZN1-0331	Zone-1	4105	0.0	2430
J-ZN1-0699	Zone-1	4129	0.1	531
J-ZN1-0115	Zone-1	4192	3.5	1201
J-ZN1-0393	Zone-1	4094	11.0	2971

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0840	Zone-1	4242	3.1	152
J-ZN1-0278	Zone-1	4110	3.6	1654
J-ZN1-0188	Zone-1	4152	0.0	2326
J-ZN1-0737	Zone-1	4246	1.8	482
J-ZN1-0787	Zone-1	4122	29.6	1571
J-ZN1-0364	Zone-1	4108	32.4	822
J-ZN1-0144	Zone-1	4139	8.9	3960
J-ZN1-0109	Zone-1	4217	0.8	881
J-ZN1-0043	Zone-1	4100	11.1	401
J-ZN1-0836	Zone-1	4227	2.3	314
J-ZN1-0808	Zone-1	4098	67.8	1391
J-ZN1-0329	Zone-1	4098	4.4	6016
J-ZN1-0406	Zone-1	4094	0.6	1129
J-ZN1-0091	Zone-1	4142	0.0	4322
J-ZN1-0735	Zone-1	4218	3.6	400
J-ZN1-0158	Zone-1	4140	6.1	1365
J-ZN1-0191	Zone-1	4167	2.4	1539
J-ZN1-0538	Zone-1	4225	10.5	508
J-ZN1-0071	Zone-1	4134	48.8	838
J-ZN1-0061	Zone-1	4205	3.5	908
J-ZN1-0766	Zone-1	4199	9.1	331
J-ZN1-0423	Zone-1	4092	0.0	3018
J-ZN1-0513	Zone-1	4153	0.0	3141
J-ZN1-0294	Zone-1	4098	6.7	1685
J-ZN1-0086	Zone-1	4124	0.0	5569
J-ZN1-0421	Zone-1	4092	0.7	630
J-ZN1-0797	Zone-1	4098	0.4	888
J-ZN1-0170	Zone-1	4158	0.0	1592
J-ZN1-0028	Zone-1	4138	0.2	478
J-ZN1-0372	Zone-1	4128	7.5	814
J-ZN1-0534	Zone-1	4141	1.0	495
J-ZN1-0390	Zone-1	4100	5.6	1468
J-ZN1-0041	Zone-1	4100	7.1	530
J-ZN1-0304	Zone-1	4109	7.8	436
J-ZN1-0108	Zone-1	4122	0.5	2063
J-ZN1-0398	Zone-1	4093	11.9	6441
J-ZN1-0639	Zone-1	4091	3.1	6914
J-ZN1-0369	Zone-1	4100	4.0	880
J-ZN1-0760	Zone-1	4190	5.0	1146

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0326	Zone-1	4088	0.0	2291
J-ZN1-0327	Zone-1	4089	43.5	1409
J-ZN1-1258	Zone-1	4175	0.2	2846
J-ZN1-0933	Zone-1	4153	6.1	208
J-ZN1-0935	Zone-1	4151	0.0	201
J-ZN1-0003	Zone-1	4092	55.0	2096
J-ZN1-0226	Zone-1	4090	0.0	1736
J-ZN1-1066	Zone-1	4146	11.3	1351
J-ZN1-1079	Zone-1	4174	40.1	863
J-ZN1-1090	Zone-1	4171	2.5	1236
J-ZN1-1119	Zone-1	4204	0.7	1108
J-ZN1-1172	Zone-1	4220	5.8	734
J-ZN1-1192	Zone-1	4207	4.5	1158
J-ZN1-0875	Zone-1	4238	2.5	401
J-ZN1-1000	Zone-1	4184	15.6	1090
J-ZN1-1002	Zone-1	4201	8.2	849
J-ZN1-1004	Zone-1	4112	32.7	1400
J-ZN1-1008	Zone-1	4150	8.2	3442
J-ZN1-1011	Zone-1	4152	0.0	3489
J-ZN1-1012	Zone-1	4154	0.0	3369
J-ZN1-1015	Zone-1	4225	5.9	850
J-ZN1-1016	Zone-1	4219	1.5	818
J-ZN1-1017	Zone-1	4250	0.9	303
J-ZN1-1021	Zone-1	4195	2.1	1322
J-ZN1-1022	Zone-1	4092	1.2	1894
J-ZN1-1024	Zone-1	4090	0.0	2092
J-ZN1-1026	Zone-1	4120	1.7	1439
J-ZN1-1028	Zone-1	4122	0.0	1375
J-ZN1-1030	Zone-1	4106	0.2	496
J-ZN1-1032	Zone-1	4106	1.8	633
J-ZN1-1033	Zone-1	4149	12.9	1150
J-ZN1-1034	Zone-1	4164	0.8	1032
J-ZN1-1036	Zone-1	4129	4.9	1146
J-ZN1-1037	Zone-1	4175	8.7	4610
J-ZN1-1039	Zone-1	4158	7.5	1211
J-ZN1-1041	Zone-1	4159	4.9	4652
J-ZN1-1045	Zone-1	4140	6.5	1111
J-ZN1-1048	Zone-1	4109	13.5	1424
J-ZN1-1050	Zone-1	4122	5.5	1233

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1052	Zone-1	4095	12.1	1176
J-ZN1-1054	Zone-1	4092	1.1	5670
J-ZN1-1056	Zone-1	4094	7.5	1337
J-ZN1-1057	Zone-1	4108	3.4	4160
J-ZN1-1059	Zone-1	4094	1.7	3249
J-ZN1-1061	Zone-1	4100	1.6	1821
J-ZN1-1062	Zone-1	4100	2.9	2296
J-ZN1-1063	Zone-1	4101	11.4	2023
J-ZN1-1064	Zone-1	4099	14.6	1793
J-ZN1-1069	Zone-1	4191	1.5	2115
J-ZN1-1072	Zone-1	4176	15.1	556
J-ZN1-1074	Zone-1	4182	0.6	1543
J-ZN1-1076	Zone-1	4161	23.6	936
J-ZN1-1080	Zone-1	4178	7.0	2329
J-ZN1-1083	Zone-1	4094	0.0	1418
J-ZN1-1087	Zone-1	4091	0.7	4792
J-ZN1-1092	Zone-1	4088	0.0	7216
J-ZN1-1096	Zone-1	4092	4.4	3067
J-ZN1-1097	Zone-1	4100	28.7	3949
J-ZN1-1098	Zone-1	4100	10.7	3397
J-ZN1-1103	Zone-1	4099	2.7	3911
J-ZN1-1113	Zone-1	4138	14.7	1650
J-ZN1-1114	Zone-1	4157	11.3	3369
J-ZN1-1118	Zone-1	4154	2.2	3142
J-ZN1-1121	Zone-1	4163	12.2	3103
J-ZN1-1123	Zone-1	4170	4.4	2110
J-ZN1-1125	Zone-1	4166	5.7	1894
J-ZN1-1127	Zone-1	4170	1.9	1913
J-ZN1-1131	Zone-1	4154	5.4	1749
J-ZN1-1132	Zone-1	4158	0.0	2154
J-ZN1-1133	Zone-1	4162	3.8	1992
J-ZN1-1138	Zone-1	4178	0.0	1073
J-ZN1-1140	Zone-1	4168	8.1	1104
J-ZN1-1142	Zone-1	4159	1.4	1389
J-ZN1-1144	Zone-1	4151	2.2	1602
J-ZN1-1148	Zone-1	4108	5.1	1517
J-ZN1-1149	Zone-1	4100	4.6	718
J-ZN1-1150	Zone-1	4101	11.3	501
J-ZN1-1151	Zone-1	4110	1.6	3052
J-ZN1-1152	Zone-1	4110	0.1	113
J-ZN1-1154	Zone-1	4110	0.0	112
J-ZN1-1156	Zone-1	4110	1.7	114
J-ZN1-1157	Zone-1	4109	4.1	426
J-ZN1-1158	Zone-1	4117	7.9	1048
J-ZN1-1160	Zone-1	4139	11.0	787
J-ZN1-1163	Zone-1	4104	0.0	4450
J-ZN1-1165	Zone-1	4106	6.8	2005
J-ZN1-1173	Zone-1	4106	0.0	3417
J-ZN1-1175	Zone-1	4106	0.0	2980
J-ZN1-1177	Zone-1	4138	11.9	1976
J-ZN1-1185	Zone-1	4159	2.5	1246
J-ZN1-1187	Zone-1	4168	16.0	1991
J-ZN1-1189	Zone-1	4152	2.0	1434
J-ZN1-1190	Zone-1	4148	0.0	2281
J-ZN1-1201	Zone-1	4090	0.0	1853
J-ZN1-1203	Zone-1	4090	0.0	1860
J-ZN1-1204	Zone-1	4090	16.9	1698
J-ZN1-1206	Zone-1	4089	1.4	1086
J-ZN1-1207	Zone-1	4094	1.2	5991
J-ZN1-1214	Zone-1	4088	0.0	8034
J-ZN1-1233	Zone-1	4084	0.0	1553
J-ZN1-1234	Zone-1	4090	0.0	1838
J-ZN1-1235	Zone-1	4089	0.0	1723
J-ZN1-1237	Zone-1	4088	0.0	1223
J-ZN1-1240	Zone-1	4088	1.0	1868
J-ZN1-0872	Zone-1	4088	0.3	3916
J-ZN1-0873	Zone-1	4088	0.0	4985
J-ZN1-0239	Zone-1	4164	0.0	1722
J-ZN1-0882	Zone-1	4144	9.4	107
J-ZN1-0883	Zone-1	4110	1.0	592
J-ZN1-0886	Zone-1	4096	7.6	1547
J-ZN1-0923	Zone-1	4179	2.0	2853
J-ZN1-0925	Zone-1	4198	3.1	343
J-ZN1-0929	Zone-1	4182	5.6	2688
J-ZN1-0932	Zone-1	4088	0.0	921
J-ZN1-0934	Zone-1	4088	0.0	1338
J-ZN1-0940	Zone-1	4151	1.9	204
J-ZN1-0955	Zone-1	4090	0.0	1601

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0970	Zone-1	4104	1.1	119
J-ZN1-0971	Zone-1	4108	10.3	124
J-ZN1-4008	Zone-1	4230	1.9	682
P-ZN1-0798B	Zone-1	4172	8.9	2240
J-ZN1-0306B	Zone-1	4144	4.3	1010
J-ZN1-0810	Zone-1	4098	2.3	8038
J-ZN1-0163	Zone-1	4154	6.8	2083
J-ZN1-0166	Zone-1	4169	5.2	6292
J-ZN1-0671	Zone-1	4098	19.6	7247
J-ZN1-0179	Zone-1	4112	17.9	6638
J-ZN1-0572	Zone-1	4176	0.0	3016
J-ZN1-0716	Zone-1	4111	3.3	695
J-ZN1-0768	Zone-1	4120	5.6	2004
J-ZN1-0285	Zone-1	4108	8.8	4869
J-ZN1-0213	Zone-1	4116	4.7	5182
J-ZN1-0615	Zone-1	4142	7.7	529
J-ZN1-0858	Zone-1	4154	0.4	4044
J-ZN1-0830	Zone-1	4186	1.4	7443
J-ZN1-0743	Zone-1	4120	4.0	365
J-ZN1-0869	Zone-1	4183	5.6	754
J-ZN1-0661	Zone-1	4123	2.9	1400
J-ZN1-0464	Zone-1	4185	10.1	3445
J-ZN1-0098	Zone-1	4136	1.5	1169
J-ZN1-0116	Zone-1	4166	2.7	4196
J-ZN1-0102	Zone-1	4174	1.7	3253
J-ZN1-0512	Zone-1	4132	3.6	5726
J-ZN1-0526	Zone-1	4227	0.4	952
J-ZN1-0752	Zone-1	4162	11.0	1266
J-ZN1-0576	Zone-1	4217	1.4	1743
J-ZN1-0773	Zone-1	4100	9.6	4086
J-ZN1-0394	Zone-1	4091	1.1	15815
J-ZN1-0361	Zone-1	4116	8.8	1509
J-ZN1-0026	Zone-1	4096	6.3	6564
J-ZN1-0589	Zone-1	4118	5.9	7517
J-ZN1-0037	Zone-1	4104	4.6	930
J-ZN1-0834	Zone-1	4214	0.0	1835
J-ZN1-0841	Zone-1	4134	4.0	3145
J-ZN1-0469	Zone-1	4150	14.0	2698

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0709	Zone-1	4098	5.3	3039
J-ZN1-0279	Zone-1	4110	2.5	4237
J-ZN1-0517	Zone-1	4122	6.7	6010
J-ZN1-0738	Zone-1	4212	4.5	1258
J-ZN1-0635	Zone-1	4090	0.0	9433
J-ZN1-0778	Zone-1	4096	7.4	10199
J-ZN1-0547	Zone-1	4179	5.1	1327
J-ZN1-0145	Zone-1	4134	8.2	5095
J-ZN1-0110	Zone-1	4192	8.5	1290
J-ZN1-0072	Zone-1	4148	0.3	1903
J-ZN1-0412	Zone-1	4099	34.0	23583
J-ZN1-0381	Zone-1	4092	20.0	5703
J-ZN1-0161	Zone-1	4144	12.2	2193
J-ZN1-0570	Zone-1	4178	9.9	1734
J-ZN1-0714	Zone-1	4125	2.1	1328
J-ZN1-0438	Zone-1	4102	8.3	4507
J-ZN1-0684	Zone-1	4146	6.1	6584
J-ZN1-0204	Zone-1	4118	5.1	4310
J-ZN1-0051	Zone-1	4142	7.2	2219
J-ZN1-0732	Zone-1	4196	0.9	3592
J-ZN1-0299	Zone-1	4098	12.8	2969
J-ZN1-0741	Zone-1	4220	2.0	700
J-ZN1-0062	Zone-1	4174	5.8	1752
J-ZN1-0495	Zone-1	4208	2.6	4277
J-ZN1-0462	Zone-1	4099	0.0	31423
J-ZN1-0330	Zone-1	4103	0.0	2899
J-ZN1-0114	Zone-1	4193	1.3	1627
J-ZN1-0100	Zone-1	4254	1.4	1357
J-ZN1-0510	Zone-1	4138	1.5	3645
J-ZN1-0178	Zone-1	4265	4.9	5
J-ZN1-0130	Zone-1	4134	5.4	4188
J-ZN1-0771	Zone-1	4165	28.6	3958
J-ZN1-0392	Zone-1	4092	6.3	11657
J-ZN1-0587	Zone-1	4218	23.3	1520
J-ZN1-0641	Zone-1	4112	14.4	2001
J-ZN1-0407	Zone-1	4092	0.1	16560
J-ZN1-0019	Zone-1	4114	0.0	5025
J-ZN1-0802	Zone-1	4092	0.0	5943
J-ZN1-0087	Zone-1	4112	0.2	6376

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0839	Zone-1	4192	0.6	684
J-ZN1-0467	Zone-1	4139	21.4	10257
J-ZN1-0434	Zone-1	4106	1.8	866
J-ZN1-0707	Zone-1	4099	8.9	3331
J-ZN1-0525	Zone-1	4104	16.5	8060
J-ZN1-0187	Zone-1	4160	0.7	2256
J-ZN1-0277	Zone-1	4110	9.2	2344
J-ZN1-0515	Zone-1	4121	5.9	6967
J-ZN1-0293	Zone-1	4106	7.2	3613
J-ZN1-0736	Zone-1	4222	5.3	362
J-ZN1-0776	Zone-1	4102	4.0	17081
J-ZN1-0057	Zone-1	4178	0.0	6566
J-ZN1-0410	Zone-1	4092	11.1	20509
J-ZN1-0379	Zone-1	4108	8.1	4321
J-ZN1-0159	Zone-1	4140	16.6	2875
J-ZN1-0313	Zone-1	4286	0.0	0
J-ZN1-0712	Zone-1	4092	7.1	1449
J-ZN1-0613	Zone-1	4156	4.8	1356
J-ZN1-0581	Zone-1	4193	0.1	1221
J-ZN1-0032	Zone-1	4136	6.4	2233
J-ZN1-0729	Zone-1	4214	1.0	1841
J-ZN1-0546	Zone-1	4150	8.1	5395
J-ZN1-0260	Zone-1	4110	27.2	3981
J-ZN1-0297	Zone-1	4099	7.3	3191
J-ZN1-0044	Zone-1	4098	4.0	8222
J-ZN1-0324	Zone-1	4100	1.6	6407
J-ZN1-0508	Zone-1	4109	1.7	3090
J-ZN1-0093	Zone-1	4176	5.9	5555
J-ZN1-0599	Zone-1	4116	10.9	6667
J-ZN1-0128	Zone-1	4138	8.9	3612
J-ZN1-0539	Zone-1	4192	8.0	3940
J-ZN1-0687	Zone-1	4150	8.2	5187
J-ZN1-0657	Zone-1	4134	10.7	187
J-ZN1-0740	Zone-1	4104	3.4	3757
J-ZN1-0585	Zone-1	4172	11.7	2263
J-ZN1-0405	Zone-1	4094	0.9	9178
J-ZN1-0080	Zone-1	4138	6.6	235
J-ZN1-0817	Zone-1	4299	0.0	0
J-ZN1-0705	Zone-1	4103	4.7	6939

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0432	Zone-1	4112	9.2	5820
J-ZN1-0854	Zone-1	4093	0.0	6183
J-ZN1-0625	Zone-1	4100	15.3	9137
J-ZN1-0482	Zone-1	4262	0.6	1
J-ZN1-0445	Zone-1	4107	7.0	22034
J-ZN1-0291	Zone-1	4102	6.4	3578
J-ZN1-0815	Zone-1	4136	10.8	235
J-ZN1-0560	Zone-1	4192	10.3	1132
J-ZN1-0377	Zone-1	4098	13.0	9144
J-ZN1-0466	Zone-1	4178	0.0	4853
J-ZN1-0122	Zone-1	4164	7.2	1199
J-ZN1-0157	Zone-1	4138	16.3	2297
J-ZN1-0682	Zone-1	4102	29.0	171
J-ZN1-0650	Zone-1	4184	11.8	5517
J-ZN1-0611	Zone-1	4179	2.3	535
J-ZN1-0727	Zone-1	4090	0.0	9621
J-ZN1-0450	Zone-1	4114	1.2	10371
J-ZN1-0775	Zone-1	4116	19.2	956
J-ZN1-0295	Zone-1	4096	4.5	2541
J-ZN1-0257	Zone-1	4112	28.0	2977
J-ZN1-0094	Zone-1	4148	1.3	1161
J-ZN1-0311	Zone-1	4096	14.6	5957
J-ZN1-0669	Zone-1	4118	74.6	1543
J-ZN1-0074	Zone-1	4152	19.2	7323
J-ZN1-0475	Zone-1	4130	2.2	6072
J-ZN1-0506	Zone-1	4111	7.9	10475
J-ZN1-0346	Zone-1	4104	8.8	4863
J-ZN1-0126	Zone-1	4141	8.7	5216
J-ZN1-0523	Zone-1	4211	1.6	1518
J-ZN1-0524	Zone-1	4164	1.3	4154
J-ZN1-0537	Zone-1	4207	10.2	851
J-ZN1-0022	Zone-1	4122	20.3	3813
J-ZN1-0142	Zone-1	4136	7.6	4050
J-ZN1-0655	Zone-1	4160	12.4	2133
J-ZN1-0553	Zone-1	4149	3.3	2081
J-ZN1-0784	Zone-1	4162	18.2	5592
J-ZN1-0403	Zone-1	4092	17.1	7246
J-ZN1-0263	Zone-1	4108	5.0	3709
J-ZN1-0173	Zone-1	4122	7.9	3497

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0597	Zone-1	4205	3.8	2668
J-ZN1-0814	Zone-1	4094	17.1	1494
J-ZN1-0430	Zone-1	4104	6.4	17255
J-ZN1-0852	Zone-1	4104	14.3	5270
J-ZN1-0623	Zone-1	4104	15.8	26634
J-ZN1-0443	Zone-1	4159	3.4	4762
J-ZN1-0480	Zone-1	4102	4.6	1678
J-ZN1-0720	Zone-1	4115	12.6	2491
J-ZN1-0289	Zone-1	4107	30.9	5552
J-ZN1-0042	Zone-1	4104	2.5	1662
J-ZN1-0686	Zone-1	4115	7.4	4830
J-ZN1-0491	Zone-1	4182	3.2	6403
J-ZN1-0757	Zone-1	4215	0.9	1321
J-ZN1-0558	Zone-1	4148	13.6	2003
J-ZN1-0375	Zone-1	4096	3.1	6927
J-ZN1-0336	Zone-1	4102	11.3	5856
J-ZN1-0082	Zone-1	4141	6.0	758
J-ZN1-0155	Zone-1	4134	9.4	4694
J-ZN1-0120	Zone-1	4167	13.7	2368
J-ZN1-0422	Zone-1	4093	1.3	5014
J-ZN1-0389	Zone-1	4100	8.3	15131
J-ZN1-0680	Zone-1	4102	6.0	2448
J-ZN1-0857	Zone-1	4140	2.4	2286
J-ZN1-0829	Zone-1	4194	4.7	2122
J-ZN1-0725	Zone-1	4172	0.3	13469
J-ZN1-0447	Zone-1	4237	0.8	842
J-ZN1-0077	Zone-1	4150	8.7	6850
J-ZN1-0309	Zone-1	4100	9.1	6635
J-ZN1-0090	Zone-1	4186	7.9	1825
J-ZN1-0632	Zone-1	4152	0.6	3455
J-ZN1-0751	Zone-1	4220	9.5	492
J-ZN1-0344	Zone-1	4104	13.2	4352
J-ZN1-0124	Zone-1	4144	3.4	4996
J-ZN1-0107	Zone-1	4159	22.0	2097
J-ZN1-0521	Zone-1	4140	7.2	3485
J-ZN1-0189	Zone-1	4236	13.6	3271
J-ZN1-0140	Zone-1	4134	12.8	5399
J-ZN1-0653	Zone-1	4147	6.4	5030
J-ZN1-0782	Zone-1	4143	8.2	5442

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0551	Zone-1	4156	3.9	2170
J-ZN1-0668	Zone-1	4110	0.0	9235
J-ZN1-0171	Zone-1	4120	6.0	6398
J-ZN1-0644	Zone-1	4116	16.3	6110
J-ZN1-0416	Zone-1	4096	9.0	2345
J-ZN1-0812	Zone-1	4094	0.0	9472
J-ZN1-0850	Zone-1	4108	5.0	2881
J-ZN1-0621	Zone-1	4140	1.7	16837
J-ZN1-0822	Zone-1	4149	0.0	3713
J-ZN1-0478	Zone-1	4102	8.4	3756
J-ZN1-0441	Zone-1	4236	6.4	504
J-ZN1-0718	Zone-1	4138	4.1	4750
J-ZN1-0536	Zone-1	4137	0.0	5425
J-ZN1-0024	Zone-1	4146	0.0	4642
J-ZN1-0489	Zone-1	4205	15.3	2817
J-ZN1-0035	Zone-1	4108	6.8	27363
J-ZN1-0745	Zone-1	4092	2.2	6787
J-ZN1-0262	Zone-1	4224	16.2	3926
J-ZN1-0837	Zone-1	4136	14.7	3156
J-ZN1-0334	Zone-1	4104	6.3	6976
J-ZN1-0569	Zone-1	4166	2.3	3577
J-ZN1-0535	Zone-1	4196	4.9	1795
J-ZN1-0420	Zone-1	4092	0.0	7936
J-ZN1-0387	Zone-1	4096	0.0	26623
J-ZN1-0678	Zone-1	4099	2.4	2439
J-ZN1-0796	Zone-1	4132	0.0	6362
J-ZN1-0723	Zone-1	4200	2.4	384
J-ZN1-0692	Zone-1	4179	6.6	1839
J-ZN1-0243	Zone-1	4138	0.0	2817
J-ZN1-0591	Zone-1	4165	7.8	2808
J-ZN1-0494	Zone-1	4202	3.4	5515
J-ZN1-0461	Zone-1	4103	5.6	29247
J-ZN1-0557	Zone-1	4161	6.6	4863
J-ZN1-0271	Zone-1	4108	36.0	4563
J-ZN1-0307	Zone-1	4098	6.6	5776
J-ZN1-0070	Zone-1	4140	6.3	956
J-ZN1-0631	Zone-1	4148	5.9	2333
J-ZN1-0322	Zone-1	4102	7.5	6954
J-ZN1-0323	Zone-1	4159	21.5	3502

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0338	Zone-1	4102	9.7	4596
J-ZN1-0105	Zone-1	4121	1.7	1027
J-ZN1-0856	Zone-1	4144	9.5	3676
J-ZN1-0391	Zone-1	4092	0.2	16534
J-ZN1-0358	Zone-1	4124	7.1	1984
J-ZN1-0049	Zone-1	4138	11.4	5465
J-ZN1-0138	Zone-1	4148	15.7	5113
J-ZN1-0015	Zone-1	4183	3.4	1302
J-ZN1-0060	Zone-1	4270	0.0	0
J-ZN1-0549	Zone-1	4158	0.0	2024
J-ZN1-0696	Zone-1	4199	2.6	1665
J-ZN1-0666	Zone-1	4104	2.4	2986
J-ZN1-0749	Zone-1	4124	24.8	5901
J-ZN1-0414	Zone-1	4104	0.0	16180
J-ZN1-0092	Zone-1	4114	25.3	569
J-ZN1-0276	Zone-1	4109	4.5	3243
J-ZN1-0186	Zone-1	4164	0.8	2234
J-ZN1-0607	Zone-1	4165	6.2	887
J-ZN1-0848	Zone-1	4090	0.0	3404
J-ZN1-0619	Zone-1	4163	7.7	1770
J-ZN1-0440	Zone-1	4094	0.8	6410
J-ZN1-0865	Zone-1	4137	0.3	6397
J-ZN1-0456	Zone-1	4145	3.6	19778
J-ZN1-0301	Zone-1	4098	3.1	9987
J-ZN1-0085	Zone-1	4092	0.0	7790
J-ZN1-0047	Zone-1	4168	0.1	6820
J-ZN1-0097	Zone-1	4173	2.6	2027
J-ZN1-0765	Zone-1	4151	4.9	805
J-ZN1-0568	Zone-1	4181	12.5	1371
J-ZN1-0533	Zone-1	4164	2.1	1216
J-ZN1-0418	Zone-1	4094	0.7	8274
J-ZN1-0132	Zone-1	4142	10.3	3923
J-ZN1-0825	Zone-1	4199	1.7	1569
J-ZN1-0794	Zone-1	4111	0.0	6517
J-ZN1-0232	Zone-1	4136	12.2	3972
J-ZN1-0868	Zone-1	4137	8.4	2394
J-ZN1-0835	Zone-1	4197	4.1	1643
J-ZN1-0459	Zone-1	4282	2.6	2
J-ZN1-0305	Zone-1	4104	1.4	5482

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0269	Zone-1	4112	8.9	4405
J-ZN1-0320	Zone-1	4100	1.1	6527
J-ZN1-0677	Zone-1	4106	32.3	1780
J-ZN1-0356	Zone-1	4108	12.2	5089
J-ZN1-0030	Zone-1	4144	2.5	3416
J-ZN1-0136	Zone-1	4145	11.5	5058
J-ZN1-0056	Zone-1	4143	0.7	6442
J-ZN1-0799	Zone-1	4106	15.9	606
J-ZN1-0493	Zone-1	4146	96.4	4798
J-ZN1-0152	Zone-1	4160	23.6	2806
J-ZN1-0664	Zone-1	4096	13.9	2385
J-ZN1-0594	Zone-1	4209	8.8	1026
J-ZN1-0564	Zone-1	4216	1.8	910
J-ZN1-0704	Zone-1	4101	8.9	1806
J-ZN1-0676	Zone-1	4098	7.1	2659
J-ZN1-0274	Zone-1	4108	7.6	4626
J-ZN1-0184	Zone-1	4112	5.6	3264
J-ZN1-0605	Zone-1	4166	9.2	1013
J-ZN1-0846	Zone-1	4094	1.6	4958
J-ZN1-0734	Zone-1	4291	0.0	0
J-ZN1-0863	Zone-1	4158	2.8	1385
J-ZN1-0485	Zone-1	4187	7.1	1587
J-ZN1-0454	Zone-1	4225	11.5	8327
J-ZN1-0731	Zone-1	4161	3.9	3619
J-ZN1-0067	Zone-1	4116	24.9	4525
J-ZN1-0643	Zone-1	4215	0.0	693
J-ZN1-0695	Zone-1	4119	5.6	2831
J-ZN1-0029	Zone-1	4208	12.4	4026
J-ZN1-0501	Zone-1	4219	2.9	1772
J-ZN1-0078	Zone-1	4151	3.8	1071
J-ZN1-0763	Zone-1	4163	5.7	1682
J-ZN1-0531	Zone-1	4162	0.1	2509
J-ZN1-0618	Zone-1	4118	9.5	6036
J-ZN1-0350	Zone-1	4104	16.3	5378
J-ZN1-0610	Zone-1	4160	5.2	1044
J-ZN1-0058	Zone-1	4143	6.0	1636
J-ZN1-0399	Zone-1	4092	9.3	14940
J-ZN1-0792	Zone-1	4104	13.1	2466
J-ZN1-0689	Zone-1	4182	8.2	3587

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0659	Zone-1	4094	32.0	3530
J-ZN1-0267	Zone-1	4110	7.7	5119
J-ZN1-0177	Zone-1	4114	10.0	6594
J-ZN1-0505	Zone-1	4114	10.0	12978
J-ZN1-0474	Zone-1	4120	17.3	5931
J-ZN1-0318	Zone-1	4092	1.3	4853
J-ZN1-0769	Zone-1	4185	0.0	4321
J-ZN1-0354	Zone-1	4110	5.1	6563
J-ZN1-0134	Zone-1	4136	10.3	3888
J-ZN1-0027	Zone-1	4123	2.7	1376
J-ZN1-0231	Zone-1	4232	9.9	3513
J-ZN1-0402	Zone-1	4090	3.6	4954
J-ZN1-0038	Zone-1	4104	1.2	5240
J-ZN1-0150	Zone-1	4155	2.0	2720
J-ZN1-0562	Zone-1	4185	8.4	1209
J-ZN1-0702	Zone-1	4098	8.2	901
J-ZN1-0429	Zone-1	4093	16.9	8006
J-ZN1-0674	Zone-1	4100	18.7	7291
J-ZN1-0603	Zone-1	4156	5.6	1136
J-ZN1-0645	Zone-1	4118	14.1	2247
J-ZN1-0426	Zone-1	4093	0.0	8877
J-ZN1-0288	Zone-1	4104	0.4	5141
J-ZN1-0861	Zone-1	4200	5.3	647
J-ZN1-0452	Zone-1	4185	8.6	15726
J-ZN1-0798	Zone-1	4100	0.0	3729
J-ZN1-0499	Zone-1	4219	2.1	2581
J-ZN1-0017	Zone-1	4186	9.8	3354
J-ZN1-0312	Zone-1	4094	4.0	18891
J-ZN1-0073	Zone-1	4140	5.9	523
J-ZN1-0154	Zone-1	4139	3.4	3685
J-ZN1-0119	Zone-1	4166	2.5	3082
J-ZN1-0273	Zone-1	4207	6.8	4966
J-ZN1-0529	Zone-1	4160	0.0	2529
J-ZN1-0845	Zone-1	4150	0.0	4836
J-ZN1-0348	Zone-1	4109	14.5	4934
J-ZN1-0578	Zone-1	4218	6.1	1621
J-ZN1-0545	Zone-1	4194	4.5	1024
J-ZN1-0040	Zone-1	4100	6.4	790
J-ZN1-0397	Zone-1	4093	1.2	8278

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0790	Zone-1	4115	0.3	2695
J-ZN1-0052	Zone-1	4142	4.5	3193
J-ZN1-0063	Zone-1	4114	0.0	6386
J-ZN1-0806	Zone-1	4149	6.3	5408
J-ZN1-0265	Zone-1	4108	8.3	3618
J-ZN1-0175	Zone-1	4118	8.5	6463
J-ZN1-0844	Zone-1	4100	0.3	12846
J-ZN1-0503	Zone-1	4213	5.9	1279
J-ZN1-0472	Zone-1	4117	2.6	23819
J-ZN1-0566	Zone-1	4142	0.0	5492
J-ZN1-0282	Zone-1	4113	10.7	1891
J-ZN1-0316	Zone-1	4090	0.1	11807
J-ZN1-0352	Zone-1	4110	5.6	6108
J-ZN1-0638	Zone-1	4092	0.3	5740
J-ZN1-0781	Zone-1	4141	3.9	2188
J-ZN1-0075	Zone-1	4152	3.6	1652
J-ZN1-0867	Zone-1	4146	25.4	2402
J-ZN1-0020	Zone-1	4122	3.7	4187
J-ZN1-0088	Zone-1	4134	1.3	1736
J-ZN1-0811	Zone-1	4094	1.4	5456
J-ZN1-0700	Zone-1	4097	6.7	1638
J-ZN1-0672	Zone-1	4098	17.2	4978
J-ZN1-0750	Zone-1	4098	41.4	5796
J-ZN1-0180	Zone-1	4107	0.0	6073
J-ZN1-0573	Zone-1	4209	5.0	2296
J-ZN1-0601	Zone-1	4291	0.0	0
J-ZN1-0717	Zone-1	4111	7.8	9033
J-ZN1-0219	Zone-1	4114	3.1	5523
J-ZN1-0617	Zone-1	4145	1.3	7390
J-ZN1-0616	Zone-1	4092	0.6	4579
J-ZN1-0859	Zone-1	4152	1.8	4272
J-ZN1-0831	Zone-1	4179	1.8	6013
J-ZN1-0744	Zone-1	4092	1.0	3120
J-ZN1-0628	Zone-1	4148	0.8	2607
J-ZN1-0497	Zone-1	4244	1.0	728
J-ZN1-0012	Zone-1	4179	11.5	3049
J-ZN1-0465	Zone-1	4166	8.9	4493
J-ZN1-0117	Zone-1	4168	3.5	3667
J-ZN1-0527	Zone-1	4162	2.4	2034

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0753	Zone-1	4139	4.1	1458
J-ZN1-0774	Zone-1	4092	5.7	9920
J-ZN1-0395	Zone-1	4091	0.0	7898
J-ZN1-0788	Zone-1	4175	42.1	6619
J-ZN1-0483	Zone-1	4194	0.0	2916
J-ZN1-0033	Zone-1	4157	7.1	3601
J-ZN1-0590	Zone-1	4153	5.3	4796
J-ZN1-0045	Zone-1	4110	11.0	3691
J-ZN1-0804	Zone-1	4096	2.8	4704
J-ZN1-0630	Zone-1	4151	7.9	292
J-ZN1-0842	Zone-1	4111	5.6	16584
J-ZN1-0435	Zone-1	4099	4.3	15856
J-ZN1-0314	Zone-1	4096	3.9	17744
J-ZN1-0280	Zone-1	4112	5.6	3834
J-ZN1-0518	Zone-1	4136	3.5	3752
J-ZN1-0739	Zone-1	4221	2.4	1095
J-ZN1-0636	Zone-1	4090	0.0	9074
J-ZN1-0779	Zone-1	4109	4.1	4366
J-ZN1-0548	Zone-1	4207	5.4	1807
J-ZN1-0366	Zone-1	4107	4.2	2267
J-ZN1-0146	Zone-1	4150	9.7	5717
J-ZN1-0111	Zone-1	4184	5.0	1015
J-ZN1-0081	Zone-1	4135	7.1	420
J-ZN1-0413	Zone-1	4094	9.0	11753
J-ZN1-0809	Zone-1	4096	0.0	10151
J-ZN1-0502	Zone-1	4134	22.3	5329
J-ZN1-0670	Zone-1	4186	0.0	1284
J-ZN1-0600	Zone-1	4184	1.3	1952
J-ZN1-0571	Zone-1	4216	1.4	2542
J-ZN1-0715	Zone-1	4158	13.8	2672
J-ZN1-0439	Zone-1	4106	0.7	2944
J-ZN1-0685	Zone-1	4161	11.4	5116
J-ZN1-0284	Zone-1	4108	7.3	4248
J-ZN1-0209	Zone-1	4117	7.6	5171
J-ZN1-0614	Zone-1	4170	16.5	1948
J-ZN1-0013	Zone-1	4194	0.0	1079
J-ZN1-0300	Zone-1	4099	5.7	4238
J-ZN1-0496	Zone-1	4215	3.9	3570
J-ZN1-0463	Zone-1	4198	7.6	3269

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0101	Zone-1	4257	0.0	986
J-ZN1-0511	Zone-1	4130	3.8	3048
J-ZN1-0131	Zone-1	4144	9.9	3836
J-ZN1-0772	Zone-1	4180	13.3	6420
J-ZN1-0626	Zone-1	4100	14.9	6653
J-ZN1-0360	Zone-1	4102	55.5	1751
J-ZN1-0588	Zone-1	4133	12.8	5085
J-ZN1-0803	Zone-1	4096	36.6	6439
J-ZN1-0095	Zone-1	4148	0.0	1280
J-ZN1-0468	Zone-1	4172	2.7	2673
J-ZN1-0708	Zone-1	4101	3.8	7648
J-ZN1-0516	Zone-1	4150	7.9	3729
J-ZN1-0104	Zone-1	4144	8.4	956
J-ZN1-0023	Zone-1	4125	92.8	3822
J-ZN1-0777	Zone-1	4097	5.9	8021
J-ZN1-0629	Zone-1	4110	3.5	7217
J-ZN1-0380	Zone-1	4092	6.9	6435
J-ZN1-0411	Zone-1	4093	0.0	21710
J-ZN1-0160	Zone-1	4143	10.6	2515
J-ZN1-0428	Zone-1	4182	0.2	6241
J-ZN1-0713	Zone-1	4122	3.7	1091
J-ZN1-0437	Zone-1	4093	3.5	12363
J-ZN1-0198	Zone-1	4120	6.0	3927
J-ZN1-0646	Zone-1	4104	25.8	1713
J-ZN1-0730	Zone-1	4225	0.4	2578
J-ZN1-0298	Zone-1	4100	7.3	3306
J-ZN1-0261	Zone-1	4109	10.9	4446
J-ZN1-0054	Zone-1	4145	2.7	7411
J-ZN1-0762	Zone-1	4186	4.9	847
J-ZN1-0509	Zone-1	4126	4.4	5023
J-ZN1-0099	Zone-1	4139	5.5	6364
J-ZN1-0129	Zone-1	4140	11.8	4032
J-ZN1-0770	Zone-1	4178	4.0	6280
J-ZN1-0540	Zone-1	4206	4.7	1101
J-ZN1-0688	Zone-1	4190	9.8	6179
J-ZN1-0658	Zone-1	4138	15.3	2575
J-ZN1-0586	Zone-1	4180	6.8	992
J-ZN1-0556	Zone-1	4152	5.8	1661
J-ZN1-0801	Zone-1	4092	1.5	13766

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0838	Zone-1	4215	1.9	1756
J-ZN1-0706	Zone-1	4108	6.8	7466
J-ZN1-0433	Zone-1	4106	2.4	7746
J-ZN1-0855	Zone-1	4110	3.2	645
J-ZN1-0514	Zone-1	4114	0.3	8492
J-ZN1-0575	Zone-1	4143	0.5	5535
J-ZN1-0292	Zone-1	4104	4.1	4570
J-ZN1-0758	Zone-1	4217	2.2	1199
J-ZN1-0362	Zone-1	4104	4.9	993
J-ZN1-0561	Zone-1	4167	0.5	1251
J-ZN1-0409	Zone-1	4091	0.0	18388
J-ZN1-0378	Zone-1	4098	3.3	9452
J-ZN1-0123	Zone-1	4162	5.6	1312
J-ZN1-0425	Zone-1	4094	0.0	13849
J-ZN1-0711	Zone-1	4096	8.5	1249
J-ZN1-0683	Zone-1	4098	3.5	127
J-ZN1-0754	Zone-1	4098	2.4	3682
J-ZN1-0580	Zone-1	4234	2.9	1079
J-ZN1-0612	Zone-1	4187	6.2	464
J-ZN1-0025	Zone-1	4147	0.0	5217
J-ZN1-0728	Zone-1	4090	1825.2	12652
J-ZN1-0451	Zone-1	4109	8.9	18434
J-ZN1-0296	Zone-1	4101	3.8	3431
J-ZN1-0259	Zone-1	4110	13.1	4278
J-ZN1-0036	Zone-1	4092	0.9	10113
J-ZN1-0507	Zone-1	4104	4.6	3467
J-ZN1-0083	Zone-1	4169	25.1	5843
J-ZN1-0476	Zone-1	4111	2.4	14609
J-ZN1-0382	Zone-1	4122	1.3	5500
J-ZN1-0347	Zone-1	4107	11.7	4324
J-ZN1-0127	Zone-1	4149	17.2	6576
J-ZN1-0143	Zone-1	4144	8.7	4600
J-ZN1-0656	Zone-1	4137	8.0	538
J-ZN1-0584	Zone-1	4221	8.0	1257
J-ZN1-0554	Zone-1	4148	32.1	1703
J-ZN1-0786	Zone-1	4204	3.9	4348
J-ZN1-0785	Zone-1	4178	24.8	5385
J-ZN1-0404	Zone-1	4096	0.1	8656
J-ZN1-0761	Zone-1	4106	11.7	3942

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0264	Zone-1	4108	5.9	3258
J-ZN1-0174	Zone-1	4118	23.6	6443
J-ZN1-0598	Zone-1	4207	2.0	465
J-ZN1-0431	Zone-1	4106	3.5	11018
J-ZN1-0853	Zone-1	4093	0.1	13071
J-ZN1-0624	Zone-1	4096	4.5	30832
J-ZN1-0648	Zone-1	4116	7.5	1616
J-ZN1-0444	Zone-1	4121	4.3	11763
J-ZN1-0481	Zone-1	4159	5.7	1942
J-ZN1-0290	Zone-1	4104	3.4	4592
J-ZN1-0011	Zone-1	4251	0.0	1887
J-ZN1-0050	Zone-1	4138	18.7	3783
J-ZN1-0492	Zone-1	4181	7.1	5609
J-ZN1-0559	Zone-1	4149	3.3	1177
J-ZN1-0376	Zone-1	4096	19.4	7176
J-ZN1-0337	Zone-1	4102	6.5	6095
J-ZN1-0156	Zone-1	4136	11.4	2913
J-ZN1-0121	Zone-1	4170	4.7	3441
J-ZN1-0819	Zone-1	4162	1.5	528
J-ZN1-0681	Zone-1	4100	1.4	5693
J-ZN1-0726	Zone-1	4090	0.0	9812
J-ZN1-0448	Zone-1	4125	2.5	7356
J-ZN1-0694	Zone-1	4185	3.7	639
J-ZN1-0252	Zone-1	4134	7.8	2665
J-ZN1-0018	Zone-1	4111	4.8	6134
J-ZN1-0310	Zone-1	4100	8.1	2071
J-ZN1-0008	Zone-1	4239	0.2	3489
J-ZN1-0065	Zone-1	4182	7.3	6881
J-ZN1-0345	Zone-1	4102	1.7	5496
J-ZN1-0710	Zone-1	4096	6.5	8555
J-ZN1-0125	Zone-1	4151	5.5	4829
J-ZN1-0522	Zone-1	4148	7.7	3353
J-ZN1-0141	Zone-1	4140	3.6	3796
J-ZN1-0654	Zone-1	4148	10.1	1370
J-ZN1-0583	Zone-1	4154	13.7	1602
J-ZN1-0552	Zone-1	4153	2.7	2224
J-ZN1-0783	Zone-1	4176	1.3	6636
J-ZN1-0627	Zone-1	4101	4.5	6956
J-ZN1-0172	Zone-1	4120	5.0	4212

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0417	Zone-1	4092	0.8	1703
J-ZN1-0813	Zone-1	4092	0.2	6345
J-ZN1-0851	Zone-1	4103	5.5	7696
J-ZN1-0622	Zone-1	4109	17.2	27360
J-ZN1-0479	Zone-1	4098	0.7	3310
J-ZN1-0442	Zone-1	4206	6.7	1401
J-ZN1-0719	Zone-1	4117	0.8	1675
J-ZN1-0031	Zone-1	4145	10.5	2571
J-ZN1-0490	Zone-1	4178	8.1	8945
J-ZN1-0756	Zone-1	4213	2.0	1343
J-ZN1-0746	Zone-1	4109	11.4	4245
J-ZN1-0374	Zone-1	4100	0.0	3494
J-ZN1-0335	Zone-1	4102	8.2	6017
J-ZN1-0633	Zone-1	4112	0.8	2696
J-ZN1-0388	Zone-1	4099	0.0	23263
J-ZN1-0679	Zone-1	4100	13.3	2316
J-ZN1-0828	Zone-1	4195	1.8	1841
J-ZN1-0724	Zone-1	4201	1.8	368
J-ZN1-0446	Zone-1	4108	14.3	20321
J-ZN1-0693	Zone-1	4194	9.6	1929
J-ZN1-0244	Zone-1	4140	3.5	3122
J-ZN1-0068	Zone-1	4185	8.2	5814
J-ZN1-0308	Zone-1	4097	3.8	7623
J-ZN1-0272	Zone-1	4108	4.9	4647
J-ZN1-0079	Zone-1	4137	2.4	407
J-ZN1-0818	Zone-1	4098	29.5	5718
J-ZN1-0343	Zone-1	4104	7.7	4206
J-ZN1-0520	Zone-1	4172	2.7	3207
J-ZN1-0106	Zone-1	4152	12.9	5407
J-ZN1-0059	Zone-1	4156	27.3	7190
J-ZN1-0647	Zone-1	4194	4.0	4826
J-ZN1-0139	Zone-1	4142	13.1	5152
J-ZN1-0652	Zone-1	4173	8.1	3193
J-ZN1-0550	Zone-1	4150	6.1	2196
J-ZN1-0697	Zone-1	4197	4.1	1382
J-ZN1-0667	Zone-1	4094	28.8	3133
J-ZN1-0596	Zone-1	4204	4.4	1426
J-ZN1-0415	Zone-1	4094	0.4	7254
J-ZN1-0849	Zone-1	4110	0.5	9930
J-ZN1-0620	Zone-1	4140	9.1	1160
J-ZN1-0821	Zone-1	4156	0.0	3694
J-ZN1-0866	Zone-1	4118	9.9	2398
J-ZN1-0488	Zone-1	4202	3.8	2655
J-ZN1-0582	Zone-1	4167	0.0	4541
J-ZN1-0302	Zone-1	4104	1.8	7861
J-ZN1-0333	Zone-1	4103	16.6	6897
J-ZN1-0419	Zone-1	4092	1.5	7530
J-ZN1-0386	Zone-1	4098	1.4	11719
J-ZN1-0133	Zone-1	4150	5.9	6753
J-ZN1-0826	Zone-1	4202	4.8	429
J-ZN1-0795	Zone-1	4128	7.0	5568
J-ZN1-0722	Zone-1	4162	4.8	2173
J-ZN1-0691	Zone-1	4228	12.1	3720
J-ZN1-0755	Zone-1	4098	10.6	4741
J-ZN1-0238	Zone-1	4139	1.7	3147
J-ZN1-0460	Zone-1	4290	0.0	-1
J-ZN1-0306	Zone-1	4116	3.7	1421
J-ZN1-0270	Zone-1	4112	6.2	2781
J-ZN1-0321	Zone-1	4104	0.0	6673
J-ZN1-0357	Zone-1	4114	7.9	1040
J-ZN1-0137	Zone-1	4151	5.0	6330
J-ZN1-0053	Zone-1	4140	6.1	755
J-ZN1-0064	Zone-1	4114	0.0	2614
J-ZN1-0153	Zone-1	4150	0.0	3145
J-ZN1-0665	Zone-1	4094	2.3	4625
J-ZN1-0595	Zone-1	4141	0.0	4875
J-ZN1-0167	Zone-1	4159	19.6	2080
J-ZN1-0565	Zone-1	4191	2.6	1126
J-ZN1-0767	Zone-1	4110	5.6	2731
J-ZN1-0275	Zone-1	4109	2.5	3939
J-ZN1-0185	Zone-1	4166	0.6	2255
J-ZN1-0606	Zone-1	4158	3.1	1522
J-ZN1-0847	Zone-1	4092	0.6	3362
J-ZN1-0864	Zone-1	4151	4.1	5424
J-ZN1-0651	Zone-1	4121	7.9	1484
J-ZN1-0455	Zone-1	4182	7.0	15119
J-ZN1-0486	Zone-1	4176	9.5	1472
J-ZN1-0076	Zone-1	4142	5.8	1145

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0039	Zone-1	4226	23.2	3769
J-ZN1-0089	Zone-1	4096	3.0	17621
J-ZN1-0764	Zone-1	4146	19.8	1813
J-ZN1-0567	Zone-1	4167	2.1	1486
J-ZN1-0532	Zone-1	4152	2.6	1708
J-ZN1-0384	Zone-1	4116	0.5	2758
J-ZN1-0351	Zone-1	4102	6.1	4136
J-ZN1-0824	Zone-1	4164	0.9	5213
J-ZN1-0793	Zone-1	4111	13.1	2891
J-ZN1-0690	Zone-1	4171	6.9	2558
J-ZN1-0660	Zone-1	4169	1.8	1239
J-ZN1-0458	Zone-1	4267	2.3	2
J-ZN1-0698	Zone-1	4096	12.3	2864
J-ZN1-0268	Zone-1	4110	3.5	4693
J-ZN1-0319	Zone-1	4102	2.7	6069
J-ZN1-0355	Zone-1	4110	17.1	3207
J-ZN1-0721	Zone-1	4097	0.9	8367
J-ZN1-0135	Zone-1	4133	4.9	4737
J-ZN1-0034	Zone-1	4108	4.5	1244
J-ZN1-0046	Zone-1	4144	8.1	3698
J-ZN1-0151	Zone-1	4168	0.8	2284
J-ZN1-0663	Zone-1	4094	2.1	2155
J-ZN1-0593	Zone-1	4187	4.3	1604
J-ZN1-0563	Zone-1	4204	6.7	1049
J-ZN1-0703	Zone-1	4100	7.1	1356
J-ZN1-0675	Zone-1	4098	8.1	680
J-ZN1-0604	Zone-1	4150	2.2	1141
J-ZN1-0183	Zone-1	4116	33.6	3707
J-ZN1-0427	Zone-1	4092	0.0	8708
J-ZN1-0862	Zone-1	4163	0.6	1034
J-ZN1-0484	Zone-1	4190	1.4	1435
J-ZN1-0453	Zone-1	4251	0.7	3037
J-ZN1-0021	Zone-1	4187	6.7	5091
J-ZN1-0500	Zone-1	4214	1.7	3016
J-ZN1-0069	Zone-1	4154	11.7	1285
J-ZN1-0530	Zone-1	4160	3.8	2329
J-ZN1-0349	Zone-1	4106	18.4	5081
J-ZN1-0609	Zone-1	4157	11.0	897
J-ZN1-0579	Zone-1	4224	0.0	1507

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0048	Zone-1	4140	7.7	4442
J-ZN1-0634	Zone-1	4113	15.6	1385
J-ZN1-0791	Zone-1	4105	70.4	3123
J-ZN1-0014	Zone-1	4150	1.2	1601
J-ZN1-0807	Zone-1	4128	17.8	928
J-ZN1-0457	Zone-1	4106	9.5	26361
J-ZN1-0266	Zone-1	4110	5.0	4522
J-ZN1-0176	Zone-1	4118	4.8	6499
J-ZN1-0504	Zone-1	4215	7.4	1216
J-ZN1-0473	Zone-1	4098	17.0	27259
J-ZN1-0317	Zone-1	4090	5.7	12316
J-ZN1-0283	Zone-1	4114	22.2	4229
J-ZN1-0543	Zone-1	4147	1.5	3816
J-ZN1-0823	Zone-1	4098	30.9	4158
J-ZN1-0353	Zone-1	4110	0.0	7067
J-ZN1-0084	Zone-1	4137	3.8	881
J-ZN1-0401	Zone-1	4090	5.5	4976
J-ZN1-0149	Zone-1	4134	9.4	5890
J-ZN1-0096	Zone-1	4175	0.0	1624
J-ZN1-0662	Zone-1	4198	4.8	3310
J-ZN1-0701	Zone-1	4100	6.7	7388
J-ZN1-0673	Zone-1	4096	13.5	5396
J-ZN1-0602	Zone-1	4160	10.4	2499
J-ZN1-0181	Zone-1	4112	41.0	3691
J-ZN1-0574	Zone-1	4233	0.0	1256
J-ZN1-0287	Zone-1	4110	7.2	4976
J-ZN1-0224	Zone-1	4121	12.3	2623
J-ZN1-0860	Zone-1	4175	3.5	2133
J-ZN1-0498	Zone-1	4273	0.6	1
J-ZN1-0016	Zone-1	4175	13.1	5106
J-ZN1-0592	Zone-1	4114	3.3	8844
J-ZN1-0118	Zone-1	4164	2.7	3966
J-ZN1-0103	Zone-1	4155	3.9	2872
J-ZN1-0528	Zone-1	4146	2.8	2926
J-ZN1-0733	Zone-1	4097	4.4	7322
J-ZN1-0544	Zone-1	4164	2.1	4377
J-ZN1-0577	Zone-1	4163	0.5	4070
J-ZN1-0396	Zone-1	4094	5.8	7051
J-ZN1-0789	Zone-1	4168	2.8	4568

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0055	Zone-1	4180	10.6	5774
J-ZN1-0805	Zone-1	4137	1.4	4686
J-ZN1-0843	Zone-1	4106	1.0	26255
J-ZN1-0471	Zone-1	4190	7.3	1469
J-ZN1-0436	Zone-1	4099	0.2	16176
J-ZN1-0315	Zone-1	4096	1.5	18392
J-ZN1-0281	Zone-1	4114	10.0	4453
J-ZN1-0608	Zone-1	4122	7.4	5968
J-ZN1-0637	Zone-1	4092	2.3	6224
J-ZN1-0780	Zone-1	4140	6.9	2045
J-ZN1-0066	Zone-1	4096	38.9	9972
J-ZN1-0400	Zone-1	4092	23.8	5988
J-ZN1-0367	Zone-1	4115	17.5	1295
J-ZN1-0112	Zone-1	4182	5.6	5497
J-ZN1-0147	Zone-1	4144	8.8	4281
J-ZN1-1242	Zone-1	4294	0.0	0
J-ZN1-1248	Zone-1	4174	2.2	3436
J-ZN1-1246	Zone-1	4297	0.0	0
J-ZN1-1243	Zone-1	4285	0.0	0
J-ZN1-1251	Zone-1	4111	0.0	2876
J-ZN1-1247	Zone-1	4215	0.0	1759
J-ZN1-1249	Zone-1	4197	0.0	2667
J-ZN1-1252	Zone-1	4092	0.0	5940
J-ZN1-1245	Zone-1	4223	0.0	1060
J-ZN1-1244	Zone-1	4162	0.0	526
J-ZN1-1250	Zone-1	4111	0.0	6511
J-ZN1-1253	Zone-1	4092	1.2	13733
J-ZN1-0816	Zone-1	4254	5.2	1057
J-ZN1-0168	Zone-1	4090	1.3	6954
J-ZN1-0325	Zone-1	4090	0.0	2674
J-ZN1-0339	Zone-1	4198	0.0	3404
J-ZN1-0340	Zone-1	4179	0.0	3614
J-ZN1-0341	Zone-1	4198	0.0	3354
J-ZN1-0342	Zone-1	4197	0.0	3202
J-ZN1-0328	Zone-1	4198	0.0	3027
J-ZN1-0001	Zone-1	4197	0.0	3584
J-ZN1-0002	Zone-1	4250	1.8	2732
J-ZN1-0928	Zone-1	4179	30.6	3465
J-ZN1-0927	Zone-1	4180	0.0	4137

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0165	Zone-1	4177	0.3	5799
J-ZN1-0164	Zone-1	4194	0.0	5373
J-ZN1-0192	Zone-1	4198	11.0	2733
J-ZN1-1241	Zone-1	4174	9.9	2953
J-ZN1-0449	Zone-1	4117	4.5	7866
J-ZN1-0004	Zone-1	4092	2.9	1572
J-ZN1-0005	Zone-1	4146	2.4	1357
J-ZN1-0006	Zone-1	4145	4.4	766
J-ZN1-0007	Zone-1	4144	0.4	1204
J-ZN1-0228	Zone-1	4175	8.1	3065
J-ZN1-0230	Zone-1	4214	6.9	2856
J-ZN1-0233	Zone-1	4218	1.8	1671
J-ZN1-0234	Zone-1	4231	0.9	1311
J-ZN1-0235	Zone-1	4224	2.8	1608
J-ZN1-0236	Zone-1	4246	1.6	321
J-ZN1-0237	Zone-1	4224	0.7	2691
J-ZN1-0245	Zone-1	4162	1.8	4088
J-ZN1-0246	Zone-1	4150	0.0	3487
J-ZN1-0248	Zone-1	4162	1.4	2462
J-ZN1-0249	Zone-1	4184	2.3	1863
J-ZN1-0250	Zone-1	4196	1.9	1729
J-ZN1-0251	Zone-1	4097	0.0	29148
J-ZN1-0253	Zone-1	4189	2.2	1627
J-ZN1-0254	Zone-1	4149	2.2	4746
J-ZN1-0255	Zone-1	4102	0.7	4205
J-ZN1-0256	Zone-1	4118	8.0	1671
J-ZN1-0258	Zone-1	4122	2.2	1295
J-ZN1-0194	Zone-1	4206	1.4	4114
J-ZN1-0195	Zone-1	4189	4.7	4978
J-ZN1-0196	Zone-1	4175	1.3	4652
J-ZN1-0199	Zone-1	4155	14.1	5162
J-ZN1-0200	Zone-1	4116	5.0	1693
J-ZN1-0201	Zone-1	4098	11.6	7339
J-ZN1-0202	Zone-1	4134	0.0	5316
J-ZN1-0203	Zone-1	4110	21.3	2617
J-ZN1-0205	Zone-1	4095	1.4	6383
J-ZN1-0206	Zone-1	4098	63.9	7364
J-ZN1-0207	Zone-1	4095	0.0	8952
J-ZN1-0208	Zone-1	4100	1.7	2299

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0210	Zone-1	4181	12.8	6464
J-ZN1-0211	Zone-1	4095	13.5	8038
J-ZN1-0212	Zone-1	4091	5.9	15803
J-ZN1-0214	Zone-1	4092	4.3	16746
J-ZN1-0215	Zone-1	4094	0.7	9303
J-ZN1-0216	Zone-1	4096	14.7	10085
J-ZN1-0217	Zone-1	4158	0.0	2315
J-ZN1-0218	Zone-1	4164	2.0	1822
J-ZN1-0220	Zone-1	4141	0.0	3539
J-ZN1-0221	Zone-1	4094	8.4	15402
J-ZN1-0222	Zone-1	4096	8.7	22231
J-ZN1-0223	Zone-1	4090	0.0	3838
J-ZN1-0225	Zone-1	4088	0.0	1914
J-ZN1-0227	Zone-1	4088	0.0	8178
J-ZN1-1065	Zone-1	4148	17.5	1651
J-ZN1-1070	Zone-1	4168	3.5	1134
J-ZN1-1084	Zone-1	4173	3.2	1306
J-ZN1-1099	Zone-1	4189	14.2	1426
J-ZN1-1110	Zone-1	4204	2.3	1218
J-ZN1-1129	Zone-1	4216	4.8	1127
J-ZN1-1137	Zone-1	4205	1.0	1182
J-ZN1-1146	Zone-1	4208	8.5	1170
J-ZN1-1153	Zone-1	4211	6.2	1169
J-ZN1-1181	Zone-1	4220	3.4	1042
J-ZN1-1202	Zone-1	4208	5.3	1222
J-ZN1-1212	Zone-1	4205	8.2	1351
J-ZN1-0874	Zone-1	4214	5.8	941
J-ZN1-0876	Zone-1	4231	2.7	1320
J-ZN1-0877	Zone-1	4245	1.4	722
J-ZN1-0878	Zone-1	4226	1.4	2104
J-ZN1-0879	Zone-1	4287	1.2	1
J-ZN1-1001	Zone-1	4168	27.9	1718
J-ZN1-1003	Zone-1	4118	0.6	7530
J-ZN1-1005	Zone-1	4112	10.1	974
J-ZN1-1006	Zone-1	4118	5.5	947
J-ZN1-1007	Zone-1	4155	9.1	4020
J-ZN1-1009	Zone-1	4150	1.8	3557
J-ZN1-1010	Zone-1	4188	23.2	2444
J-ZN1-1013	Zone-1	4184	4.3	1182
J-ZN1-1014	Zone-1	4166	4.9	1352
J-ZN1-1018	Zone-1	4169	1.8	2673
J-ZN1-1019	Zone-1	4148	4.7	2617
J-ZN1-1020	Zone-1	4130	0.0	4488
J-ZN1-1023	Zone-1	4090	0.0	3348
J-ZN1-1025	Zone-1	4119	13.5	7846
J-ZN1-1027	Zone-1	4119	1.6	1457
J-ZN1-1029	Zone-1	4108	2.9	505
J-ZN1-1031	Zone-1	4110	2.6	677
J-ZN1-1035	Zone-1	4120	0.9	3997
J-ZN1-1038	Zone-1	4162	4.7	1836
J-ZN1-1040	Zone-1	4160	0.0	5100
J-ZN1-1042	Zone-1	4150	0.2	5217
J-ZN1-1043	Zone-1	4151	2.8	4888
J-ZN1-1044	Zone-1	4138	15.4	1246
J-ZN1-1046	Zone-1	4112	17.1	1474
J-ZN1-1047	Zone-1	4104	0.8	3840
J-ZN1-1049	Zone-1	4120	30.9	2626
J-ZN1-1051	Zone-1	4092	5.5	1410
J-ZN1-1053	Zone-1	4094	15.1	7249
J-ZN1-1055	Zone-1	4092	1.6	1597
J-ZN1-1058	Zone-1	4094	2.0	8227
J-ZN1-1060	Zone-1	4098	7.8	3513
J-ZN1-1067	Zone-1	4209	2.9	5399
J-ZN1-1068	Zone-1	4186	1.8	5554
J-ZN1-1071	Zone-1	4176	10.9	652
J-ZN1-1073	Zone-1	4166	5.5	3506
J-ZN1-1075	Zone-1	4173	6.5	3122
J-ZN1-1077	Zone-1	4172	17.4	3084
J-ZN1-1078	Zone-1	4172	9.1	3202
J-ZN1-1081	Zone-1	4092	1.4	7575
J-ZN1-1082	Zone-1	4092	4.9	8888
J-ZN1-1085	Zone-1	4090	9.2	9531
J-ZN1-1086	Zone-1	4090	0.0	12223
J-ZN1-1088	Zone-1	4090	17.4	15480
J-ZN1-1089	Zone-1	4090	3.4	2427
J-ZN1-1091	Zone-1	4092	1.5	7863
J-ZN1-1093	Zone-1	4093	0.2	8384
J-ZN1-1094	Zone-1	4094	9.8	8020

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1095	Zone-1	4092	0.2	6223
J-ZN1-1100	Zone-1	4098	0.6	5092
J-ZN1-1101	Zone-1	4100	0.0	4079
J-ZN1-1102	Zone-1	4100	0.0	3989
J-ZN1-1104	Zone-1	4126	4.5	2767
J-ZN1-1105	Zone-1	4125	0.0	2846
J-ZN1-1106	Zone-1	4122	6.6	2776
J-ZN1-1107	Zone-1	4130	49.5	2871
J-ZN1-1108	Zone-1	4119	5.7	2672
J-ZN1-1109	Zone-1	4120	13.6	2665
J-ZN1-1111	Zone-1	4138	7.4	4382
J-ZN1-1112	Zone-1	4138	6.8	3933
J-ZN1-1115	Zone-1	4177	8.0	6146
J-ZN1-1116	Zone-1	4156	15.8	4327
J-ZN1-1117	Zone-1	4156	14.0	3666
J-ZN1-1120	Zone-1	4162	11.9	3911
J-ZN1-1122	Zone-1	4166	10.8	4058
J-ZN1-1124	Zone-1	4164	6.6	3568
J-ZN1-1126	Zone-1	4168	0.8	3572
J-ZN1-1128	Zone-1	4165	2.2	1688
J-ZN1-1130	Zone-1	4153	1.2	3101
J-ZN1-1134	Zone-1	4162	13.0	1704
J-ZN1-1135	Zone-1	4172	1.5	1121
J-ZN1-1136	Zone-1	4171	2.5	1209
J-ZN1-1139	Zone-1	4175	2.1	1128
J-ZN1-1141	Zone-1	4156	7.4	1732
J-ZN1-1143	Zone-1	4149	3.5	2119
J-ZN1-1145	Zone-1	4107	22.0	3162
J-ZN1-1147	Zone-1	4108	10.4	3308
J-ZN1-1155	Zone-1	4104	5.7	999
J-ZN1-1159	Zone-1	4117	3.2	1056
J-ZN1-1161	Zone-1	4108	18.7	6525
J-ZN1-1162	Zone-1	4109	8.2	6851
J-ZN1-1164	Zone-1	4105	12.7	6906
J-ZN1-1166	Zone-1	4108	16.2	6851
J-ZN1-1167	Zone-1	4108	3.8	6798
J-ZN1-1168	Zone-1	4110	16.1	6930
J-ZN1-1169	Zone-1	4108	13.3	6220
J-ZN1-1170	Zone-1	4110	8.4	6804
J-ZN1-1171	Zone-1	4108	21.5	6016
J-ZN1-1174	Zone-1	4106	0.0	3491
J-ZN1-1176	Zone-1	4137	8.2	2016
J-ZN1-1178	Zone-1	4136	12.1	2233
J-ZN1-1179	Zone-1	4168	18.8	1951
J-ZN1-1180	Zone-1	4165	29.7	1920
J-ZN1-1182	Zone-1	4164	0.0	2228
J-ZN1-1183	Zone-1	4158	7.0	2280
J-ZN1-1184	Zone-1	4176	1.6	2252
J-ZN1-1186	Zone-1	4166	0.8	2245
J-ZN1-1188	Zone-1	4149	4.4	2475
J-ZN1-1191	Zone-1	4109	6.4	3341
J-ZN1-1193	Zone-1	4109	4.5	3691
J-ZN1-1194	Zone-1	4107	11.5	3863
J-ZN1-1195	Zone-1	4104	17.9	4043
J-ZN1-1196	Zone-1	4105	7.2	3985
J-ZN1-1197	Zone-1	4105	11.0	4675
J-ZN1-1198	Zone-1	4104	7.9	2583
J-ZN1-1199	Zone-1	4102	0.1	6305
J-ZN1-1200	Zone-1	4088	0.0	4050
J-ZN1-1205	Zone-1	4086	0.0	3054
J-ZN1-1208	Zone-1	4090	0.0	9004
J-ZN1-1209	Zone-1	4089	0.1	8293
J-ZN1-1210	Zone-1	4093	0.0	9922
J-ZN1-1211	Zone-1	4090	0.0	8998
J-ZN1-1213	Zone-1	4089	0.0	8278
J-ZN1-1215	Zone-1	4089	2.4	8151
J-ZN1-1216	Zone-1	4090	22.7	8335
J-ZN1-1217	Zone-1	4090	0.0	4229
J-ZN1-1218	Zone-1	4090	0.0	2547
J-ZN1-1219	Zone-1	4090	0.0	2531
J-ZN1-1220	Zone-1	4090	0.0	2982
J-ZN1-1221	Zone-1	4090	0.0	2939
J-ZN1-1222	Zone-1	4090	0.0	4114
J-ZN1-1223	Zone-1	4090	0.0	5657
J-ZN1-1224	Zone-1	4090	0.0	3307
J-ZN1-1225	Zone-1	4090	0.0	2984
J-ZN1-1226	Zone-1	4090	0.0	2398
J-ZN1-1227	Zone-1	4090	0.0	2792

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1228	Zone-1	4089	0.0	2732
J-ZN1-1229	Zone-1	4090	0.0	2780
J-ZN1-1230	Zone-1	4089	0.0	2039
J-ZN1-1231	Zone-1	4089	0.0	2008
J-ZN1-1232	Zone-1	4088	0.0	2254
J-ZN1-1236	Zone-1	4090	0.0	7657
J-ZN1-1238	Zone-1	4088	0.1	8220
J-ZN1-1239	Zone-1	4088	0.0	8230
J-ZN1-0870	Zone-1	4088	0.0	8119
J-ZN1-0871	Zone-1	4088	0.0	7486
J-ZN1-0240	Zone-1	4108	1.8	522
J-ZN1-0241	Zone-1	4112	0.6	1589
J-ZN1-0242	Zone-1	4219	1.9	539
J-ZN1-0880	Zone-1	4092	0.0	11336
J-ZN1-0881	Zone-1	4094	6.5	3160
J-ZN1-0193	Zone-1	4108	26.2	6107
J-ZN1-0884	Zone-1	4114	5.4	4815
J-ZN1-0885	Zone-1	4144	5.4	3579
J-ZN1-0887	Zone-1	4092	0.0	11370
J-ZN1-0888	Zone-1	4090	0.0	19896
J-ZN1-0889	Zone-1	4094	0.0	11875
J-ZN1-0890	Zone-1	4169	1.5	3918
J-ZN1-0891	Zone-1	4178	0.3	6552
J-ZN1-0892	Zone-1	4194	8.6	1980
J-ZN1-0893	Zone-1	4182	7.9	6881
J-ZN1-0894	Zone-1	4203	1.7	4256
J-ZN1-0895	Zone-1	4182	0.2	6272
J-ZN1-0896	Zone-1	4182	0.6	6281
J-ZN1-0897	Zone-1	4098	11.9	682
J-ZN1-0898	Zone-1	4096	6.3	6918
J-ZN1-0899	Zone-1	4100	4.3	3435
J-ZN1-0900	Zone-1	4104	0.0	3088
J-ZN1-0901	Zone-1	4092	15.4	13791
J-ZN1-0902	Zone-1	4090	9.9	7959
J-ZN1-0903	Zone-1	4098	2.2	10210
J-ZN1-0904	Zone-1	4104	5.0	997
J-ZN1-0905	Zone-1	4167	2.6	4212
J-ZN1-0906	Zone-1	4149	7.7	5029
J-ZN1-0907	Zone-1	4163	1.6	4637

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0908	Zone-1	4144	6.0	5470
J-ZN1-0909	Zone-1	4121	2.2	3437
J-ZN1-0910	Zone-1	4110	7.6	4171
J-ZN1-0911	Zone-1	4093	0.0	22999
J-ZN1-0912	Zone-1	4092	4.1	22765
J-ZN1-0913	Zone-1	4092	0.0	10043
J-ZN1-0914	Zone-1	4093	0.0	9947
J-ZN1-0915	Zone-1	4093	0.0	9701
J-ZN1-0916	Zone-1	4100	0.0	8350
J-ZN1-0917	Zone-1	4102	1.1	7538
J-ZN1-0918	Zone-1	4098	7.2	9379
J-ZN1-0919	Zone-1	4097	12.4	7946
J-ZN1-0920	Zone-1	4104	1.3	5286
J-ZN1-0921	Zone-1	4114	0.0	6199
J-ZN1-0922	Zone-1	4122	9.7	1825
J-ZN1-0924	Zone-1	4164	1.9	4310
J-ZN1-0926	Zone-1	4223	2.9	1216
J-ZN1-0936	Zone-1	4098	0.6	8461
J-ZN1-0939	Zone-1	4137	4.7	1001
J-ZN1-0930	Zone-1	4090	0.0	5841
J-ZN1-0931	Zone-1	4090	8.0	7952
J-ZN1-0937	Zone-1	4247	0.2	257
J-ZN1-0938	Zone-1	4234	0.2	1067
J-ZN1-0941	Zone-1	4181	1.1	6672
J-ZN1-0942	Zone-1	4170	0.0	9241
J-ZN1-0943	Zone-1	4161	0.0	5276
J-ZN1-0944	Zone-1	4212	0.0	4600
J-ZN1-0945	Zone-1	4290	0.0	-1
J-ZN1-0946	Zone-1	4095	40.0	8140
J-ZN1-0947	Zone-1	4250	5.1	5
J-ZN1-0948	Zone-1	4250	4.9	2278
J-ZN1-0949	Zone-1	4210	2.4	1766
J-ZN1-0950	Zone-1	4215	1.6	1073
J-ZN1-0951	Zone-1	4158	5.5	4615
J-ZN1-0952	Zone-1	4142	13.9	6020
J-ZN1-0953	Zone-1	4102	5.1	2577
J-ZN1-0954	Zone-1	4104	22.8	6397
J-ZN1-0956	Zone-1	4094	0.3	18700
J-ZN1-0957	Zone-1	4098	1.7	10785

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0958	Zone-1	4097	0.7	11099
J-ZN1-0959	Zone-1	4098	0.0	31594
J-ZN1-0960	Zone-1	4095	16.5	29840
J-ZN1-0961	Zone-1	4098	0.2	31474
J-ZN1-0962	Zone-1	4100	0.0	31187
J-ZN1-0963	Zone-1	4103	0.9	30527
J-ZN1-0964	Zone-1	4093	0.0	26455
J-ZN1-0965	Zone-1	4095	0.0	26977
J-ZN1-0966	Zone-1	4170	5.0	1393
J-ZN1-0967	Zone-1	4090	1.7	10976
J-ZN1-0968	Zone-1	4110	0.9	7074
J-ZN1-0969	Zone-1	4090	0.8	6515
J-ZN1-0972	Zone-1	4123	14.1	1809
J-ZN1-0973	Zone-1	4152	6.2	1577
J-ZN1-0974	Zone-1	4204	7.7	1263
J-ZN1-0975	Zone-1	4125	0.0	7477
J-ZN1-0976	Zone-1	4178	6.4	534
J-ZN1-0977	Zone-1	4094	8.7	9003
J-ZN1-0978	Zone-1	4092	0.0	9032
J-ZN1-0979	Zone-1	4096	0.2	7778
J-ZN1-0980	Zone-1	4178	0.0	8852
J-ZN1-0981	Zone-1	4178	0.0	1789
J-ZN1-0982	Zone-1	4156	137.9	3538
J-ZN1-0983	Zone-1	4096	1.2	7049
J-ZN1-0984	Zone-1	4102	14.6	2394
J-ZN1-0985	Zone-1	4125	28.9	1515
J-ZN1-0986	Zone-1	4102	4.5	5579
J-ZN1-0988	Zone-1	4175	0.3	2213
J-ZN1-0989	Zone-1	4175	1.7	1940
J-ZN1-0990	Zone-1	4156	0.0	1762
J-ZN1-0991	Zone-1	4161	1.2	1714
J-ZN1-0992	Zone-1	4150	4.4	4901
J-ZN1-0993	Zone-1	4150	3.5	4908
J-ZN1-0994	Zone-1	4150	4.6	4560
J-ZN1-0995	Zone-1	4140	26.9	368
J-ZN1-0996	Zone-1	4140	0.7	949
J-ZN1-0997	Zone-1	4092	1.3	10343
J-ZN1-0998	Zone-1	4094	12.8	9720
J-ZN1-0999	Zone-1	4134	5.4	5810

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1280	Zone-1	4091	0.0	8824
J2554	Zone-1	4184	4.4	3089
J2556	Zone-1	4188	0.6	3062
J2558	Zone-1	4220	0.0	2064
J2560	Zone-1	4200	11.8	3216
J2564	Zone-1	4164	23.6	2881
J2566	Zone-1	4174	3.4	6355
J-ZN1-4005	Zone-1	4192	7.7	1454
J-ZN1-4007	Zone-1	4186	3.7	1566
J-ZN1-4013	Zone-1	4096	3.8	6686
J-ZN1-4015	Zone-1	4088	0.0	8622
J-ZN1-4017	Zone-1	4088	8.3	8222
J-ZN1-1436	Zone-1	4178	1.6	6926
J2568	Zone-1	4198	1.3	4235
J2570	Zone-1	4100	13.7	6398
J-ZN1-0528A	Zone-1	4162	5.9	2530
P-ZN1-0856B	Zone-1	4162	34.8	3786
P-ZN1-0798A	Zone-1	4170	7.5	3216
J-ZN1-0306A	Zone-1	4124	3.6	1185
J-ZN1-1281	Zone-1	4111	5.3	1275
HYD494	Zone-1	4172	5.8	1758
HYD1168	Zone-1	4097	7.3	9605
HYD157	Zone-1	4174	0.0	3270
HYD1167	Zone-1	4097	0.0	9647
HYD148	Zone-1	4122	0.0	1120
HYD1005	Zone-1	4090	0.0	7948
HYD1006	Zone-1	4090	0.0	7911
HYDRANT597	Zone-3	4426	51.1	1836
J-BV-0002	Zone-5	4401	4.9	6416
J-BV-0004	Zone-5	4460	0.0	5304
J-BV-0005	Zone-5	4547	0.0	2095
J-BV-0006	Zone-5	4543	0.0	2096
J-BV-0008	Zone-5	4548	4.2	2170
J-BV-0010	Zone-5	4494	0.0	3594
J-BV5-0004	Zone-5	4493	0.0	7535
J-BV5-0001	Zone-5	4590	0.0	7533
J-BV-0001	Zone-5	4546	8.1	2224

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-BV-0003	Zone-5	4442	13.1	6617
J-BV-0007	Zone-5	4486	16.5	6600

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-BV-0009	Zone-5	4503	3.8	4022

Appendix H. Pressures at Peak-Hour Demand with Phase 1 Improvements

H. Pressures at Peak-Hour Demand with Phase 1 Improvements

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0810	Zone-1	4098	3.7	84
J-ZN1-0163	Zone-1	4154	10.9	53
J-ZN1-0166	Zone-1	4169	8.3	52
J-ZN1-0671	Zone-1	4098	31.3	79
J-PRE-0030	Prescott	4244	9.9	53
J-ZN1-0179	Zone-1	4112	28.6	71
J-ZN1-0572	Zone-1	4176	0.0	49
J-ZN1-0716	Zone-1	4111	5.3	73
J-ZN1-0768	Zone-1	4120	8.9	48
J-ZN1-0285	Zone-1	4108	14.1	73
J-ZN1-0213	Zone-1	4116	7.6	69
J-ZN1-0615	Zone-1	4142	12.3	65
J-ZN1-0858	Zone-1	4154	0.6	59
J-ZN1-0830	Zone-1	4186	2.2	50
J-PRV-MOY-0005	PRV-13	4268	25.5	81
J-ZN1-0743	Zone-1	4120	6.4	74
J-ZN1-0642	Zone-1	4095	0.5	80
J-UL-0004	Upper Lynnewood	4269	0.6	74
J-ZN1-0869	Zone-1	4183	9.0	62
J-ZN1-0661	Zone-1	4123	4.7	59
J-ZN1-0010	Zone-1	4148	25.3	65
J-ZN1-0464	Zone-1	4185	16.1	52
J-ZN1-0098	Zone-1	4136	2.5	37
J-HOS-0028	URH-HOSP-HLVL	4317	31.0	75
J-ZN1-0116	Zone-1	4166	4.3	52
J-ZN1-0102	Zone-1	4174	2.7	50
J-ZN1-0512	Zone-1	4132	5.8	73
J-HOS-0058	URH-HOSP-HLVL	4369	4.7	52
J-ZN1-0526	Zone-1	4227	0.7	41
J-ZN1-0752	Zone-1	4162	17.5	56

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-HWY-0008	PRV-2-HWY	4233	0.6	53
J-ZN1-0576	Zone-1	4217	2.2	39
J-ZN1-0542	Zone-1	4162	25.2	61
J-ZN1-0773	Zone-1	4100	15.4	76
J-ZN1-0394	Zone-1	4091	1.7	87
J-ZN1-0361	Zone-1	4116	14.2	69
J-ZN1-0026	Zone-1	4096	10.1	63
J-ZN1-0589	Zone-1	4118	9.4	75
J-ZN1-0037	Zone-1	4104	7.4	74
J-ZN1-0834	Zone-1	4214	0.0	35
J-TW-0003	Tanglewood	4820	20.5	74
J-HOS-0052	URH-HOSP-HLVL	4322	21.6	78
J-ZN1-0841	Zone-1	4134	6.4	75
J-ZN1-0469	Zone-1	4150	22.4	67
J-ZN1-0709	Zone-1	4098	8.5	68
J-ZN1-0279	Zone-1	4110	4.1	72
J-PAT-0033	Patterson	4470	45.7	14
J-ZN1-0517	Zone-1	4122	10.7	78
J-PRE-0039	Prescott	4224	10.9	66
J-ZN1-0738	Zone-1	4212	7.2	49
J-ZN1-0635	Zone-1	4090	0.0	82
J-SL-0085	Lindley	4134	0.0	107
J-ZN1-0778	Zone-1	4096	11.9	82
J-ZN1-0547	Zone-1	4179	8.1	52
J-WO-0010	West Oregon	4194	5.4	108
J-ZN1-0365	Zone-1	4115	13.1	70
J-PRV-2-ELD-0003	PRV-2	4226	1.5	60
J-ZN1-0145	Zone-1	4134	13.2	62
J-ZN1-0110	Zone-1	4192	13.6	42
J-ZN1-0072	Zone-1	4148	0.4	62

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0412	Zone-1	4099	54.3	86
J-ZN1-0381	Zone-1	4092	32.0	83
J-ZN1-0161	Zone-1	4144	19.5	57
J-PRV-2-ELD-0010	PRV-2	4219	17.4	63
J-PRE-0029	Prescott	4237	7.6	56
J-ZN1-0570	Zone-1	4178	15.9	49
J-ZN1-0714	Zone-1	4125	3.3	63
J-ZN1-0438	Zone-1	4102	13.3	82
J-ZN1-0684	Zone-1	4146	9.8	65
J-PRE-0032	Prescott	4263	3.4	44
J-ZN1-0204	Zone-1	4118	8.1	68
J-PRE-0011	Prescott	4213	3.1	65
J-ZN1-0051	Zone-1	4142	11.5	62
J-ZN1-0732	Zone-1	4196	1.4	41
J-ZN1-0299	Zone-1	4098	20.5	77
J-ZN1-0741	Zone-1	4220	3.3	48
J-PAT-0035	Patterson	4346	16.3	70
J-ZN1-0197	Zone-1	4172	11.6	45
J-PRE-0062	Prescott	4218	8.8	64
J-UL-0002	Upper Lynnewood	4295	14.1	63
J-ZN1-0062	Zone-1	4174	9.3	54
J-ZN1-0495	Zone-1	4208	4.2	40
J-ZN1-0462	Zone-1	4099	0.0	93
J-HOS-0026	URH-HOSP-HLVL	4271	5.5	95
J-ZN1-0330	Zone-1	4103	0.0	75
J-ZN1-0114	Zone-1	4193	2.0	42
J-ZN1-0100	Zone-1	4254	2.3	21
J-ZN1-0510	Zone-1	4138	2.5	71
J-ZN1-0178	Zone-1	4265	7.9	17
J-ZN1-0130	Zone-1	4134	8.6	64
J-PRV-HWY-0007	PRV-2-HWY	4191	13.6	71
J-ZN1-0771	Zone-1	4165	45.7	54
J-ZN1-0541	Zone-1	4220	7.4	37
J-ZN1-0392	Zone-1	4092	10.2	85
J-ZN1-0359	Zone-1	4120	18.9	67
J-PRV-MOY-0007	PRV-13	4255	19.5	79
J-ZN1-0587	Zone-1	4218	37.3	31
J-ZN1-0641	Zone-1	4112	23.1	68
J-ZN1-0407	Zone-1	4092	0.1	82

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0019	Zone-1	4114	0.0	63
J-ZN1-0802	Zone-1	4092	0.0	45
J-ZN1-0087	Zone-1	4112	0.4	78
J-ZN1-0839	Zone-1	4192	1.0	49
J-SL-0093	Lindley	4173	0.0	90
J-ZN1-0467	Zone-1	4139	34.2	71
J-ZN1-0434	Zone-1	4106	3.0	80
J-ZN1-0707	Zone-1	4099	14.3	68
J-ZN1-0525	Zone-1	4104	26.4	66
J-ZN1-0187	Zone-1	4160	1.0	50
J-ZN1-0277	Zone-1	4110	14.8	72
J-ZN1-0515	Zone-1	4121	9.4	78
J-ZN1-0293	Zone-1	4106	11.5	74
J-ZN1-0736	Zone-1	4222	8.4	36
J-PRV-2-OGD-0001	PRV_Ogden	4266	2.0	81
J-ZN1-0776	Zone-1	4102	6.4	78
J-WO-0008	West Oregon	4219	2.5	97
J-ZN1-0833	Zone-1	4099	9.8	59
J-ZN1-0363	Zone-1	4104	3.8	75
J-PRV-2-ELD-0007	PRV-2	4228	9.8	59
J-PRV-MOY-0008	PRV-13	4248	8.3	91
J-ZN1-0057	Zone-1	4178	0.0	49
J-ZN1-0410	Zone-1	4092	17.8	87
J-ZN1-0379	Zone-1	4108	13.0	76
J-ZN1-0159	Zone-1	4140	26.5	59
J-HOS-0054	URH-HOSP-HLVL	4388	37.6	49
J-ZN1-0313	Zone-1	4286	0.0	9
J-ZN1-0820	Zone-1	4289	0.3	5
J-ZN1-0712	Zone-1	4092	11.3	71
J-ZN1-0613	Zone-1	4156	7.6	60
J-ZN1-0581	Zone-1	4193	0.2	45
J-ZN1-0032	Zone-1	4136	10.2	62
J-ZN1-0729	Zone-1	4214	1.5	35
J-ZN1-0546	Zone-1	4150	13.0	53
J-ZN1-0260	Zone-1	4110	43.6	72
J-ZN1-0297	Zone-1	4099	11.6	77
J-ZN1-0044	Zone-1	4098	6.3	79
J-PRE-0060	Prescott	4248	6.2	50
J-SL-0087	Lindley	4195	14.0	81

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0056	Prescott	4233	6.4	62
J-PRV-3-UMO-0002	PRV-3	4317	20.0	78
J-ZN1-0324	Zone-1	4100	2.5	76
J-ZN1-0508	Zone-1	4109	2.8	76
J-ZN1-0093	Zone-1	4176	9.4	52
J-ZN1-0599	Zone-1	4116	17.4	68
J-HOS-0038	URH-HOSP-HLVL	4345	0.0	67
J-ZN1-0128	Zone-1	4138	14.2	62
J-PAT-0015	Patterson	4431	3.6	28
J-HOS-0061	URH-HOSP-HLVL	4253	13.4	103
J-ZN1-0539	Zone-1	4192	12.9	49
J-PRE-0047	Prescott	4246	1.1	57
J-ZN1-0687	Zone-1	4150	13.1	64
J-ZN1-0657	Zone-1	4134	17.1	68
J-ZN1-0740	Zone-1	4104	5.4	59
J-ZN1-0555	Zone-1	4148	22.1	62
J-ZN1-0585	Zone-1	4172	18.7	51
J-PAT-0002	Patterson	4281	11.3	93
J-ZN1-0405	Zone-1	4094	1.5	59
J-ZN1-0800	Zone-1	4098	13.5	77
J-PRE-0013	Prescott	4218	1.2	68
J-PRE-0028	Prescott	4240	5.9	56
J-ZN1-0080	Zone-1	4138	10.6	66
J-PRE-0059	Prescott	4257	0.6	52
J-ZN1-0817	Zone-1	4299	0.0	5
J-PAT-0021	Patterson	4437	29.6	25
J-ZN1-0705	Zone-1	4103	7.5	68
J-ZN1-0432	Zone-1	4112	14.7	79
J-ZN1-0854	Zone-1	4093	0.0	84
J-ZN1-0625	Zone-1	4100	24.5	90
J-ZN1-0482	Zone-1	4262	1.0	19
J-ZN1-0445	Zone-1	4107	11.2	83
J-ZN1-0291	Zone-1	4102	10.3	75
J-PAT-0043	Patterson	4310	2.3	82
J-PRV-HWY-0001	PRV-2-HWY	4234	37.6	53
J-ZN1-0815	Zone-1	4136	17.3	72
J-SL-0067	Lindley	4216	16.2	71
J-WO-0007	West Oregon	4268	3.6	76
J-ZN1-0748	Zone-1	4220	7.2	31

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-HOS-0020	URH-HOSP-HLVL	4228	2.5	114
J-ZN1-0560	Zone-1	4192	16.4	44
J-PRV-2-ELD-0015	PRV-2	4200	1.3	71
J-ZN1-0408	Zone-1	4091	2.4	70
J-ZN1-0377	Zone-1	4098	20.7	81
J-ZN1-0466	Zone-1	4178	0.0	41
J-ZN1-0122	Zone-1	4164	11.5	53
J-ZN1-0157	Zone-1	4138	26.1	60
J-ZN1-0424	Zone-1	4092	4.6	72
J-PRE-0048	Prescott	4269	9.9	47
J-ZN1-0682	Zone-1	4102	46.5	73
J-ZN1-0650	Zone-1	4184	18.8	45
J-ZN1-0611	Zone-1	4179	3.6	50
J-ZN1-0190	Zone-1	4160	3.6	50
J-ZN1-0727	Zone-1	4090	0.0	82
J-ZN1-0450	Zone-1	4114	1.9	80
J-ZN1-0775	Zone-1	4116	30.6	50
J-ZN1-0295	Zone-1	4096	7.2	78
J-ZN1-0257	Zone-1	4112	44.8	71
J-PAT-0009	Patterson	4368	0.0	62
J-ZN1-0094	Zone-1	4148	2.1	63
J-ZN1-0311	Zone-1	4096	23.4	81
J-UM-0010	Upper Moyina	4384	31.8	77
J-HOS-0023	URH-HOSP-HLVL	4267	7.2	97
J-ZN1-0669	Zone-1	4118	119.4	61
J-ZN1-0074	Zone-1	4152	30.7	62
J-ZN1-0475	Zone-1	4130	3.5	73
J-ZN1-0506	Zone-1	4111	12.6	76
J-HOS-0036	URH-HOSP-HLVL	4383	4.4	51
J-ZN1-0346	Zone-1	4104	14.2	74
J-ZN1-0126	Zone-1	4141	13.9	65
J-ZN1-0523	Zone-1	4211	2.5	47
J-ZN1-0524	Zone-1	4164	2.1	53
J-ZN1-0537	Zone-1	4207	16.3	42
J-ZN1-0022	Zone-1	4122	32.4	61
J-ZN1-0142	Zone-1	4136	12.1	63
J-ZN1-0655	Zone-1	4160	19.9	55
J-PRV-2-ELD-0006	PRV-2	4232	17.5	58
J-ZN1-0553	Zone-1	4149	5.2	63

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0784	Zone-1	4162	29.1	56
J-PRE-0008	Prescott	4290	2.6	43
J-ZN1-0403	Zone-1	4092	27.4	53
J-ZN1-0371	Zone-1	4119	39.1	70
J-ZN1-0263	Zone-1	4108	8.0	73
J-ZN1-0173	Zone-1	4122	12.6	67
J-ZN1-0597	Zone-1	4205	6.0	43
J-PAT-0028	Patterson	4367	4.7	60
J-PRE-0057	Prescott	4311	1.2	29
J-ZN1-0814	Zone-1	4094	27.4	71
J-ZN1-0430	Zone-1	4104	10.2	83
J-ZN1-0852	Zone-1	4104	22.9	82
J-ZN1-0623	Zone-1	4104	25.3	87
J-PRV-MOY-0009	PRV-13	4269	2.3	82
J-ZN1-0443	Zone-1	4159	5.4	62
J-ZN1-0480	Zone-1	4102	7.4	81
J-ZN1-0720	Zone-1	4115	20.1	67
J-ZN1-0289	Zone-1	4107	49.5	74
J-PRE-0002	Prescott	4252	4.2	54
J-ZN1-0042	Zone-1	4104	3.9	75
J-ZN1-0686	Zone-1	4115	11.8	62
J-UM-0004	Upper Moyina	4429	15.9	57
J-ZN1-0491	Zone-1	4182	5.1	53
J-PRV-2-ELD-0001	PRV-2	4229	6.7	58
J-ZN1-0757	Zone-1	4215	1.5	35
J-ZN1-0747	Zone-1	4121	12.3	43
J-ZN1-0558	Zone-1	4148	21.8	62
J-PRV-2-ELD-0014	PRV-2	4192	6.3	75
J-ZN1-0375	Zone-1	4096	4.9	82
J-ZN1-0336	Zone-1	4102	18.0	75
J-ZN1-0082	Zone-1	4141	9.7	65
J-ZN1-0155	Zone-1	4134	15.1	61
J-ZN1-0120	Zone-1	4167	22.0	51
J-ZN1-0422	Zone-1	4093	2.0	72
J-ZN1-0389	Zone-1	4100	13.2	79
J-ZN1-0680	Zone-1	4102	9.6	79
J-ZN1-0857	Zone-1	4140	3.9	61
J-ZN1-0829	Zone-1	4194	7.6	42
J-ZN1-0725	Zone-1	4172	0.6	59

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0447	Zone-1	4237	1.4	30
J-PRE-0035	Prescott	4236	7.3	52
J-ZN1-0247	Zone-1	4140	18.2	63
J-PAT-0004	Patterson	4332	36.2	72
J-ZN1-0077	Zone-1	4150	13.9	63
J-ZN1-0309	Zone-1	4100	14.6	80
J-ZN1-0090	Zone-1	4186	12.6	47
J-UM-0008	Upper Moyina	4362	25.4	87
J-PAT-0036	Patterson	4321	0.0	81
J-ZN1-0632	Zone-1	4152	1.0	64
J-CR-0002	Crown Ridge	4417	21.0	104
J-ZN1-0751	Zone-1	4220	15.2	31
J-HOS-0034	URH-HOSP-HLVL	4378	0.3	52
J-ZN1-0344	Zone-1	4104	21.1	74
J-ZN1-0124	Zone-1	4144	5.4	63
J-ZN1-0107	Zone-1	4159	35.2	57
J-ZN1-0521	Zone-1	4140	11.5	76
J-ZN1-0189	Zone-1	4236	21.8	28
J-PRV-MOY-0003	PRV-13	4269	16.7	68
J-ZN1-0140	Zone-1	4134	20.4	62
J-ZN1-0653	Zone-1	4147	10.2	62
J-ZN1-0782	Zone-1	4143	13.1	64
J-ZN1-0551	Zone-1	4156	6.3	60
J-PRE-0036	Prescott	4306	2.3	29
J-ZN1-0668	Zone-1	4110	0.0	73
J-PRE-0026	Prescott	4234	4.0	56
J-ZN1-0171	Zone-1	4120	9.7	68
J-ZN1-0644	Zone-1	4116	26.0	66
J-ZN1-0416	Zone-1	4096	14.5	66
J-ZN1-0812	Zone-1	4094	0.0	78
J-ZN1-0850	Zone-1	4108	8.0	77
J-ZN1-0621	Zone-1	4140	2.8	73
J-ZN1-0822	Zone-1	4149	0.0	65
J-ZN1-0478	Zone-1	4102	13.4	82
J-ZN1-0441	Zone-1	4236	10.2	29
J-ZN1-0718	Zone-1	4138	6.6	66
J-ZN1-0536	Zone-1	4137	0.0	59
J-SL-0083	Lindley	4151	6.5	100
J-ZN1-0024	Zone-1	4146	0.0	55
J-ZN1-0489	Zone-1	4205	24.4	43

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0035	Zone-1	4108	10.9	86
J-ZN1-0303	Zone-1	4108	13.1	73
J-ZN1-0745	Zone-1	4092	3.5	83
J-ZN1-0262	Zone-1	4224	25.9	32
J-ZN1-0837	Zone-1	4136	23.5	73
J-ZN1-0373	Zone-1	4101	2.6	78
J-ZN1-0334	Zone-1	4104	10.1	74
J-HOS-0030	URH-HOSP-HLVL	4357	1.1	58
J-ZN1-0569	Zone-1	4166	3.7	54
J-ZN1-0535	Zone-1	4196	7.9	47
J-ZN1-0420	Zone-1	4092	0.0	72
J-ZN1-0387	Zone-1	4096	0.0	80
J-ZN1-0678	Zone-1	4099	3.8	80
J-PRE-1254	PRV-2-HWY	4195	0.0	79
J-ZN1-0827	Zone-1	4178	8.8	49
J-ZN1-0796	Zone-1	4132	0.0	72
J-ZN1-0723	Zone-1	4200	3.8	42
J-ZN1-0692	Zone-1	4179	10.6	50
J-ZN1-0243	Zone-1	4138	0.0	60
J-ZN1-0591	Zone-1	4165	12.4	52
J-HOS-0008	URH-HOSP-HLVL	4279	5.6	92
J-ZN1-0494	Zone-1	4202	5.4	43
J-ZN1-0461	Zone-1	4103	9.0	91
J-ZN1-0557	Zone-1	4161	10.5	49
J-ZN1-0271	Zone-1	4108	57.6	73
J-ZN1-0307	Zone-1	4098	10.6	78
J-ZN1-0070	Zone-1	4140	10.1	66
J-ZN1-0631	Zone-1	4148	9.5	65
J-ZN1-0322	Zone-1	4102	12.0	75
J-ZN1-0323	Zone-1	4159	34.4	56
J-PRV-2-ELD-0011	PRV-2	4202	10.1	71
J-HOS-0032	URH-HOSP-HLVL	4269	5.0	99
J-ZN1-0338	Zone-1	4102	15.5	75
J-ZN1-0519	Zone-1	4141	2.7	72
J-ZN1-0105	Zone-1	4121	2.7	73
J-PRE-0010	Prescott	4291	3.4	41
J-ZN1-0856	Zone-1	4144	15.2	66
J-ZN1-0391	Zone-1	4092	0.3	85
J-ZN1-0358	Zone-1	4124	11.3	66
J-HOS-0047	URH-HOSP-HLVL	4311	0.0	85

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0049	Zone-1	4138	18.2	62
J-ZN1-0138	Zone-1	4148	25.2	58
J-FHH-0008	Foothill_Homedale	4257	5.3	83
J-ZN1-0015	Zone-1	4183	5.5	48
J-ZN1-0060	Zone-1	4270	0.0	18
J-ZN1-0549	Zone-1	4158	0.0	61
J-ZN1-0696	Zone-1	4199	4.1	65
J-ZN1-0666	Zone-1	4104	3.8	79
J-ZN1-0749	Zone-1	4124	39.7	57
J-WO-0002	West Oregon	4209	6.8	102
J-TW-0002	Tanglewood	4183	0.0	350
J-ZN1-0169	Zone-1	4173	26.1	45
J-ZN1-0414	Zone-1	4104	0.0	88
J-ZN1-0092	Zone-1	4114	40.4	71
J-ZN1-0276	Zone-1	4109	7.2	72
J-ZN1-0186	Zone-1	4164	1.3	48
J-ZN1-0607	Zone-1	4165	9.9	57
J-ZN1-0848	Zone-1	4090	0.0	87
J-ZN1-0619	Zone-1	4163	12.3	55
J-UL-0011	Upper Lynnewood	4283	3.8	68
J-ZN1-0440	Zone-1	4094	1.2	85
J-ZN1-0865	Zone-1	4137	0.5	60
J-SL-0081	Lindley	4108	13.4	119
J-ZN1-0487	Zone-1	4217	4.9	38
J-ZN1-0456	Zone-1	4145	5.7	68
J-ZN1-0301	Zone-1	4098	5.0	79
J-FHH-0005	Foothill_Homedale	4252	18.7	85
J-ZN1-0085	Zone-1	4092	0.0	87
J-PAT-0019	Patterson	4393	3.2	49
J-ZN1-0047	Zone-1	4168	0.1	54
J-ZN1-0097	Zone-1	4173	4.2	56
J-ZN1-0765	Zone-1	4151	7.8	61
J-PRV-3-UMO-0006	PRV-3	4337	5.7	70
J-ZN1-0332	Zone-1	4103	0.8	75
J-ZN1-0568	Zone-1	4181	20.0	49
J-ZN1-0533	Zone-1	4164	3.3	59
J-UM-0014	Upper Moyina	4400	30.5	70
J-ZN1-0418	Zone-1	4094	1.2	67
J-ZN1-0385	Zone-1	4098	6.6	79
J-ZN1-0477	Zone-1	4200	0.0	31

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0132	Zone-1	4142	16.4	61
J-ZN1-0825	Zone-1	4199	2.7	43
J-ZN1-0794	Zone-1	4111	0.1	81
J-PRV-2-OGD-0002	PRV_Ogden	4281	77.5	74
J-PRE-0033	Prescott	4202	1.5	72
J-ZN1-0232	Zone-1	4136	19.5	61
J-ZN1-0868	Zone-1	4137	13.4	63
J-ZN1-0835	Zone-1	4197	6.6	61
J-ZN1-0459	Zone-1	4282	4.1	10
J-ZN1-0305	Zone-1	4104	2.2	75
J-ZN1-0269	Zone-1	4112	14.2	71
J-ZN1-0320	Zone-1	4100	1.7	76
J-PRV-2-ELD-0008	PRV-2	4218	13.4	63
J-ZN1-0677	Zone-1	4106	51.6	66
J-HOS-0060	URH-HOSP-HLVL	4251	6.1	104
J-PRE-0046	Prescott	4256	3.5	52
J-HOS-0045	URH-HOSP-HLVL	4414	16.8	37
J-ZN1-0356	Zone-1	4108	19.5	73
J-ZN1-0030	Zone-1	4144	4.1	69
J-ZN1-0136	Zone-1	4145	18.4	60
J-FHH-0006	Foothill_Homedale	4296	12.0	66
J-PRE-0005	Prescott	4277	3.3	45
J-ZN1-0056	Zone-1	4143	1.2	66
J-ZN1-0799	Zone-1	4106	25.5	74
J-ZN1-0493	Zone-1	4146	154.3	50
J-ZN1-0152	Zone-1	4160	37.8	50
J-ZN1-0664	Zone-1	4096	22.3	83
J-ZN1-0594	Zone-1	4209	14.0	31
J-ZN1-0564	Zone-1	4216	3.0	34
J-ZN1-0704	Zone-1	4101	14.2	68
J-ZN1-0676	Zone-1	4098	11.4	80
J-ZN1-0274	Zone-1	4108	12.2	73
J-ZN1-0184	Zone-1	4112	8.9	71
J-ZN1-0605	Zone-1	4166	14.8	55
J-PAT-0029	Patterson	4344	1.0	70
J-ZN1-0846	Zone-1	4094	2.5	85
J-ZN1-0734	Zone-1	4291	0.0	8
J-ZN1-0863	Zone-1	4158	4.4	51
J-SL-0079	Lindley	4148	9.5	101

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0485	Zone-1	4187	11.3	51
J-ZN1-0454	Zone-1	4225	18.4	34
J-ZN1-0731	Zone-1	4161	6.3	60
J-UM-0002	Upper Moyina	4353	13.1	91
J-ZN1-0067	Zone-1	4116	39.8	69
J-ZN1-0643	Zone-1	4215	0.0	35
J-ZN1-0695	Zone-1	4119	9.0	61
J-PAT-0018	Patterson	4396	5.6	50
J-ZN1-0029	Zone-1	4208	19.8	39
J-ZN1-0501	Zone-1	4219	4.7	34
J-ZN1-0078	Zone-1	4151	6.1	61
J-ZN1-0763	Zone-1	4163	9.1	57
J-PRV-3-UMO-0004	PRV-3	4324	62.9	75
J-WO-0004	West Oregon	4238	25.7	89
J-ZN1-0531	Zone-1	4162	0.1	74
J-UM-0013	Upper Moyina	4401	31.0	70
J-ZN1-0618	Zone-1	4118	15.2	66
J-ZN1-0350	Zone-1	4104	26.1	74
J-ZN1-0610	Zone-1	4160	8.3	58
J-PRE-0025	Prescott	4248	3.0	56
J-ZN1-0058	Zone-1	4143	9.6	65
J-ZN1-0399	Zone-1	4092	14.9	89
J-ZN1-0792	Zone-1	4104	21.0	51
J-PRV-MOY-0006	PRV-13	4295	8.8	69
J-ZN1-0689	Zone-1	4182	13.2	48
J-ZN1-0659	Zone-1	4094	51.2	83
J-PRV-2-ELD-0017	PRV-2	4203	11.9	70
J-PRE-0055	Prescott	4229	6.6	59
J-PRV-OFR-0002	PRV-6	4248	9.5	64
J-ZN1-0267	Zone-1	4110	12.4	72
J-ZN1-0177	Zone-1	4114	16.0	70
J-ZN1-0505	Zone-1	4114	16.0	77
J-ZN1-0474	Zone-1	4120	27.8	77
J-ZN1-0318	Zone-1	4092	2.0	81
J-HOS-0056	URH-HOSP-HLVL	4225	7.1	119
J-PAT-0037	Patterson	4378	0.0	58
J-SL-0073	Lindley	4239	38.3	61
J-ZN1-0769	Zone-1	4185	0.0	38

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0044	Prescott	4289	3.9	38
J-HOS-0044	URH-HOSP-HLVL	4431	8.3	29
J-ZN1-0354	Zone-1	4110	8.1	72
J-ZN1-0640	Zone-1	4089	0.9	82
J-ZN1-0134	Zone-1	4136	16.5	64
J-ZN1-0027	Zone-1	4123	4.2	59
J-ZN1-0231	Zone-1	4232	15.8	29
J-HOS-0011	URH-HOSP-HLVL	4224	5.3	118
J-ZN1-0402	Zone-1	4090	5.8	46
J-ZN1-0370	Zone-1	4115	28.4	72
J-ZN1-0038	Zone-1	4104	2.0	75
J-ZN1-0150	Zone-1	4155	3.3	55
J-PRE-0034	Prescott	4243	7.2	56
J-ZN1-0562	Zone-1	4185	13.4	47
J-ZN1-0702	Zone-1	4098	13.1	68
J-ZN1-0429	Zone-1	4093	27.0	74
J-ZN1-0674	Zone-1	4100	30.0	80
J-ZN1-0603	Zone-1	4156	8.9	60
J-ZN1-0182	Zone-1	4112	7.9	71
J-ZN1-0645	Zone-1	4118	22.5	65
J-ZN1-0426	Zone-1	4093	0.0	77
J-ZN1-0288	Zone-1	4104	0.7	75
J-ZN1-0229	Zone-1	4122	18.1	66
J-ZN1-0861	Zone-1	4200	8.5	32
J-SL-0077	Lindley	4185	13.0	85
J-ZN1-0832	Zone-1	4211	5.1	40
J-ZN1-0452	Zone-1	4185	13.8	53
J-ZN1-0798	Zone-1	4100	0.0	62
J-UL-0006	Upper Lynnewood	4230	48.7	91
J-SL-0090	Lindley	4236	3.2	63
J-ZN1-0499	Zone-1	4219	3.3	34
J-ZN1-0017	Zone-1	4186	15.7	48
J-ZN1-0312	Zone-1	4094	6.5	82
J-ZN1-0073	Zone-1	4140	9.4	65
J-ZN1-0154	Zone-1	4139	5.5	59
J-ZN1-0119	Zone-1	4166	4.1	52
J-ZN1-0273	Zone-1	4207	10.9	38
J-UM-0011	Upper Moyina	4485	0.0	34
J-ZN1-0529	Zone-1	4160	0.0	74
J-ZN1-0845	Zone-1	4150	0.0	64

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0383	Zone-1	4120	0.0	77
J-ZN1-0348	Zone-1	4109	23.1	72
J-ZN1-0578	Zone-1	4218	9.8	38
J-ZN1-0545	Zone-1	4194	7.2	45
J-ZN1-0040	Zone-1	4100	10.3	76
J-ZN1-0397	Zone-1	4093	1.9	84
J-ZN1-0790	Zone-1	4115	0.5	79
J-HOS-0006	URH-HOSP-HLVL	4281	13.6	94
J-ZN1-0052	Zone-1	4142	7.3	62
J-ZN1-0063	Zone-1	4114	0.0	80
J-PRE-0053	Prescott	4279	1.6	37
J-ZN1-0806	Zone-1	4149	10.0	54
J-PRV-OFR-0001	PRV-6	4264	8.9	57
J-ZN1-0265	Zone-1	4108	13.3	73
J-ZN1-0175	Zone-1	4118	13.7	68
J-ZN1-0844	Zone-1	4100	0.6	85
J-ZN1-0503	Zone-1	4213	9.4	35
J-ZN1-0472	Zone-1	4117	4.1	80
J-ZN1-0566	Zone-1	4142	0.0	57
J-ZN1-0282	Zone-1	4113	17.1	70
J-ZN1-0316	Zone-1	4090	0.1	82
J-PRE-0042	Prescott	4258	0.0	51
J-PRE-0038	Prescott	4184	0.0	78
J-HOS-0042	URH-HOSP-HLVL	4431	0.0	30
J-ZN1-0352	Zone-1	4110	9.0	72
J-ZN1-0638	Zone-1	4092	0.5	81
J-UM-0006	Upper Moyina	4369	16.7	84
J-UM-0003	Upper Moyina	4364	13.9	57
J-ZN1-0781	Zone-1	4141	6.2	65
J-ZN1-0075	Zone-1	4152	5.8	61
J-ZN1-0867	Zone-1	4146	40.6	66
J-ZN1-0368	Zone-1	4110	19.4	77
J-ZN1-0020	Zone-1	4122	5.9	60
J-PAT-0020	Patterson	4255	0.0	104
J-ZN1-0113	Zone-1	4180	6.7	47
J-ZN1-0148	Zone-1	4146	16.7	59
J-ZN1-0088	Zone-1	4134	2.1	69
J-ZN1-0811	Zone-1	4094	2.2	79
J-ZN1-0700	Zone-1	4097	10.8	67
J-ZN1-0672	Zone-1	4098	27.5	80

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0750	Zone-1	4098	66.2	58
J-ZN1-0180	Zone-1	4107	0.0	73
J-ZN1-0573	Zone-1	4209	8.0	41
J-ZN1-0601	Zone-1	4291	0.0	5
J-ZN1-0717	Zone-1	4111	12.6	72
J-ZN1-0286	Zone-1	4110	9.6	72
J-ZN1-0219	Zone-1	4114	5.0	70
J-ZN1-0617	Zone-1	4145	2.1	60
J-ZN1-0616	Zone-1	4092	1.0	71
J-ZN1-0859	Zone-1	4152	2.9	53
J-SL-0075	Lindley	4233	1.5	64
J-PRV-MOY-0010	PRV-13	4274	3.4	80
J-ZN1-0831	Zone-1	4179	2.8	52
J-FHH-0002	Foothill_Homedale	4270	18.0	77
J-ZN1-0744	Zone-1	4092	1.6	83
J-SL-0088	Lindley	4098	14.4	123
J-ZN1-0628	Zone-1	4148	1.4	65
J-PRE-0063	Prescott	4230	4.4	61
J-ZN1-0497	Zone-1	4244	1.7	24
J-ZN1-0012	Zone-1	4179	18.4	51
J-ZN1-0465	Zone-1	4166	14.3	60
J-HOS-0029	URH-HOSP-HLVL	4344	14.5	63
J-PAT-0038	Patterson	4211	4.5	142
J-ZN1-0117	Zone-1	4168	5.7	51
J-CR-0003	Crown Ridge	4422	11.2	102
J-ZN1-0527	Zone-1	4162	3.8	72
J-ZN1-0753	Zone-1	4139	6.5	39
J-PRV-HWY-0009	PRV-2-HWY	4206	2.3	65
J-PRE-0024	Prescott	4230	15.3	59
J-ZN1-0774	Zone-1	4092	9.1	81
J-ZN1-0395	Zone-1	4091	0.0	87
J-ZN1-0788	Zone-1	4175	67.3	51
J-ZN1-0483	Zone-1	4194	0.0	33
J-ZN1-0033	Zone-1	4157	11.4	66
J-ZN1-0590	Zone-1	4153	8.4	60
J-PRE-0007	Prescott	4303	4.1	35
J-ZN1-0045	Zone-1	4110	17.7	72
J-PRE-0051	Prescott	4249	6.6	55
J-ZN1-0804	Zone-1	4096	4.4	66

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-TW-0004	Tanglewood	4814	43.8	76
J-HOS-0053	URH-HOSP-HLVL	4369	63.5	57
J-ZN1-0630	Zone-1	4151	12.7	64
J-PRV-MOY-0012	PRV-13	4293	1.4	71
J-ZN1-0842	Zone-1	4111	9.0	80
J-ZN1-0470	Zone-1	4223	19.7	35
J-ZN1-0435	Zone-1	4099	6.9	84
J-ZN1-0314	Zone-1	4096	6.2	80
J-ZN1-0280	Zone-1	4112	8.9	71
J-ZN1-0518	Zone-1	4136	5.5	74
J-PRE-0040	Prescott	4232	33.0	63
J-ZN1-0739	Zone-1	4221	3.8	43
J-HOS-0040	URH-HOSP-HLVL	4462	0.0	16
J-ZN1-0636	Zone-1	4090	0.0	82
J-ZN1-0779	Zone-1	4109	6.6	72
J-ZN1-0548	Zone-1	4207	8.6	39
J-ZN1-0759	Zone-1	4223	1.9	30
J-ZN1-0366	Zone-1	4107	6.7	75
J-PRV-MOY-0002	PRV-13	4298	11.7	67
J-ZN1-0146	Zone-1	4150	15.5	58
J-ZN1-0111	Zone-1	4184	8.0	46
J-PRE-0014	Prescott	4224	1.5	66
J-ZN1-0081	Zone-1	4135	11.4	68
J-ZN1-0413	Zone-1	4094	14.4	87
J-ZN1-0809	Zone-1	4096	0.0	91
J-ZN1-0502	Zone-1	4134	35.7	53
J-ZN1-0162	Zone-1	4146	5.9	56
J-ZN1-0670	Zone-1	4186	0.0	47
J-ZN1-0600	Zone-1	4184	2.1	69
J-ZN1-0571	Zone-1	4216	2.3	35
J-ZN1-0715	Zone-1	4158	22.0	54
J-ZN1-0439	Zone-1	4106	1.1	77
J-ZN1-0685	Zone-1	4161	18.3	59
J-ZN1-0284	Zone-1	4108	11.6	73
J-ZN1-0209	Zone-1	4117	12.2	69
J-ZN1-0614	Zone-1	4170	26.3	52
J-PAT-0030	Patterson	4350	0.0	67
J-ZN1-0013	Zone-1	4194	0.0	42
J-SL-0068	Lindley	4235	12.9	63

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0300	Zone-1	4099	9.1	77
J-UL-0003	Upper Lynnewood	4306	13.3	58
J-ZN1-0496	Zone-1	4215	6.2	37
J-ZN1-0009	Zone-1	4153	0.3	62
J-ZN1-0463	Zone-1	4198	12.1	46
J-HOS-0027	URH-HOSP-HLVL	4313	12.2	77
J-ZN1-0331	Zone-1	4105	0.0	74
J-ZN1-0699	Zone-1	4129	0.1	56
J-ZN1-0115	Zone-1	4192	5.7	42
J-ZN1-0101	Zone-1	4257	0.0	20
J-ZN1-0511	Zone-1	4130	6.0	74
J-ZN1-0131	Zone-1	4144	15.8	60
J-PRE-0023	Prescott	4255	7.2	50
J-PRE-0022	Prescott	4241	4.2	52
J-ZN1-0772	Zone-1	4180	21.3	48
J-ZN1-0626	Zone-1	4100	23.8	70
J-ZN1-0360	Zone-1	4102	88.8	76
J-ZN1-0393	Zone-1	4094	17.6	84
J-PAT-0008	Patterson	4372	8.2	59
J-ZN1-0588	Zone-1	4133	20.6	68
J-PAT-0010	Patterson	4326	0.0	79
J-ZN1-0803	Zone-1	4096	58.5	65
J-ZN1-0095	Zone-1	4148	0.0	63
J-ZN1-0840	Zone-1	4242	5.0	28
J-ZN1-0468	Zone-1	4172	4.3	58
J-ZN1-0708	Zone-1	4101	6.1	66
J-ZN1-0278	Zone-1	4110	5.8	72
J-ZN1-0188	Zone-1	4152	0.0	53
J-ZN1-0516	Zone-1	4150	12.6	68
J-ZN1-0104	Zone-1	4144	13.4	63
J-ZN1-0737	Zone-1	4246	2.9	61
J-ZN1-0023	Zone-1	4125	148.5	61
J-ZN1-0787	Zone-1	4122	47.4	48
J-ZN1-0777	Zone-1	4097	9.4	81
J-WO-0009	West Oregon	4213	2.7	100
J-ZN1-0364	Zone-1	4108	51.9	73
J-HOS-0022	URH-HOSP-HLVL	4253	6.9	103
J-PRE-0009	Prescott	4282	0.0	46
J-ZN1-0144	Zone-1	4139	14.3	59
J-ZN1-0109	Zone-1	4217	1.3	32

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0629	Zone-1	4110	5.6	64
J-ZN1-0380	Zone-1	4092	11.1	83
J-ZN1-0411	Zone-1	4093	0.0	87
J-ZN1-0160	Zone-1	4143	17.0	57
J-PRV-2-ELD-0009	PRV-2	4231	16.8	58
J-ZN1-0428	Zone-1	4182	0.4	46
J-PRV-OFR-0004	PRV-6	4185	3.9	91
J-ZN1-0713	Zone-1	4122	5.9	64
J-ZN1-0437	Zone-1	4093	5.5	87
J-PRE-0031	Prescott	4223	0.0	61
J-ZN1-0198	Zone-1	4120	9.6	67
J-ZN1-0646	Zone-1	4104	41.2	68
J-PRE-0003	Prescott	4250	2.1	54
J-ZN1-0043	Zone-1	4100	17.7	76
J-ZN1-0730	Zone-1	4225	0.6	32
J-ZN1-0298	Zone-1	4100	11.7	77
J-ZN1-0261	Zone-1	4109	17.5	72
J-PRV-2-ELD-0002	PRV-2	4248	10.7	50
J-ZN1-0054	Zone-1	4145	4.3	60
J-PRE-0061	Prescott	4268	7.4	42
J-UL-0001	Upper Lynnewood	4296	4.9	63
J-ZN1-0836	Zone-1	4227	3.7	32
J-ZN1-0762	Zone-1	4186	7.8	46
J-PRV-3-UMO-0003	PRV-3	4300	7.4	86
J-ZN1-0808	Zone-1	4098	108.5	63
J-ZN1-0329	Zone-1	4098	7.1	77
J-HOS-0025	URH-HOSP-HLVL	4322	9.9	77
J-ZN1-0509	Zone-1	4126	7.1	75
J-ZN1-0099	Zone-1	4139	8.7	69
J-HOS-0039	URH-HOSP-HLVL	4330	0.0	75
J-ZN1-0129	Zone-1	4140	18.9	62
J-HOS-0049	URH-HOSP-HLVL	4254	0.0	115
J-PAT-0026	Patterson	4288	0.0	91
J-ZN1-0770	Zone-1	4178	6.5	48
J-ZN1-0540	Zone-1	4206	7.6	43
J-ZN1-0688	Zone-1	4190	15.7	45
J-ZN1-0658	Zone-1	4138	24.5	69
J-ZN1-0586	Zone-1	4180	10.9	49

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0556	Zone-1	4152	9.3	61
J-PAT-0005	Patterson	4311	10.0	80
J-ZN1-0406	Zone-1	4094	0.9	59
J-ZN1-0801	Zone-1	4092	2.4	94
J-PAT-0001	Patterson	4232	6.0	115
J-ZN1-0091	Zone-1	4142	0.1	52
J-ZN1-0838	Zone-1	4215	3.0	39
J-UL-0009	Upper Lynnewood	4270	4.9	74
J-ZN1-0706	Zone-1	4108	10.9	65
J-ZN1-0433	Zone-1	4106	3.9	81
J-ZN1-0855	Zone-1	4110	5.2	73
J-SL-0072	Lindley	4260	0.0	52
J-ZN1-0514	Zone-1	4114	0.6	80
J-ZN1-0575	Zone-1	4143	0.8	57
J-ZN1-0292	Zone-1	4104	6.5	75
J-ZN1-0735	Zone-1	4218	5.7	37
J-PRV-MOY-0004	PRV-13	4281	19.3	67
J-ZN1-0758	Zone-1	4217	3.5	34
J-PRV-MOY-0014	PRV-13	4239	13.8	95
J-ZN1-0362	Zone-1	4104	7.8	75
J-HOS-0021	URH-HOSP-HLVL	4261	6.9	101
J-ZN1-0561	Zone-1	4167	0.7	55
J-ZN1-0409	Zone-1	4091	0.0	85
J-ZN1-0378	Zone-1	4098	5.3	81
J-ZN1-0158	Zone-1	4140	9.8	59
J-ZN1-0123	Zone-1	4162	8.9	54
J-ZN1-0425	Zone-1	4094	0.1	81
J-PRE-0049	Prescott	4271	0.6	46
J-PAT-0013	Patterson	4315	1.7	78
J-ZN1-0711	Zone-1	4096	13.6	69
J-ZN1-0683	Zone-1	4098	5.6	76
J-ZN1-0754	Zone-1	4098	3.9	55
J-ZN1-0191	Zone-1	4167	3.9	47
J-ZN1-0580	Zone-1	4234	4.6	29
J-ZN1-0612	Zone-1	4187	9.9	48
J-ZN1-0025	Zone-1	4147	0.0	54
J-ZN1-0728	Zone-1	4090	2920.4	72
J-ZN1-0451	Zone-1	4109	14.2	81
J-ZN1-0296	Zone-1	4101	6.0	76

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0259	Zone-1	4110	21.0	72
J-ZN1-0036	Zone-1	4092	1.4	70
J-SL-0086	Lindley	4217	32.8	71
J-PRV-MOY-0011	PRV-13	4292	8.1	72
J-PRV-3-UMO-0001	PRV-3	4285	17.7	91
J-HOS-0024	URH-HOSP-HLVL	4300	18.8	82
J-ZN1-0507	Zone-1	4104	7.4	80
J-ZN1-0083	Zone-1	4169	40.1	55
J-ZN1-0476	Zone-1	4111	3.8	79
J-ZN1-0382	Zone-1	4122	2.1	76
J-ZN1-0347	Zone-1	4107	18.8	73
J-HOS-0037	URH-HOSP-HLVL	4420	29.6	34
J-ZN1-0127	Zone-1	4149	27.6	59
J-PAT-0014	Patterson	4435	27.8	26
J-ZN1-0538	Zone-1	4225	16.8	34
J-PRE-0012	Prescott	4206	2.7	70
J-ZN1-0143	Zone-1	4144	13.8	60
J-ZN1-0656	Zone-1	4137	12.7	66
J-ZN1-0584	Zone-1	4221	12.8	30
J-ZN1-0554	Zone-1	4148	51.4	62
J-ZN1-0786	Zone-1	4204	6.3	38
J-ZN1-0785	Zone-1	4178	39.7	49
J-ZN1-0404	Zone-1	4096	0.2	58
J-HOS-0009	URH-HOSP-HLVL	4319	0.0	75
J-ZN1-0761	Zone-1	4106	18.7	55
J-ZN1-0264	Zone-1	4108	9.5	73
J-ZN1-0174	Zone-1	4118	37.8	68
J-ZN1-0598	Zone-1	4207	3.3	42
J-ZN1-0071	Zone-1	4134	78.1	68
J-PRE-0058	Prescott	4313	2.2	28
J-ZN1-0431	Zone-1	4106	5.5	82
J-ZN1-0853	Zone-1	4093	0.2	83
J-ZN1-0624	Zone-1	4096	7.2	93
J-ZN1-0648	Zone-1	4116	11.9	62
J-ZN1-0444	Zone-1	4121	6.9	78
J-ZN1-0481	Zone-1	4159	9.2	64
J-ZN1-0290	Zone-1	4104	5.4	75
J-ZN1-0011	Zone-1	4251	0.0	22
J-ZN1-0050	Zone-1	4138	29.9	62

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-UM-0005	Upper Moyina	4417	7.5	63
J-ZN1-0492	Zone-1	4181	11.3	53
J-UM-0001	Upper Moyina	4417	9.1	63
J-ZN1-0061	Zone-1	4205	5.5	41
J-WO-0006	West Oregon	4230	9.4	92
J-PRV-2-OGD-0003	PRV_Ogden	4255	4.5	85
J-ZN1-0559	Zone-1	4149	5.2	62
J-ZN1-0766	Zone-1	4199	14.6	41
J-ZN1-0376	Zone-1	4096	31.0	82
J-ZN1-0337	Zone-1	4102	10.3	75
J-HOS-0010	URH-HOSP-HLVL	4410	30.0	39
J-ZN1-0156	Zone-1	4136	18.3	61
J-ZN1-0121	Zone-1	4170	7.5	50
J-ZN1-0423	Zone-1	4092	0.0	72
J-ZN1-0819	Zone-1	4162	2.5	63
J-ZN1-0513	Zone-1	4153	0.0	45
J-ZN1-0681	Zone-1	4100	2.2	80
J-HOS-0051	URH-HOSP-HLVL	4252	0.0	114
J-ZN1-0726	Zone-1	4090	0.0	82
J-ZN1-0448	Zone-1	4125	3.9	76
J-ZN1-0694	Zone-1	4185	5.9	66
J-ZN1-0294	Zone-1	4098	10.6	77
J-ZN1-0252	Zone-1	4134	12.5	65
J-ZN1-0018	Zone-1	4111	7.7	64
J-PAT-0031	Patterson	4391	0.0	48
J-ZN1-0086	Zone-1	4124	0.0	73
J-ZN1-0310	Zone-1	4100	13.0	80
J-UM-0009	Upper Moyina	4360	31.5	88
J-ZN1-0008	Zone-1	4239	0.4	27
J-ZN1-0065	Zone-1	4182	11.7	48
J-HOS-0035	URH-HOSP-HLVL	4367	10.4	57
J-ZN1-0345	Zone-1	4102	2.7	75
J-ZN1-0710	Zone-1	4096	10.4	58
J-ZN1-0125	Zone-1	4151	8.8	58
J-ZN1-0522	Zone-1	4148	12.3	73
J-PAT-0007	Patterson	4332	18.8	71
J-ZN1-0141	Zone-1	4140	5.7	61
J-ZN1-0654	Zone-1	4148	16.1	61
J-ZN1-0583	Zone-1	4154	22.0	61
J-ZN1-0552	Zone-1	4153	4.3	61

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0783	Zone-1	4176	2.1	50
J-ZN1-0627	Zone-1	4101	7.2	69
J-PRE-0027	Prescott	4261	33.8	45
J-ZN1-0172	Zone-1	4120	7.9	68
J-ZN1-0417	Zone-1	4092	1.2	72
J-ZN1-0813	Zone-1	4092	0.3	72
J-ZN1-0851	Zone-1	4103	8.8	83
J-ZN1-0622	Zone-1	4109	27.4	86
J-ZN1-0479	Zone-1	4098	1.1	84
J-ZN1-0442	Zone-1	4206	10.8	42
J-ZN1-0719	Zone-1	4117	1.3	67
J-ZN1-0031	Zone-1	4145	16.8	59
J-ZN1-0490	Zone-1	4178	13.0	55
J-PRE-0006	Prescott	4306	3.5	32
J-ZN1-0756	Zone-1	4213	3.1	34
J-ZN1-0746	Zone-1	4109	18.2	76
J-PRV-2-ELD-0013	PRV-2	4208	27.8	67
J-ZN1-0374	Zone-1	4100	0.0	54
J-ZN1-0335	Zone-1	4102	13.1	75
J-CR-0001	Crown Ridge	4436	42.8	96
J-ZN1-0633	Zone-1	4112	1.3	70
J-ZN1-0388	Zone-1	4099	0.0	79
J-ZN1-0421	Zone-1	4092	1.2	71
J-ZN1-0679	Zone-1	4100	21.3	79
J-PRV-HWY-0011	PRV-2-HWY	4184	15.0	74
J-ZN1-0828	Zone-1	4195	2.9	42
J-ZN1-0797	Zone-1	4098	0.7	80
J-ZN1-0724	Zone-1	4201	2.8	42
J-ZN1-0446	Zone-1	4108	22.9	82
J-ZN1-0693	Zone-1	4194	15.4	43
J-ZN1-0244	Zone-1	4140	5.5	63
J-PRV-MOY-0001	PRV-13	4276	1.6	79
J-ZN1-0068	Zone-1	4185	13.1	45
J-ZN1-0308	Zone-1	4097	6.1	80
J-ZN1-0272	Zone-1	4108	7.8	73
J-ZN1-0079	Zone-1	4137	3.8	67
J-UL-0008	Upper Lynnewood	4230	10.7	91
J-HOS-0057	URH-HOSP-HLVL	4386	4.4	45

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-2-ELD-0012	PRV-2	4219	27.8	63
J-ZN1-0818	Zone-1	4098	47.1	58
J-ZN1-0343	Zone-1	4104	12.3	74
J-HOS-0033	URH-HOSP-HLVL	4320	0.0	77
J-ZN1-0520	Zone-1	4172	4.3	60
J-ZN1-0106	Zone-1	4152	20.6	60
J-PRV-2-ELD-0004	PRV-2	4252	19.6	48
J-HOS-0048	URH-HOSP-HLVL	4268	0.3	107
J-ZN1-0059	Zone-1	4156	43.6	60
J-ZN1-0647	Zone-1	4194	6.5	42
J-ZN1-0139	Zone-1	4142	20.9	60
J-ZN1-0652	Zone-1	4173	12.9	50
J-PAT-0027	Patterson	4314	25.7	80
J-ZN1-0550	Zone-1	4150	9.7	63
J-ZN1-0697	Zone-1	4197	6.5	62
J-ZN1-0667	Zone-1	4094	46.1	81
J-ZN1-0596	Zone-1	4204	7.0	55
J-ZN1-0170	Zone-1	4158	0.0	51
J-WO-0003	West Oregon	4224	15.0	95
J-ZN1-0415	Zone-1	4094	0.7	67
J-PAT-0012	Patterson	4274	12.9	97
J-ZN1-0849	Zone-1	4110	0.7	75
J-ZN1-0620	Zone-1	4140	14.6	65
J-ZN1-0821	Zone-1	4156	0.0	62
J-PRE-0021	Prescott	4265	5.7	53
J-ZN1-0866	Zone-1	4118	15.8	67
J-SL-0082	Lindley	4204	24.5	77
J-ZN1-0488	Zone-1	4202	6.1	45
J-ZN1-0582	Zone-1	4167	0.0	47
J-ZN1-0302	Zone-1	4104	2.8	75
J-ZN1-0028	Zone-1	4138	0.3	52
J-HOS-0012	URH-HOSP-HLVL	4338	3.1	69
J-SL-0092	Lindley	4210	12.6	74
J-PRV-3-UMO-0007	PRV-3	4321	0.0	76
J-ZN1-0372	Zone-1	4128	12.0	66
J-ZN1-0333	Zone-1	4103	26.5	75
J-WO-0005	West Oregon	4223	5.0	95
J-ZN1-0534	Zone-1	4141	1.7	69
J-ZN1-0419	Zone-1	4092	2.5	71

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0386	Zone-1	4098	2.3	79
J-ZN1-0133	Zone-1	4150	9.5	58
J-ZN1-0826	Zone-1	4202	7.6	42
J-ZN1-0795	Zone-1	4128	11.2	73
J-PAT-0016	Patterson	4313	13.1	79
J-ZN1-0722	Zone-1	4162	7.7	73
J-ZN1-0691	Zone-1	4228	19.3	30
J-ZN1-0755	Zone-1	4098	17.0	58
J-ZN1-0238	Zone-1	4139	2.7	59
J-ZN1-0460	Zone-1	4290	0.0	7
J-ZN1-0306	Zone-1	4116	5.9	70
J-ZN1-0270	Zone-1	4112	9.9	71
J-ZN1-0321	Zone-1	4104	0.0	74
J-HOS-0031	URH-HOSP-HLVL	4273	34.6	97
J-PRE-0001	Prescott	4269	3.7	46
J-ZN1-0390	Zone-1	4100	9.0	80
J-ZN1-0357	Zone-1	4114	12.6	70
J-HOS-0046	URH-HOSP-HLVL	4287	21.1	92
J-ZN1-0041	Zone-1	4100	11.4	76
J-ZN1-0137	Zone-1	4151	8.0	57
J-FHH-0007	Foothill_Homedale	4266	22.1	79
J-HOS-0007	URH-HOSP-HLVL	4380	2.2	51
J-ZN1-0053	Zone-1	4140	9.7	65
J-ZN1-0064	Zone-1	4114	0.0	80
J-ZN1-0153	Zone-1	4150	0.0	55
J-ZN1-0665	Zone-1	4094	3.6	84
J-ZN1-0595	Zone-1	4141	0.0	58
J-ZN1-0167	Zone-1	4159	31.3	51
J-ZN1-0565	Zone-1	4191	4.1	44
J-ZN1-0767	Zone-1	4110	9.0	53
J-ZN1-0275	Zone-1	4109	4.1	72
J-ZN1-0185	Zone-1	4166	1.0	48
J-ZN1-0606	Zone-1	4158	5.0	61
J-ZN1-0847	Zone-1	4092	0.9	86
J-UL-0010	Upper Lynnewood	4262	3.1	77
J-ZN1-0864	Zone-1	4151	6.6	54
J-SL-0080	Lindley	4105	3.1	120
J-ZN1-0651	Zone-1	4121	12.6	60
J-ZN1-0455	Zone-1	4182	11.2	52
J-ZN1-0486	Zone-1	4176	15.2	56

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PAT-0003	Patterson	4321	1.4	77
J-ZN1-0076	Zone-1	4142	9.3	65
J-ZN1-0039	Zone-1	4226	37.1	33
J-ZN1-0089	Zone-1	4096	4.8	80
J-ZN1-0764	Zone-1	4146	31.8	64
J-PRV-3-UMO-0005	PRV-3	4309	0.0	82
J-ZN1-0567	Zone-1	4167	3.3	55
J-ZN1-0532	Zone-1	4152	4.2	64
J-PAT-0044	Patterson	4426	0.0	11
J-ZN1-0384	Zone-1	4116	0.8	79
J-ZN1-0351	Zone-1	4102	9.8	75
J-ZN1-0824	Zone-1	4164	1.4	58
J-ZN1-0793	Zone-1	4111	20.9	48
J-ZN1-0690	Zone-1	4171	11.1	53
J-ZN1-0660	Zone-1	4169	2.9	72
J-PRV-2-ELD-0018	PRV-2	4240	41.8	54
J-ZN1-0458	Zone-1	4267	3.7	17
J-ZN1-0698	Zone-1	4096	19.7	67
J-ZN1-0304	Zone-1	4109	12.5	72
J-ZN1-0268	Zone-1	4110	5.5	72
J-PAT-0032	Patterson	4394	0.5	46
J-ZN1-0319	Zone-1	4102	4.3	76
J-PRV-OFR-0003	PRV-6	4225	16.3	74
J-SL-0074	Lindley	4213	22.0	72
J-HOS-0059	URH-HOSP-HLVL	4312	11.7	77
J-PRE-0045	Prescott	4272	1.0	45
J-ZN1-0355	Zone-1	4110	27.4	72
J-ZN1-0721	Zone-1	4097	1.5	59
J-ZN1-0135	Zone-1	4133	7.9	65
J-ZN1-0108	Zone-1	4122	0.8	76
J-ZN1-0034	Zone-1	4108	7.2	72
J-ZN1-0046	Zone-1	4144	13.0	59
J-ZN1-0151	Zone-1	4168	1.4	47
J-ZN1-0663	Zone-1	4094	3.4	84
J-ZN1-0593	Zone-1	4187	6.9	41
J-ZN1-0563	Zone-1	4204	10.7	39
J-ZN1-0703	Zone-1	4100	11.4	67
J-ZN1-0675	Zone-1	4098	13.0	80
J-ZN1-0604	Zone-1	4150	3.4	62

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0183	Zone-1	4116	53.8	69
J-ZN1-0427	Zone-1	4092	0.0	77
J-PAT-0042	Patterson	4306	5.0	82
J-PAT-0034	Patterson	4463	0.0	17
J-ZN1-0862	Zone-1	4163	0.9	48
J-SL-0078	Lindley	4154	16.7	98
J-ZN1-0484	Zone-1	4190	2.2	50
J-ZN1-0453	Zone-1	4251	1.1	24
J-SL-0091	Lindley	4180	11.5	87
J-UL-0007	Upper Lynnewood	4228	8.5	92
J-FHH-0009	Foothill_Homedale	4310	11.7	60
J-ZN1-0021	Zone-1	4187	10.8	48
J-ZN1-0500	Zone-1	4214	2.7	37
J-ZN1-0069	Zone-1	4154	18.7	60
J-PAT-0022	Patterson	4298	2.1	86
J-UM-0012	Upper Moyina	4375	15.2	82
J-ZN1-0530	Zone-1	4160	6.1	74
J-ZN1-0349	Zone-1	4106	29.4	73
J-ZN1-0609	Zone-1	4157	17.5	60
J-ZN1-0579	Zone-1	4224	0.0	33
J-ZN1-0048	Zone-1	4140	12.4	61
J-ZN1-0634	Zone-1	4113	25.0	69
J-ZN1-0398	Zone-1	4093	19.0	85
J-ZN1-0791	Zone-1	4105	112.6	50
J-ZN1-0014	Zone-1	4150	2.0	62
J-SL-0069	Lindley	4232	16.7	64
J-PRE-0054	Prescott	4265	4.5	43
J-ZN1-0807	Zone-1	4128	28.5	60
J-ZN1-0457	Zone-1	4106	15.2	84
J-HOS-0055	URH-HOSP-HLVL	4337	31.4	71
J-ZN1-0266	Zone-1	4110	7.9	72
J-ZN1-0176	Zone-1	4118	7.7	68
J-ZN1-0504	Zone-1	4215	11.8	34
J-ZN1-0473	Zone-1	4098	27.2	89
J-ZN1-0317	Zone-1	4090	9.1	82
J-ZN1-0283	Zone-1	4114	35.5	70
J-ZN1-0543	Zone-1	4147	2.3	66
J-UM-0015	Upper Moyina	4446	25.2	51
J-PRE-0043	Prescott	4263	1.5	49
J-ZN1-0823	Zone-1	4098	49.5	59

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0353	Zone-1	4110	0.0	72
J-ZN1-0639	Zone-1	4091	5.0	82
J-HOS-0043	URH-HOSP-HLVL	4415	2.2	36
J-PAT-0017	Patterson	4357	14.6	89
J-FHH-0004	Foothill_Homedale	4232	20.6	94
J-ZN1-0084	Zone-1	4137	6.0	67
J-ZN1-0401	Zone-1	4090	8.8	53
J-ZN1-0369	Zone-1	4100	6.4	81
J-PAT-0011	Patterson	4376	16.8	57
J-ZN1-0149	Zone-1	4134	15.0	62
J-ZN1-0096	Zone-1	4175	0.0	56
J-ZN1-0662	Zone-1	4198	7.7	46
J-ZN1-0701	Zone-1	4100	10.8	66
J-ZN1-0673	Zone-1	4096	21.6	81
J-ZN1-0602	Zone-1	4160	16.6	51
J-ZN1-0181	Zone-1	4112	65.7	71
J-ZN1-0574	Zone-1	4233	0.0	29
J-ZN1-0287	Zone-1	4110	11.6	72
J-ZN1-0224	Zone-1	4121	19.8	67
J-ZN1-0860	Zone-1	4175	5.6	43
J-SL-0076	Lindley	4188	2.8	84
J-PRE-0050	Prescott	4232	3.1	60
J-SL-0089	Lindley	4284	2.8	42
J-UL-0005	Upper Lynnewood	4259	6.5	79
J-PRE-0064	Prescott	4256	10.8	51
J-ZN1-0498	Zone-1	4273	0.9	12
J-ZN1-0016	Zone-1	4175	21.0	53
J-ZN1-0592	Zone-1	4114	5.3	70
J-ZN1-0118	Zone-1	4164	4.3	52
J-ZN1-0103	Zone-1	4155	6.3	60
J-PRV-2-ELD-0016	PRV-2	4224	0.9	60
J-ZN1-0528	Zone-1	4146	4.5	77
J-ZN1-0733	Zone-1	4097	7.0	65
J-ZN1-0544	Zone-1	4164	3.3	58
J-ZN1-0577	Zone-1	4163	0.7	59
J-HOS-0050	URH-HOSP-HLVL	4333	0.0	82
J-ZN1-0396	Zone-1	4094	9.3	84
J-ZN1-0789	Zone-1	4168	4.5	54
J-PRE-0004	Prescott	4243	5.9	57
J-ZN1-0055	Zone-1	4180	16.9	47

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0052	Prescott	4259	14.9	45
J-ZN1-0805	Zone-1	4137	2.2	59
J-TW-0005	Tanglewood	4772	4.4	94
J-ZN1-0843	Zone-1	4106	1.6	84
J-ZN1-0471	Zone-1	4190	11.6	51
J-ZN1-0436	Zone-1	4099	0.4	84
J-ZN1-0315	Zone-1	4096	2.4	80
J-ZN1-0281	Zone-1	4114	16.0	70
J-ZN1-0608	Zone-1	4122	11.9	64
J-PRE-0041	Prescott	4250	3.5	55
J-PRE-0037	Prescott	4242	4.2	53
J-HOS-0041	URH-HOSP-HLVL	4422	0.0	34
J-ZN1-0637	Zone-1	4092	3.7	81
J-ZN1-0780	Zone-1	4140	11.0	63
J-ZN1-0760	Zone-1	4190	8.0	44
J-ZN1-0066	Zone-1	4096	62.3	81
J-ZN1-0400	Zone-1	4092	38.1	45
J-ZN1-0367	Zone-1	4115	28.0	75
J-PAT-0006	Patterson	4349	30.8	64
J-PAT-0041	Patterson	4227	18.9	140
J-ZN1-0112	Zone-1	4182	9.0	47
J-ZN1-0147	Zone-1	4144	14.1	60
J-ZN1-1242	Zone-1	4294	0.0	7
J-PAT-0077	Patterson	4445	0.0	2
J-ZN1-1248	Zone-1	4174	3.6	44
J-ZN1-1246	Zone-1	4297	0.0	2
J-ZN1-1243	Zone-1	4285	0.0	9
J-ZN1-1251	Zone-1	4111	0.1	48
J-ZN1-1247	Zone-1	4215	0.0	35
J-ZN1-1249	Zone-1	4197	0.0	33
J-ZN1-1252	Zone-1	4092	0.0	45
J-ZN1-1245	Zone-1	4223	0.0	32
J-ZN1-1244	Zone-1	4162	0.0	63
J-HOS-0101	URH-HOSP-HLVL	4372	2.7	51
J-PAT-0082	Patterson	4280	0.0	93
J-PAT-0079	Patterson	4314	6.0	84
J-UM-0021	Upper Moyina	4336	19.0	98
J-HOS-0105	URH-HOSP-HLVL	4260	12.7	101
J-HOS-0108	URH-HOSP-HLVL	4259	1.3	100
J-HOS-0102	URH-HOSP-HLVL	4266	5.6	97

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PAT-0080	Patterson	4288	8.8	91
J-HOS-0106	URH-HOSP-HLVL	4314	27.6	81
J-HOS-0103	URH-HOSP-HLVL	4274	15.2	98
J-UL-0013	Upper Lynnewood	4289	0.0	66
J-PAT-0076	Patterson	4286	0.0	92
J-SL-0108	Lindley	4166	0.0	93
J-WO-0013	West Oregon	4247	3.5	85
J-HOS-0100	URH-HOSP-HLVL	4311	0.3	83
J-PRE-0089	Prescott	4220	3.3	73
J-CR-0008	Crown Ridge	4396	18.3	114
J-TW-0008	Tanglewood	4179	11.7	351
J-UM-0020	Upper Moyina	4458	0.0	46
J-PAT-0078	Patterson	4212	0.0	147
J-ZN1-1250	Zone-1	4111	0.0	81
J-ZN1-1253	Zone-1	4092	2.0	94
J-FHH-0017	Foothill_Homedale	4300	0.0	65
J-PRV-3-UMO-0008	PRV-3	4325	0.0	75
J-FHH-0018	Foothill_Homedale	4301	7.2	64
J-PAT-0081	Patterson	4306	2.0	84
J-PRV-2-OGD-0008	PRV_Ogden	4282	2.2	74
J-PRV-2-ELD-0020	PRV-2	4253	20.6	50
J-PRV-MOY-0015	PRV-13	4278	0.0	78
J-PRV-OFR-0008	PRV-6	4254	6.4	61
J-PRV-2-ELD-0021	PRV-2	4238	25.7	54
J-HOS-0104	URH-HOSP-HLVL	4227	0.0	127
J-PRV-HWY-0022	PRV-2-HWY	4189	0.0	72
J-PRV-3-UMO-0009	PRV-3	4343	2.7	67
J-HOS-0107	URH-HOSP-HLVL	4268	5.7	101
J-PRV-2-ELD-0022	PRV-2	4250	12.2	49
J-ZN1-0816	Zone-1	4254	8.4	22
J-SL-0052	Stewart_Lenox	4188	0.0	97
J-SL-0012	Stewart_Lenox	4227	13.6	69
J-SL-0010	Stewart_Lenox	4199	5.0	85
J-SL-0004	Stewart_Lenox	4190	0.0	85
J-SL-0015	Stewart_Lenox	4188	0.0	86
J-SL-0024	Stewart_Lenox	4192	4.3	84

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-SL-0002	Stewart_Lenox_PRV	4215	0.0	41
J-PRV-SL-0004	Stewart_Lenox_PRV	4134	7.5	75
J-PRV-SL-0003	Stewart_Lenox_PRV	4212	2.3	42
J-SL-0006	Stewart_Lenox	4227	0.6	69
J-SL-0032	Stewart_Lenox	4198	5.0	82
J-SL-0008	Stewart_Lenox	4212	3.7	75
J-SL-0036	Stewart_Lenox	4210	3.0	77
J-SL-0007	Stewart_Lenox	4220	5.2	72
J-SL-0044	Stewart_Lenox	4226	6.7	69
J-SL-0049	Stewart_Lenox	4235	4.5	66
J-SL-0016	Stewart_Lenox	4178	0.2	91
J-SL-0009	Stewart_Lenox	4247	0.6	60
J-SL-0013	Stewart_Lenox	4220	2.5	73
J-SL-0014	Stewart_Lenox	4178	29.1	90
J-SL-0050	Stewart_Lenox	4219	4.9	73
J-SL-0051	Stewart_Lenox	4227	1.3	69
J-SL-0005	Stewart_Lenox	4246	3.2	61
J-SL-0011	Stewart_Lenox	4200	8.1	81
J-SL-0018	Stewart_Lenox	4228	9.2	69
J-SL-0019	Stewart_Lenox	4242	2.9	63
J-SL-0020	Stewart_Lenox	4248	8.5	60
J-SL-0021	Stewart_Lenox	4236	3.7	65
J-SL-0022	Stewart_Lenox	4189	8.5	96
J-SL-0023	Stewart_Lenox	4198	7.6	92
J-SL-0025	Stewart_Lenox	4187	12.9	94
J-SL-0026	Stewart_Lenox	4188	0.0	94
J-SL-0027	Stewart_Lenox	4226	3.8	73
J-SL-0028	Stewart_Lenox	4238	1.3	68
J-SL-0029	Stewart_Lenox	4232	4.8	67
J-SL-0030	Stewart_Lenox	4234	1.3	66
J-SL-0031	Stewart_Lenox	4276	8.5	48
J-PRV-SL-0005	Stewart_Lenox_PRV	4225	2.3	36
J-PRV-SL-0006	Stewart_Lenox_PRV	4216	1.0	40
J-PRV-SL-0007	Stewart_Lenox_PRV	4230	0.5	34
J-PRV-SL-0008	Stewart_Lenox_PRV	4204	1.1	45
J-PRV-SL-0009	Stewart_Lenox_PRV	4141	2.4	72
J-PRV-SL-0010	Stewart_Lenox_PRV	4126	3.1	79
J-PRV-SL-0011	Stewart_Lenox_PRV	4145	4.1	70
J-PRV-SL-0012	Stewart_Lenox_PRV	4157	8.2	65
J-PRV-SL-0013	Stewart_Lenox_PRV	4114	67.3	84

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-SL-0033	Stewart_Lenox	4247	0.0	61
J-SL-0034	Stewart_Lenox	4187	0.0	87
J-SL-0035	Stewart_Lenox	4182	3.1	89
J-SL-0037	Stewart_Lenox	4181	5.1	89
J-SL-0038	Stewart_Lenox	4185	6.1	87
J-SL-0039	Stewart_Lenox	4224	3.8	71
J-SL-0040	Stewart_Lenox	4189	3.6	86
J-SL-0041	Stewart_Lenox	4249	0.0	60
J-SL-0042	Stewart_Lenox	4242	3.1	63
J-SL-0043	Stewart_Lenox	4247	3.2	61
J-PRV-SL-0014	Stewart_Lenox_PRV	4117	0.2	83
J-PRV-SL-0015	Stewart_Lenox_PRV	4114	0.0	84
J-PRV-SL-0016	Stewart_Lenox_PRV	4213	0.4	41
J-SL-0053	Stewart_Lenox	4211	0.1	76
J-PRV-SL-0017	Stewart_Lenox_PRV	4214	0.0	41
J-SL-0045	Stewart_Lenox	4228	6.6	69
J-SL-0046	Stewart_Lenox	4241	0.0	63
J-SL-0048	Stewart_Lenox	4209	1.5	77
J-ZN1-0168	Zone-1	4090	2.1	81
J-ZN1-0325	Zone-1	4090	0.0	81
J-ZN1-0326	Zone-1	4088	0.0	82
J-ZN1-0327	Zone-1	4089	69.6	81
J-ZN1-0339	Zone-1	4198	0.0	40
J-ZN1-0340	Zone-1	4179	0.0	48
J-ZN1-0341	Zone-1	4198	0.0	40
J-ZN1-0342	Zone-1	4197	0.0	41
J-ZN1-0328	Zone-1	4198	0.0	40
J-HC-0001	Havencrest	4417	30.8	90
J-BV5-0004	Zone-5	4493	0.0	93
J-HOS-0001	URH-HOSP-HLVL	4292	0.0	99
J-HOS-0002	URH-HOSP-HLVL	4364	0.0	67
J-ESI-0001	ESI	4369	0.0	83
J-ESI-0002	ESI	4388	94.5	74
J-ESI-0003	ESI	4354	0.0	89
J-HOS-0109	URH-HOSP-HLVL	4187	0.0	146
J-SL-0063	Lindley	4138	0.4	106
J-ZN1-0001	Zone-1	4197	0.0	35
J-HOS-0003	URH-HOSP-HLVL	4213	0.0	120
J-ZN1-0002	Zone-1	4250	2.9	23
J-ZN1-1258	Zone-1	4175	0.3	52

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0928	Zone-1	4179	48.9	50
J-ZN1-0927	Zone-1	4180	0.0	49
J-ZN1-0165	Zone-1	4177	0.5	51
J-ZN1-0164	Zone-1	4194	0.0	45
J-SH-0001	Sierra Heights	4232	6.5	74
J-ZN1-0192	Zone-1	4198	17.7	43
J-PAT-0023	Patterson	4187	3.5	146
J-SL-0071	Lindley	4214	0.0	73
J-SL-0002	Stewart_Lenox	4186	0.0	98
J-ZN1-0933	Zone-1	4153	9.7	63
J-ZN1-0935	Zone-1	4151	0.0	64
J-PAT-0040	Patterson	4244	0.0	121
J-PAT-0039	Patterson	4197	0.0	143
J-BV5-0001	Zone-5	4590	0.0	47
J-TW-0007	Tanglewood	4822	4.2	73
J-ZN1-1241	Zone-1	4174	15.8	49
J-FHH-0003	Foothill_Homedale	4285	43.1	71
J-ZN1-0449	Zone-1	4117	7.2	79
J-HOS-0013	URH-HOSP-HLVL	4307	15.9	82
J-SL-0084	Lindley	4146	0.0	102
J-SL-0064	Lindley	4147	27.1	101
J-ZN1-0003	Zone-1	4092	88.0	81
J-ZN1-0004	Zone-1	4092	4.7	71
J-ZN1-0005	Zone-1	4146	3.9	64
J-ZN1-0006	Zone-1	4145	7.0	63
J-ZN1-0007	Zone-1	4144	0.6	64
J-FHH-0001	Foothill_Homedale	4289	7.7	69
J-SL-0047	Stewart_Lenox	4210	0.0	76
J-TW-0001	Tanglewood	4549	0.0	191
J-SL-0065	Lindley	4124	0.0	112
J-SL-0066	Lindley	4184	97.2	85
J-SL-0070	Lindley	4221	0.0	71
J-HOS-0004	URH-HOSP-HLVL	4373	11.5	51
J-HOS-0005	URH-HOSP-HLVL	4409	76.3	39
J-HOS-0014	URH-HOSP-HLVL	4356	19.4	62
J-PRV-HWY-0002	PRV-2-HWY	4218	3.9	60
J-PRV-HWY-0003	PRV-2-HWY	4216	3.0	61
J-PRV-HWY-0004	PRV-2-HWY	4243	5.2	49

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-HWY-0005	PRV-2-HWY	4238	4.1	51
J-PRV-HWY-0006	PRV-2-HWY	4222	2.4	58
J-HOS-0015	URH-HOSP-HLVL	4451	0.0	21
J-WO-0001	West Oregon	4226	2.0	94
J-ZN1-0228	Zone-1	4175	13.0	49
J-HOS-0016	URH-HOSP-HLVL	4322	7.8	76
J-PRV-2-ELD-0005	PRV-2	4218	10.6	63
J-HOS-0017	URH-HOSP-HLVL	4324	14.8	72
J-ZN1-0230	Zone-1	4214	11.0	37
J-PRE-0015	Prescott	4247	21.3	50
J-ZN1-0233	Zone-1	4218	3.0	39
J-ZN1-0234	Zone-1	4231	1.5	30
J-ZN1-0235	Zone-1	4224	4.4	33
J-ZN1-0236	Zone-1	4246	2.6	24
J-ZN1-0237	Zone-1	4224	1.1	33
J-PRE-0016	Prescott	4258	1.8	46
J-HOS-0018	URH-HOSP-HLVL	4269	1.7	96
J-HOS-0019	URH-HOSP-HLVL	4320	4.4	78
J-ZN1-0245	Zone-1	4162	2.8	49
J-ZN1-0246	Zone-1	4150	0.0	60
J-ZN1-0248	Zone-1	4162	2.3	74
J-ZN1-0249	Zone-1	4184	3.6	69
J-ZN1-0250	Zone-1	4196	3.0	66
J-ZN1-0251	Zone-1	4097	0.0	93
J-PRE-0020	Prescott	4300	0.2	37
J-ZN1-0253	Zone-1	4189	3.5	50
J-ZN1-0254	Zone-1	4149	3.6	67
J-ZN1-0255	Zone-1	4102	1.1	82
J-ZN1-0256	Zone-1	4118	12.8	66
J-ZN1-0258	Zone-1	4122	3.6	64
J-BV-0001	Zone-5	4546	13.0	66
J-UM-0007	Upper Moyina	4434	5.2	56
J-ZN1-0194	Zone-1	4206	2.2	40
J-ZN1-0195	Zone-1	4189	7.5	47
J-ZN1-0196	Zone-1	4175	2.0	53
J-ZN1-0199	Zone-1	4155	22.5	62
J-ZN1-0200	Zone-1	4116	8.0	62
J-ZN1-0201	Zone-1	4098	18.6	65
J-ZN1-0202	Zone-1	4134	0.0	54
J-ZN1-0203	Zone-1	4110	34.1	53
J-ZN1-0205	Zone-1	4095	2.2	67
J-ZN1-0206	Zone-1	4098	102.3	66
J-ZN1-0207	Zone-1	4095	0.1	58
J-ZN1-0208	Zone-1	4100	2.7	57
J-PRV-MOY-0013	PRV-13	4275	9.3	80
J-PAT-0024	Patterson	4247	0.0	108
J-PAT-0025	Patterson	4246	0.4	109
J-ZN1-0210	Zone-1	4181	20.5	48
J-ZN1-0211	Zone-1	4095	21.6	82
J-ZN1-0212	Zone-1	4091	9.4	88
J-ZN1-0214	Zone-1	4092	6.8	85
J-ZN1-0215	Zone-1	4094	1.1	83
J-ZN1-0216	Zone-1	4096	23.5	82
J-ZN1-0217	Zone-1	4158	0.0	53
J-ZN1-0218	Zone-1	4164	3.2	50
J-ZN1-0220	Zone-1	4141	0.0	58
J-ZN1-0221	Zone-1	4094	13.5	82
J-ZN1-0222	Zone-1	4096	14.0	80
J-ZN1-0223	Zone-1	4090	0.0	82
J-ZN1-0225	Zone-1	4088	0.0	83
J-ZN1-0226	Zone-1	4090	0.0	82
J-ZN1-0227	Zone-1	4088	0.0	83
J-PRV-HWY-0012	PRV-2-HWY	4234	0.0	53
J-PRV-HWY-0013	PRV-2-HWY	4217	0.4	60
J-PRV-HWY-0014	PRV-2-HWY	4221	5.0	58
J-PRV-HWY-0015	PRV-2-HWY	4216	11.5	61
J-PRV-HWY-0016	PRV-2-HWY	4238	3.8	51
J-PRV-HWY-0017	PRV-2-HWY	4241	23.1	50
J-PRV-HWY-0018	PRV-2-HWY	4216	0.0	61
J-PRV-HWY-0019	PRV-2-HWY	4222	2.0	58
J-PRV-HWY-0021	PRV-2-HWY	4238	2.8	51
J-HOS-0088	URH-HOSP-HLVL	4364	0.0	67
J-HOS-0089	URH-HOSP-HLVL	4292	3.4	99
J-HOS-0090	URH-HOSP-HLVL	4316	0.8	88

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-HOS-0091	URH-HOSP-HLVL	4331	1.1	82
J-HOS-0092	URH-HOSP-HLVL	4284	0.0	102
J-HOS-0093	URH-HOSP-HLVL	4315	6.1	89
J-HOS-0094	URH-HOSP-HLVL	4328	0.0	77
J-HOS-0095	URH-HOSP-HLVL	4454	3.7	19
J-HOS-0096	URH-HOSP-HLVL	4452	0.0	20
J-HOS-0097	URH-HOSP-HLVL	4365	9.6	58
J-HOS-0098	URH-HOSP-HLVL	4352	157.5	62
J-HOS-0099	URH-HOSP-HLVL	4318	25.1	78
J-ZN1-1065	Zone-1	4148	28.1	62
J-ZN1-1066	Zone-1	4146	18.0	63
J-ZN1-1070	Zone-1	4168	5.5	54
J-ZN1-1079	Zone-1	4174	64.2	52
J-ZN1-1084	Zone-1	4173	5.1	52
J-ZN1-1090	Zone-1	4171	4.1	53
J-ZN1-1099	Zone-1	4189	22.8	45
J-ZN1-1110	Zone-1	4204	3.6	39
J-ZN1-1119	Zone-1	4204	1.2	39
J-ZN1-1129	Zone-1	4216	7.6	34
J-ZN1-1137	Zone-1	4205	1.6	39
J-ZN1-1146	Zone-1	4208	13.6	37
J-ZN1-1153	Zone-1	4211	9.9	36
J-ZN1-1172	Zone-1	4220	9.3	32
J-ZN1-1181	Zone-1	4220	5.4	32
J-ZN1-1192	Zone-1	4207	7.2	38
J-ZN1-1202	Zone-1	4208	8.4	37
J-ZN1-1212	Zone-1	4205	13.2	39
J-WO-0011	West Oregon	4242	16.2	87
J-WO-0012	West Oregon	4244	2.9	86
J-ZN1-0874	Zone-1	4214	9.3	35
J-HOS-0062	URH-HOSP-HLVL	4274	91.3	97
J-HOS-0063	URH-HOSP-HLVL	4314	9.4	80
J-HOS-0064	URH-HOSP-HLVL	4302	0.4	85
J-HOS-0065	URH-HOSP-HLVL	4344	13.8	63
J-HOS-0066	URH-HOSP-HLVL	4401	9.7	38
J-CR-0004	Crown Ridge	4444	10.0	93
J-CR-0005	Crown Ridge	4435	10.3	96
J-CR-0006	Crown Ridge	4439	4.5	95
J-HOS-0067	URH-HOSP-HLVL	4385	0.0	118
J-HOS-0068	URH-HOSP-HLVL	4253	17.0	103

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-HOS-0069	URH-HOSP-HLVL	4361	9.8	56
J-HOS-0070	URH-HOSP-HLVL	4346	11.1	62
J-HOS-0071	URH-HOSP-HLVL	4286	15.8	88
J-ZN1-0875	Zone-1	4238	3.9	26
J-PRE-0065	Prescott	4246	4.6	56
J-PRE-0066	Prescott	4232	1.9	63
J-PRE-0067	Prescott	4298	1.8	34
J-ZN1-0876	Zone-1	4231	4.3	30
J-ZN1-0877	Zone-1	4245	2.2	24
J-ZN1-0878	Zone-1	4226	2.2	32
J-ZN1-0879	Zone-1	4287	1.9	6
J-PRE-0068	Prescott	4299	13.9	34
J-PRE-0069	Prescott	4257	7.3	46
J-PRE-0070	Prescott	4261	5.4	45
J-PRE-0071	Prescott	4186	12.9	77
J-PRE-0072	Prescott	4194	4.0	74
J-PRE-0073	Prescott	4196	10.5	73
J-HOS-0081	URH-HOSP-HLVL	4236	58.6	111
J-HOS-0082	URH-HOSP-HLVL	4296	54.2	85
J-HOS-0083	URH-HOSP-HLVL	4274	7.5	94
J-HOS-0084	URH-HOSP-HLVL	4309	11.3	79
J-HOS-0085	URH-HOSP-HLVL	4257	22.2	101
J-HOS-0086	URH-HOSP-HLVL	4276	0.0	98
J-HOS-0087	URH-HOSP-HLVL	4301	0.0	87
J-ZN1-1000	Zone-1	4184	24.9	39
J-ZN1-1001	Zone-1	4168	44.7	46
J-ZN1-1002	Zone-1	4201	13.2	32
J-PRV-OFR-0005	PRV-6	4210	17.8	80
J-PRV-OFR-0006	PRV-6	4198	17.8	85
J-PRV-OFR-0007	PRV-6	4231	9.0	71
J-ZN1-1003	Zone-1	4118	0.9	75
J-ZN1-1004	Zone-1	4112	52.3	77
J-ZN1-1005	Zone-1	4112	16.1	73
J-ZN1-1006	Zone-1	4118	8.8	70
J-ZN1-1007	Zone-1	4155	14.5	58
J-ZN1-1008	Zone-1	4150	13.1	60
J-ZN1-1009	Zone-1	4150	2.9	60
J-ZN1-1010	Zone-1	4188	37.1	43
J-ZN1-1011	Zone-1	4152	0.0	60

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1012	Zone-1	4154	0.0	59
J-ZN1-1013	Zone-1	4184	6.8	67
J-ZN1-1014	Zone-1	4166	7.8	74
J-PRE-0085	Prescott	4242	13.6	51
J-ZN1-1015	Zone-1	4225	9.4	34
J-PRE-0086	Prescott	4210	6.2	41
J-UL-0012	Upper Lynnewood	4212	6.0	99
J-PRE-0087	Prescott	4300	1.3	37
J-PRE-0088	Prescott	4256	3.5	57
J-ZN1-1016	Zone-1	4219	2.3	37
J-ZN1-1017	Zone-1	4250	1.5	24
J-ZN1-1018	Zone-1	4169	2.8	60
J-ZN1-1019	Zone-1	4148	7.6	69
J-ZN1-1020	Zone-1	4130	0.0	75
J-ZN1-1021	Zone-1	4195	3.3	47
J-ZN1-1022	Zone-1	4092	1.9	86
J-ZN1-1023	Zone-1	4090	0.0	87
J-ZN1-1024	Zone-1	4090	0.0	87
J-ZN1-1025	Zone-1	4119	21.7	68
J-ZN1-1026	Zone-1	4120	2.7	67
J-ZN1-1027	Zone-1	4119	2.6	68
J-ZN1-1028	Zone-1	4122	0.0	67
J-ZN1-1029	Zone-1	4108	4.6	74
J-ZN1-1030	Zone-1	4106	0.3	75
J-ZN1-1031	Zone-1	4110	4.2	72
J-ZN1-1032	Zone-1	4106	2.9	74
J-ZN1-1033	Zone-1	4149	20.7	54
J-ZN1-1034	Zone-1	4164	1.3	48
J-ZN1-1035	Zone-1	4120	1.4	61
J-ZN1-1036	Zone-1	4129	7.9	57
J-PAT-0049	Patterson	4223	16.0	140
J-PAT-0050	Patterson	4236	12.4	134
J-PAT-0051	Patterson	4342	12.8	73
J-PAT-0052	Patterson	4334	7.1	76
J-PAT-0053	Patterson	4361	6.5	65
J-PAT-0054	Patterson	4322	10.0	81
J-PAT-0055	Patterson	4373	18.1	58
J-FHH-0015	Foothill_Homedale	4249	51.8	86
J-FHH-0016	Foothill_Homedale	4248	2.1	87
J-PAT-0056	Patterson	4326	24.6	75

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PAT-0057	Patterson	4318	20.4	79
J-PAT-0058	Patterson	4348	15.0	66
J-PAT-0059	Patterson	4377	3.2	53
J-PAT-0060	Patterson	4357	8.1	62
J-PAT-0061	Patterson	4349	21.5	65
J-PAT-0062	Patterson	4373	0.0	55
J-PAT-0063	Patterson	4396	1.5	45
J-PAT-0064	Patterson	4413	7.2	38
J-BV-0002	Zone-5	4401	7.8	129
J-BV-0003	Zone-5	4442	20.9	111
J-BV-0004	Zone-5	4460	0.0	103
J-BV-0005	Zone-5	4547	0.0	66
J-BV-0006	Zone-5	4543	0.0	67
J-BV-0007	Zone-5	4486	26.4	92
J-BV-0008	Zone-5	4548	6.7	65
J-BV-0009	Zone-5	4503	6.1	85
J-BV-0010	Zone-5	4494	0.0	89
J-PAT-0065	Patterson	4383	37.0	50
J-PAT-0066	Patterson	4420	16.0	34
J-PAT-0067	Patterson	4389	12.0	75
J-PAT-0068	Patterson	4386	7.0	49
J-PAT-0069	Patterson	4322	14.7	75
J-PAT-0070	Patterson	4381	15.9	51
J-ZN1-1037	Zone-1	4175	13.9	53
J-ZN1-1038	Zone-1	4162	7.5	59
J-ZN1-1039	Zone-1	4158	12.1	60
J-ZN1-1040	Zone-1	4160	0.0	59
J-ZN1-1041	Zone-1	4159	7.9	60
J-ZN1-1042	Zone-1	4150	0.3	64
J-ZN1-1043	Zone-1	4151	4.4	63
J-ZN1-1044	Zone-1	4138	24.6	38
J-ZN1-1045	Zone-1	4140	10.3	37
J-ZN1-1046	Zone-1	4112	27.3	63
J-ZN1-1047	Zone-1	4104	1.3	57
J-ZN1-1048	Zone-1	4109	21.6	55
J-ZN1-1049	Zone-1	4120	49.5	58
J-ZN1-1050	Zone-1	4122	8.8	57
J-ZN1-1051	Zone-1	4092	8.8	71
J-ZN1-1052	Zone-1	4095	19.4	70
J-ZN1-1053	Zone-1	4094	24.2	69

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1054	Zone-1	4092	1.8	70
J-ZN1-1055	Zone-1	4092	2.5	72
J-ZN1-1056	Zone-1	4094	12.0	71
J-SL-0102	Lindley	4224	5.7	68
J-SL-0103	Lindley	4231	2.4	65
J-ZN1-1057	Zone-1	4108	5.4	86
J-SL-0104	Lindley	4218	1.5	71
J-SL-0105	Lindley	4209	2.7	74
J-ZN1-1058	Zone-1	4094	3.2	56
J-ZN1-1059	Zone-1	4094	2.7	56
J-ZN1-1060	Zone-1	4098	12.4	59
J-ZN1-1061	Zone-1	4100	2.5	58
J-ZN1-1062	Zone-1	4100	4.7	57
J-ZN1-1063	Zone-1	4101	18.3	57
J-ZN1-1064	Zone-1	4099	23.3	58
J-KL-0001	Katie Lane	4232	3.2	84
J-KL-0002	Katie Lane	4232	5.3	84
J-KL-0003	Katie Lane	4233	6.5	84
J-KL-0004	Katie Lane	4234	18.5	83
J-KL-0005	Katie Lane	4212	0.0	93
J-KL-0006	Katie Lane	4202	41.6	97
J-PRV-2-OGD-0004	PRV_Ogden	4266	4.5	81
J-PRV-2-OGD-0005	PRV_Ogden	4242	5.9	91
J-PRV-2-OGD-0006	PRV_Ogden	4236	11.9	94
J-PRV-2-OGD-0007	PRV_Ogden	4250	3.8	87
J-PAT-0071	Patterson	4247	0.0	108
J-PAT-0072	Patterson	4256	0.0	105
J-PAT-0073	Patterson	4238	0.2	112
J-PAT-0074	Patterson	4333	36.0	70
J-PAT-0075	Patterson	4243	0.0	109
J-ZN1-1067	Zone-1	4209	4.6	39
J-SH-0004	Sierra Heights	4250	23.3	66
J-SH-0005	Sierra Heights	4252	25.8	65
J-SH-0006	Sierra Heights	4242	26.0	69
J-SH-0007	Sierra Heights	4262	14.9	61
J-SH-0008	Sierra Heights	4274	19.5	56
J-ZN1-1068	Zone-1	4186	2.8	47
J-ZN1-1069	Zone-1	4191	2.5	46

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1071	Zone-1	4176	17.4	49
J-ZN1-1072	Zone-1	4176	24.1	49
J-ZN1-1073	Zone-1	4166	8.8	52
J-ZN1-1074	Zone-1	4182	1.0	45
J-ZN1-1075	Zone-1	4173	10.4	50
J-ZN1-1076	Zone-1	4161	37.7	55
J-ZN1-1077	Zone-1	4172	27.8	51
J-ZN1-1078	Zone-1	4172	14.6	51
J-ZN1-1080	Zone-1	4178	11.3	49
J-ZN1-1081	Zone-1	4092	2.2	83
J-ZN1-1082	Zone-1	4092	7.8	83
J-ZN1-1083	Zone-1	4094	0.0	82
J-SL-0106	Lindley	4203	0.0	78
J-SL-0107	Lindley	4188	6.0	84
J-ZN1-1085	Zone-1	4090	14.8	88
J-ZN1-1086	Zone-1	4090	0.1	88
J-ZN1-1087	Zone-1	4091	1.1	88
J-ZN1-1088	Zone-1	4090	27.8	89
J-ZN1-1089	Zone-1	4090	5.4	90
J-ZN1-1091	Zone-1	4092	2.4	87
J-ZN1-1092	Zone-1	4088	0.0	89
J-ZN1-1093	Zone-1	4093	0.3	85
J-ZN1-1094	Zone-1	4094	15.7	83
J-ZN1-1095	Zone-1	4092	0.4	83
J-ZN1-1096	Zone-1	4092	7.0	83
J-ZN1-1097	Zone-1	4100	45.9	80
J-ZN1-1098	Zone-1	4100	17.1	80
J-ZN1-1100	Zone-1	4098	1.0	80
J-ZN1-1101	Zone-1	4100	0.0	80
J-ZN1-1102	Zone-1	4100	0.0	80
J-ZN1-1103	Zone-1	4099	4.3	80
J-ZN1-1104	Zone-1	4126	7.3	65
J-ZN1-1105	Zone-1	4125	0.0	66
J-ZN1-1106	Zone-1	4122	10.6	67
J-ZN1-1107	Zone-1	4130	79.2	63
J-ZN1-1108	Zone-1	4119	9.1	68
J-ZN1-1109	Zone-1	4120	13.6	68
J-ZN1-1111	Zone-1	4138	11.8	63
J-ZN1-1112	Zone-1	4138	10.9	63
J-ZN1-1113	Zone-1	4138	23.5	63

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1114	Zone-1	4157	18.1	57
J-ZN1-1115	Zone-1	4177	12.8	49
J-ZN1-1116	Zone-1	4156	25.3	58
J-ZN1-1117	Zone-1	4156	22.4	58
J-ZN1-1118	Zone-1	4154	3.5	59
J-ZN1-1120	Zone-1	4162	19.0	55
J-ZN1-1121	Zone-1	4163	19.5	55
J-ZN1-1122	Zone-1	4166	17.3	54
J-ZN1-1123	Zone-1	4170	7.0	52
J-ZN1-1124	Zone-1	4164	10.5	54
J-ZN1-1125	Zone-1	4166	9.2	54
J-ZN1-1126	Zone-1	4168	1.4	51
J-ZN1-1127	Zone-1	4170	3.1	50
J-ZN1-1128	Zone-1	4165	3.5	50
J-ZN1-1130	Zone-1	4153	1.9	56
J-ZN1-1131	Zone-1	4154	8.6	55
J-ZN1-1132	Zone-1	4158	0.0	53
J-ZN1-1133	Zone-1	4162	6.0	52
J-ZN1-1134	Zone-1	4162	20.7	50
J-ZN1-1135	Zone-1	4172	2.4	46
J-ZN1-1136	Zone-1	4171	4.1	46
J-ZN1-1138	Zone-1	4178	0.0	43
J-ZN1-1139	Zone-1	4175	3.3	44
J-ZN1-1140	Zone-1	4168	13.0	47
J-ZN1-1141	Zone-1	4156	11.9	52
J-ZN1-1142	Zone-1	4159	2.3	51
J-ZN1-1143	Zone-1	4149	5.6	55
J-ZN1-1144	Zone-1	4151	3.5	54
J-ZN1-1145	Zone-1	4107	35.2	73
J-ZN1-1147	Zone-1	4108	16.6	73
J-ZN1-1148	Zone-1	4108	8.1	73
J-ZN1-1149	Zone-1	4100	7.4	76
J-ZN1-1150	Zone-1	4101	18.1	76
J-ZN1-1151	Zone-1	4110	2.6	72
J-ZN1-1152	Zone-1	4110	0.2	72
J-ZN1-1154	Zone-1	4110	0.0	72
J-ZN1-1155	Zone-1	4104	9.2	75
J-ZN1-1156	Zone-1	4110	2.7	72
J-ZN1-1157	Zone-1	4109	6.5	72
J-ZN1-1158	Zone-1	4117	12.6	69
J-ZN1-1159	Zone-1	4117	5.1	69
J-ZN1-1160	Zone-1	4139	17.6	59
J-ZN1-1161	Zone-1	4108	29.8	73
J-ZN1-1162	Zone-1	4109	13.1	72
J-ZN1-1163	Zone-1	4104	0.0	74
J-ZN1-1164	Zone-1	4105	20.3	74
J-ZN1-1165	Zone-1	4106	10.9	73
J-ZN1-1166	Zone-1	4108	25.9	73
J-ZN1-1167	Zone-1	4108	6.2	73
J-ZN1-1168	Zone-1	4110	25.7	72
J-ZN1-1169	Zone-1	4108	21.2	73
J-ZN1-1170	Zone-1	4110	13.4	72
J-ZN1-1171	Zone-1	4108	34.5	73
J-ZN1-1173	Zone-1	4106	0.0	73
J-ZN1-1174	Zone-1	4106	0.0	73
J-ZN1-1175	Zone-1	4106	0.0	73
J-ZN1-1176	Zone-1	4137	13.1	60
J-ZN1-1177	Zone-1	4138	19.0	60
J-ZN1-1178	Zone-1	4136	19.4	61
J-ZN1-1179	Zone-1	4168	30.1	47
J-ZN1-1180	Zone-1	4165	47.5	48
J-ZN1-1182	Zone-1	4164	0.0	48
J-ZN1-1183	Zone-1	4158	11.2	51
J-ZN1-1184	Zone-1	4176	2.6	43
J-ZN1-1185	Zone-1	4159	4.1	50
J-ZN1-1186	Zone-1	4166	1.2	48
J-ZN1-1187	Zone-1	4168	25.6	47
J-ZN1-1188	Zone-1	4149	7.1	55
J-ZN1-1189	Zone-1	4152	3.2	54
J-ZN1-1190	Zone-1	4148	0.0	55
J-ZN1-1191	Zone-1	4109	10.2	72
J-ZN1-1193	Zone-1	4109	7.2	72
J-ZN1-1194	Zone-1	4107	18.4	73
J-ZN1-1195	Zone-1	4104	28.6	74
J-ZN1-1196	Zone-1	4105	11.5	74
J-ZN1-1197	Zone-1	4105	17.6	74
J-ZN1-1198	Zone-1	4104	12.6	74
J-ZN1-1199	Zone-1	4102	0.2	75
J-ZN1-1200	Zone-1	4088	0.0	82
J-ZN1-1201	Zone-1	4090	0.0	82

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1203	Zone-1	4090	0.0	82
J-ZN1-1204	Zone-1	4090	27.1	81
J-ZN1-1205	Zone-1	4086	0.0	83
J-ZN1-1206	Zone-1	4089	2.2	82
J-ZN1-1207	Zone-1	4094	1.9	80
J-ZN1-1208	Zone-1	4090	0.0	82
J-ZN1-1209	Zone-1	4089	0.2	82
J-ZN1-1210	Zone-1	4093	0.0	81
J-ZN1-1211	Zone-1	4090	0.0	82
J-ZN1-1213	Zone-1	4089	0.0	83
J-ZN1-1214	Zone-1	4088	0.0	83
J-ZN1-1215	Zone-1	4089	3.8	82
J-ZN1-1216	Zone-1	4090	36.3	82
J-ZN1-1217	Zone-1	4090	0.0	82
J-ZN1-1218	Zone-1	4090	0.0	82
J-ZN1-1219	Zone-1	4090	0.0	82
J-ZN1-1220	Zone-1	4090	0.0	82
J-ZN1-1221	Zone-1	4090	0.0	82
J-ZN1-1222	Zone-1	4090	0.0	82
J-ZN1-1223	Zone-1	4090	0.0	82
J-ZN1-1224	Zone-1	4090	0.0	82
J-ZN1-1225	Zone-1	4090	0.0	82
J-ZN1-1226	Zone-1	4090	0.0	82
J-ZN1-1227	Zone-1	4090	0.0	82
J-ZN1-1228	Zone-1	4089	0.0	82
J-ZN1-1229	Zone-1	4090	0.0	82
J-ZN1-1230	Zone-1	4089	0.0	82
J-ZN1-1231	Zone-1	4089	0.0	82
J-ZN1-1232	Zone-1	4088	0.0	83
J-ZN1-1233	Zone-1	4084	0.0	85
J-ZN1-1234	Zone-1	4090	0.0	82
J-ZN1-1235	Zone-1	4089	0.0	82
J-ZN1-1236	Zone-1	4090	0.0	82
J-ZN1-1237	Zone-1	4088	0.0	83
J-ZN1-1238	Zone-1	4088	0.2	83
J-ZN1-1239	Zone-1	4088	0.0	83
J-ZN1-1240	Zone-1	4088	1.6	83
J-ZN1-0870	Zone-1	4088	0.0	83
J-ZN1-0871	Zone-1	4088	0.0	83
J-ZN1-0872	Zone-1	4088	0.5	83

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0873	Zone-1	4088	0.0	83
J-ZN1-0239	Zone-1	4164	0.0	51
J-ZN1-0240	Zone-1	4108	2.9	74
J-ZN1-0241	Zone-1	4112	0.9	70
J-ZN1-0242	Zone-1	4219	3.1	51
J-PRE-0017	Prescott	4284	3.0	44
J-PRE-0018	Prescott	4290	12.6	32
J-PRE-0019	Prescott	4254	3.8	48
J-ZN1-0880	Zone-1	4092	0.0	78
J-ZN1-0881	Zone-1	4094	10.4	68
J-HOS-0072	URH-HOSP-HLVL	4338	0.0	71
J-ZN1-0193	Zone-1	4108	41.8	73
J-PRV-2-ELD-0019	PRV-2	4215	2.5	64
J-ZN1-0882	Zone-1	4144	15.0	62
J-ZN1-0883	Zone-1	4110	1.5	73
J-ZN1-0884	Zone-1	4114	8.7	63
J-PAT-0045	Patterson	4356	9.1	61
J-ZN1-0885	Zone-1	4144	8.7	66
J-ZN1-0886	Zone-1	4096	12.1	67
J-ZN1-0887	Zone-1	4092	0.0	78
J-ZN1-0888	Zone-1	4090	0.0	87
J-ZN1-0889	Zone-1	4094	0.0	87
J-ZN1-0890	Zone-1	4169	2.4	54
J-ZN1-0891	Zone-1	4178	0.5	49
J-ZN1-0892	Zone-1	4194	13.7	43
J-ZN1-0893	Zone-1	4182	12.7	48
J-ZN1-0894	Zone-1	4203	2.7	38
J-ZN1-0895	Zone-1	4182	0.2	46
J-ZN1-0896	Zone-1	4182	1.0	46
J-ZN1-0897	Zone-1	4098	19.1	80
J-ZN1-0898	Zone-1	4096	10.2	82
J-ZN1-0899	Zone-1	4100	6.9	54
J-ZN1-0900	Zone-1	4104	0.0	51
J-ZN1-0901	Zone-1	4092	24.7	94
J-SL-0094	Lindley	4149	8.0	100
J-SL-0001	Stewart_Lenox	4225	0.2	70
J-ZN1-0902	Zone-1	4090	15.9	88
J-ZN1-0903	Zone-1	4098	3.5	81
J-ZN1-0904	Zone-1	4104	8.1	75
J-ZN1-0905	Zone-1	4167	4.1	52

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0906	Zone-1	4149	12.4	59
J-ZN1-0907	Zone-1	4163	2.6	53
J-ZN1-0908	Zone-1	4144	9.6	60
J-ZN1-0909	Zone-1	4121	3.5	67
J-ZN1-0910	Zone-1	4110	12.2	72
J-PRV-SL-0001	Stewart_Lenox_PRV	4118	10.0	82
J-ZN1-0911	Zone-1	4093	0.0	81
J-ZN1-0912	Zone-1	4092	6.5	82
J-ZN1-0913	Zone-1	4092	0.1	81
J-ZN1-0914	Zone-1	4093	0.0	81
J-ZN1-0915	Zone-1	4093	0.0	81
J-ZN1-0916	Zone-1	4100	0.0	77
J-ZN1-0917	Zone-1	4102	1.7	76
J-ZN1-0918	Zone-1	4098	11.5	78
J-ZN1-0919	Zone-1	4097	19.8	81
J-ZN1-0920	Zone-1	4104	2.0	75
J-ZN1-0921	Zone-1	4114	0.0	80
J-ZN1-0922	Zone-1	4122	15.5	75
J-ZN1-0923	Zone-1	4179	3.1	42
J-PRE-0074	Prescott	4280	0.9	42
J-PRE-0075	Prescott	4269	3.9	47
J-ZN1-0924	Zone-1	4164	3.1	58
J-ZN1-0925	Zone-1	4198	4.9	43
J-ZN1-0926	Zone-1	4223	4.7	29
J-ZN1-0936	Zone-1	4098	0.9	58
J-ZN1-0939	Zone-1	4137	7.5	60
J-SL-0095	Lindley	4188	3.5	84
J-SL-0096	Lindley	4272	0.9	48
J-ZN1-0929	Zone-1	4182	8.9	48
J-HOS-0073	URH-HOSP-HLVL	4334	54.2	81
J-HOS-0074	URH-HOSP-HLVL	4334	0.0	81
J-ZN1-0930	Zone-1	4090	0.0	82
J-ZN1-0931	Zone-1	4090	12.7	82
J-ZN1-0932	Zone-1	4088	0.0	83
J-ZN1-0934	Zone-1	4088	0.0	83
J-UM-0016	Upper Moyina	4353	6.9	91
J-UM-0017	Upper Moyina	4419	15.7	63
J-UM-0018	Upper Moyina	4377	10.3	81
J-PRE-0076	Prescott	4212	14.3	66
J-ZN1-0937	Zone-1	4247	0.3	23

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0938	Zone-1	4234	0.3	29
J-PRE-0077	Prescott	4269	2.2	47
J-PRE-0078	Prescott	4253	6.3	54
J-PRE-0079	Prescott	4254	13.5	53
J-ZN1-0940	Zone-1	4151	3.1	64
J-ZN1-0941	Zone-1	4181	1.8	53
J-ZN1-0942	Zone-1	4170	0.0	58
J-ZN1-0943	Zone-1	4161	0.0	62
J-SH-0002	Sierra Heights	4212	0.0	82
J-ZN1-0944	Zone-1	4212	0.0	38
J-ZN1-0945	Zone-1	4290	0.0	7
J-ZN1-0946	Zone-1	4095	64.0	63
J-HOS-0075	URH-HOSP-HLVL	4249	10.8	110
J-HOS-0076	URH-HOSP-HLVL	4263	35.2	102
J-ZN1-0947	Zone-1	4250	8.2	17
J-ZN1-0948	Zone-1	4250	7.8	23
J-HOS-0077	URH-HOSP-HLVL	4303	6.3	85
J-HOS-0078	URH-HOSP-HLVL	4324	14.0	76
J-HOS-0079	URH-HOSP-HLVL	4381	53.5	47
J-HOS-0080	URH-HOSP-HLVL	4283	16.9	90
J-ZN1-0949	Zone-1	4210	3.8	36
J-ZN1-0950	Zone-1	4215	2.6	34
J-ZN1-0951	Zone-1	4158	8.8	51
J-ZN1-0952	Zone-1	4142	22.2	58
J-ZN1-0953	Zone-1	4102	8.2	69
J-ZN1-0954	Zone-1	4104	36.4	69
J-ZN1-0955	Zone-1	4090	0.0	78
J-FHH-0010	Foothill_Homedale	4307	0.0	61
J-FHH-0011	Foothill_Homedale	4279	4.0	73
J-FHH-0012	Foothill_Homedale	4256	0.0	83
J-FHH-0013	Foothill_Homedale	4306	0.0	62
J-FHH-0014	Foothill_Homedale	4236	10.5	92
J-ZN1-0956	Zone-1	4094	0.4	82
J-ZN1-0957	Zone-1	4098	2.7	79
J-ZN1-0958	Zone-1	4097	1.1	79
J-ZN1-0959	Zone-1	4098	0.0	93
J-ZN1-0960	Zone-1	4095	26.4	95
J-ZN1-0961	Zone-1	4098	0.3	93
J-ZN1-0962	Zone-1	4100	0.0	92
J-ZN1-0963	Zone-1	4103	1.4	91

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-SH-0003	Sierra Heights	4225	14.2	77
J-PAT-0046	Patterson	4394	5.2	49
J-SL-0017	Stewart_Lenox	4183	0.7	88
J-ZN1-0964	Zone-1	4093	0.0	99
J-ZN1-0965	Zone-1	4095	0.0	95
J-CR-0007	Crown Ridge	4415	0.0	105
J-SL-0097	Lindley	4203	8.6	77
J-PRE-0080	Prescott	4206	15.6	74
J-ZN1-0966	Zone-1	4170	8.1	58
J-PAT-0047	Patterson	4426	0.0	30
J-PRE-0081	Prescott	4202	0.3	76
J-SL-0098	Lindley	4227	3.3	67
J-ZN1-0967	Zone-1	4090	2.7	95
J-ZN1-0968	Zone-1	4110	1.4	72
J-ZN1-0969	Zone-1	4090	1.3	82
J-ZN1-0970	Zone-1	4104	1.8	75
J-ZN1-0971	Zone-1	4108	16.5	73
J-ZN1-0972	Zone-1	4123	22.6	66
J-ZN1-0973	Zone-1	4152	9.9	58
J-PAT-0048	Patterson	4343	16.1	67
J-UM-0019	Upper Moyina	4437	3.9	55
J-TW-0006	Tanglewood	4807	21.2	79
J-PRV-HWY-0020	PRV-2-HWY	4233	0.5	53
J-PRE-0082	Prescott	4211	7.6	67
J-ZN1-0974	Zone-1	4204	12.3	43
J-ZN1-0975	Zone-1	4125	0.0	76
J-ZN1-0976	Zone-1	4178	10.2	52
J-ZN1-0977	Zone-1	4094	13.9	82
J-ZN1-0978	Zone-1	4092	0.0	67
J-ZN1-0979	Zone-1	4096	0.3	72
J-SL-0099	Lindley	4146	4.4	102
J-SL-0100	Lindley	4138	0.0	106
J-SL-0101	Lindley	4130	0.0	109
J-SL-0003	Stewart_Lenox	4214	4.4	75
J-PRE-0083	Prescott	4243	3.3	54
J-ZN1-0980	Zone-1	4178	0.0	55
J-ZN1-0981	Zone-1	4178	0.0	55
J-ZN1-0982	Zone-1	4156	220.6	57
J-ZN1-0983	Zone-1	4096	1.9	63
J-ZN1-0984	Zone-1	4102	23.4	78

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0985	Zone-1	4125	46.2	65
J-ZN1-0986	Zone-1	4102	7.2	76
J-PRE-0084	Prescott	4250	6.9	55
J-ZN1-0988	Zone-1	4175	0.4	65
J-ZN1-0989	Zone-1	4175	2.7	65
J-ZN1-0990	Zone-1	4156	0.0	65
J-ZN1-0991	Zone-1	4161	1.9	63
J-ZN1-0992	Zone-1	4150	7.0	64
J-ZN1-0993	Zone-1	4150	5.7	64
J-ZN1-0994	Zone-1	4150	7.3	64
J-ZN1-0995	Zone-1	4140	43.1	68
J-ZN1-0996	Zone-1	4140	1.2	65
J-ZN1-0997	Zone-1	4092	2.1	85
J-ZN1-0998	Zone-1	4094	20.4	84
J-ZN1-0999	Zone-1	4134	8.6	62
J-HC-0002	Havencrest	4396	10.9	100
J-SL-0111	Stewart_Lenox	4215	0.9	78
J-SL-0112	Stewart_Lenox	4259	6.1	56
J-TW-0019	Tanglewood	4777	2.2	92
J-ZN1-1280	Zone-1	4091	0.0	66
J2554	Zone-1	4184	7.0	47
J2556	Zone-1	4188	0.9	45
J2558	Zone-1	4220	0.0	32
J2560	Zone-1	4200	18.9	42
J2564	Zone-1	4164	37.7	52
J2566	Zone-1	4174	5.4	54
J-ZN1-4005	Zone-1	4192	12.3	61
J-ZN1-4007	Zone-1	4186	6.0	63
J-ZN1-4008	Zone-1	4230	3.1	44
J-ZN1-4013	Zone-1	4096	6.2	82
J-ZN1-4015	Zone-1	4088	0.0	83
J-ZN1-4017	Zone-1	4088	13.2	83
J-ZN1-1436	Zone-1	4178	2.6	53
J2568	Zone-1	4198	2.0	44
J2570	Zone-1	4100	22.0	80
J2572	Prescott	4202	5.1	70
J-ZN1-0528A	Zone-1	4162	9.4	70
P-ZN1-0856B	Zone-1	4162	55.6	59
P-ZN1-0798A	Zone-1	4170	12.0	51
P-ZN1-0798B	Zone-1	4172	14.2	50

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0306A	Zone-1	4124	5.8	66
J-ZN1-0306B	Zone-1	4144	6.9	57
J-SH-0100	Sierra Heights	4282	1.0	52
J-SH-0105	Sierra Heights	4282	1.9	52
J-SH-0110	Sierra Heights	4268	14.1	58
J-SH-115	Sierra Heights	4248	0.0	67
J-SH-120	Sierra Heights	4271	0.0	57
J-SH-125	Sierra Heights	4246	1.4	68
HYDRANT597	Zone-3	4426	81.8	31
J-ZN1-1281	Zone-1	4111	8.5	71

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
HYD494	Zone-1	4172	9.3	55
HYD1168	Zone-1	4097	11.7	82
HYD157	Zone-1	4174	0.0	50
HYD1167	Zone-1	4097	0.0	81
HYD148	Zone-1	4122	0.0	73
HYD1005	Zone-1	4090	0.0	88
HYD1006	Zone-1	4090	0.0	88
HYD595	Zone-1	4428	0.0	30
J2578	Upper Moyina	4372	0.0	82

Appendix I. Fire Flow at Maximum-Day Demand with Phase 1 Improvements

I. Fire Flow at Maximum-Day Demand with Phase 1 Improvements

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0810	Zone-1	4098	2.3	8804
J-ZN1-0163	Zone-1	4154	6.8	2749
J-ZN1-0166	Zone-1	4169	5.2	6436
J-ZN1-0671	Zone-1	4098	19.6	7547
J-PRE-0030	Prescott	4244	6.2	4770
J-ZN1-0179	Zone-1	4112	17.9	6840
J-ZN1-0572	Zone-1	4176	0.0	3176
J-ZN1-0716	Zone-1	4111	3.3	5032
J-ZN1-0768	Zone-1	4120	5.6	2116
J-ZN1-0285	Zone-1	4108	8.8	5201
J-ZN1-0213	Zone-1	4116	4.7	5382
J-ZN1-0615	Zone-1	4142	7.7	2990
J-ZN1-0858	Zone-1	4154	0.4	6134
J-ZN1-0830	Zone-1	4186	1.4	10842
J-PRV-MOY-0005	PRV-13	4268	15.9	513
J-ZN1-0743	Zone-1	4120	4.0	404
J-UL-0004	Upper Lynnewood	4269	0.4	3648
J-ZN1-0869	Zone-1	4183	5.6	3958
J-ZN1-0661	Zone-1	4123	2.9	2212
J-ZN1-0464	Zone-1	4185	10.1	3778
J-ZN1-0098	Zone-1	4136	1.5	1167
J-HOS-0028	URH-HOSP-HLVL	4317	19.4	2480
J-ZN1-0116	Zone-1	4166	2.7	4463
J-ZN1-0102	Zone-1	4174	1.7	3552
J-ZN1-0512	Zone-1	4132	3.6	8167
J-HOS-0058	URH-HOSP-HLVL	4369	2.9	1533
J-ZN1-0526	Zone-1	4227	0.4	1921
J-ZN1-0752	Zone-1	4162	11.0	4773
J-PRV-HWY-0008	PRV-2-HWY	4233	0.3	3553
J-ZN1-0576	Zone-1	4217	1.4	3942

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0773	Zone-1	4100	9.6	4136
J-ZN1-0394	Zone-1	4091	1.1	16547
J-ZN1-0361	Zone-1	4116	8.8	2880
J-ZN1-0026	Zone-1	4096	6.3	6960
J-ZN1-0589	Zone-1	4118	5.9	9478
J-ZN1-0037	Zone-1	4104	4.6	3611
J-ZN1-0834	Zone-1	4214	0.0	2704
J-TW-0003	Tanglewood	4820	12.8	5306
J-HOS-0052	URH-HOSP-HLVL	4322	13.5	4251
J-ZN1-0841	Zone-1	4134	4.0	3726
J-ZN1-0469	Zone-1	4150	14.0	3432
J-ZN1-0709	Zone-1	4098	5.3	3530
J-ZN1-0279	Zone-1	4110	2.5	4419
J-PAT-0033	Patterson	4470	28.6	28
J-ZN1-0517	Zone-1	4122	6.7	7818
J-PRE-0039	Prescott	4224	6.8	3992
J-ZN1-0738	Zone-1	4212	4.5	3319
J-ZN1-0635	Zone-1	4090	0.0	9576
J-ZN1-0778	Zone-1	4096	7.4	10619
J-ZN1-0547	Zone-1	4179	5.1	2148
J-PRV-2-ELD-0003	PRV-2	4226	1.0	2423
J-ZN1-0145	Zone-1	4134	8.2	5753
J-ZN1-0110	Zone-1	4192	8.5	2501
J-ZN1-0072	Zone-1	4148	0.3	2972
J-ZN1-0412	Zone-1	4099	34.0	27722
J-ZN1-0381	Zone-1	4092	20.0	6042
J-ZN1-0161	Zone-1	4144	12.2	2696
J-PRV-2-ELD-0010	PRV-2	4219	10.9	2325
J-PRE-0029	Prescott	4237	4.8	5730
J-ZN1-0570	Zone-1	4178	9.9	3328

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0714	Zone-1	4125	2.1	4417
J-ZN1-0438	Zone-1	4102	8.3	5647
J-ZN1-0684	Zone-1	4146	6.1	7052
J-PRE-0032	Prescott	4263	2.1	1320
J-ZN1-0204	Zone-1	4118	5.1	4428
J-PRE-0011	Prescott	4213	2.0	6915
J-ZN1-0051	Zone-1	4142	7.2	2236
J-ZN1-0732	Zone-1	4196	0.9	3640
J-ZN1-0299	Zone-1	4098	12.8	3019
J-ZN1-0741	Zone-1	4220	2.0	1120
J-PAT-0035	Patterson	4346	10.2	6350
J-PRE-0062	Prescott	4218	5.5	7291
J-UL-0002	Upper Lynnewood	4295	8.8	3028
J-ZN1-0062	Zone-1	4174	5.8	1979
J-ZN1-0495	Zone-1	4208	2.6	6582
J-ZN1-0462	Zone-1	4099	0.0	40155
J-HOS-0026	URH-HOSP-HLVL	4271	3.4	3498
J-ZN1-0330	Zone-1	4103	0.0	2926
J-ZN1-0114	Zone-1	4193	1.3	2963
J-ZN1-0100	Zone-1	4254	1.4	1220
J-ZN1-0510	Zone-1	4138	1.5	7086
J-ZN1-0178	Zone-1	4265	4.9	5
J-ZN1-0130	Zone-1	4134	5.4	4223
J-PRV-HWY-0007	PRV-2-HWY	4191	8.5	6311
J-ZN1-0771	Zone-1	4165	28.6	3992
J-ZN1-0392	Zone-1	4092	6.3	12059
J-PRV-MOY-0007	PRV-13	4255	12.2	115
J-ZN1-0587	Zone-1	4218	23.3	2767
J-ZN1-0641	Zone-1	4112	14.4	2298
J-ZN1-0407	Zone-1	4092	0.1	18571
J-ZN1-0019	Zone-1	4114	0.0	5858
J-ZN1-0802	Zone-1	4092	0.0	6171
J-ZN1-0087	Zone-1	4112	0.2	6464
J-ZN1-0839	Zone-1	4192	0.6	3641
J-SL-0093	Lindley	4173	0.0	5582
J-ZN1-0467	Zone-1	4139	21.4	11461
J-ZN1-0434	Zone-1	4106	1.8	5785
J-ZN1-0707	Zone-1	4099	8.9	5912

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0525	Zone-1	4104	16.5	9198
J-ZN1-0187	Zone-1	4160	0.7	2598
J-ZN1-0277	Zone-1	4110	9.2	2399
J-ZN1-0515	Zone-1	4121	5.9	9218
J-ZN1-0293	Zone-1	4106	7.2	3821
J-ZN1-0736	Zone-1	4222	5.3	2738
J-ZN1-0776	Zone-1	4102	4.0	17361
J-PRV-2-ELD-0007	PRV-2	4228	6.1	1946
J-PRV-MOY-0008	PRV-13	4248	5.2	1683
J-ZN1-0057	Zone-1	4178	0.0	6834
J-ZN1-0410	Zone-1	4092	11.1	23523
J-ZN1-0379	Zone-1	4108	8.1	5562
J-ZN1-0159	Zone-1	4140	16.6	3246
J-HOS-0054	URH-HOSP-HLVL	4388	23.5	1539
J-ZN1-0313	Zone-1	4286	0.0	0
J-ZN1-0712	Zone-1	4092	7.1	4955
J-ZN1-0613	Zone-1	4156	4.8	3959
J-ZN1-0581	Zone-1	4193	0.1	1966
J-ZN1-0032	Zone-1	4136	6.4	2615
J-ZN1-0729	Zone-1	4214	1.0	2712
J-ZN1-0546	Zone-1	4150	8.1	6125
J-ZN1-0260	Zone-1	4110	27.2	4308
J-ZN1-0297	Zone-1	4099	7.3	3251
J-ZN1-0044	Zone-1	4098	4.0	8412
J-PRE-0060	Prescott	4248	3.9	3325
J-PRV-3-UMO-0002	PRV-3	4317	12.5	2289
J-ZN1-0324	Zone-1	4100	1.6	6564
J-ZN1-0508	Zone-1	4109	1.7	3280
J-ZN1-0093	Zone-1	4176	5.9	5737
J-ZN1-0599	Zone-1	4116	10.9	8730
J-HOS-0038	URH-HOSP-HLVL	4345	0.0	7112
J-ZN1-0128	Zone-1	4138	8.9	3630
J-PAT-0015	Patterson	4431	2.2	250
J-HOS-0061	URH-HOSP-HLVL	4253	8.4	3082
J-ZN1-0539	Zone-1	4192	8.0	5885
J-PRE-0047	Prescott	4246	0.7	6446
J-ZN1-0687	Zone-1	4150	8.2	5304
J-ZN1-0657	Zone-1	4134	10.7	3254

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0740	Zone-1	4104	3.4	3948
J-ZN1-0585	Zone-1	4172	11.7	4730
J-PAT-0002	Patterson	4281	7.1	1813
J-ZN1-0405	Zone-1	4094	0.9	9781
J-PRE-0013	Prescott	4218	0.7	6892
J-PRE-0028	Prescott	4240	3.7	5464
J-ZN1-0080	Zone-1	4138	6.6	250
J-PRE-0059	Prescott	4257	0.4	4540
J-ZN1-0817	Zone-1	4299	0.0	0
J-PAT-0021	Patterson	4437	18.5	216
J-ZN1-0705	Zone-1	4103	4.7	8040
J-ZN1-0432	Zone-1	4112	9.2	6435
J-ZN1-0854	Zone-1	4093	0.0	7004
J-ZN1-0625	Zone-1	4100	15.3	9798
J-ZN1-0482	Zone-1	4262	0.6	1
J-ZN1-0445	Zone-1	4107	7.0	26329
J-ZN1-0291	Zone-1	4102	6.4	3742
J-PAT-0043	Patterson	4310	1.4	2724
J-PRV-HWY-0001	PRV-2-HWY	4234	23.5	3867
J-ZN1-0815	Zone-1	4136	10.8	234
J-SL-0067	Lindley	4216	10.1	2354
J-WO-0007	West Oregon	4268	2.3	1996
J-HOS-0020	URH-HOSP-HLVL	4228	1.6	2858
J-ZN1-0560	Zone-1	4192	10.3	2774
J-ZN1-0377	Zone-1	4098	13.0	10327
J-ZN1-0466	Zone-1	4178	0.0	5663
J-ZN1-0122	Zone-1	4164	7.2	2131
J-ZN1-0157	Zone-1	4138	16.3	2480
J-ZN1-0682	Zone-1	4102	29.0	176
J-ZN1-0650	Zone-1	4184	11.8	5966
J-ZN1-0611	Zone-1	4179	2.3	2472
J-ZN1-0727	Zone-1	4090	0.0	9771
J-ZN1-0450	Zone-1	4114	1.2	13144
J-ZN1-0775	Zone-1	4116	19.2	1538
J-ZN1-0295	Zone-1	4096	4.5	2582
J-ZN1-0257	Zone-1	4112	28.0	3539
J-PAT-0009	Patterson	4368	0.0	5151
J-ZN1-0094	Zone-1	4148	1.3	4398
J-ZN1-0311	Zone-1	4096	14.6	6032

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0023	URH-HOSP-HLVL	4267	4.5	2984
J-ZN1-0669	Zone-1	4118	74.6	2251
J-ZN1-0074	Zone-1	4152	19.2	7775
J-ZN1-0475	Zone-1	4130	2.2	8166
J-ZN1-0506	Zone-1	4111	7.9	12337
J-HOS-0036	URH-HOSP-HLVL	4383	2.7	5581
J-ZN1-0346	Zone-1	4104	8.8	4946
J-ZN1-0126	Zone-1	4141	8.7	6271
J-ZN1-0523	Zone-1	4211	1.6	2716
J-ZN1-0524	Zone-1	4164	1.3	4217
J-ZN1-0537	Zone-1	4207	10.2	3516
J-ZN1-0022	Zone-1	4122	20.3	4624
J-ZN1-0142	Zone-1	4136	7.6	4077
J-ZN1-0655	Zone-1	4160	12.4	2206
J-PRV-2-ELD-0006	PRV-2	4232	10.9	1646
J-ZN1-0553	Zone-1	4149	3.3	3683
J-ZN1-0784	Zone-1	4162	18.2	6004
J-PRE-0008	Prescott	4290	1.6	2813
J-ZN1-0403	Zone-1	4092	17.1	7569
J-ZN1-0263	Zone-1	4108	5.0	3948
J-ZN1-0173	Zone-1	4122	7.9	3594
J-ZN1-0597	Zone-1	4205	3.8	4396
J-PAT-0028	Patterson	4367	2.9	6043
J-ZN1-0814	Zone-1	4094	17.1	4738
J-ZN1-0430	Zone-1	4104	6.4	20073
J-ZN1-0852	Zone-1	4104	14.3	5758
J-ZN1-0623	Zone-1	4104	15.8	31608
J-ZN1-0443	Zone-1	4159	3.4	8516
J-ZN1-0480	Zone-1	4102	4.6	5928
J-ZN1-0720	Zone-1	4115	12.6	2858
J-ZN1-0289	Zone-1	4107	30.9	6223
J-PRE-0002	Prescott	4252	2.6	4680
J-ZN1-0042	Zone-1	4104	2.5	1702
J-ZN1-0686	Zone-1	4115	7.4	5588
J-ZN1-0491	Zone-1	4182	3.2	8979
J-PRV-2-ELD-0001	PRV-2	4229	4.2	3728
J-ZN1-0757	Zone-1	4215	0.9	2089
J-ZN1-0558	Zone-1	4148	13.6	3818

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0375	Zone-1	4096	3.1	7472
J-ZN1-0336	Zone-1	4102	11.3	5964
J-ZN1-0082	Zone-1	4141	6.0	2925
J-ZN1-0155	Zone-1	4134	9.4	5403
J-ZN1-0120	Zone-1	4167	13.7	2822
J-ZN1-0422	Zone-1	4093	1.3	5408
J-ZN1-0389	Zone-1	4100	8.3	15366
J-ZN1-0680	Zone-1	4102	6.0	2490
J-ZN1-0857	Zone-1	4140	2.4	4019
J-ZN1-0829	Zone-1	4194	4.7	2428
J-ZN1-0725	Zone-1	4172	0.3	16767
J-ZN1-0447	Zone-1	4237	0.8	1679
J-PRE-0035	Prescott	4236	4.5	7005
J-PAT-0004	Patterson	4332	22.6	3085
J-ZN1-0077	Zone-1	4150	8.7	7289
J-ZN1-0309	Zone-1	4100	9.1	6783
J-ZN1-0090	Zone-1	4186	7.9	1812
J-UM-0008	Upper Moyina	4362	15.9	2327
J-PAT-0036	Patterson	4321	0.0	6507
J-ZN1-0632	Zone-1	4152	0.6	5272
J-ZN1-0751	Zone-1	4220	9.5	1916
J-HOS-0034	URH-HOSP-HLVL	4378	0.2	3482
J-ZN1-0344	Zone-1	4104	13.2	4413
J-ZN1-0124	Zone-1	4144	3.4	5931
J-ZN1-0107	Zone-1	4159	22.0	3378
J-ZN1-0521	Zone-1	4140	7.2	4955
J-ZN1-0189	Zone-1	4236	13.6	3229
J-ZN1-0140	Zone-1	4134	12.8	5543
J-ZN1-0653	Zone-1	4147	6.4	6111
J-ZN1-0782	Zone-1	4143	8.2	6534
J-ZN1-0551	Zone-1	4156	3.9	3555
J-PRE-0036	Prescott	4306	1.4	1837
J-ZN1-0668	Zone-1	4110	0.0	11166
J-PRE-0026	Prescott	4234	2.5	3892
J-ZN1-0171	Zone-1	4120	6.0	6966
J-ZN1-0644	Zone-1	4116	16.3	8253
J-ZN1-0416	Zone-1	4096	9.0	2481
J-ZN1-0812	Zone-1	4094	0.0	10409
J-ZN1-0850	Zone-1	4108	5.0	3048

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0621	Zone-1	4140	1.7	20022
J-ZN1-0822	Zone-1	4149	0.0	6126
J-ZN1-0478	Zone-1	4102	8.4	4048
J-ZN1-0441	Zone-1	4236	6.4	1762
J-ZN1-0718	Zone-1	4138	4.1	6940
J-ZN1-0536	Zone-1	4137	0.0	6107
J-SL-0083	Lindley	4151	4.1	2226
J-ZN1-0024	Zone-1	4146	0.0	5162
J-ZN1-0489	Zone-1	4205	15.3	4502
J-ZN1-0035	Zone-1	4108	6.8	32841
J-ZN1-0745	Zone-1	4092	2.2	7262
J-ZN1-0262	Zone-1	4224	16.2	3933
J-ZN1-0837	Zone-1	4136	14.7	3233
J-ZN1-0334	Zone-1	4104	6.3	7178
J-HOS-0030	URH-HOSP-HLVL	4357	0.7	1666
J-ZN1-0569	Zone-1	4166	2.3	3928
J-ZN1-0535	Zone-1	4196	4.9	4953
J-ZN1-0420	Zone-1	4092	0.0	8943
J-ZN1-0387	Zone-1	4096	0.0	27074
J-ZN1-0678	Zone-1	4099	2.4	2478
J-ZN1-0796	Zone-1	4132	0.0	7170
J-ZN1-0723	Zone-1	4200	2.4	1977
J-ZN1-0692	Zone-1	4179	6.6	1827
J-ZN1-0243	Zone-1	4138	0.0	3174
J-ZN1-0591	Zone-1	4165	7.8	3803
J-HOS-0008	URH-HOSP-HLVL	4279	3.5	3005
J-ZN1-0494	Zone-1	4202	3.4	8847
J-ZN1-0461	Zone-1	4103	5.6	36765
J-ZN1-0557	Zone-1	4161	6.6	5504
J-ZN1-0271	Zone-1	4108	36.0	4859
J-ZN1-0307	Zone-1	4098	6.6	6157
J-ZN1-0070	Zone-1	4140	6.3	3012
J-ZN1-0631	Zone-1	4148	5.9	2721
J-ZN1-0322	Zone-1	4102	7.5	7145
J-ZN1-0323	Zone-1	4159	21.5	3523
J-HOS-0032	URH-HOSP-HLVL	4269	3.1	4175
J-ZN1-0338	Zone-1	4102	9.7	4658
J-ZN1-0105	Zone-1	4121	1.7	2782
J-ZN1-0856	Zone-1	4144	9.5	3709

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0391	Zone-1	4092	0.2	17328
J-ZN1-0358	Zone-1	4124	7.1	2184
J-HOS-0047	URH-HOSP-HLVL	4311	0.0	8426
J-ZN1-0049	Zone-1	4138	11.4	5502
J-ZN1-0138	Zone-1	4148	15.7	5188
J-FHH-0008	Foothill_Homedale	4257	3.3	4417
J-ZN1-0015	Zone-1	4183	3.4	2876
J-ZN1-0060	Zone-1	4270	0.0	0
J-ZN1-0549	Zone-1	4158	0.0	6941
J-ZN1-0696	Zone-1	4199	2.6	8953
J-ZN1-0666	Zone-1	4104	2.4	3414
J-ZN1-0749	Zone-1	4124	24.8	6497
J-WO-0002	West Oregon	4209	4.3	1956
J-TW-0002	Tanglewood	4183	0.0	2744
J-ZN1-0414	Zone-1	4104	0.0	18238
J-ZN1-0092	Zone-1	4114	25.3	5474
J-ZN1-0276	Zone-1	4109	4.5	3359
J-ZN1-0186	Zone-1	4164	0.8	2592
J-ZN1-0607	Zone-1	4165	6.2	3715
J-ZN1-0848	Zone-1	4090	0.0	3585
J-ZN1-0619	Zone-1	4163	7.7	4862
J-UL-0011	Upper Lynnewood	4283	2.4	2395
J-ZN1-0440	Zone-1	4094	0.8	7073
J-ZN1-0865	Zone-1	4137	0.3	7770
J-ZN1-0456	Zone-1	4145	3.6	24363
J-ZN1-0301	Zone-1	4098	3.1	10305
J-ZN1-0085	Zone-1	4092	0.0	7921
J-PAT-0019	Patterson	4393	2.0	2366
J-ZN1-0047	Zone-1	4168	0.1	7109
J-ZN1-0097	Zone-1	4173	2.6	2222
J-ZN1-0765	Zone-1	4151	4.9	3088
J-PRV-3-UMO-0006	PRV-3	4337	3.5	2251
J-ZN1-0568	Zone-1	4181	12.5	2425
J-ZN1-0533	Zone-1	4164	2.1	3196
J-UM-0014	Upper Moyina	4400	19.1	2112
J-ZN1-0418	Zone-1	4094	0.7	8970
J-ZN1-0132	Zone-1	4142	10.3	3943
J-ZN1-0825	Zone-1	4199	1.7	3714
J-ZN1-0794	Zone-1	4111	0.0	7440

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-2-OGD-0002	PRV_Ogden	4281	48.5	2885
J-PRE-0033	Prescott	4202	0.9	4939
J-ZN1-0232	Zone-1	4136	12.2	4698
J-ZN1-0868	Zone-1	4137	8.4	3026
J-ZN1-0835	Zone-1	4197	4.1	4720
J-ZN1-0459	Zone-1	4282	2.6	2
J-ZN1-0305	Zone-1	4104	1.4	6625
J-ZN1-0269	Zone-1	4112	8.9	4620
J-ZN1-0320	Zone-1	4100	1.1	6692
J-PRV-2-ELD-0008	PRV-2	4218	8.4	2684
J-ZN1-0677	Zone-1	4106	32.3	1911
J-HOS-0060	URH-HOSP-HLVL	4251	3.8	3482
J-HOS-0045	URH-HOSP-HLVL	4414	10.5	1660
J-ZN1-0356	Zone-1	4108	12.2	5190
J-ZN1-0030	Zone-1	4144	2.5	6997
J-ZN1-0136	Zone-1	4145	11.5	5159
J-FHH-0006	Foothill_Homedale	4296	7.5	4019
J-PRE-0005	Prescott	4277	2.1	3409
J-ZN1-0056	Zone-1	4143	0.7	6960
J-ZN1-0799	Zone-1	4106	15.9	3541
J-ZN1-0493	Zone-1	4146	96.4	5304
J-ZN1-0152	Zone-1	4160	23.6	3427
J-ZN1-0664	Zone-1	4096	13.9	5330
J-ZN1-0594	Zone-1	4209	8.8	1279
J-ZN1-0564	Zone-1	4216	1.8	1905
J-ZN1-0704	Zone-1	4101	8.9	5453
J-ZN1-0676	Zone-1	4098	7.1	2701
J-ZN1-0274	Zone-1	4108	7.6	4995
J-ZN1-0184	Zone-1	4112	5.6	3328
J-ZN1-0605	Zone-1	4166	9.2	3756
J-PAT-0029	Patterson	4344	0.6	6967
J-ZN1-0846	Zone-1	4094	1.6	5258
J-ZN1-0734	Zone-1	4291	0.0	0
J-ZN1-0863	Zone-1	4158	2.8	1481
J-SL-0079	Lindley	4148	6.0	4218
J-ZN1-0485	Zone-1	4187	7.1	2665
J-ZN1-0454	Zone-1	4225	11.5	12567
J-ZN1-0731	Zone-1	4161	3.9	6496

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-UM-0002	Upper Moyina	4353	8.2	1966
J-ZN1-0067	Zone-1	4116	24.9	4681
J-ZN1-0643	Zone-1	4215	0.0	976
J-ZN1-0695	Zone-1	4119	5.6	3516
J-PAT-0018	Patterson	4396	3.5	2904
J-ZN1-0029	Zone-1	4208	12.4	4098
J-ZN1-0501	Zone-1	4219	2.9	2701
J-ZN1-0078	Zone-1	4151	3.8	2280
J-ZN1-0763	Zone-1	4163	5.7	3642
J-PRV-3-UMO-0004	PRV-3	4324	39.3	2018
J-WO-0004	West Oregon	4238	16.1	1996
J-ZN1-0531	Zone-1	4162	0.1	7147
J-UM-0013	Upper Moyina	4401	19.4	1923
J-ZN1-0618	Zone-1	4118	9.5	8197
J-ZN1-0350	Zone-1	4104	16.3	5485
J-ZN1-0610	Zone-1	4160	5.2	3882
J-PRE-0025	Prescott	4248	1.8	10649
J-ZN1-0058	Zone-1	4143	6.0	2135
J-ZN1-0399	Zone-1	4092	9.3	15550
J-ZN1-0792	Zone-1	4104	13.1	2511
J-ZN1-0689	Zone-1	4182	8.2	3608
J-ZN1-0659	Zone-1	4094	32.0	4332
J-PRV-2-ELD-0017	PRV-2	4203	7.4	2546
J-PRV-OFR-0002	PRV-6	4248	5.9	1872
J-ZN1-0267	Zone-1	4110	7.7	5501
J-ZN1-0177	Zone-1	4114	10.0	6948
J-ZN1-0505	Zone-1	4114	10.0	16104
J-ZN1-0474	Zone-1	4120	17.3	9891
J-ZN1-0318	Zone-1	4092	1.3	4884
J-PAT-0037	Patterson	4378	0.0	4845
J-SL-0073	Lindley	4239	24.0	1648
J-ZN1-0769	Zone-1	4185	0.0	5151
J-HOS-0044	URH-HOSP-HLVL	4431	5.2	1621
J-ZN1-0354	Zone-1	4110	5.1	6758
J-ZN1-0134	Zone-1	4136	10.3	3999
J-ZN1-0027	Zone-1	4123	2.7	2888
J-ZN1-0231	Zone-1	4232	9.9	3492
J-HOS-0011	URH-HOSP-HLVL	4224	3.3	5247

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0402	Zone-1	4090	3.6	5146
J-ZN1-0038	Zone-1	4104	1.2	6348
J-ZN1-0150	Zone-1	4155	2.0	3457
J-PRE-0034	Prescott	4243	4.5	5088
J-ZN1-0562	Zone-1	4185	8.4	2664
J-ZN1-0702	Zone-1	4098	8.2	2223
J-ZN1-0429	Zone-1	4093	16.9	8865
J-ZN1-0674	Zone-1	4100	18.7	8559
J-ZN1-0603	Zone-1	4156	5.6	4356
J-ZN1-0645	Zone-1	4118	14.1	5870
J-ZN1-0426	Zone-1	4093	0.0	9745
J-ZN1-0288	Zone-1	4104	0.4	6184
J-ZN1-0861	Zone-1	4200	5.3	735
J-SL-0077	Lindley	4185	8.1	4568
J-ZN1-0452	Zone-1	4185	8.6	20068
J-ZN1-0798	Zone-1	4100	0.0	3934
J-UL-0006	Upper Lynnewood	4230	30.4	3741
J-SL-0090	Lindley	4236	2.0	2331
J-ZN1-0499	Zone-1	4219	2.1	4030
J-ZN1-0017	Zone-1	4186	9.8	3377
J-ZN1-0312	Zone-1	4094	4.0	19671
J-ZN1-0073	Zone-1	4140	5.9	2886
J-ZN1-0154	Zone-1	4139	3.4	4420
J-ZN1-0119	Zone-1	4166	2.5	3171
J-ZN1-0273	Zone-1	4207	6.8	5029
J-UM-0011	Upper Moyina	4485	0.0	1592
J-ZN1-0529	Zone-1	4160	0.0	5918
J-ZN1-0845	Zone-1	4150	0.0	4949
J-ZN1-0348	Zone-1	4109	14.5	5025
J-ZN1-0578	Zone-1	4218	6.1	3031
J-ZN1-0545	Zone-1	4194	4.5	3671
J-ZN1-0040	Zone-1	4100	6.4	2423
J-ZN1-0397	Zone-1	4093	1.2	8635
J-ZN1-0790	Zone-1	4115	0.3	6598
J-HOS-0006	URH-HOSP-HLVL	4281	8.5	4030
J-ZN1-0052	Zone-1	4142	4.5	3266
J-ZN1-0063	Zone-1	4114	0.0	7229
J-ZN1-0806	Zone-1	4149	6.3	6129
J-PRV-OFR-0001	PRV-6	4264	5.6	2263

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0265	Zone-1	4108	8.3	3798
J-ZN1-0175	Zone-1	4118	8.5	6948
J-ZN1-0844	Zone-1	4100	0.3	14229
J-ZN1-0503	Zone-1	4213	5.9	2319
J-ZN1-0472	Zone-1	4117	2.6	28469
J-ZN1-0566	Zone-1	4142	0.0	6154
J-ZN1-0282	Zone-1	4113	10.7	1919
J-ZN1-0316	Zone-1	4090	0.1	12062
J-PRE-0042	Prescott	4258	0.0	4725
J-HOS-0042	URH-HOSP-HLVL	4431	0.0	8802
J-ZN1-0352	Zone-1	4110	5.6	6267
J-ZN1-0638	Zone-1	4092	0.3	5785
J-UM-0006	Upper Moyina	4369	10.4	1524
J-UM-0003	Upper Moyina	4364	8.7	1746
J-ZN1-0781	Zone-1	4141	3.9	2241
J-ZN1-0075	Zone-1	4152	3.6	2442
J-ZN1-0867	Zone-1	4146	25.4	2402
J-ZN1-0020	Zone-1	4122	3.7	4965
J-PAT-0020	Patterson	4255	0.0	1785
J-ZN1-0088	Zone-1	4134	1.3	3640
J-ZN1-0811	Zone-1	4094	1.4	5875
J-ZN1-0700	Zone-1	4097	6.7	1945
J-ZN1-0672	Zone-1	4098	17.2	5120
J-ZN1-0750	Zone-1	4098	41.4	6140
J-ZN1-0180	Zone-1	4107	0.0	6222
J-ZN1-0573	Zone-1	4209	5.0	4776
J-ZN1-0601	Zone-1	4291	0.0	0
J-ZN1-0717	Zone-1	4111	7.8	10860
J-ZN1-0219	Zone-1	4114	3.1	5755
J-ZN1-0617	Zone-1	4145	1.3	7676
J-ZN1-0616	Zone-1	4092	0.6	5944
J-ZN1-0859	Zone-1	4152	1.8	4868
J-SL-0075	Lindley	4233	0.9	5182
J-PRV-MOY-0010	PRV-13	4274	2.1	1700
J-ZN1-0831	Zone-1	4179	1.8	8106
J-FHH-0002	Foothill_Homedale	4270	11.2	4117
J-ZN1-0744	Zone-1	4092	1.0	3253
J-SL-0088	Lindley	4098	9.0	5510
J-ZN1-0628	Zone-1	4148	0.8	3152

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRE-0063	Prescott	4230	2.8	4466
J-ZN1-0497	Zone-1	4244	1.0	3164
J-ZN1-0012	Zone-1	4179	11.5	3061
J-ZN1-0465	Zone-1	4166	8.9	5497
J-HOS-0029	URH-HOSP-HLVL	4344		
J-PAT-0038	Patterson	4211	2.8	6269
J-ZN1-0117	Zone-1	4168	3.5	3836
J-CR-0003	Crown Ridge	4422	7.0	2755
J-ZN1-0527	Zone-1	4162	2.4	5335
J-ZN1-0753	Zone-1	4139	4.1	1533
J-ZN1-0774	Zone-1	4092	5.7	10095
J-ZN1-0395	Zone-1	4091	0.0	8033
J-ZN1-0788	Zone-1	4175	42.1	6846
J-ZN1-0483	Zone-1	4194	0.0	3688
J-ZN1-0033	Zone-1	4157	7.1	4202
J-ZN1-0590	Zone-1	4153	5.3	5809
J-PRE-0007	Prescott	4303	2.5	1875
J-ZN1-0045	Zone-1	4110	11.0	3846
J-PRE-0051	Prescott	4249	4.1	11085
J-ZN1-0804	Zone-1	4096	2.8	5004
J-TW-0004	Tanglewood	4814	27.4	3035
J-HOS-0053	URH-HOSP-HLVL	4369	39.7	2595
J-ZN1-0630	Zone-1	4151	7.9	1720
J-ZN1-0842	Zone-1	4111	5.6	20328
J-ZN1-0435	Zone-1	4099	4.3	18032
J-ZN1-0314	Zone-1	4096	3.9	18392
J-ZN1-0280	Zone-1	4112	5.6	3960
J-ZN1-0518	Zone-1	4136	3.5	4596
J-PRE-0040	Prescott	4232	20.6	4452
J-ZN1-0739	Zone-1	4221	2.4	3009
J-HOS-0040	URH-HOSP-HLVL	4462	0.0	0
J-ZN1-0636	Zone-1	4090	0.0	9203
J-ZN1-0779	Zone-1	4109	4.1	5124
J-ZN1-0548	Zone-1	4207	5.4	3213
J-ZN1-0366	Zone-1	4107	4.2	2706
J-PRV-MOY-0002	PRV-13	4298	7.3	310
J-ZN1-0146	Zone-1	4150	9.7	6084
J-ZN1-0111	Zone-1	4184	5.0	2815
J-PRE-0014	Prescott	4224	1.0	9748

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0081	Zone-1	4135	7.1	2192
J-ZN1-0413	Zone-1	4094	9.0	12819
J-ZN1-0809	Zone-1	4096	0.0	10939
J-ZN1-0502	Zone-1	4134	22.3	5893
J-ZN1-0670	Zone-1	4186	0.0	2171
J-ZN1-0600	Zone-1	4184	1.3	9135
J-ZN1-0571	Zone-1	4216	1.4	3566
J-ZN1-0715	Zone-1	4158	13.8	3445
J-ZN1-0439	Zone-1	4106	0.7	3203
J-ZN1-0685	Zone-1	4161	11.4	5227
J-ZN1-0284	Zone-1	4108	7.3	4427
J-ZN1-0209	Zone-1	4117	7.6	5367
J-ZN1-0614	Zone-1	4170	16.5	4147
J-PAT-0030	Patterson	4350	0.0	7253
J-ZN1-0013	Zone-1	4194	0.0	1098
J-SL-0068	Lindley	4235	8.1	2095
J-ZN1-0300	Zone-1	4099	5.7	4299
J-ZN1-0496	Zone-1	4215	3.9	5733
J-ZN1-0463	Zone-1	4198	7.6	3571
J-HOS-0027	URH-HOSP-HLVL	4313	7.6	2875
J-ZN1-0101	Zone-1	4257	0.0	816
J-ZN1-0511	Zone-1	4130	3.8	3698
J-ZN1-0131	Zone-1	4144	9.9	3854
J-PRE-0023	Prescott	4255	4.5	4242
J-PRE-0022	Prescott	4241	2.6	6921
J-ZN1-0772	Zone-1	4180	13.3	6613
J-ZN1-0626	Zone-1	4100	14.9	7862
J-ZN1-0360	Zone-1	4102	55.5	2520
J-PAT-0008	Patterson	4372	5.1	3357
J-ZN1-0588	Zone-1	4133	12.8	7248
J-PAT-0010	Patterson	4326	0.0	6558
J-ZN1-0803	Zone-1	4096	36.6	6861
J-ZN1-0095	Zone-1	4148	0.0	4403
J-ZN1-0468	Zone-1	4172	2.7	3064
J-ZN1-0708	Zone-1	4101	3.8	8511
J-ZN1-0516	Zone-1	4150	7.9	4723
J-ZN1-0104	Zone-1	4144	8.4	2994
J-ZN1-0023	Zone-1	4125	92.8	5144
J-ZN1-0777	Zone-1	4097	5.9	8280

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0022	URH-HOSP-HLVL	4253	4.3	2933
J-PRE-0009	Prescott	4282	0.0	3303
J-ZN1-0629	Zone-1	4110	3.5	8435
J-ZN1-0380	Zone-1	4092	6.9	6854
J-ZN1-0411	Zone-1	4093	0.0	25103
J-ZN1-0160	Zone-1	4143	10.6	2882
J-PRV-2-ELD-0009	PRV-2	4231	10.5	2163
J-ZN1-0428	Zone-1	4182	0.2	6521
J-PRV-OFR-0004	PRV-6	4185	2.4	2019
J-ZN1-0713	Zone-1	4122	3.7	4658
J-ZN1-0437	Zone-1	4093	3.5	13588
J-PRE-0031	Prescott	4223	0.0	4063
J-ZN1-0198	Zone-1	4120	6.0	4021
J-ZN1-0646	Zone-1	4104	25.8	1826
J-ZN1-0730	Zone-1	4225	0.4	4826
J-ZN1-0298	Zone-1	4100	7.3	3355
J-ZN1-0261	Zone-1	4109	10.9	4938
J-ZN1-0054	Zone-1	4145	2.7	7695
J-PRE-0061	Prescott	4268	4.6	2493
J-UL-0001	Upper Lynnewood	4296	3.0	3455
J-ZN1-0762	Zone-1	4186	4.9	2794
J-PRV-3-UMO-0003	PRV-3	4300	4.6	2201
J-HOS-0025	URH-HOSP-HLVL	4322	6.2	6447
J-ZN1-0509	Zone-1	4126	4.4	8552
J-ZN1-0099	Zone-1	4139	5.5	7072
J-HOS-0039	URH-HOSP-HLVL	4330	0.0	9257
J-ZN1-0129	Zone-1	4140	11.8	4053
J-HOS-0049	URH-HOSP-HLVL	4254	0.0	7367
J-PAT-0026	Patterson	4288	0.0	4003
J-ZN1-0770	Zone-1	4178	4.0	6508
J-ZN1-0540	Zone-1	4206	4.7	3808
J-ZN1-0688	Zone-1	4190	9.8	6310
J-ZN1-0658	Zone-1	4138	15.3	2798
J-ZN1-0586	Zone-1	4180	6.8	3112
J-ZN1-0556	Zone-1	4152	5.8	2907
J-PAT-0005	Patterson	4311	6.3	3061
J-ZN1-0801	Zone-1	4092	1.5	14192
J-PAT-0001	Patterson	4232	3.7	4025

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0838	Zone-1	4215	1.9	2377
J-UL-0009	Upper Lynnewood	4270	3.1	3647
J-ZN1-0706	Zone-1	4108	6.8	8789
J-ZN1-0433	Zone-1	4106	2.4	9373
J-ZN1-0855	Zone-1	4110	3.2	1071
J-ZN1-0514	Zone-1	4114	0.3	10622
J-ZN1-0575	Zone-1	4143	0.5	6327
J-ZN1-0292	Zone-1	4104	4.1	4918
J-PRV-MOY-0004	PRV-13	4281	12.0	111
J-ZN1-0758	Zone-1	4217	2.2	1996
J-PRV-MOY-0014	PRV-13	4239	8.6	1732
J-ZN1-0362	Zone-1	4104	4.9	2812
J-HOS-0021	URH-HOSP-HLVL	4261	4.3	3735
J-ZN1-0561	Zone-1	4167	0.5	3222
J-ZN1-0409	Zone-1	4091	0.0	20817
J-ZN1-0378	Zone-1	4098	3.3	10177
J-ZN1-0123	Zone-1	4162	5.6	2174
J-ZN1-0425	Zone-1	4094	0.0	15404
J-PRE-0049	Prescott	4271	0.3	4617
J-PAT-0013	Patterson	4315	1.1	2705
J-ZN1-0711	Zone-1	4096	8.5	1717
J-ZN1-0683	Zone-1	4098	3.5	130
J-ZN1-0754	Zone-1	4098	2.4	3874
J-ZN1-0580	Zone-1	4234	2.9	4436
J-ZN1-0612	Zone-1	4187	6.2	1884
J-ZN1-0025	Zone-1	4147	0.0	5907
J-ZN1-0728	Zone-1	4090	1825.2	13493
J-ZN1-0451	Zone-1	4109	8.9	22540
J-ZN1-0296	Zone-1	4101	3.8	3520
J-ZN1-0259	Zone-1	4110	13.1	4723
J-ZN1-0036	Zone-1	4092	0.9	10860
J-PRV-MOY-0011	PRV-13	4292	5.1	1505
J-PRV-3-UMO-0001	PRV-3	4285	11.1	1896
J-HOS-0024	URH-HOSP-HLVL	4300	11.7	2637
J-ZN1-0507	Zone-1	4104	4.6	5131
J-ZN1-0083	Zone-1	4169	25.1	6049
J-ZN1-0476	Zone-1	4111	2.4	18483

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0382	Zone-1	4122	1.3	6051
J-ZN1-0347	Zone-1	4107	11.7	4391
J-HOS-0037	URH-HOSP-HLVL	4420	18.5	3761
J-ZN1-0127	Zone-1	4149	17.2	6763
J-PAT-0014	Patterson	4435	17.4	233
J-PRE-0012	Prescott	4206	1.7	4521
J-ZN1-0143	Zone-1	4144	8.7	4641
J-ZN1-0656	Zone-1	4137	8.0	3457
J-ZN1-0584	Zone-1	4221	8.0	2439
J-ZN1-0554	Zone-1	4148	32.1	2554
J-ZN1-0786	Zone-1	4204	3.9	4437
J-ZN1-0785	Zone-1	4178	24.8	5701
J-ZN1-0404	Zone-1	4096	0.1	9160
J-ZN1-0761	Zone-1	4106	11.7	4169
J-ZN1-0264	Zone-1	4108	5.9	3408
J-ZN1-0174	Zone-1	4118	23.6	6894
J-ZN1-0598	Zone-1	4207	2.0	3501
J-ZN1-0431	Zone-1	4106	3.5	12303
J-ZN1-0853	Zone-1	4093	0.1	14514
J-ZN1-0624	Zone-1	4096	4.5	37793
J-ZN1-0648	Zone-1	4116	7.5	2490
J-ZN1-0444	Zone-1	4121	4.3	13479
J-ZN1-0481	Zone-1	4159	5.7	2785
J-ZN1-0290	Zone-1	4104	3.4	6085
J-ZN1-0011	Zone-1	4251	0.0	1754
J-ZN1-0050	Zone-1	4138	18.7	3799
J-ZN1-0492	Zone-1	4181	7.1	7263
J-UM-0001	Upper Moyina	4417	5.7	2051
J-WO-0006	West Oregon	4230	5.9	1824
J-ZN1-0559	Zone-1	4149	3.3	3209
J-ZN1-0376	Zone-1	4096	19.4	7773
J-ZN1-0337	Zone-1	4102	6.5	6201
J-HOS-0010	URH-HOSP-HLVL	4410	18.7	1400
J-ZN1-0156	Zone-1	4136	11.4	3192
J-ZN1-0121	Zone-1	4170	4.7	3536
J-ZN1-0819	Zone-1	4162	1.5	3404
J-ZN1-0681	Zone-1	4100	1.4	6989
J-ZN1-0726	Zone-1	4090	0.0	9969
J-ZN1-0448	Zone-1	4125	2.5	10569

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0694	Zone-1	4185	3.7	4886
J-ZN1-0252	Zone-1	4134	7.8	2706
J-ZN1-0018	Zone-1	4111	4.8	7002
J-PAT-0031	Patterson	4391	0.0	7532
J-ZN1-0310	Zone-1	4100	8.1	2090
J-UM-0009	Upper Moyina	4360	19.7	2070
J-ZN1-0008	Zone-1	4239	0.2	3476
J-ZN1-0065	Zone-1	4182	7.3	7087
J-HOS-0035	URH-HOSP-HLVL	4367	6.5	4495
J-ZN1-0345	Zone-1	4102	1.7	5606
J-ZN1-0710	Zone-1	4096	6.5	9027
J-ZN1-0125	Zone-1	4151	5.5	4949
J-ZN1-0522	Zone-1	4148	7.7	6343
J-PAT-0007	Patterson	4332	11.8	2580
J-ZN1-0141	Zone-1	4140	3.6	3815
J-ZN1-0654	Zone-1	4148	10.1	4595
J-ZN1-0583	Zone-1	4154	13.7	4051
J-ZN1-0552	Zone-1	4153	2.7	3693
J-ZN1-0783	Zone-1	4176	1.3	6867
J-ZN1-0627	Zone-1	4101	4.5	8200
J-PRE-0027	Prescott	4261	21.1	2686
J-ZN1-0172	Zone-1	4120	5.0	4375
J-ZN1-0417	Zone-1	4092	0.8	1852
J-ZN1-0813	Zone-1	4092	0.2	7303
J-ZN1-0851	Zone-1	4103	5.5	8324
J-ZN1-0622	Zone-1	4109	17.2	32884
J-ZN1-0479	Zone-1	4098	0.7	3547
J-ZN1-0442	Zone-1	4206	6.7	5122
J-ZN1-0719	Zone-1	4117	0.8	5215
J-ZN1-0031	Zone-1	4145	10.5	3108
J-ZN1-0490	Zone-1	4178	8.1	12042
J-ZN1-0756	Zone-1	4213	2.0	1502
J-ZN1-0746	Zone-1	4109	11.4	5486
J-ZN1-0374	Zone-1	4100	0.0	3677
J-ZN1-0335	Zone-1	4102	8.2	6142
J-CR-0001	Crown Ridge	4436	26.8	2528
J-ZN1-0633	Zone-1	4112	0.8	5783
J-ZN1-0388	Zone-1	4099	0.0	23851
J-ZN1-0679	Zone-1	4100	13.3	2354

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0828	Zone-1	4195	1.8	2502
J-ZN1-0724	Zone-1	4201	1.8	1841
J-ZN1-0446	Zone-1	4108	14.3	24528
J-ZN1-0693	Zone-1	4194	9.6	1917
J-ZN1-0244	Zone-1	4140	3.5	3181
J-PRV-MOY-0001	PRV-13	4276	1.0	1778
J-ZN1-0068	Zone-1	4185	8.2	6135
J-ZN1-0308	Zone-1	4097	3.8	7837
J-ZN1-0272	Zone-1	4108	4.9	4984
J-ZN1-0079	Zone-1	4137	2.4	1541
J-UL-0008	Upper Lynnewood	4230	6.7	3869
J-ZN1-0818	Zone-1	4098	29.5	6053
J-ZN1-0343	Zone-1	4104	7.7	4260
J-HOS-0033	URH-HOSP-HLVL	4320	0.0	4994
J-ZN1-0520	Zone-1	4172	2.7	4586
J-ZN1-0106	Zone-1	4152	12.9	6108
J-PRV-2-ELD-0004	PRV-2	4252	12.2	1933
J-HOS-0048	URH-HOSP-HLVL	4268	0.2	7445
J-ZN1-0059	Zone-1	4156	27.3	7612
J-ZN1-0647	Zone-1	4194	4.0	4959
J-ZN1-0139	Zone-1	4142	13.1	5214
J-ZN1-0652	Zone-1	4173	8.1	4238
J-PAT-0027	Patterson	4314	16.1	3906
J-ZN1-0550	Zone-1	4150	6.1	4288
J-ZN1-0697	Zone-1	4197	4.1	5147
J-ZN1-0667	Zone-1	4094	28.8	3390
J-ZN1-0596	Zone-1	4204	4.4	3795
J-WO-0003	West Oregon	4224	9.4	1896
J-ZN1-0415	Zone-1	4094	0.4	7835
J-PAT-0012	Patterson	4274	8.1	4107
J-ZN1-0849	Zone-1	4110	0.5	11721
J-ZN1-0620	Zone-1	4140	9.1	4710
J-ZN1-0821	Zone-1	4156	0.0	6784
J-PRE-0021	Prescott	4265	3.6	4116
J-ZN1-0866	Zone-1	4118	9.9	5756
J-ZN1-0488	Zone-1	4202	3.8	4213
J-ZN1-0582	Zone-1	4167	0.0	5422
J-ZN1-0302	Zone-1	4104	1.8	8559

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0012	URH-HOSP-HLVL	4338	1.9	2968
J-SL-0092	Lindley	4210	7.9	3379
J-PRV-3-UMO-0007	PRV-3	4321	0.0	1687
J-ZN1-0333	Zone-1	4103	16.6	7088
J-WO-0005	West Oregon	4223	3.1	1928
J-ZN1-0419	Zone-1	4092	1.5	8333
J-ZN1-0386	Zone-1	4098	1.4	12079
J-ZN1-0133	Zone-1	4150	5.9	7030
J-ZN1-0826	Zone-1	4202	4.8	3300
J-ZN1-0795	Zone-1	4128	7.0	6087
J-PAT-0016	Patterson	4313	8.2	1985
J-ZN1-0722	Zone-1	4162	4.8	5017
J-ZN1-0691	Zone-1	4228	12.1	3713
J-ZN1-0755	Zone-1	4098	10.6	4938
J-ZN1-0238	Zone-1	4139	1.7	3638
J-ZN1-0460	Zone-1	4290	0.0	0
J-ZN1-0306	Zone-1	4116	3.7	2825
J-ZN1-0270	Zone-1	4112	6.2	2832
J-ZN1-0321	Zone-1	4104	0.0	6850
J-HOS-0031	URH-HOSP-HLVL	4273	21.6	4928
J-PRE-0001	Prescott	4269	2.3	2117
J-ZN1-0357	Zone-1	4114	7.9	3119
J-HOS-0046	URH-HOSP-HLVL	4287	13.2	4368
J-ZN1-0137	Zone-1	4151	5.0	6623
J-FHH-0007	Foothill_Homedale	4266	13.8	3991
J-HOS-0007	URH-HOSP-HLVL	4380	1.4	3317
J-ZN1-0053	Zone-1	4140	6.1	3755
J-ZN1-0064	Zone-1	4114	0.0	4956
J-ZN1-0153	Zone-1	4150	0.0	3811
J-ZN1-0665	Zone-1	4094	2.3	5429
J-ZN1-0595	Zone-1	4141	0.0	5507
J-ZN1-0167	Zone-1	4159	19.6	2982
J-ZN1-0565	Zone-1	4191	2.6	2450
J-ZN1-0767	Zone-1	4110	5.6	2879
J-ZN1-0275	Zone-1	4109	2.5	4149
J-ZN1-0185	Zone-1	4166	0.6	2634
J-ZN1-0606	Zone-1	4158	3.1	4298
J-ZN1-0847	Zone-1	4092	0.6	3535
J-UL-0010	Upper Lynnewood	4262	1.9	3472

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0864	Zone-1	4151	4.1	6392
J-SL-0080	Lindley	4105	1.9	5395
J-ZN1-0651	Zone-1	4121	7.9	2671
J-ZN1-0455	Zone-1	4182	7.0	19780
J-ZN1-0486	Zone-1	4176	9.5	2505
J-PAT-0003	Patterson	4321	0.9	3905
J-ZN1-0076	Zone-1	4142	5.8	3035
J-ZN1-0039	Zone-1	4226	23.2	3771
J-ZN1-0089	Zone-1	4096	3.0	18254
J-ZN1-0764	Zone-1	4146	19.8	3168
J-ZN1-0567	Zone-1	4167	2.1	3228
J-ZN1-0532	Zone-1	4152	2.6	4660
J-PAT-0044	Patterson	4426	0.0	0
J-ZN1-0384	Zone-1	4116	0.5	2797
J-ZN1-0351	Zone-1	4102	6.1	4194
J-ZN1-0824	Zone-1	4164	0.9	6967
J-ZN1-0793	Zone-1	4111	13.1	3052
J-ZN1-0690	Zone-1	4171	6.9	2552
J-ZN1-0660	Zone-1	4169	1.8	6923
J-PRV-2-ELD-0018	PRV-2	4240	26.1	2136
J-ZN1-0458	Zone-1	4267	2.3	2
J-ZN1-0698	Zone-1	4096	12.3	3054
J-ZN1-0268	Zone-1	4110	3.5	4972
J-PAT-0032	Patterson	4394	0.3	3562
J-ZN1-0319	Zone-1	4102	2.7	6155
J-PRV-OFR-0003	PRV-6	4225	10.2	2009
J-SL-0074	Lindley	4213	13.8	5461
J-HOS-0059	URH-HOSP-HLVL	4312	7.3	2539
J-ZN1-0355	Zone-1	4110	17.1	3245
J-ZN1-0721	Zone-1	4097	0.9	8951
J-ZN1-0135	Zone-1	4133	4.9	4808
J-ZN1-0034	Zone-1	4108	4.5	1889
J-ZN1-0046	Zone-1	4144	8.1	3714
J-ZN1-0151	Zone-1	4168	0.8	2692
J-ZN1-0663	Zone-1	4094	2.1	5222
J-ZN1-0593	Zone-1	4187	4.3	1946
J-ZN1-0563	Zone-1	4204	6.7	2194
J-ZN1-0703	Zone-1	4100	7.1	2254

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0675	Zone-1	4098	8.1	692
J-ZN1-0604	Zone-1	4150	2.2	1867
J-ZN1-0183	Zone-1	4116	33.6	3799
J-ZN1-0427	Zone-1	4092	0.0	9560
J-PAT-0042	Patterson	4306	3.1	3109
J-PAT-0034	Patterson	4463	0.0	0
J-ZN1-0862	Zone-1	4163	0.6	1104
J-SL-0078	Lindley	4154	10.4	4663
J-ZN1-0484	Zone-1	4190	1.4	2456
J-ZN1-0453	Zone-1	4251	0.7	6339
J-SL-0091	Lindley	4180	7.2	3104
J-ZN1-0021	Zone-1	4187	6.7	5224
J-ZN1-0500	Zone-1	4214	1.7	4458
J-ZN1-0069	Zone-1	4154	11.7	2227
J-PAT-0022	Patterson	4298	1.3	3244
J-UM-0012	Upper Moyina	4375	9.5	1927
J-ZN1-0530	Zone-1	4160	3.8	5983
J-ZN1-0349	Zone-1	4106	18.4	5177
J-ZN1-0609	Zone-1	4157	11.0	3783
J-ZN1-0579	Zone-1	4224	0.0	3165
J-ZN1-0048	Zone-1	4140	7.7	4462
J-ZN1-0634	Zone-1	4113	15.6	5209
J-ZN1-0791	Zone-1	4105	70.4	3285
J-ZN1-0014	Zone-1	4150	1.2	3667
J-SL-0069	Lindley	4232	10.4	2161
J-PRE-0054	Prescott	4265	2.8	3563
J-ZN1-0807	Zone-1	4128	17.8	4261
J-ZN1-0457	Zone-1	4106	9.5	31901
J-HOS-0055	URH-HOSP-HLVL	4337	19.6	2413
J-ZN1-0266	Zone-1	4110	5.0	4806
J-ZN1-0176	Zone-1	4118	4.8	7020
J-ZN1-0504	Zone-1	4215	7.4	2264
J-ZN1-0473	Zone-1	4098	17.0	32420
J-ZN1-0317	Zone-1	4090	5.7	12599
J-ZN1-0283	Zone-1	4114	22.2	4371
J-ZN1-0543	Zone-1	4147	1.5	6701
J-PRE-0043	Prescott	4263	0.9	4749
J-ZN1-0823	Zone-1	4098	30.9	4353
J-ZN1-0353	Zone-1	4110	0.0	7312

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0043	URH-HOSP-HLVL	4415	1.4	2218
J-FHH-0004	Foothill_Homedale	4232	12.9	4514
J-ZN1-0084	Zone-1	4137	3.8	1856
J-ZN1-0401	Zone-1	4090	5.5	5182
J-PAT-0011	Patterson	4376	10.5	3108
J-ZN1-0149	Zone-1	4134	9.4	6436
J-ZN1-0096	Zone-1	4175	0.0	1762
J-ZN1-0662	Zone-1	4198	4.8	5031
J-ZN1-0701	Zone-1	4100	6.7	8114
J-ZN1-0673	Zone-1	4096	13.5	5673
J-ZN1-0602	Zone-1	4160	10.4	2859
J-ZN1-0181	Zone-1	4112	41.0	3767
J-ZN1-0574	Zone-1	4233	0.0	2105
J-ZN1-0287	Zone-1	4110	7.2	5309
J-ZN1-0224	Zone-1	4121	12.3	2665
J-ZN1-0860	Zone-1	4175	3.5	2384
J-SL-0076	Lindley	4188	1.7	8769
J-UL-0005	Upper Lynnewood	4259	4.1	3699
J-PRE-0064	Prescott	4256	6.7	4487
J-ZN1-0498	Zone-1	4273	0.6	1
J-ZN1-0016	Zone-1	4175	13.1	5225
J-ZN1-0592	Zone-1	4114	3.3	10437
J-ZN1-0118	Zone-1	4164	2.7	4069
J-ZN1-0103	Zone-1	4155	3.9	3610
J-PRV-2-ELD-0016	PRV-2	4224	0.6	2475
J-ZN1-0528	Zone-1	4146	2.8	4330
J-ZN1-0733	Zone-1	4097	4.4	7888
J-ZN1-0544	Zone-1	4164	2.1	6497
J-ZN1-0577	Zone-1	4163	0.5	7761
J-HOS-0050	URH-HOSP-HLVL	4333	0.0	4154
J-ZN1-0396	Zone-1	4094	5.8	7349
J-ZN1-0789	Zone-1	4168	2.8	4682
J-PRE-0004	Prescott	4243	3.7	5070
J-ZN1-0055	Zone-1	4180	10.6	5921
J-PRE-0052	Prescott	4259	9.3	4026
J-ZN1-0805	Zone-1	4137	1.4	5181
J-TW-0005	Tanglewood	4772	2.7	3040
J-ZN1-0843	Zone-1	4106	1.0	31791
J-ZN1-0471	Zone-1	4190	7.3	4663

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0436	Zone-1	4099	0.2	18441
J-ZN1-0315	Zone-1	4096	1.5	18887
J-ZN1-0281	Zone-1	4114	10.0	4640
J-ZN1-0608	Zone-1	4122	7.4	7891
J-PRE-0041	Prescott	4250	2.2	4538
J-PRE-0037	Prescott	4242	2.6	3466
J-HOS-0041	URH-HOSP-HLVL	4422	0.0	7168
J-ZN1-0637	Zone-1	4092	2.3	6278
J-ZN1-0780	Zone-1	4140	6.9	2067
J-ZN1-0066	Zone-1	4096	38.9	10230
J-ZN1-0400	Zone-1	4092	23.8	6217
J-ZN1-0367	Zone-1	4115	17.5	2616
J-PAT-0006	Patterson	4349	19.2	2175
J-PAT-0041	Patterson	4227	11.8	5871
J-ZN1-0112	Zone-1	4182	5.6	5891
J-ZN1-0147	Zone-1	4144	8.8	4355
J-ZN1-1242	Zone-1	4294	0.0	0
J-PAT-0077	Patterson	4445	0.0	0
J-ZN1-1248	Zone-1	4174	2.2	4011
J-ZN1-1246	Zone-1	4297	0.0	0
J-ZN1-1243	Zone-1	4285	0.0	0
J-ZN1-1251	Zone-1	4111	0.0	3037
J-ZN1-1247	Zone-1	4215	0.0	2626
J-ZN1-1249	Zone-1	4197	0.0	3250
J-ZN1-1252	Zone-1	4092	0.0	6168
J-ZN1-1245	Zone-1	4223	0.0	1675
J-ZN1-1244	Zone-1	4162	0.0	3343
J-HOS-0101	URH-HOSP-HLVL	4372	1.7	1450
J-PAT-0082	Patterson	4280	0.0	1787
J-PAT-0079	Patterson	4314	3.7	5541
J-UM-0021	Upper Moyina	4336	11.9	2209
J-HOS-0105	URH-HOSP-HLVL	4260	8.0	3623
J-HOS-0102	URH-HOSP-HLVL	4266	3.5	2952
J-PAT-0080	Patterson	4288	5.5	3856
J-HOS-0106	URH-HOSP-HLVL	4314	17.3	2719
J-HOS-0103	URH-HOSP-HLVL	4274	9.5	2723
J-UL-0013	Upper Lynnewood	4289	0.0	2842
J-PAT-0076	Patterson	4286	0.0	4001
J-SL-0108	Lindley	4166	0.0	5454

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-WO-0013	West Oregon	4247	2.2	2566
J-HOS-0100	URH-HOSP-HLVL	4311	0.2	4034
J-PRE-0089	Prescott	4220	2.0	6009
J-CR-0008	Crown Ridge	4396	11.4	2686
J-TW-0008	Tanglewood	4179	7.3	2727
J-UM-0020	Upper Moyina	4458	0.0	2029
J-PAT-0078	Patterson	4212	0.0	6012
J-ZN1-1250	Zone-1	4111	0.0	7429
J-ZN1-1253	Zone-1	4092	1.2	14153
J-FHH-0017	Foothill_Homedale	4300	0.0	4100
J-PRV-3-UMO-0008	PRV-3	4325	0.0	1656
J-FHH-0018	Foothill_Homedale	4301	4.5	3938
J-PAT-0081	Patterson	4306	1.3	2670
J-PRV-2-OGD-0008	PRV_Ogden	4282	1.4	3105
J-PRV-2-ELD-0020	PRV-2	4253	12.9	2541
J-PRV-MOY-0015	PRV-13	4278	0.0	1782
J-PRV-OFR-0008	PRV-6	4254	4.0	917
J-PRV-2-ELD-0021	PRV-2	4238	16.0	3807
J-HOS-0104	URH-HOSP-HLVL	4227	0.0	7615
J-PRV-HWY-0022	PRV-2-HWY	4189	0.0	6696
J-PRV-3-UMO-0009	PRV-3	4343	1.7	2273
J-HOS-0107	URH-HOSP-HLVL	4268	3.6	2704
J-ZN1-0816	Zone-1	4254	5.2	981
J-SL-0052	Stewart_Lenox	4188	0.0	2477
J-SL-0012	Stewart_Lenox	4227	8.5	4121
J-SL-0010	Stewart_Lenox	4199	3.1	3161
J-SL-0004	Stewart_Lenox	4190	0.0	3890
J-SL-0015	Stewart_Lenox	4188	0.0	2819
J-SL-0024	Stewart_Lenox	4192	2.7	1881
J-PRV-SL-0002	Stewart_Lenox_PRV	4215	0.0	2575
J-SL-0006	Stewart_Lenox	4227	0.4	4350
J-SL-0032	Stewart_Lenox	4198	3.1	266
J-SL-0008	Stewart_Lenox	4212	2.3	224
J-SL-0036	Stewart_Lenox	4210	1.9	247
J-SL-0007	Stewart_Lenox	4220	3.3	478

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-SL-0044	Stewart_Lenox	4226	4.2	573
J-SL-0049	Stewart_Lenox	4235	2.8	147
J-SL-0009	Stewart_Lenox	4247	0.4	4052
J-SL-0013	Stewart_Lenox	4220	1.6	4261
J-SL-0014	Stewart_Lenox	4178	18.2	3972
J-SL-0050	Stewart_Lenox	4219	3.0	836
J-SL-0011	Stewart_Lenox	4200	5.1	4859
J-SL-0018	Stewart_Lenox	4228	5.7	4686
J-SL-0019	Stewart_Lenox	4242	1.8	4827
J-SL-0020	Stewart_Lenox	4248	5.3	5190
J-SL-0021	Stewart_Lenox	4236	2.3	212
J-SL-0022	Stewart_Lenox	4189	5.3	2523
J-SL-0025	Stewart_Lenox	4187	8.0	2710
J-SL-0027	Stewart_Lenox	4226	2.4	2239
J-SL-0028	Stewart_Lenox	4238	0.8	1769
J-SL-0029	Stewart_Lenox	4232	3.0	3825
J-SL-0030	Stewart_Lenox	4234	0.8	3677
J-SL-0031	Stewart_Lenox	4276	5.3	1934
J-PRV-SL-0005	Stewart_Lenox_PRV	4225	1.4	797
J-PRV-SL-0006	Stewart_Lenox_PRV	4216	0.7	279
J-PRV-SL-0009	Stewart_Lenox_PRV	4141	1.5	1975
J-PRV-SL-0011	Stewart_Lenox_PRV	4145	2.5	170
J-PRV-SL-0012	Stewart_Lenox_PRV	4157	5.1	116
J-SL-0033	Stewart_Lenox	4247	0.0	4293
J-SL-0034	Stewart_Lenox	4187	0.0	4370
J-SL-0035	Stewart_Lenox	4182	2.0	4725
J-SL-0037	Stewart_Lenox	4181	3.2	4708
J-SL-0038	Stewart_Lenox	4185	3.8	2463
J-SL-0039	Stewart_Lenox	4224	2.4	563
J-SL-0040	Stewart_Lenox	4189	2.2	238
J-SL-0041	Stewart_Lenox	4249	0.0	4348
J-SL-0042	Stewart_Lenox	4242	1.9	4837
J-SL-0043	Stewart_Lenox	4247	2.0	4149
J-PRV-SL-0014	Stewart_Lenox_PRV	4117	0.1	1700
J-PRV-SL-0016	Stewart_Lenox_PRV	4213	0.3	2627
J-SL-0053	Stewart_Lenox	4211	0.1	2857

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-SL-0017	Stewart_Lenox_PRV	4214	0.0	2707
J-SL-0045	Stewart_Lenox	4228	4.1	4750
J-SL-0048	Stewart_Lenox	4209	0.9	2898
J-ZN1-0168	Zone-1	4090	1.3	7045
J-ZN1-0325	Zone-1	4090	0.0	2685
J-ZN1-0339	Zone-1	4198	0.0	3444
J-ZN1-0340	Zone-1	4179	0.0	3650
J-ZN1-0341	Zone-1	4198	0.0	3391
J-ZN1-0342	Zone-1	4197	0.0	3232
J-ZN1-0328	Zone-1	4198	0.0	3050
J-HC-0001	Havencrest	4417	19.2	505
J-BV5-0004	Zone-5	4493	0.0	7535
J-HOS-0001	URH-HOSP-HLVL	4292	0.0	5768
J-HOS-0002	URH-HOSP-HLVL	4364	0.0	3558
J-ESI-0001	ESI	4369	0.0	109
J-HOS-0109	URH-HOSP-HLVL	4187	0.0	4993
J-SL-0063	Lindley	4138	0.3	2466
J-ZN1-0001	Zone-1	4197	0.0	4371
J-HOS-0003	URH-HOSP-HLVL	4213	0.0	2633
J-ZN1-0002	Zone-1	4250	1.8	2697
J-ZN1-0928	Zone-1	4179	30.6	3479
J-ZN1-0927	Zone-1	4180	0.0	4160
J-ZN1-0165	Zone-1	4177	0.3	5861
J-ZN1-0164	Zone-1	4194	0.0	5407
J-ZN1-0192	Zone-1	4198	11.0	2735
J-SL-0071	Lindley	4214	0.0	12429
J-PAT-0040	Patterson	4244	0.0	6529
J-PAT-0039	Patterson	4197	0.0	6896
J-BV5-0001	Zone-5	4590	0.0	7533
J-TW-0007	Tanglewood	4822	2.6	2538
J-ZN1-1241	Zone-1	4174	9.9	3043
J-FHH-0003	Foothill_Homedale	4285	26.9	3545
J-ZN1-0449	Zone-1	4117	4.5	8817
J-HOS-0013	URH-HOSP-HLVL	4307	9.9	3207
J-SL-0084	Lindley	4146	0.0	1997
J-ZN1-0004	Zone-1	4092	2.9	1647
J-ZN1-0005	Zone-1	4146	2.4	4508
J-ZN1-0006	Zone-1	4145	4.4	4245
J-ZN1-0007	Zone-1	4144	0.4	1927

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-FHH-0001	Foothill_Homedale	4289	4.8	3429
J-SL-0047	Stewart_Lenox	4210	0.0	3049
J-TW-0001	Tanglewood	4549	0.0	3424
J-SL-0065	Lindley	4124	0.0	5705
J-SL-0066	Lindley	4184	60.8	2051
J-SL-0070	Lindley	4221	0.0	7075
J-HOS-0004	URH-HOSP-HLVL	4373	7.2	1675
J-HOS-0005	URH-HOSP-HLVL	4409	47.7	4196
J-HOS-0014	URH-HOSP-HLVL	4356	12.1	4987
J-PRV-HWY-0002	PRV-2-HWY	4218	2.4	3128
J-PRV-HWY-0003	PRV-2-HWY	4216	1.8	3072
J-PRV-HWY-0004	PRV-2-HWY	4243	3.3	2628
J-PRV-HWY-0005	PRV-2-HWY	4238	2.5	2987
J-PRV-HWY-0006	PRV-2-HWY	4222	1.5	3059
J-HOS-0015	URH-HOSP-HLVL	4451	0.0	416
J-WO-0001	West Oregon	4226	1.3	1884
J-ZN1-0228	Zone-1	4175	8.1	3223
J-HOS-0016	URH-HOSP-HLVL	4322	4.9	4943
J-PRV-2-ELD-0005	PRV-2	4218	6.6	3518
J-HOS-0017	URH-HOSP-HLVL	4324	9.3	2156
J-ZN1-0230	Zone-1	4214	6.9	4154
J-PRE-0015	Prescott	4247	13.3	5759
J-ZN1-0233	Zone-1	4218	1.8	3691
J-ZN1-0234	Zone-1	4231	0.9	2111
J-ZN1-0235	Zone-1	4224	2.8	4948
J-ZN1-0236	Zone-1	4246	1.6	2737
J-ZN1-0237	Zone-1	4224	0.7	4968
J-PRE-0016	Prescott	4258	1.1	3882
J-HOS-0018	URH-HOSP-HLVL	4269	1.0	3346
J-HOS-0019	URH-HOSP-HLVL	4320	2.7	5610
J-ZN1-0245	Zone-1	4162	1.8	4728
J-ZN1-0246	Zone-1	4150	0.0	4722
J-ZN1-0248	Zone-1	4162	1.4	5343
J-ZN1-0249	Zone-1	4184	2.3	8860
J-ZN1-0250	Zone-1	4196	1.9	9038
J-ZN1-0251	Zone-1	4097	0.0	35158
J-PRE-0020	Prescott	4300	0.2	2081
J-ZN1-0253	Zone-1	4189	2.2	2720
J-ZN1-0254	Zone-1	4149	2.2	6110
J-ZN1-0255	Zone-1	4102	0.7	6922
J-ZN1-0256	Zone-1	4118	8.0	5369
J-ZN1-0258	Zone-1	4122	2.2	4548
J-BV-0001	Zone-5	4546	8.1	2224
J-UM-0007	Upper Moyina	4434	3.2	2418
J-ZN1-0194	Zone-1	4206	1.4	4190
J-ZN1-0195	Zone-1	4189	4.7	5103
J-ZN1-0196	Zone-1	4175	1.3	4739
J-ZN1-0199	Zone-1	4155	14.1	5275
J-ZN1-0200	Zone-1	4116	5.0	2669
J-ZN1-0201	Zone-1	4098	11.6	7923
J-ZN1-0202	Zone-1	4134	0.0	5858
J-ZN1-0203	Zone-1	4110	21.3	2755
J-ZN1-0205	Zone-1	4095	1.4	6845
J-ZN1-0206	Zone-1	4098	63.9	8002
J-ZN1-0207	Zone-1	4095	0.0	9507
J-ZN1-0208	Zone-1	4100	1.7	2396
J-PRV-MOY-0013	PRV-13	4275	5.8	1646
J-PAT-0024	Patterson	4247	0.0	4056
J-PAT-0025	Patterson	4246	0.3	4010
J-ZN1-0210	Zone-1	4181	12.8	6652
J-ZN1-0211	Zone-1	4095	13.5	8835
J-ZN1-0212	Zone-1	4091	5.9	16533
J-ZN1-0214	Zone-1	4092	4.3	17520
J-ZN1-0215	Zone-1	4094	0.7	9848
J-ZN1-0216	Zone-1	4096	14.7	10491
J-ZN1-0217	Zone-1	4158	0.0	3103
J-ZN1-0218	Zone-1	4164	2.0	2681
J-ZN1-0220	Zone-1	4141	0.0	4256
J-ZN1-0221	Zone-1	4094	8.4	15940
J-ZN1-0222	Zone-1	4096	8.7	23041
J-ZN1-0223	Zone-1	4090	0.0	3856
J-ZN1-0225	Zone-1	4088	0.0	1921
J-ZN1-0227	Zone-1	4088	0.0	8276
J-PRV-HWY-0012	PRV-2-HWY	4234	0.0	3647

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-HWY-0015	PRV-2-HWY	4216	7.2	2910
J-PRV-HWY-0016	PRV-2-HWY	4238	2.4	2534
J-HOS-0088	URH-HOSP-HLVL	4364	0.0	3561
J-HOS-0089	URH-HOSP-HLVL	4292	2.1	2359
J-HOS-0090	URH-HOSP-HLVL	4316	0.5	2346
J-HOS-0097	URH-HOSP-HLVL	4365	6.0	4443
J-ZN1-1065	Zone-1	4148	17.5	2432
J-ZN1-1070	Zone-1	4168	3.5	3183
J-ZN1-1084	Zone-1	4173	3.2	2921
J-ZN1-1099	Zone-1	4189	14.2	2845
J-ZN1-1110	Zone-1	4204	2.3	2276
J-ZN1-1129	Zone-1	4216	4.8	2025
J-ZN1-1137	Zone-1	4205	1.0	2113
J-ZN1-1146	Zone-1	4208	8.5	2147
J-ZN1-1153	Zone-1	4211	6.2	2010
J-ZN1-1181	Zone-1	4220	3.4	1894
J-ZN1-1202	Zone-1	4208	5.3	2068
J-ZN1-1212	Zone-1	4205	8.2	2335
J-WO-0011	West Oregon	4242	10.1	1897
J-WO-0012	West Oregon	4244	1.8	1981
J-ZN1-0874	Zone-1	4214	5.8	1962
J-HOS-0063	URH-HOSP-HLVL	4314	5.9	4562
J-CR-0005	Crown Ridge	4435	6.4	2617
J-CR-0006	Crown Ridge	4439	2.8	2504
J-HOS-0067	URH-HOSP-HLVL	4385	0.0	2559
J-HOS-0069	URH-HOSP-HLVL	4361	6.1	2142
J-HOS-0070	URH-HOSP-HLVL	4346	6.9	2404
J-HOS-0071	URH-HOSP-HLVL	4286	9.9	2804
J-PRE-0066	Prescott	4232	1.2	7793
J-PRE-0067	Prescott	4298	1.1	3012
J-ZN1-0876	Zone-1	4231	2.7	4744
J-ZN1-0877	Zone-1	4245	1.4	2847
J-ZN1-0878	Zone-1	4226	1.4	3333
J-ZN1-0879	Zone-1	4287	1.2	1
J-PRE-0068	Prescott	4299	8.7	2669
J-PRE-0069	Prescott	4257	4.5	1911
J-PRE-0071	Prescott	4186	8.0	2368
J-HOS-0081	URH-HOSP-HLVL	4236	36.6	4246
J-HOS-0083	URH-HOSP-HLVL	4274	4.7	2442
J-HOS-0085	URH-HOSP-HLVL	4257	13.9	3653
J-HOS-0086	URH-HOSP-HLVL	4276	0.0	2535
J-HOS-0087	URH-HOSP-HLVL	4301	0.0	2136
J-ZN1-1001	Zone-1	4168	27.9	1871
J-PRV-OFR-0006	PRV-6	4198	11.1	1906
J-ZN1-1003	Zone-1	4118	0.6	9492
J-ZN1-1005	Zone-1	4112	10.1	3615
J-ZN1-1006	Zone-1	4118	5.5	4647
J-ZN1-1007	Zone-1	4155	9.1	6097
J-ZN1-1009	Zone-1	4150	1.8	4867
J-ZN1-1010	Zone-1	4188	23.2	3477
J-ZN1-1013	Zone-1	4184	4.3	5353
J-ZN1-1014	Zone-1	4166	4.9	3042
J-PRE-0085	Prescott	4242	8.5	6682
J-PRE-0087	Prescott	4300	0.8	2079
J-ZN1-1018	Zone-1	4169	1.8	3080
J-ZN1-1019	Zone-1	4148	4.7	2911
J-ZN1-1020	Zone-1	4130	0.0	5470
J-ZN1-1023	Zone-1	4090	0.0	3523
J-ZN1-1025	Zone-1	4119	13.5	9127
J-ZN1-1027	Zone-1	4119	1.6	1524
J-ZN1-1029	Zone-1	4108	2.9	3449
J-ZN1-1031	Zone-1	4110	2.6	1532
J-ZN1-1035	Zone-1	4120	0.9	4753
J-PAT-0049	Patterson	4223	10.0	5999
J-PAT-0051	Patterson	4342	8.0	5882
J-PAT-0052	Patterson	4334	4.4	3023
J-FHH-0015	Foothill_Homedale	4249	32.4	4157
J-PAT-0056	Patterson	4326	15.4	2932
J-PAT-0058	Patterson	4348	9.4	3223
J-PAT-0059	Patterson	4377	2.0	3167
J-PAT-0061	Patterson	4349	13.4	2893
J-PAT-0062	Patterson	4373	0.0	2495
J-PAT-0063	Patterson	4396	1.0	3819
J-BV-0003	Zone-5	4442	13.1	6618
J-BV-0007	Zone-5	4486	16.5	6600
J-BV-0009	Zone-5	4503	3.8	4022
J-PAT-0065	Patterson	4383	23.1	1692

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PAT-0068	Patterson	4386	4.4	1563
J-PAT-0069	Patterson	4322	9.2	2204
J-PAT-0070	Patterson	4381	9.9	3677
J-ZN1-1038	Zone-1	4162	4.7	1829
J-ZN1-1040	Zone-1	4160	0.0	5211
J-ZN1-1042	Zone-1	4150	0.2	5334
J-ZN1-1043	Zone-1	4151	2.8	4984
J-ZN1-1044	Zone-1	4138	15.4	1292
J-ZN1-1046	Zone-1	4112	17.1	2058
J-ZN1-1047	Zone-1	4104	0.8	4057
J-ZN1-1049	Zone-1	4120	30.9	2798
J-ZN1-1051	Zone-1	4092	5.5	5351
J-ZN1-1053	Zone-1	4094	15.1	7974
J-ZN1-1055	Zone-1	4092	1.6	1728
J-SL-0102	Lindley	4224	3.6	2618
J-SL-0103	Lindley	4231	1.5	2615
J-ZN1-1058	Zone-1	4094	2.0	8766
J-ZN1-1060	Zone-1	4098	7.8	3676
J-KL-0001	Katie Lane	4232	2.0	3373
J-KL-0003	Katie Lane	4233	4.0	3038
J-KL-0004	Katie Lane	4234	11.5	2963
J-KL-0005	Katie Lane	4212	0.0	2933
J-ZN1-1067	Zone-1	4209	2.9	5425
J-SH-0004	Sierra Heights	4250	14.6	2042
J-SH-0005	Sierra Heights	4252	16.1	1944
J-SH-0006	Sierra Heights	4242	16.2	2109
J-ZN1-1068	Zone-1	4186	1.8	5597
J-ZN1-1071	Zone-1	4176	10.9	3661
J-ZN1-1073	Zone-1	4166	5.5	3863
J-ZN1-1075	Zone-1	4173	6.5	3690
J-ZN1-1077	Zone-1	4172	17.4	3331
J-ZN1-1078	Zone-1	4172	9.1	3583
J-ZN1-1081	Zone-1	4092	1.4	8145
J-ZN1-1082	Zone-1	4092	4.9	9591
J-SL-0106	Lindley	4203	0.0	6843
J-ZN1-1085	Zone-1	4090	9.2	9751
J-ZN1-1086	Zone-1	4090	0.0	12617
J-ZN1-1088	Zone-1	4090	17.4	16151
J-ZN1-1089	Zone-1	4090	3.4	2445

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1091	Zone-1	4092	1.5	7997
J-ZN1-1093	Zone-1	4093	0.2	8749
J-ZN1-1094	Zone-1	4094	9.8	8709
J-ZN1-1095	Zone-1	4092	0.2	6626
J-ZN1-1100	Zone-1	4098	0.6	6401
J-ZN1-1101	Zone-1	4100	0.0	4752
J-ZN1-1102	Zone-1	4100	0.0	4620
J-ZN1-1104	Zone-1	4126	4.5	3307
J-ZN1-1105	Zone-1	4125	0.0	3367
J-ZN1-1106	Zone-1	4122	6.6	3348
J-ZN1-1107	Zone-1	4130	49.5	3360
J-ZN1-1108	Zone-1	4119	5.7	3084
J-ZN1-1109	Zone-1	4120	13.6	3075
J-ZN1-1111	Zone-1	4138	7.4	4440
J-ZN1-1112	Zone-1	4138	6.8	3977
J-ZN1-1115	Zone-1	4177	8.0	6332
J-ZN1-1116	Zone-1	4156	15.8	4367
J-ZN1-1117	Zone-1	4156	14.0	3689
J-ZN1-1120	Zone-1	4162	11.9	3941
J-ZN1-1122	Zone-1	4166	10.8	4092
J-ZN1-1124	Zone-1	4164	6.6	3590
J-ZN1-1126	Zone-1	4168	0.8	3666
J-ZN1-1128	Zone-1	4165	2.2	2579
J-ZN1-1130	Zone-1	4153	1.2	3789
J-ZN1-1134	Zone-1	4162	13.0	2676
J-ZN1-1135	Zone-1	4172	1.5	2317
J-ZN1-1136	Zone-1	4171	2.5	2281
J-ZN1-1139	Zone-1	4175	2.1	2029
J-ZN1-1141	Zone-1	4156	7.4	2114
J-ZN1-1143	Zone-1	4149	3.5	2688
J-ZN1-1145	Zone-1	4107	22.0	3306
J-ZN1-1147	Zone-1	4108	10.4	3474
J-ZN1-1155	Zone-1	4104	5.7	5325
J-ZN1-1159	Zone-1	4117	3.2	1644
J-ZN1-1161	Zone-1	4108	18.7	6711
J-ZN1-1162	Zone-1	4109	8.2	7067
J-ZN1-1164	Zone-1	4105	12.7	7108
J-ZN1-1166	Zone-1	4108	16.2	7060
J-ZN1-1167	Zone-1	4108	3.8	7007

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1168	Zone-1	4110	16.1	7154
J-ZN1-1169	Zone-1	4108	13.3	6388
J-ZN1-1170	Zone-1	4110	8.4	7016
J-ZN1-1171	Zone-1	4108	21.5	6169
J-ZN1-1174	Zone-1	4106	0.0	3535
J-ZN1-1176	Zone-1	4137	8.2	2164
J-ZN1-1178	Zone-1	4136	12.1	2421
J-ZN1-1179	Zone-1	4168	18.8	2211
J-ZN1-1180	Zone-1	4165	29.7	2154
J-ZN1-1182	Zone-1	4164	0.0	2583
J-ZN1-1183	Zone-1	4158	7.0	2619
J-ZN1-1184	Zone-1	4176	1.6	2713
J-ZN1-1186	Zone-1	4166	0.8	2620
J-ZN1-1188	Zone-1	4149	4.4	2783
J-ZN1-1191	Zone-1	4109	6.4	3381
J-ZN1-1193	Zone-1	4109	4.5	3741
J-ZN1-1194	Zone-1	4107	11.5	3916
J-ZN1-1195	Zone-1	4104	17.9	4101
J-ZN1-1196	Zone-1	4105	7.2	4042
J-ZN1-1197	Zone-1	4105	11.0	4754
J-ZN1-1198	Zone-1	4104	7.9	2606
J-ZN1-1199	Zone-1	4102	0.1	6460
J-ZN1-1200	Zone-1	4088	0.0	4077
J-ZN1-1205	Zone-1	4086	0.0	3070
J-ZN1-1208	Zone-1	4090	0.0	9130
J-ZN1-1209	Zone-1	4089	0.1	8395
J-ZN1-1210	Zone-1	4093	0.0	10096
J-ZN1-1211	Zone-1	4090	0.0	9124
J-ZN1-1213	Zone-1	4089	0.0	8379
J-ZN1-1215	Zone-1	4089	2.4	8248
J-ZN1-1216	Zone-1	4090	22.7	8438
J-ZN1-1217	Zone-1	4090	0.0	4250
J-ZN1-1218	Zone-1	4090	0.0	2553
J-ZN1-1219	Zone-1	4090	0.0	2537
J-ZN1-1220	Zone-1	4090	0.0	2993
J-ZN1-1221	Zone-1	4090	0.0	2949
J-ZN1-1222	Zone-1	4090	0.0	4134
J-ZN1-1223	Zone-1	4090	0.0	5700
J-ZN1-1224	Zone-1	4090	0.0	3321
J-ZN1-1225	Zone-1	4090	0.0	2994
J-ZN1-1226	Zone-1	4090	0.0	2404
J-ZN1-1227	Zone-1	4090	0.0	2801
J-ZN1-1228	Zone-1	4089	0.0	2739
J-ZN1-1229	Zone-1	4090	0.0	2788
J-ZN1-1230	Zone-1	4089	0.0	2045
J-ZN1-1231	Zone-1	4089	0.0	2014
J-ZN1-1232	Zone-1	4088	0.0	2259
J-ZN1-1236	Zone-1	4090	0.0	7742
J-ZN1-1238	Zone-1	4088	0.1	8319
J-ZN1-1239	Zone-1	4088	0.0	8329
J-ZN1-0870	Zone-1	4088	0.0	8214
J-ZN1-0871	Zone-1	4088	0.0	7566
J-ZN1-0240	Zone-1	4108	1.8	2303
J-ZN1-0241	Zone-1	4112	0.6	5478
J-ZN1-0242	Zone-1	4219	1.9	3623
J-PRE-0017	Prescott	4284	1.8	3087
J-PRE-0018	Prescott	4290	7.9	2097
J-ZN1-0880	Zone-1	4092	0.0	12285
J-ZN1-0881	Zone-1	4094	6.5	3346
J-HOS-0072	URH-HOSP-HLVL	4338	0.0	1786
J-ZN1-0193	Zone-1	4108	26.2	6260
J-PRV-2-ELD-0019	PRV-2	4215	1.6	2322
J-ZN1-0884	Zone-1	4114	5.4	5584
J-PAT-0045	Patterson	4356	5.7	1959
J-ZN1-0885	Zone-1	4144	5.4	3609
J-ZN1-0887	Zone-1	4092	0.0	12324
J-ZN1-0888	Zone-1	4090	0.0	22687
J-ZN1-0889	Zone-1	4094	0.0	12962
J-ZN1-0890	Zone-1	4169	1.5	3980
J-ZN1-0891	Zone-1	4178	0.3	6826
J-ZN1-0892	Zone-1	4194	8.6	1968
J-ZN1-0893	Zone-1	4182	7.9	7087
J-ZN1-0894	Zone-1	4203	1.7	4338
J-ZN1-0895	Zone-1	4182	0.2	6544
J-ZN1-0896	Zone-1	4182	0.6	6557
J-ZN1-0897	Zone-1	4098	11.9	693
J-ZN1-0898	Zone-1	4096	6.3	7462
J-ZN1-0899	Zone-1	4100	4.3	3614

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0900	Zone-1	4104	0.0	3250
J-ZN1-0901	Zone-1	4092	15.4	14219
J-SL-0094	Lindley	4149	5.0	4473
J-SL-0001	Stewart_Lenox	4225	0.1	619
J-ZN1-0902	Zone-1	4090	9.9	8095
J-ZN1-0903	Zone-1	4098	2.2	10968
J-ZN1-0904	Zone-1	4104	5.0	2762
J-ZN1-0905	Zone-1	4167	2.6	4493
J-ZN1-0906	Zone-1	4149	7.7	5145
J-ZN1-0907	Zone-1	4163	1.6	4734
J-ZN1-0908	Zone-1	4144	6.0	5691
J-ZN1-0909	Zone-1	4121	2.2	3512
J-ZN1-0910	Zone-1	4110	7.6	4345
J-PRV-SL-0001	Stewart_Lenox_PRV	4118	6.3	348
J-ZN1-0911	Zone-1	4093	0.0	23829
J-ZN1-0912	Zone-1	4092	4.1	23568
J-ZN1-0913	Zone-1	4092	0.0	10222
J-ZN1-0914	Zone-1	4093	0.0	10122
J-ZN1-0915	Zone-1	4093	0.0	9864
J-ZN1-0916	Zone-1	4100	0.0	8975
J-ZN1-0917	Zone-1	4102	1.1	7924
J-ZN1-0918	Zone-1	4098	7.2	9762
J-ZN1-0919	Zone-1	4097	12.4	8196
J-ZN1-0920	Zone-1	4104	1.3	5934
J-ZN1-0921	Zone-1	4114	0.0	7279
J-ZN1-0922	Zone-1	4122	9.7	4378
J-PRE-0074	Prescott	4280	0.5	13729
J-PRE-0075	Prescott	4269	2.4	5203
J-ZN1-0924	Zone-1	4164	1.9	6397
J-ZN1-0926	Zone-1	4223	2.9	2407
J-ZN1-0936	Zone-1	4098	0.6	9065
J-ZN1-0939	Zone-1	4137	4.7	5995
J-SL-0095	Lindley	4188	2.2	9115
J-SL-0096	Lindley	4272	0.5	11364
J-HOS-0073	URH-HOSP-HLVL	4334	33.9	4268
J-ZN1-0930	Zone-1	4090	0.0	5887
J-ZN1-0931	Zone-1	4090	8.0	8044
J-UM-0016	Upper Moyina	4353	4.3	1989
J-UM-0017	Upper Moyina	4419	9.8	1984
J-UM-0018	Upper Moyina	4377	6.4	2086
J-PRE-0076	Prescott	4212	8.9	4035
J-ZN1-0937	Zone-1	4247	0.2	2582
J-ZN1-0938	Zone-1	4234	0.2	3935
J-PRE-0077	Prescott	4269	1.4	3236
J-PRE-0079	Prescott	4254	8.4	3782
J-ZN1-0941	Zone-1	4181	1.1	9088
J-ZN1-0942	Zone-1	4170	0.0	12549
J-ZN1-0943	Zone-1	4161	0.0	6275
J-SH-0002	Sierra Heights	4212	0.0	2743
J-ZN1-0944	Zone-1	4212	0.0	4615
J-ZN1-0945	Zone-1	4290	0.0	0
J-ZN1-0946	Zone-1	4095	40.0	8701
J-HOS-0075	URH-HOSP-HLVL	4249	6.7	4017
J-HOS-0076	URH-HOSP-HLVL	4263	22.0	5176
J-ZN1-0947	Zone-1	4250	5.1	170
J-ZN1-0948	Zone-1	4250	4.9	2252
J-HOS-0077	URH-HOSP-HLVL	4303	3.9	4079
J-HOS-0079	URH-HOSP-HLVL	4381	33.4	1807
J-HOS-0080	URH-HOSP-HLVL	4283	10.6	2845
J-ZN1-0949	Zone-1	4210	2.4	1945
J-ZN1-0950	Zone-1	4215	1.6	1894
J-ZN1-0951	Zone-1	4158	5.5	5382
J-ZN1-0952	Zone-1	4142	13.9	7121
J-ZN1-0953	Zone-1	4102	5.1	2765
J-ZN1-0954	Zone-1	4104	22.8	7650
J-FHH-0010	Foothill_Homedale	4307	0.0	3455
J-FHH-0011	Foothill_Homedale	4279	2.5	3674
J-FHH-0012	Foothill_Homedale	4256	0.0	3699
J-FHH-0013	Foothill_Homedale	4306	0.0	3165
J-FHH-0014	Foothill_Homedale	4236	6.5	4184
J-ZN1-0956	Zone-1	4094	0.3	19459
J-ZN1-0957	Zone-1	4098	1.7	11208
J-ZN1-0958	Zone-1	4097	0.7	11532
J-ZN1-0959	Zone-1	4098	0.0	40312
J-ZN1-0960	Zone-1	4095	16.5	38286
J-ZN1-0961	Zone-1	4098	0.2	39065
J-ZN1-0962	Zone-1	4100	0.0	39836
J-ZN1-0963	Zone-1	4103	0.9	38805

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-SH-0003	Sierra Heights	4225	8.9	2525
J-PAT-0046	Patterson	4394	3.2	3214
J-SL-0017	Stewart_Lenox	4183	0.4	4483
J-ZN1-0964	Zone-1	4093	0.0	9542
J-ZN1-0965	Zone-1	4095	0.0	31606
J-CR-0007	Crown Ridge	4415	0.0	2564
J-SL-0097	Lindley	4203	5.4	3023
J-PRE-0080	Prescott	4206	9.8	3728
J-ZN1-0966	Zone-1	4170	5.0	1499
J-PAT-0047	Patterson	4426	0.0	263
J-PRE-0081	Prescott	4202	0.2	3676
J-SL-0098	Lindley	4227	2.0	2858
J-ZN1-0967	Zone-1	4090	1.7	11228
J-ZN1-0968	Zone-1	4110	0.9	7319
J-ZN1-0969	Zone-1	4090	0.8	6574
J-ZN1-0972	Zone-1	4123	14.1	1831
J-ZN1-0973	Zone-1	4152	6.2	1647
J-PAT-0048	Patterson	4343	10.0	2157
J-UM-0019	Upper Moyina	4437	2.5	2253
J-TW-0006	Tanglewood	4807	13.3	2806
J-PRV-HWY-0020	PRV-2-HWY	4233	0.3	2714
J-PRE-0082	Prescott	4211	4.8	2983
J-ZN1-0974	Zone-1	4204	7.7	5306
J-ZN1-0975	Zone-1	4125	0.0	10680
J-ZN1-0976	Zone-1	4178	6.4	2687
J-ZN1-0977	Zone-1	4094	8.7	9681
J-ZN1-0978	Zone-1	4092	0.0	9606
J-ZN1-0979	Zone-1	4096	0.2	8669
J-SL-0099	Lindley	4146	2.7	2685
J-SL-0100	Lindley	4138	0.0	2482
J-SL-0101	Lindley	4130	0.0	2791
J-PRE-0083	Prescott	4243	2.0	5268
J-ZN1-0980	Zone-1	4178	0.0	11907
J-ZN1-0981	Zone-1	4178	0.0	1955
J-ZN1-0982	Zone-1	4156	137.9	3538
J-ZN1-0983	Zone-1	4096	1.2	7483
J-ZN1-0984	Zone-1	4102	14.6	2435
J-ZN1-0985	Zone-1	4125	28.9	1645
J-ZN1-0986	Zone-1	4102	4.5	6140

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRE-0084	Prescott	4250	4.3	4140
J-ZN1-0988	Zone-1	4175	0.3	4452
J-ZN1-0989	Zone-1	4175	1.7	3116
J-ZN1-0990	Zone-1	4156	0.0	1878
J-ZN1-0991	Zone-1	4161	1.2	1829
J-ZN1-0992	Zone-1	4150	4.4	5019
J-ZN1-0993	Zone-1	4150	3.5	5026
J-ZN1-0994	Zone-1	4150	4.6	4678
J-ZN1-0995	Zone-1	4140	26.9	2526
J-ZN1-0996	Zone-1	4140	0.7	2993
J-ZN1-0997	Zone-1	4092	1.3	10684
J-ZN1-0998	Zone-1	4094	12.8	10049
J-ZN1-0999	Zone-1	4134	5.4	6377
J-SL-0112	Stewart_Lenox	4259	3.8	1544
J-TW-0019	Tanglewood	4777	1.4	3809
J-ZN1-1280	Zone-1	4091	0.0	9351
J2554	Zone-1	4184	4.4	3580
J2556	Zone-1	4188	0.6	3621
J2558	Zone-1	4220	0.0	2597
J2560	Zone-1	4200	11.8	4283
J2564	Zone-1	4164	23.6	2776
J2566	Zone-1	4174	3.4	8451
J-ZN1-4005	Zone-1	4192	7.7	4531
J-ZN1-4007	Zone-1	4186	3.7	4309
J-ZN1-4013	Zone-1	4096	3.8	7182
J-ZN1-4015	Zone-1	4088	0.0	8733
J-ZN1-4017	Zone-1	4088	8.3	8320
J-ZN1-1436	Zone-1	4178	1.6	9569
J2568	Zone-1	4198	1.3	6300
J2570	Zone-1	4100	13.7	6531
J2572	Prescott	4202	3.2	1483
J-ZN1-0528A	Zone-1	4162	5.9	4416
P-ZN1-0856B	Zone-1	4162	34.8	3826
P-ZN1-0798A	Zone-1	4170	7.5	3878
J-ZN1-0306A	Zone-1	4124	3.6	2398
J-SH-115	Sierra Heights	4248	0.0	1695
HYDRANT597	Zone-3	4426	51.1	1930
J-ZN1-1281	Zone-1	4111	5.3	2220
HYD494	Zone-1	4172	5.8	1981

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
HYD1168	Zone-1	4097	7.3	10147
HYD157	Zone-1	4174	0.0	4990
HYD1167	Zone-1	4097	0.0	10093
HYD148	Zone-1	4122	0.0	4722
HYD1005	Zone-1	4090	0.0	8084
HYD1006	Zone-1	4090	0.0	8045
HYD595	Zone-1	4428		
J2578	Upper Moyina	4372	0.0	1742
J-ZN1-0642	Zone-1	4095	0.3	2077
J-ZN1-0010	Zone-1	4148	15.8	1832
J-ZN1-0542	Zone-1	4162	15.7	846
J-SL-0085	Lindley	4134	0.0	1866
J-WO-0010	West Oregon	4194	3.4	1685
J-ZN1-0365	Zone-1	4115	8.2	855
J-ZN1-0197	Zone-1	4172	7.2	2412
J-ZN1-0541	Zone-1	4220	4.6	803
J-ZN1-0359	Zone-1	4120	11.8	1331
J-PRV-2-OGD-0001	PRV_Ogden	4266	1.3	1277
J-WO-0008	West Oregon	4219	1.5	762
J-ZN1-0833	Zone-1	4099	6.1	2735
J-ZN1-0363	Zone-1	4104	2.4	1794
J-ZN1-0820	Zone-1	4289	0.2	0
J-SL-0087	Lindley	4195	8.7	462
J-PRE-0056	Prescott	4233	4.0	2250
J-ZN1-0555	Zone-1	4148	13.8	1481
J-ZN1-0800	Zone-1	4098	8.4	309
J-ZN1-0748	Zone-1	4220	4.5	2479
J-PRV-2-ELD-0015	PRV-2	4200	0.8	588
J-ZN1-0408	Zone-1	4091	1.5	2529
J-ZN1-0424	Zone-1	4092	2.9	2195
J-PRE-0048	Prescott	4269	6.2	827
J-ZN1-0190	Zone-1	4160	2.2	1552
J-UM-0010	Upper Moyina	4384	19.9	1179
J-ZN1-0371	Zone-1	4119	24.5	1191
J-PRE-0057	Prescott	4311	0.8	1489
J-PRV-MOY-0009	PRV-13	4269	1.5	907
J-UM-0004	Upper Moyina	4429	9.9	273
J-ZN1-0747	Zone-1	4121	7.7	39

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-2-ELD-0014	PRV-2	4192	3.9	527
J-ZN1-0247	Zone-1	4140	11.3	1305
J-CR-0002	Crown Ridge	4417	13.1	2201
J-PRV-MOY-0003	PRV-13	4269	10.5	55
J-ZN1-0303	Zone-1	4108	8.2	483
J-ZN1-0373	Zone-1	4101	1.6	586
J-PRE-1254	PRV-2-HWY	4195	0.0	3701
J-ZN1-0827	Zone-1	4178	5.5	432
J-PRV-2-ELD-0011	PRV-2	4202	6.3	1360
J-ZN1-0519	Zone-1	4141	1.7	2980
J-PRE-0010	Prescott	4291	2.1	1340
J-ZN1-0169	Zone-1	4173	16.3	1209
J-SL-0081	Lindley	4108	8.4	4895
J-ZN1-0487	Zone-1	4217	3.0	1121
J-FHH-0005	Foothill_Homedale	4252	11.7	2183
J-ZN1-0332	Zone-1	4103	0.5	921
J-ZN1-0385	Zone-1	4098	4.1	2369
J-ZN1-0477	Zone-1	4200	0.0	2825
J-PRE-0046	Prescott	4256	2.2	1177
J-PRV-MOY-0006	PRV-13	4295	5.5	616
J-PRE-0055	Prescott	4229	4.1	407
J-HOS-0056	URH-HOSP-HLVL	4225	4.4	147
J-PRE-0044	Prescott	4289	2.4	57
J-ZN1-0640	Zone-1	4089	0.6	1833
J-ZN1-0370	Zone-1	4115	17.8	1395
J-ZN1-0182	Zone-1	4112	4.9	3206
J-ZN1-0229	Zone-1	4122	11.3	1581
J-ZN1-0832	Zone-1	4211	3.2	1218
J-ZN1-0383	Zone-1	4120	0.0	4496
J-PRE-0053	Prescott	4279	1.0	361
J-PRE-0038	Prescott	4184	0.0	2242
J-ZN1-0368	Zone-1	4110	12.1	1334
J-ZN1-0113	Zone-1	4180	4.2	1919
J-ZN1-0148	Zone-1	4146	10.4	4189
J-ZN1-0286	Zone-1	4110	6.0	1858
J-PRV-HWY-0009	PRV-2-HWY	4206	1.5	2545
J-PRE-0024	Prescott	4230	9.6	1254

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-MOY-0012	PRV-13	4293	0.9	960
J-ZN1-0470	Zone-1	4223	12.3	982
J-ZN1-0759	Zone-1	4223	1.2	883
J-ZN1-0162	Zone-1	4146	3.7	2369
J-UL-0003	Upper Lynnewood	4306	8.3	1365
J-ZN1-0009	Zone-1	4153	0.2	1759
J-ZN1-0331	Zone-1	4105	0.0	2451
J-ZN1-0699	Zone-1	4129	0.1	612
J-ZN1-0115	Zone-1	4192	3.5	1525
J-ZN1-0393	Zone-1	4094	11.0	2984
J-ZN1-0840	Zone-1	4242	3.1	168
J-ZN1-0278	Zone-1	4110	3.6	1682
J-ZN1-0188	Zone-1	4152	0.0	2657
J-ZN1-0737	Zone-1	4246	1.8	1783
J-ZN1-0787	Zone-1	4122	29.6	1647
J-WO-0009	West Oregon	4213	1.7	1634
J-ZN1-0364	Zone-1	4108	32.4	1353
J-ZN1-0144	Zone-1	4139	8.9	4302
J-ZN1-0109	Zone-1	4217	0.8	1640
J-PRE-0003	Prescott	4250	1.3	1554
J-ZN1-0043	Zone-1	4100	11.1	404
J-PRV-2-ELD-0002	PRV-2	4248	6.7	1000
J-ZN1-0836	Zone-1	4227	2.3	374
J-ZN1-0808	Zone-1	4098	67.8	1448
J-ZN1-0329	Zone-1	4098	4.4	6149
J-ZN1-0406	Zone-1	4094	0.6	1173
J-ZN1-0091	Zone-1	4142	0.0	4737
J-SL-0072	Lindley	4260	0.0	1015
J-ZN1-0735	Zone-1	4218	3.6	3078
J-ZN1-0158	Zone-1	4140	6.1	1423
J-ZN1-0191	Zone-1	4167	2.4	1682
J-SL-0086	Lindley	4217	20.5	1091
J-ZN1-0538	Zone-1	4225	10.5	937
J-HOS-0009	URH-HOSP-HLVL	4319	0.0	2081
J-ZN1-0071	Zone-1	4134	48.8	1367
J-PRE-0058	Prescott	4313	1.4	791
J-UM-0005	Upper Moyina	4417	4.7	363
J-ZN1-0061	Zone-1	4205	3.5	1006

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-2-OGD-0003	PRV_Ogden	4255	2.8	1072
J-ZN1-0766	Zone-1	4199	9.1	400
J-ZN1-0423	Zone-1	4092	0.0	3200
J-ZN1-0513	Zone-1	4153	0.0	3510
J-HOS-0051	URH-HOSP-HLVL	4252	0.0	4347
J-ZN1-0294	Zone-1	4098	6.7	1704
J-ZN1-0086	Zone-1	4124	0.0	5635
J-PRE-0006	Prescott	4306	2.2	788
J-PRV-2-ELD-0013	PRV-2	4208	17.4	593
J-ZN1-0421	Zone-1	4092	0.7	654
J-PRV-HWY-0011	PRV-2-HWY	4184	9.4	1705
J-ZN1-0797	Zone-1	4098	0.4	899
J-HOS-0057	URH-HOSP-HLVL	4386	2.7	1199
J-PRV-2-ELD-0012	PRV-2	4219	17.4	1494
J-ZN1-0170	Zone-1	4158	0.0	1903
J-SL-0082	Lindley	4204	15.3	1175
J-ZN1-0028	Zone-1	4138	0.2	551
J-ZN1-0372	Zone-1	4128	7.5	859
J-ZN1-0534	Zone-1	4141	1.0	2616
J-ZN1-0390	Zone-1	4100	5.6	1481
J-ZN1-0041	Zone-1	4100	7.1	534
J-PRV-3-UMO-0005	PRV-3	4309	0.0	1198
J-ZN1-0304	Zone-1	4109	7.8	440
J-PRE-0045	Prescott	4272	0.7	2202
J-ZN1-0108	Zone-1	4122	0.5	2074
J-UL-0007	Upper Lynnewood	4228	5.3	1786
J-FHH-0009	Foothill_Homedale	4310	7.3	644
J-ZN1-0398	Zone-1	4093	11.9	6704
J-UM-0015	Upper Moyina	4446	15.8	876
J-ZN1-0639	Zone-1	4091	3.1	6981
J-PAT-0017	Patterson	4357	9.1	360
J-ZN1-0369	Zone-1	4100	4.0	1127
J-PRE-0050	Prescott	4232	1.9	1461
J-SL-0089	Lindley	4284	1.7	1029
J-ZN1-0760	Zone-1	4190	5.0	1198
J-HOS-0108	URH-HOSP-HLVL	4259	0.8	1182

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-2-ELD-0022	PRV-2	4250	7.6	471
J-PRV-SL-0004	Stewart_Lenox_PRV	4134	4.7	152
J-PRV-SL-0003	Stewart_Lenox_PRV	4212	1.4	54
J-SL-0016	Stewart_Lenox	4178	0.1	3422
J-SL-0051	Stewart_Lenox	4227	0.8	86
J-SL-0005	Stewart_Lenox	4246	2.0	68
J-SL-0023	Stewart_Lenox	4198	4.7	2032
J-SL-0026	Stewart_Lenox	4188	0.0	2438
J-PRV-SL-0007	Stewart_Lenox_PRV	4230	0.3	201
J-PRV-SL-0008	Stewart_Lenox_PRV	4204	0.7	271
J-PRV-SL-0010	Stewart_Lenox_PRV	4126	1.9	75
J-PRV-SL-0013	Stewart_Lenox_PRV	4114	42.1	1702
J-PRV-SL-0015	Stewart_Lenox_PRV	4114	0.0	285
J-SL-0046	Stewart_Lenox	4241	0.0	61
J-ZN1-0326	Zone-1	4088	0.0	2300
J-ZN1-0327	Zone-1	4089	43.5	1416
J-ESI-0002	ESI	4388	59.1	160
J-ESI-0003	ESI	4354	0.0	115
J-ZN1-1258	Zone-1	4175	0.2	2851
J-SH-0001	Sierra Heights	4232	4.0	2157
J-PAT-0023	Patterson	4187	2.2	3347
J-SL-0002	Stewart_Lenox	4186	0.0	2116
J-ZN1-0933	Zone-1	4153	6.1	1254
J-ZN1-0935	Zone-1	4151	0.0	966
J-SL-0064	Lindley	4147	17.0	1542
J-ZN1-0003	Zone-1	4092	55.0	2103
J-ZN1-0226	Zone-1	4090	0.0	1742
J-PRV-HWY-0013	PRV-2-HWY	4217	0.3	2466
J-PRV-HWY-0014	PRV-2-HWY	4221	3.1	2854
J-PRV-HWY-0017	PRV-2-HWY	4241	14.5	2399
J-PRV-HWY-0018	PRV-2-HWY	4216	0.0	2960
J-PRV-HWY-0019	PRV-2-HWY	4222	1.3	3035
J-PRV-HWY-0021	PRV-2-HWY	4238	1.7	2961
J-HOS-0091	URH-HOSP-HLVL	4331	0.7	1945
J-HOS-0092	URH-HOSP-HLVL	4284	0.0	2133
J-HOS-0093	URH-HOSP-HLVL	4315	3.8	1870
J-HOS-0094	URH-HOSP-HLVL	4328	0.0	3489
J-HOS-0095	URH-HOSP-HLVL	4454	2.3	87
J-HOS-0096	URH-HOSP-HLVL	4452	0.0	328
J-HOS-0098	URH-HOSP-HLVL	4352	98.4	1021
J-HOS-0099	URH-HOSP-HLVL	4318	15.7	2857
J-ZN1-1066	Zone-1	4146	11.3	1724
J-ZN1-1079	Zone-1	4174	40.1	1311
J-ZN1-1090	Zone-1	4171	2.5	2309
J-ZN1-1119	Zone-1	4204	0.7	1776
J-ZN1-1172	Zone-1	4220	5.8	1015
J-ZN1-1192	Zone-1	4207	4.5	1803
J-HOS-0062	URH-HOSP-HLVL	4274	57.1	2415
J-HOS-0064	URH-HOSP-HLVL	4302	0.3	3284
J-HOS-0065	URH-HOSP-HLVL	4344	8.6	1191
J-HOS-0066	URH-HOSP-HLVL	4401	6.1	1017
J-CR-0004	Crown Ridge	4444	6.3	1972
J-HOS-0068	URH-HOSP-HLVL	4253	10.6	1925
J-ZN1-0875	Zone-1	4238	2.5	539
J-PRE-0065	Prescott	4246	2.9	2082
J-PRE-0070	Prescott	4261	3.4	883
J-PRE-0072	Prescott	4194	2.5	1502
J-PRE-0073	Prescott	4196	6.6	1257
J-HOS-0082	URH-HOSP-HLVL	4296	33.9	1899
J-HOS-0084	URH-HOSP-HLVL	4309	7.1	1489
J-ZN1-1000	Zone-1	4184	15.6	1200
J-ZN1-1002	Zone-1	4201	8.2	980
J-PRV-OFR-0005	PRV-6	4210	11.2	1777
J-PRV-OFR-0007	PRV-6	4231	5.6	1679
J-ZN1-1004	Zone-1	4112	32.7	1480
J-ZN1-1008	Zone-1	4150	8.2	4621
J-ZN1-1011	Zone-1	4152	0.0	3994
J-ZN1-1012	Zone-1	4154	0.0	3851
J-ZN1-1015	Zone-1	4225	5.9	2798
J-PRE-0086	Prescott	4210	3.9	2135

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-UL-0012	Upper Lynnewood	4212	3.8	3576
J-PRE-0088	Prescott	4256	2.2	1720
J-ZN1-1016	Zone-1	4219	1.5	1057
J-ZN1-1017	Zone-1	4250	0.9	417
J-ZN1-1021	Zone-1	4195	2.1	1567
J-ZN1-1022	Zone-1	4092	1.2	1978
J-ZN1-1024	Zone-1	4090	0.0	2186
J-ZN1-1026	Zone-1	4120	1.7	1506
J-ZN1-1028	Zone-1	4122	0.0	1439
J-ZN1-1030	Zone-1	4106	0.2	1389
J-ZN1-1032	Zone-1	4106	1.8	1172
J-ZN1-1033	Zone-1	4149	12.9	1214
J-ZN1-1034	Zone-1	4164	0.8	1103
J-ZN1-1036	Zone-1	4129	4.9	1229
J-PAT-0050	Patterson	4236	7.7	1828
J-PAT-0053	Patterson	4361	4.1	1498
J-PAT-0054	Patterson	4322	6.2	2059
J-PAT-0055	Patterson	4373	11.3	1348
J-FHH-0016	Foothill_Homedale	4248	1.3	3807
J-PAT-0057	Patterson	4318	12.7	2353
J-PAT-0060	Patterson	4357	5.1	2209
J-PAT-0064	Patterson	4413	4.5	1497
J-BV-0002	Zone-5	4401	4.9	6416
J-BV-0004	Zone-5	4460	0.0	5304
J-BV-0005	Zone-5	4547	0.0	2095
J-BV-0006	Zone-5	4543	0.0	2096
J-BV-0008	Zone-5	4548	4.2	2170
J-BV-0010	Zone-5	4494	0.0	3594
J-PAT-0066	Patterson	4420	10.0	673
J-PAT-0067	Patterson	4389	7.5	470
J-ZN1-1037	Zone-1	4175	8.7	4693
J-ZN1-1039	Zone-1	4158	7.5	1203
J-ZN1-1041	Zone-1	4159	4.9	4733
J-ZN1-1045	Zone-1	4140	6.5	1168
J-ZN1-1048	Zone-1	4109	13.5	1487
J-ZN1-1050	Zone-1	4122	5.5	1302
J-ZN1-1052	Zone-1	4095	12.1	2155
J-ZN1-1054	Zone-1	4092	1.1	6117
J-ZN1-1056	Zone-1	4094	7.5	1431
J-ZN1-1057	Zone-1	4108	3.4	4360
J-SL-0104	Lindley	4218	0.9	2254
J-SL-0105	Lindley	4209	1.7	1459
J-ZN1-1059	Zone-1	4094	1.7	3395
J-ZN1-1061	Zone-1	4100	1.6	1898
J-ZN1-1062	Zone-1	4100	2.9	2393
J-ZN1-1063	Zone-1	4101	11.4	2107
J-ZN1-1064	Zone-1	4099	14.6	1865
J-KL-0002	Katie Lane	4232	3.3	2727
J-KL-0006	Katie Lane	4202	26.0	2650
J-PRV-2-OGD-0004	PRV_Ogden	4266	2.8	1130
J-PRV-2-OGD-0005	PRV_Ogden	4242	3.7	1065
J-PRV-2-OGD-0006	PRV_Ogden	4236	7.5	983
J-PRV-2-OGD-0007	PRV_Ogden	4250	2.4	1216
J-PAT-0071	Patterson	4247	0.0	3983
J-PAT-0072	Patterson	4256	0.0	3379
J-PAT-0073	Patterson	4238	0.1	2531
J-PAT-0074	Patterson	4333	22.5	1668
J-PAT-0075	Patterson	4243	0.0	1599
J-SH-0007	Sierra Heights	4262	9.3	1063
J-SH-0008	Sierra Heights	4274	12.2	919
J-ZN1-1069	Zone-1	4191	1.5	2112
J-ZN1-1072	Zone-1	4176	15.1	1803
J-ZN1-1074	Zone-1	4182	0.6	1576
J-ZN1-1076	Zone-1	4161	23.6	945
J-ZN1-1080	Zone-1	4178	7.0	2323
J-ZN1-1083	Zone-1	4094	0.0	317
J-SL-0107	Lindley	4188	3.8	4383
J-ZN1-1087	Zone-1	4091	0.7	4823
J-ZN1-1092	Zone-1	4088	0.0	7321
J-ZN1-1096	Zone-1	4092	4.4	3195
J-ZN1-1097	Zone-1	4100	28.7	4550
J-ZN1-1098	Zone-1	4100	10.7	3798
J-ZN1-1103	Zone-1	4099	2.7	4499
J-ZN1-1113	Zone-1	4138	14.7	1655
J-ZN1-1114	Zone-1	4157	11.3	3387
J-ZN1-1118	Zone-1	4154	2.2	3158

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1121	Zone-1	4163	12.2	3120
J-ZN1-1123	Zone-1	4170	4.4	2112
J-ZN1-1125	Zone-1	4166	5.7	1894
J-ZN1-1127	Zone-1	4170	1.9	1928
J-ZN1-1131	Zone-1	4154	5.4	1854
J-ZN1-1132	Zone-1	4158	0.0	2745
J-ZN1-1133	Zone-1	4162	3.8	2464
J-ZN1-1138	Zone-1	4178	0.0	1858
J-ZN1-1140	Zone-1	4168	8.1	1731
J-ZN1-1142	Zone-1	4159	1.4	1604
J-ZN1-1144	Zone-1	4151	2.2	1855
J-ZN1-1148	Zone-1	4108	5.1	1547
J-ZN1-1149	Zone-1	4100	4.6	2077
J-ZN1-1150	Zone-1	4101	11.3	505
J-ZN1-1151	Zone-1	4110	1.6	3160
J-ZN1-1152	Zone-1	4110	0.1	739
J-ZN1-1154	Zone-1	4110	0.0	762
J-ZN1-1156	Zone-1	4110	1.7	769
J-ZN1-1157	Zone-1	4109	4.1	430
J-ZN1-1158	Zone-1	4117	7.9	1607
J-ZN1-1160	Zone-1	4139	11.0	1037
J-ZN1-1163	Zone-1	4104	0.0	4520
J-ZN1-1165	Zone-1	4106	6.8	2023
J-ZN1-1173	Zone-1	4106	0.0	3459
J-ZN1-1175	Zone-1	4106	0.0	3010
J-ZN1-1177	Zone-1	4138	11.9	2118
J-ZN1-1185	Zone-1	4159	2.5	1324
J-ZN1-1187	Zone-1	4168	16.0	2264
J-ZN1-1189	Zone-1	4152	2.0	1519
J-ZN1-1190	Zone-1	4148	0.0	2527
J-ZN1-1201	Zone-1	4090	0.0	1862
J-ZN1-1203	Zone-1	4090	0.0	1868
J-ZN1-1204	Zone-1	4090	16.9	1706
J-ZN1-1206	Zone-1	4089	1.4	1091
J-ZN1-1207	Zone-1	4094	1.2	6041
J-ZN1-1214	Zone-1	4088	0.0	8128

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1233	Zone-1	4084	0.0	1559
J-ZN1-1234	Zone-1	4090	0.0	1844
J-ZN1-1235	Zone-1	4089	0.0	1729
J-ZN1-1237	Zone-1	4088	0.0	1228
J-ZN1-1240	Zone-1	4088	1.0	1874
J-ZN1-0872	Zone-1	4088	0.3	3935
J-ZN1-0873	Zone-1	4088	0.0	5016
J-ZN1-0239	Zone-1	4164	0.0	2393
J-PRE-0019	Prescott	4254	2.4	2513
J-ZN1-0882	Zone-1	4144	9.4	114
J-ZN1-0883	Zone-1	4110	1.0	896
J-ZN1-0886	Zone-1	4096	7.6	1616
J-ZN1-0923	Zone-1	4179	2.0	3300
J-ZN1-0925	Zone-1	4198	3.1	1794
J-ZN1-0929	Zone-1	4182	5.6	2692
J-HOS-0074	URH-HOSP-HLVL	4334	0.0	4110
J-ZN1-0932	Zone-1	4088	0.0	925
J-ZN1-0934	Zone-1	4088	0.0	1343
J-PRE-0078	Prescott	4253	3.9	2738
J-ZN1-0940	Zone-1	4151	1.9	1040
J-HOS-0078	URH-HOSP-HLVL	4324	8.7	2782
J-ZN1-0955	Zone-1	4090	0.0	1670
J-ZN1-0970	Zone-1	4104	1.1	3494
J-ZN1-0971	Zone-1	4108	10.3	864
J-SL-0003	Stewart_Lenox	4214	2.8	2424
J-HC-0002	Havencrest	4396	6.8	514
J-SL-0111	Stewart_Lenox	4215	0.6	443
J-ZN1-4008	Zone-1	4230	1.9	1801
P-ZN1-0798B	Zone-1	4172	8.9	2443
J-ZN1-0306B	Zone-1	4144	4.3	1822
J-SH-0100	Sierra Heights	4282	0.7	1095
J-SH-0105	Sierra Heights	4282	1.2	1078
J-SH-0110	Sierra Heights	4268	8.8	1486
J-SH-120	Sierra Heights	4271	0.0	1196
J-SH-125	Sierra Heights	4246	0.9	1481

Appendix J. Pressures at Peak-Hour Demand with Phase 1 and Phase 2 Improvement

J. Pressures at Peak-Hour Demand with Phase 1 and Phase 2 Improvement

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0810	Zone-1	4098	3.7	86
J-ZN1-0163	Zone-1	4154	10.9	53
J-ZN1-0166	Zone-1	4169	8.3	53
J-ZN1-0671	Zone-1	4098	31.3	80
J-PRE-0030	Prescott	4244	9.9	47
J-ZN1-0179	Zone-1	4112	28.6	71
J-ZN1-0572	Zone-1	4176	0.0	61
J-ZN1-0716	Zone-1	4111	5.3	75
J-ZN1-0768	Zone-1	4120	8.9	49
J-ZN1-0285	Zone-1	4108	14.1	73
J-ZN1-0213	Zone-1	4116	7.6	69
J-ZN1-0615	Zone-1	4142	12.3	65
J-ZN1-0858	Zone-1	4154	0.6	62
J-ZN1-0830	Zone-1	4186	2.2	61
J-PRV-MOY-0005	PRV-13	4268	25.5	81
J-ZN1-0743	Zone-1	4120	6.4	74
J-ZN1-0642	Zone-1	4095	0.5	80
J-UL-0004	Upper Lynnewood	4269	0.6	60
J-ZN1-0869	Zone-1	4183	9.0	63
J-ZN1-0661	Zone-1	4123	4.7	60
J-ZN1-0010	Zone-1	4148	25.3	65
J-ZN1-0464	Zone-1	4185	16.1	54
J-ZN1-0098	Zone-1	4136	2.5	39
J-HOS-0028	URH-HOSP-HLVL	4317	31.0	71
J-ZN1-0116	Zone-1	4166	4.3	52
J-ZN1-0102	Zone-1	4174	2.7	50
J-ZN1-0512	Zone-1	4132	5.8	75
J-HOS-0058	URH-HOSP-HLVL	4369	4.7	49
J-ZN1-0526	Zone-1	4227	0.7	42
J-ZN1-0752	Zone-1	4162	17.5	60

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-HWY-0008	PRV-2-HWY	4233	0.6	53
J-ZN1-0576	Zone-1	4217	2.2	53
J-ZN1-0542	Zone-1	4162	25.2	71
J-ZN1-0773	Zone-1	4100	15.4	76
J-ZN1-0394	Zone-1	4091	1.7	88
J-ZN1-0361	Zone-1	4116	14.2	69
J-ZN1-0026	Zone-1	4096	10.1	64
J-ZN1-0589	Zone-1	4118	9.4	77
J-ZN1-0037	Zone-1	4104	7.4	75
J-ZN1-0834	Zone-1	4214	0.0	45
J-TW-0003	Tanglewood	4820	20.5	74
J-HOS-0052	URH-HOSP-HLVL	4322	21.6	74
J-ZN1-0841	Zone-1	4134	6.4	76
J-ZN1-0469	Zone-1	4150	22.4	70
J-ZN1-0709	Zone-1	4098	8.5	70
J-ZN1-0279	Zone-1	4110	4.1	72
J-PAT-0033	Patterson	4470	45.7	14
J-ZN1-0517	Zone-1	4122	10.7	80
J-PRE-0039	Prescott	4224	10.9	55
J-ZN1-0738	Zone-1	4212	7.2	56
J-ZN1-0635	Zone-1	4090	0.0	82
J-SL-0085	Lindley	4134	0.0	107
J-ZN1-0778	Zone-1	4096	11.9	82
J-ZN1-0547	Zone-1	4179	8.1	64
J-WO-0010	West Oregon	4194	5.4	120
J-ZN1-0365	Zone-1	4115	13.1	70
J-PRV-2-ELD-0003	PRV-2	4226	1.5	60
J-ZN1-0145	Zone-1	4134	13.2	62
J-ZN1-0110	Zone-1	4192	13.6	42
J-ZN1-0072	Zone-1	4148	0.4	62

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0412	Zone-1	4099	54.3	88
J-ZN1-0381	Zone-1	4092	32.0	83
J-ZN1-0161	Zone-1	4144	19.5	57
J-PRV-2-ELD-0010	PRV-2	4219	17.4	63
J-PRE-0029	Prescott	4237	7.6	53
J-ZN1-0570	Zone-1	4178	15.9	61
J-ZN1-0714	Zone-1	4125	3.3	65
J-ZN1-0438	Zone-1	4102	13.3	84
J-ZN1-0684	Zone-1	4146	9.8	65
J-PRE-0032	Prescott	4263	3.4	39
J-ZN1-0204	Zone-1	4118	8.1	68
J-PRE-0011	Prescott	4213	3.1	60
J-ZN1-0051	Zone-1	4142	11.5	62
J-ZN1-0732	Zone-1	4196	1.4	41
J-ZN1-0299	Zone-1	4098	20.5	77
J-ZN1-0741	Zone-1	4220	3.3	53
J-PAT-0035	Patterson	4346	16.3	70
J-ZN1-0197	Zone-1	4172	11.6	45
J-PRE-0062	Prescott	4218	8.8	60
J-UL-0002	Upper Lynnewood	4295	14.1	49
J-ZN1-0062	Zone-1	4174	9.3	92
J-ZN1-0495	Zone-1	4208	4.2	52
J-ZN1-0462	Zone-1	4099	0.0	97
J-HOS-0026	URH-HOSP-HLVL	4271	5.5	91
J-ZN1-0330	Zone-1	4103	0.0	75
J-ZN1-0114	Zone-1	4193	2.0	42
J-ZN1-0100	Zone-1	4254	2.3	21
J-ZN1-0510	Zone-1	4138	2.5	73
J-ZN1-0178	Zone-1	4265	7.9	17
J-ZN1-0130	Zone-1	4134	8.6	65
J-PRV-HWY-0007	PRV-2-HWY	4191	13.6	71
J-ZN1-0771	Zone-1	4165	45.7	54
J-ZN1-0541	Zone-1	4220	7.4	45
J-ZN1-0392	Zone-1	4092	10.2	85
J-ZN1-0359	Zone-1	4120	18.9	67
J-PRV-MOY-0007	PRV-13	4255	19.5	79
J-ZN1-0587	Zone-1	4218	37.3	34
J-ZN1-0641	Zone-1	4112	23.1	70
J-ZN1-0407	Zone-1	4092	0.1	84

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0019	Zone-1	4114	0.0	65
J-ZN1-0802	Zone-1	4092	0.0	46
J-ZN1-0087	Zone-1	4112	0.4	79
J-ZN1-0839	Zone-1	4192	1.0	57
J-SL-0093	Lindley	4173	0.0	90
J-ZN1-0467	Zone-1	4139	34.2	74
J-ZN1-0434	Zone-1	4106	3.0	83
J-ZN1-0707	Zone-1	4099	14.3	70
J-ZN1-0525	Zone-1	4104	26.4	67
J-ZN1-0187	Zone-1	4160	1.0	50
J-ZN1-0277	Zone-1	4110	14.8	72
J-ZN1-0515	Zone-1	4121	9.4	80
J-ZN1-0293	Zone-1	4106	11.5	74
J-ZN1-0736	Zone-1	4222	8.4	44
J-PRV-2-OGD-0001	PRV_Ogden	4266	2.0	81
J-ZN1-0776	Zone-1	4102	6.4	78
J-WO-0008	West Oregon	4219	2.5	109
J-ZN1-0833	Zone-1	4099	9.8	60
J-ZN1-0363	Zone-1	4104	3.8	75
J-PRV-2-ELD-0007	PRV-2	4228	9.8	59
J-PRV-MOY-0008	PRV-13	4248	8.3	91
J-ZN1-0057	Zone-1	4178	0.0	50
J-ZN1-0410	Zone-1	4092	17.8	89
J-ZN1-0379	Zone-1	4108	13.0	76
J-ZN1-0159	Zone-1	4140	26.5	59
J-HOS-0054	URH-HOSP-HLVL	4388	37.6	45
J-ZN1-0313	Zone-1	4286	0.0	9
J-ZN1-0820	Zone-1	4289	0.3	20
J-ZN1-0712	Zone-1	4092	11.3	73
J-ZN1-0613	Zone-1	4156	7.6	64
J-ZN1-0581	Zone-1	4193	0.2	53
J-ZN1-0032	Zone-1	4136	10.2	64
J-ZN1-0729	Zone-1	4214	1.5	45
J-ZN1-0546	Zone-1	4150	13.0	55
J-ZN1-0260	Zone-1	4110	43.6	72
J-ZN1-0297	Zone-1	4099	11.6	77
J-ZN1-0044	Zone-1	4098	6.3	79
J-PRE-0060	Prescott	4248	6.2	45
J-SL-0087	Lindley	4195	14.0	81

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0056	Prescott	4233	6.4	56
J-PRV-3-UMO-0002	PRV-3	4317	20.0	78
J-ZN1-0324	Zone-1	4100	2.5	76
J-ZN1-0508	Zone-1	4109	2.8	78
J-ZN1-0093	Zone-1	4176	9.4	52
J-ZN1-0599	Zone-1	4116	17.4	70
J-HOS-0038	URH-HOSP-HLVL	4345	0.0	65
J-ZN1-0128	Zone-1	4138	14.2	62
J-PAT-0015	Patterson	4431	3.6	14
J-HOS-0061	URH-HOSP-HLVL	4253	13.4	100
J-ZN1-0539	Zone-1	4192	12.9	57
J-PRE-0047	Prescott	4246	1.1	46
J-ZN1-0687	Zone-1	4150	13.1	64
J-ZN1-0657	Zone-1	4134	17.1	68
J-ZN1-0740	Zone-1	4104	5.4	60
J-ZN1-0555	Zone-1	4148	22.1	75
J-ZN1-0585	Zone-1	4172	18.7	54
J-PAT-0002	Patterson	4281	11.3	90
J-ZN1-0405	Zone-1	4094	1.5	60
J-ZN1-0800	Zone-1	4098	13.5	77
J-PRE-0013	Prescott	4218	1.2	58
J-PRE-0028	Prescott	4240	5.9	53
J-ZN1-0080	Zone-1	4138	10.6	66
J-PRE-0059	Prescott	4257	0.6	41
J-PAT-0021	Patterson	4437	29.6	12
J-ZN1-0705	Zone-1	4103	7.5	69
J-ZN1-0432	Zone-1	4112	14.7	81
J-ZN1-0854	Zone-1	4093	0.0	87
J-ZN1-0625	Zone-1	4100	24.5	93
J-ZN1-0482	Zone-1	4262	1.0	20
J-ZN1-0445	Zone-1	4107	11.2	85
J-ZN1-0291	Zone-1	4102	10.3	76
J-PAT-0043	Patterson	4310	2.3	82
J-PRV-HWY-0001	PRV-2-HWY	4234	37.6	53
J-ZN1-0815	Zone-1	4136	17.3	72
J-SL-0067	Lindley	4216	16.2	71
J-WO-0007	West Oregon	4268	3.6	88
J-ZN1-0748	Zone-1	4220	7.2	31
J-HOS-0020	URH-HOSP-HLVL	4228	2.5	110

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0560	Zone-1	4192	16.4	56
J-PRV-2-ELD-0015	PRV-2	4200	1.3	71
J-ZN1-0408	Zone-1	4091	2.4	72
J-ZN1-0377	Zone-1	4098	20.7	81
J-ZN1-0466	Zone-1	4178	0.0	43
J-ZN1-0122	Zone-1	4164	11.5	53
J-ZN1-0157	Zone-1	4138	26.1	60
J-ZN1-0424	Zone-1	4092	4.6	74
J-PRE-0048	Prescott	4269	9.9	36
J-ZN1-0682	Zone-1	4102	46.5	74
J-ZN1-0650	Zone-1	4184	18.8	46
J-ZN1-0611	Zone-1	4179	3.6	54
J-ZN1-0190	Zone-1	4160	3.6	50
J-ZN1-0727	Zone-1	4090	0.0	82
J-ZN1-0450	Zone-1	4114	1.9	82
J-ZN1-0775	Zone-1	4116	30.6	51
J-ZN1-0295	Zone-1	4096	7.2	78
J-ZN1-0257	Zone-1	4112	44.8	71
J-PAT-0009	Patterson	4368	0.0	62
J-ZN1-0094	Zone-1	4148	2.1	67
J-ZN1-0311	Zone-1	4096	23.4	81
J-UM-0010	Upper Moyina	4384	31.8	77
J-HOS-0023	URH-HOSP-HLVL	4267	7.2	93
J-ZN1-0669	Zone-1	4118	119.4	62
J-ZN1-0074	Zone-1	4152	30.7	62
J-ZN1-0475	Zone-1	4130	3.5	75
J-ZN1-0506	Zone-1	4111	12.6	78
J-HOS-0036	URH-HOSP-HLVL	4383	4.4	48
J-ZN1-0346	Zone-1	4104	14.2	74
J-ZN1-0126	Zone-1	4141	13.9	65
J-ZN1-0523	Zone-1	4211	2.5	48
J-ZN1-0524	Zone-1	4164	2.1	53
J-ZN1-0537	Zone-1	4207	16.3	51
J-ZN1-0022	Zone-1	4122	32.4	63
J-ZN1-0142	Zone-1	4136	12.1	63
J-ZN1-0655	Zone-1	4160	19.9	55
J-PRV-2-ELD-0006	PRV-2	4232	17.5	58
J-ZN1-0553	Zone-1	4149	5.2	75
J-ZN1-0784	Zone-1	4162	29.1	56

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0008	Prescott	4290	2.6	41
J-ZN1-0403	Zone-1	4092	27.4	54
J-ZN1-0371	Zone-1	4119	39.1	70
J-ZN1-0263	Zone-1	4108	8.0	73
J-ZN1-0173	Zone-1	4122	12.6	67
J-ZN1-0597	Zone-1	4205	6.0	52
J-PAT-0028	Patterson	4367	4.7	61
J-PRE-0057	Prescott	4311	1.2	18
J-ZN1-0814	Zone-1	4094	27.4	72
J-ZN1-0430	Zone-1	4104	10.2	85
J-ZN1-0852	Zone-1	4104	22.9	84
J-ZN1-0623	Zone-1	4104	25.3	90
J-PRV-MOY-0009	PRV-13	4269	2.3	82
J-ZN1-0443	Zone-1	4159	5.4	64
J-ZN1-0480	Zone-1	4102	7.4	84
J-ZN1-0720	Zone-1	4115	20.1	68
J-ZN1-0289	Zone-1	4107	49.5	74
J-PRE-0002	Prescott	4252	4.2	52
J-ZN1-0042	Zone-1	4104	3.9	75
J-ZN1-0686	Zone-1	4115	11.8	64
J-UM-0004	Upper Moyina	4429	15.9	57
J-ZN1-0491	Zone-1	4182	5.1	62
J-PRV-2-ELD-0001	PRV-2	4229	6.7	58
J-ZN1-0757	Zone-1	4215	1.5	47
J-ZN1-0747	Zone-1	4121	12.3	45
J-ZN1-0558	Zone-1	4148	21.8	74
J-PRV-2-ELD-0014	PRV-2	4192	6.3	75
J-ZN1-0375	Zone-1	4096	4.9	82
J-ZN1-0336	Zone-1	4102	18.0	75
J-ZN1-0082	Zone-1	4141	9.7	65
J-ZN1-0155	Zone-1	4134	15.1	62
J-ZN1-0120	Zone-1	4167	22.0	51
J-ZN1-0422	Zone-1	4093	2.0	73
J-ZN1-0389	Zone-1	4100	13.2	79
J-ZN1-0680	Zone-1	4102	9.6	79
J-ZN1-0857	Zone-1	4140	3.9	63
J-ZN1-0829	Zone-1	4194	7.6	54
J-ZN1-0725	Zone-1	4172	0.6	63
J-ZN1-0447	Zone-1	4237	1.4	32

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0035	Prescott	4236	7.3	49
J-ZN1-0247	Zone-1	4140	18.2	63
J-PAT-0004	Patterson	4332	36.2	70
J-ZN1-0077	Zone-1	4150	13.9	63
J-ZN1-0309	Zone-1	4100	14.6	80
J-ZN1-0090	Zone-1	4186	12.6	47
J-UM-0008	Upper Moyina	4362	25.4	87
J-PAT-0036	Patterson	4321	0.0	82
J-ZN1-0632	Zone-1	4152	1.0	78
J-CR-0002	Crown Ridge	4417	21.0	99
J-ZN1-0751	Zone-1	4220	15.2	34
J-HOS-0034	URH-HOSP-HLVL	4378	0.3	49
J-ZN1-0344	Zone-1	4104	21.1	74
J-ZN1-0124	Zone-1	4144	5.4	63
J-ZN1-0107	Zone-1	4159	35.2	57
J-ZN1-0521	Zone-1	4140	11.5	77
J-ZN1-0189	Zone-1	4236	21.8	28
J-PRV-MOY-0003	PRV-13	4269	16.7	68
J-ZN1-0140	Zone-1	4134	20.4	63
J-ZN1-0653	Zone-1	4147	10.2	62
J-ZN1-0782	Zone-1	4143	13.1	64
J-ZN1-0551	Zone-1	4156	6.3	72
J-PRE-0036	Prescott	4306	2.3	23
J-ZN1-0668	Zone-1	4110	0.0	75
J-PRE-0026	Prescott	4234	4.0	51
J-ZN1-0171	Zone-1	4120	9.7	68
J-ZN1-0644	Zone-1	4116	26.0	68
J-ZN1-0416	Zone-1	4096	14.5	68
J-ZN1-0812	Zone-1	4094	0.0	80
J-ZN1-0850	Zone-1	4108	8.0	80
J-ZN1-0621	Zone-1	4140	2.8	76
J-ZN1-0822	Zone-1	4149	0.0	79
J-ZN1-0478	Zone-1	4102	13.4	84
J-ZN1-0441	Zone-1	4236	10.2	31
J-ZN1-0718	Zone-1	4138	6.6	69
J-ZN1-0536	Zone-1	4137	0.0	60
J-SL-0083	Lindley	4151	6.5	100
J-ZN1-0024	Zone-1	4146	0.0	56
J-ZN1-0489	Zone-1	4205	24.4	52
J-ZN1-0035	Zone-1	4108	10.9	90

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0303	Zone-1	4108	13.1	73
J-ZN1-0745	Zone-1	4092	3.5	83
J-ZN1-0262	Zone-1	4224	25.9	32
J-ZN1-0837	Zone-1	4136	23.5	73
J-ZN1-0373	Zone-1	4101	2.6	78
J-ZN1-0334	Zone-1	4104	10.1	74
J-HOS-0030	URH-HOSP-HLVL	4357	1.1	54
J-ZN1-0569	Zone-1	4166	3.7	66
J-ZN1-0535	Zone-1	4196	7.9	56
J-ZN1-0420	Zone-1	4092	0.0	74
J-ZN1-0387	Zone-1	4096	0.0	80
J-ZN1-0678	Zone-1	4099	3.8	80
J-PRE-1254	PRV-2-HWY	4195	0.0	68
J-ZN1-0827	Zone-1	4178	8.8	61
J-ZN1-0796	Zone-1	4132	0.0	72
J-ZN1-0723	Zone-1	4200	3.8	46
J-ZN1-0692	Zone-1	4179	10.6	50
J-ZN1-0243	Zone-1	4138	0.0	60
J-ZN1-0591	Zone-1	4165	12.4	54
J-HOS-0008	URH-HOSP-HLVL	4279	5.6	88
J-ZN1-0494	Zone-1	4202	5.4	54
J-ZN1-0461	Zone-1	4103	9.0	95
J-ZN1-0557	Zone-1	4161	10.5	50
J-ZN1-0271	Zone-1	4108	57.6	73
J-ZN1-0307	Zone-1	4098	10.6	79
J-ZN1-0070	Zone-1	4140	10.1	66
J-ZN1-0631	Zone-1	4148	9.5	90
J-ZN1-0322	Zone-1	4102	12.0	75
J-ZN1-0323	Zone-1	4159	34.4	57
J-PRV-2-ELD-0011	PRV-2	4202	10.1	71
J-HOS-0032	URH-HOSP-HLVL	4269	5.0	96
J-ZN1-0338	Zone-1	4102	15.5	75
J-ZN1-0519	Zone-1	4141	2.7	73
J-ZN1-0105	Zone-1	4121	2.7	74
J-PRE-0010	Prescott	4291	3.4	39
J-ZN1-0856	Zone-1	4144	15.2	67
J-ZN1-0391	Zone-1	4092	0.3	85
J-ZN1-0358	Zone-1	4124	11.3	66
J-HOS-0047	URH-HOSP-HLVL	4311	0.0	84
J-ZN1-0049	Zone-1	4138	18.2	62

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0138	Zone-1	4148	25.2	58
J-FHH-0008	Foothill_Homedale	4257	5.3	83
J-ZN1-0015	Zone-1	4183	5.5	60
J-ZN1-0549	Zone-1	4158	0.0	74
J-ZN1-0696	Zone-1	4199	4.1	63
J-ZN1-0666	Zone-1	4104	3.8	81
J-ZN1-0749	Zone-1	4124	39.7	59
J-WO-0002	West Oregon	4209	6.8	114
J-TW-0002	Tanglewood	4183	0.0	350
J-ZN1-0169	Zone-1	4173	26.1	45
J-ZN1-0414	Zone-1	4104	0.0	92
J-ZN1-0092	Zone-1	4114	40.4	73
J-ZN1-0276	Zone-1	4109	7.2	72
J-ZN1-0186	Zone-1	4164	1.3	48
J-ZN1-0607	Zone-1	4165	9.9	61
J-ZN1-0848	Zone-1	4090	0.0	89
J-ZN1-0619	Zone-1	4163	12.3	58
J-UL-0011	Upper Lynnewood	4283	3.8	54
J-ZN1-0440	Zone-1	4094	1.2	87
J-ZN1-0865	Zone-1	4137	0.5	62
J-SL-0081	Lindley	4108	13.4	119
J-ZN1-0487	Zone-1	4217	4.9	41
J-ZN1-0456	Zone-1	4145	5.7	70
J-ZN1-0301	Zone-1	4098	5.0	79
J-FHH-0005	Foothill_Homedale	4252	18.7	85
J-ZN1-0085	Zone-1	4092	0.0	87
J-PAT-0019	Patterson	4393	3.2	49
J-ZN1-0047	Zone-1	4168	0.1	54
J-ZN1-0097	Zone-1	4173	4.2	66
J-ZN1-0765	Zone-1	4151	7.8	74
J-PRV-3-UMO-0006	PRV-3	4337	5.7	70
J-ZN1-0332	Zone-1	4103	0.8	75
J-ZN1-0568	Zone-1	4181	20.0	61
J-ZN1-0533	Zone-1	4164	3.3	62
J-UM-0014	Upper Moyina	4400	30.5	71
J-ZN1-0418	Zone-1	4094	1.2	69
J-ZN1-0385	Zone-1	4098	6.6	79
J-ZN1-0477	Zone-1	4200	0.0	32
J-ZN1-0132	Zone-1	4142	16.4	61
J-ZN1-0825	Zone-1	4199	2.7	55

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0794	Zone-1	4111	0.1	82
J-PRV-2-OGD-0002	PRV_Ogden	4281	77.5	74
J-PRE-0033	Prescott	4202	1.5	69
J-ZN1-0232	Zone-1	4136	19.5	61
J-ZN1-0868	Zone-1	4137	13.4	66
J-ZN1-0835	Zone-1	4197	6.6	63
J-ZN1-0459	Zone-1	4282	4.1	11
J-ZN1-0305	Zone-1	4104	2.2	75
J-ZN1-0269	Zone-1	4112	14.2	71
J-ZN1-0320	Zone-1	4100	1.7	76
J-PRV-2-ELD-0008	PRV-2	4218	13.4	63
J-ZN1-0677	Zone-1	4106	51.6	68
J-HOS-0060	URH-HOSP-HLVL	4251	6.1	101
J-PRE-0046	Prescott	4256	3.5	42
J-HOS-0045	URH-HOSP-HLVL	4414	16.8	100
J-ZN1-0356	Zone-1	4108	19.5	73
J-ZN1-0030	Zone-1	4144	4.1	71
J-ZN1-0136	Zone-1	4145	18.4	60
J-FHH-0006	Foothill_Homedale	4296	12.0	66
J-PRE-0005	Prescott	4277	3.3	42
J-ZN1-0056	Zone-1	4143	1.2	67
J-ZN1-0799	Zone-1	4106	25.5	74
J-ZN1-0493	Zone-1	4146	154.3	51
J-ZN1-0152	Zone-1	4160	37.8	50
J-ZN1-0664	Zone-1	4096	22.3	85
J-ZN1-0594	Zone-1	4209	14.0	33
J-ZN1-0564	Zone-1	4216	3.0	46
J-ZN1-0704	Zone-1	4101	14.2	69
J-ZN1-0676	Zone-1	4098	11.4	80
J-ZN1-0274	Zone-1	4108	12.2	73
J-ZN1-0184	Zone-1	4112	8.9	71
J-ZN1-0605	Zone-1	4166	14.8	58
J-PAT-0029	Patterson	4344	1.0	70
J-ZN1-0846	Zone-1	4094	2.5	88
J-ZN1-0863	Zone-1	4158	4.4	52
J-SL-0079	Lindley	4148	9.5	101
J-ZN1-0485	Zone-1	4187	11.3	54
J-ZN1-0454	Zone-1	4225	18.4	36
J-ZN1-0731	Zone-1	4161	6.3	73

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-UM-0002	Upper Moyina	4353	13.1	91
J-ZN1-0067	Zone-1	4116	39.8	69
J-ZN1-0643	Zone-1	4215	0.0	44
J-ZN1-0695	Zone-1	4119	9.0	62
J-PAT-0018	Patterson	4396	5.6	50
J-ZN1-0029	Zone-1	4208	19.8	39
J-ZN1-0501	Zone-1	4219	4.7	46
J-ZN1-0078	Zone-1	4151	6.1	61
J-ZN1-0763	Zone-1	4163	9.1	69
J-PRV-3-UMO-0004	PRV-3	4324	62.9	75
J-WO-0004	West Oregon	4238	25.7	101
J-ZN1-0531	Zone-1	4162	0.1	74
J-UM-0013	Upper Moyina	4401	31.0	70
J-ZN1-0618	Zone-1	4118	15.2	67
J-ZN1-0350	Zone-1	4104	26.1	74
J-ZN1-0610	Zone-1	4160	8.3	62
J-PRE-0025	Prescott	4248	3.0	49
J-ZN1-0058	Zone-1	4143	9.6	65
J-ZN1-0399	Zone-1	4092	14.9	89
J-ZN1-0792	Zone-1	4104	21.0	52
J-PRV-MOY-0006	PRV-13	4295	8.8	69
J-ZN1-0689	Zone-1	4182	13.2	48
J-ZN1-0659	Zone-1	4094	51.2	85
J-PRV-2-ELD-0017	PRV-2	4203	11.9	70
J-PRE-0055	Prescott	4229	6.6	53
J-PRV-OFR-0002	PRV-6	4248	9.5	64
J-ZN1-0267	Zone-1	4110	12.4	72
J-ZN1-0177	Zone-1	4114	16.0	70
J-ZN1-0505	Zone-1	4114	16.0	79
J-ZN1-0474	Zone-1	4120	27.8	80
J-ZN1-0318	Zone-1	4092	2.0	81
J-HOS-0056	URH-HOSP-HLVL	4225	7.1	115
J-PAT-0037	Patterson	4378	0.0	58
J-SL-0073	Lindley	4239	38.3	61
J-ZN1-0769	Zone-1	4185	0.0	40
J-PRE-0044	Prescott	4289	3.9	27
J-HOS-0044	URH-HOSP-HLVL	4431	8.3	93
J-ZN1-0354	Zone-1	4110	8.1	72

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0640	Zone-1	4089	0.9	82
J-ZN1-0134	Zone-1	4136	16.5	64
J-ZN1-0027	Zone-1	4123	4.2	60
J-ZN1-0231	Zone-1	4232	15.8	29
J-HOS-0011	URH-HOSP-HLVL	4224	5.3	115
J-ZN1-0402	Zone-1	4090	5.8	47
J-ZN1-0370	Zone-1	4115	28.4	72
J-ZN1-0038	Zone-1	4104	2.0	75
J-ZN1-0150	Zone-1	4155	3.3	55
J-PRE-0034	Prescott	4243	7.2	53
J-ZN1-0562	Zone-1	4185	13.4	59
J-ZN1-0702	Zone-1	4098	13.1	69
J-ZN1-0429	Zone-1	4093	27.0	76
J-ZN1-0674	Zone-1	4100	30.0	80
J-ZN1-0603	Zone-1	4156	8.9	64
J-ZN1-0182	Zone-1	4112	7.9	71
J-ZN1-0645	Zone-1	4118	22.5	67
J-ZN1-0426	Zone-1	4093	0.0	80
J-ZN1-0288	Zone-1	4104	0.7	75
J-ZN1-0229	Zone-1	4122	18.1	67
J-ZN1-0861	Zone-1	4200	8.5	34
J-SL-0077	Lindley	4185	13.0	85
J-ZN1-0832	Zone-1	4211	5.1	50
J-ZN1-0452	Zone-1	4185	13.8	56
J-ZN1-0798	Zone-1	4100	0.0	64
J-UL-0006	Upper Lynnewood	4230	48.7	77
J-SL-0090	Lindley	4236	3.2	63
J-ZN1-0499	Zone-1	4219	3.3	46
J-ZN1-0017	Zone-1	4186	15.7	48
J-ZN1-0312	Zone-1	4094	6.5	82
J-ZN1-0073	Zone-1	4140	9.4	66
J-ZN1-0154	Zone-1	4139	5.5	59
J-ZN1-0119	Zone-1	4166	4.1	52
J-ZN1-0273	Zone-1	4207	10.9	38
J-UM-0011	Upper Moyina	4485	0.0	34
J-ZN1-0529	Zone-1	4160	0.0	74
J-ZN1-0845	Zone-1	4150	0.0	64
J-ZN1-0383	Zone-1	4120	0.0	77
J-ZN1-0348	Zone-1	4109	23.1	72
J-ZN1-0578	Zone-1	4218	9.8	53

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0545	Zone-1	4194	7.2	57
J-ZN1-0040	Zone-1	4100	10.3	76
J-ZN1-0397	Zone-1	4093	1.9	85
J-ZN1-0790	Zone-1	4115	0.5	80
J-HOS-0006	URH-HOSP-HLVL	4281	13.6	91
J-ZN1-0052	Zone-1	4142	7.3	63
J-ZN1-0063	Zone-1	4114	0.0	80
J-PRE-0053	Prescott	4279	1.6	32
J-ZN1-0806	Zone-1	4149	10.0	55
J-PRV-OFR-0001	PRV-6	4264	8.9	57
J-ZN1-0265	Zone-1	4108	13.3	73
J-ZN1-0175	Zone-1	4118	13.7	68
J-ZN1-0844	Zone-1	4100	0.6	88
J-ZN1-0503	Zone-1	4213	9.4	47
J-ZN1-0472	Zone-1	4117	4.1	82
J-ZN1-0566	Zone-1	4142	0.0	58
J-ZN1-0282	Zone-1	4113	17.1	70
J-ZN1-0316	Zone-1	4090	0.1	82
J-PRE-0042	Prescott	4258	0.0	41
J-PRE-0038	Prescott	4184	0.0	73
J-HOS-0042	URH-HOSP-HLVL	4431	0.0	93
J-ZN1-0352	Zone-1	4110	9.0	72
J-ZN1-0638	Zone-1	4092	0.5	81
J-UM-0006	Upper Moyina	4369	16.7	84
J-UM-0003	Upper Moyina	4364	13.9	55
J-ZN1-0781	Zone-1	4141	6.2	65
J-ZN1-0075	Zone-1	4152	5.8	61
J-ZN1-0867	Zone-1	4146	40.6	66
J-ZN1-0368	Zone-1	4110	19.4	77
J-ZN1-0020	Zone-1	4122	5.9	62
J-PAT-0020	Patterson	4255	0.0	101
J-ZN1-0113	Zone-1	4180	6.7	47
J-ZN1-0148	Zone-1	4146	16.7	59
J-ZN1-0088	Zone-1	4134	2.1	69
J-ZN1-0811	Zone-1	4094	2.2	81
J-ZN1-0700	Zone-1	4097	10.8	69
J-ZN1-0672	Zone-1	4098	27.5	80
J-ZN1-0750	Zone-1	4098	66.2	59
J-ZN1-0180	Zone-1	4107	0.0	73
J-ZN1-0573	Zone-1	4209	8.0	54

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0717	Zone-1	4111	12.6	74
J-ZN1-0286	Zone-1	4110	9.6	72
J-ZN1-0219	Zone-1	4114	5.0	70
J-ZN1-0617	Zone-1	4145	2.1	60
J-ZN1-0616	Zone-1	4092	1.0	73
J-ZN1-0859	Zone-1	4152	2.9	55
J-SL-0075	Lindley	4233	1.5	64
J-PRV-MOY-0010	PRV-13	4274	3.4	80
J-ZN1-0831	Zone-1	4179	2.8	64
J-FHH-0002	Foothill_Homedale	4270	18.0	77
J-ZN1-0744	Zone-1	4092	1.6	83
J-SL-0088	Lindley	4098	14.4	123
J-ZN1-0628	Zone-1	4148	1.4	89
J-PRE-0063	Prescott	4230	4.4	58
J-ZN1-0497	Zone-1	4244	1.7	38
J-ZN1-0012	Zone-1	4179	18.4	51
J-ZN1-0465	Zone-1	4166	14.3	63
J-HOS-0029	URH-HOSP-HLVL	4344	14.5	60
J-PAT-0038	Patterson	4211	4.5	143
J-ZN1-0117	Zone-1	4168	5.7	51
J-CR-0003	Crown Ridge	4422	11.2	97
J-ZN1-0527	Zone-1	4162	3.8	72
J-ZN1-0753	Zone-1	4139	6.5	41
J-PRV-HWY-0009	PRV-2-HWY	4206	2.3	65
J-PRE-0024	Prescott	4230	15.3	53
J-ZN1-0774	Zone-1	4092	9.1	81
J-ZN1-0395	Zone-1	4091	0.0	88
J-ZN1-0788	Zone-1	4175	67.3	51
J-ZN1-0483	Zone-1	4194	0.0	35
J-ZN1-0033	Zone-1	4157	11.4	72
J-ZN1-0590	Zone-1	4153	8.4	62
J-PRE-0007	Prescott	4303	4.1	33
J-ZN1-0045	Zone-1	4110	17.7	72
J-PRE-0051	Prescott	4249	6.6	49
J-ZN1-0804	Zone-1	4096	4.4	68
J-TW-0004	Tanglewood	4814	43.8	76
J-HOS-0053	URH-HOSP-HLVL	4369	63.5	53
J-ZN1-0630	Zone-1	4151	12.7	89
J-PRV-MOY-0012	PRV-13	4293	1.4	71

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0842	Zone-1	4111	9.0	82
J-ZN1-0470	Zone-1	4223	19.7	38
J-ZN1-0435	Zone-1	4099	6.9	86
J-ZN1-0314	Zone-1	4096	6.2	80
J-ZN1-0280	Zone-1	4112	8.9	71
J-ZN1-0518	Zone-1	4136	5.5	76
J-PRE-0040	Prescott	4232	33.0	52
J-ZN1-0739	Zone-1	4221	3.8	52
J-HOS-0040	URH-HOSP-HLVL	4462	0.0	15
J-ZN1-0636	Zone-1	4090	0.0	82
J-ZN1-0779	Zone-1	4109	6.6	72
J-ZN1-0548	Zone-1	4207	8.6	52
J-ZN1-0759	Zone-1	4223	1.9	42
J-ZN1-0366	Zone-1	4107	6.7	75
J-PRV-MOY-0002	PRV-13	4298	11.7	67
J-ZN1-0146	Zone-1	4150	15.5	58
J-ZN1-0111	Zone-1	4184	8.0	46
J-PRE-0014	Prescott	4224	1.5	55
J-ZN1-0081	Zone-1	4135	11.4	68
J-ZN1-0413	Zone-1	4094	14.4	90
J-ZN1-0809	Zone-1	4096	0.0	95
J-ZN1-0502	Zone-1	4134	35.7	55
J-ZN1-0162	Zone-1	4146	5.9	56
J-ZN1-0670	Zone-1	4186	0.0	55
J-ZN1-0600	Zone-1	4184	2.1	69
J-ZN1-0571	Zone-1	4216	2.3	47
J-ZN1-0715	Zone-1	4158	22.0	57
J-ZN1-0439	Zone-1	4106	1.1	79
J-ZN1-0685	Zone-1	4161	18.3	59
J-ZN1-0284	Zone-1	4108	11.6	73
J-ZN1-0209	Zone-1	4117	12.2	69
J-ZN1-0614	Zone-1	4170	26.3	56
J-PAT-0030	Patterson	4350	0.0	67
J-ZN1-0013	Zone-1	4194	0.0	55
J-SL-0068	Lindley	4235	12.9	63
J-ZN1-0300	Zone-1	4099	9.1	77
J-UL-0003	Upper Lynnewood	4306	13.3	45
J-ZN1-0496	Zone-1	4215	6.2	49
J-ZN1-0009	Zone-1	4153	0.3	63
J-ZN1-0463	Zone-1	4198	12.1	49

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-HOS-0027	URH-HOSP-HLVL	4313	12.2	73
J-ZN1-0331	Zone-1	4105	0.0	74
J-ZN1-0699	Zone-1	4129	0.1	58
J-ZN1-0115	Zone-1	4192	5.7	42
J-ZN1-0101	Zone-1	4257	0.0	20
J-ZN1-0511	Zone-1	4130	6.0	76
J-ZN1-0131	Zone-1	4144	15.8	60
J-PRE-0023	Prescott	4255	7.2	42
J-PRE-0022	Prescott	4241	4.2	48
J-ZN1-0772	Zone-1	4180	21.3	49
J-ZN1-0626	Zone-1	4100	23.8	72
J-ZN1-0360	Zone-1	4102	88.8	76
J-ZN1-0393	Zone-1	4094	17.6	84
J-PAT-0008	Patterson	4372	8.2	59
J-ZN1-0588	Zone-1	4133	20.6	71
J-PAT-0010	Patterson	4326	0.0	79
J-ZN1-0803	Zone-1	4096	58.5	67
J-ZN1-0095	Zone-1	4148	0.0	67
J-ZN1-0840	Zone-1	4242	5.0	31
J-ZN1-0468	Zone-1	4172	4.3	61
J-ZN1-0708	Zone-1	4101	6.1	68
J-ZN1-0278	Zone-1	4110	5.8	72
J-ZN1-0188	Zone-1	4152	0.0	54
J-ZN1-0516	Zone-1	4150	12.6	69
J-ZN1-0104	Zone-1	4144	13.4	64
J-ZN1-0737	Zone-1	4246	2.9	59
J-ZN1-0023	Zone-1	4125	148.5	63
J-ZN1-0787	Zone-1	4122	47.4	49
J-ZN1-0777	Zone-1	4097	9.4	81
J-WO-0009	West Oregon	4213	2.7	112
J-ZN1-0364	Zone-1	4108	51.9	73
J-HOS-0022	URH-HOSP-HLVL	4253	6.9	100
J-PRE-0009	Prescott	4282	0.0	44
J-ZN1-0144	Zone-1	4139	14.3	59
J-ZN1-0109	Zone-1	4217	1.3	32
J-ZN1-0629	Zone-1	4110	5.6	66
J-ZN1-0380	Zone-1	4092	11.1	83
J-ZN1-0411	Zone-1	4093	0.0	90
J-ZN1-0160	Zone-1	4143	17.0	58
J-PRV-2-ELD-0009	PRV-2	4231	16.8	58

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0428	Zone-1	4182	0.4	46
J-PRV-OFR-0004	PRV-6	4185	3.9	91
J-ZN1-0713	Zone-1	4122	5.9	65
J-ZN1-0437	Zone-1	4093	5.5	90
J-PRE-0031	Prescott	4223	0.0	56
J-ZN1-0198	Zone-1	4120	9.6	67
J-ZN1-0646	Zone-1	4104	41.2	69
J-PRE-0003	Prescott	4250	2.1	51
J-ZN1-0043	Zone-1	4100	17.7	76
J-ZN1-0730	Zone-1	4225	0.6	44
J-ZN1-0298	Zone-1	4100	11.7	77
J-ZN1-0261	Zone-1	4109	17.5	73
J-PRV-2-ELD-0002	PRV-2	4248	10.7	50
J-ZN1-0054	Zone-1	4145	4.3	61
J-PRE-0061	Prescott	4268	7.4	37
J-UL-0001	Upper Lynnewood	4296	4.9	50
J-ZN1-0836	Zone-1	4227	3.7	52
J-ZN1-0762	Zone-1	4186	7.8	58
J-PRV-3-UMO-0003	PRV-3	4300	7.4	86
J-ZN1-0808	Zone-1	4098	108.5	64
J-ZN1-0329	Zone-1	4098	7.1	77
J-HOS-0025	URH-HOSP-HLVL	4322	9.9	74
J-ZN1-0509	Zone-1	4126	7.1	78
J-ZN1-0099	Zone-1	4139	8.7	69
J-HOS-0039	URH-HOSP-HLVL	4330	0.0	74
J-ZN1-0129	Zone-1	4140	18.9	62
J-HOS-0049	URH-HOSP-HLVL	4254	0.0	114
J-PAT-0026	Patterson	4288	0.0	89
J-ZN1-0770	Zone-1	4178	6.5	48
J-ZN1-0540	Zone-1	4206	7.6	51
J-ZN1-0688	Zone-1	4190	15.7	45
J-ZN1-0658	Zone-1	4138	24.5	69
J-ZN1-0586	Zone-1	4180	10.9	53
J-ZN1-0556	Zone-1	4152	9.3	73
J-PAT-0005	Patterson	4311	10.0	78
J-ZN1-0406	Zone-1	4094	0.9	60
J-ZN1-0801	Zone-1	4092	2.4	94
J-PAT-0001	Patterson	4232	6.0	113
J-ZN1-0091	Zone-1	4142	0.1	53

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0838	Zone-1	4215	3.0	42
J-UL-0009	Upper Lynnewood	4270	4.9	60
J-ZN1-0706	Zone-1	4108	10.9	66
J-ZN1-0433	Zone-1	4106	3.9	83
J-ZN1-0855	Zone-1	4110	5.2	75
J-SL-0072	Lindley	4260	0.0	52
J-ZN1-0514	Zone-1	4114	0.6	82
J-ZN1-0575	Zone-1	4143	0.8	59
J-ZN1-0292	Zone-1	4104	6.5	75
J-ZN1-0735	Zone-1	4218	5.7	46
J-PRV-MOY-0004	PRV-13	4281	19.3	67
J-ZN1-0758	Zone-1	4217	3.5	46
J-PRV-MOY-0014	PRV-13	4239	13.8	95
J-ZN1-0362	Zone-1	4104	7.8	75
J-HOS-0021	URH-HOSP-HLVL	4261	6.9	98
J-ZN1-0561	Zone-1	4167	0.7	67
J-ZN1-0409	Zone-1	4091	0.0	87
J-ZN1-0378	Zone-1	4098	5.3	81
J-ZN1-0158	Zone-1	4140	9.8	59
J-ZN1-0123	Zone-1	4162	8.9	54
J-ZN1-0425	Zone-1	4094	0.1	83
J-PRE-0049	Prescott	4271	0.6	35
J-PAT-0013	Patterson	4315	1.7	76
J-ZN1-0711	Zone-1	4096	13.6	71
J-ZN1-0683	Zone-1	4098	5.6	77
J-ZN1-0754	Zone-1	4098	3.9	56
J-ZN1-0191	Zone-1	4167	3.9	47
J-ZN1-0580	Zone-1	4234	4.6	47
J-ZN1-0612	Zone-1	4187	9.9	51
J-ZN1-0025	Zone-1	4147	0.0	56
J-ZN1-0728	Zone-1	4090	2920.4	74
J-ZN1-0451	Zone-1	4109	14.2	83
J-ZN1-0296	Zone-1	4101	6.0	76
J-ZN1-0259	Zone-1	4110	21.0	72
J-ZN1-0036	Zone-1	4092	1.4	72
J-SL-0086	Lindley	4217	32.8	71
J-PRV-MOY-0011	PRV-13	4292	8.1	72
J-PRV-3-UMO-0001	PRV-3	4285	17.7	88

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-HOS-0024	URH-HOSP-HLVL	4300	18.8	79
J-ZN1-0507	Zone-1	4104	7.4	82
J-ZN1-0083	Zone-1	4169	40.1	55
J-ZN1-0476	Zone-1	4111	3.8	81
J-ZN1-0382	Zone-1	4122	2.1	76
J-ZN1-0347	Zone-1	4107	18.8	73
J-HOS-0037	URH-HOSP-HLVL	4420	29.6	97
J-ZN1-0127	Zone-1	4149	27.6	59
J-PAT-0014	Patterson	4435	27.8	12
J-ZN1-0538	Zone-1	4225	16.8	43
J-PRE-0012	Prescott	4206	2.7	67
J-ZN1-0143	Zone-1	4144	13.8	60
J-ZN1-0656	Zone-1	4137	12.7	66
J-ZN1-0584	Zone-1	4221	12.8	33
J-ZN1-0554	Zone-1	4148	51.4	75
J-ZN1-0786	Zone-1	4204	6.3	38
J-ZN1-0785	Zone-1	4178	39.7	50
J-ZN1-0404	Zone-1	4096	0.2	59
J-HOS-0009	URH-HOSP-HLVL	4319	0.0	71
J-ZN1-0761	Zone-1	4106	18.7	57
J-ZN1-0264	Zone-1	4108	9.5	73
J-ZN1-0174	Zone-1	4118	37.8	68
J-ZN1-0598	Zone-1	4207	3.3	51
J-ZN1-0071	Zone-1	4134	78.1	68
J-PRE-0058	Prescott	4313	2.2	17
J-ZN1-0431	Zone-1	4106	5.5	84
J-ZN1-0853	Zone-1	4093	0.2	85
J-ZN1-0624	Zone-1	4096	7.2	97
J-ZN1-0648	Zone-1	4116	11.9	63
J-ZN1-0444	Zone-1	4121	6.9	80
J-ZN1-0481	Zone-1	4159	9.2	66
J-ZN1-0290	Zone-1	4104	5.4	75
J-ZN1-0011	Zone-1	4251	0.0	22
J-ZN1-0050	Zone-1	4138	29.9	62
J-UM-0005	Upper Moyina	4417	7.5	63
J-ZN1-0492	Zone-1	4181	11.3	63
J-UM-0001	Upper Moyina	4417	9.1	64
J-ZN1-0061	Zone-1	4205	5.5	78
J-WO-0006	West Oregon	4230	9.4	105
J-PRV-2-OGD-0003	PRV_Ogden	4255	4.5	85

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0559	Zone-1	4149	5.2	74
J-ZN1-0766	Zone-1	4199	14.6	45
J-ZN1-0376	Zone-1	4096	31.0	82
J-ZN1-0337	Zone-1	4102	10.3	76
J-HOS-0010	URH-HOSP-HLVL	4410	30.0	36
J-ZN1-0156	Zone-1	4136	18.3	61
J-ZN1-0121	Zone-1	4170	7.5	50
J-ZN1-0423	Zone-1	4092	0.0	74
J-ZN1-0819	Zone-1	4162	2.5	66
J-ZN1-0513	Zone-1	4153	0.0	47
J-ZN1-0681	Zone-1	4100	2.2	80
J-HOS-0051	URH-HOSP-HLVL	4252	0.0	114
J-ZN1-0726	Zone-1	4090	0.0	82
J-ZN1-0448	Zone-1	4125	3.9	79
J-ZN1-0694	Zone-1	4185	5.9	66
J-ZN1-0294	Zone-1	4098	10.6	77
J-ZN1-0252	Zone-1	4134	12.5	65
J-ZN1-0018	Zone-1	4111	7.7	65
J-PAT-0031	Patterson	4391	0.0	48
J-ZN1-0086	Zone-1	4124	0.0	73
J-ZN1-0310	Zone-1	4100	13.0	80
J-UM-0009	Upper Moyina	4360	31.5	88
J-ZN1-0008	Zone-1	4239	0.4	27
J-ZN1-0065	Zone-1	4182	11.7	48
J-HOS-0035	URH-HOSP-HLVL	4367	10.4	54
J-ZN1-0345	Zone-1	4102	2.7	75
J-ZN1-0710	Zone-1	4096	10.4	60
J-ZN1-0125	Zone-1	4151	8.8	58
J-ZN1-0522	Zone-1	4148	12.3	74
J-PAT-0007	Patterson	4332	18.8	69
J-ZN1-0141	Zone-1	4140	5.7	61
J-ZN1-0654	Zone-1	4148	16.1	62
J-ZN1-0583	Zone-1	4154	22.0	65
J-ZN1-0552	Zone-1	4153	4.3	73
J-ZN1-0783	Zone-1	4176	2.1	51
J-ZN1-0627	Zone-1	4101	7.2	71
J-PRE-0027	Prescott	4261	33.8	40
J-ZN1-0172	Zone-1	4120	7.9	68
J-ZN1-0417	Zone-1	4092	1.2	73
J-ZN1-0813	Zone-1	4092	0.3	74

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0851	Zone-1	4103	8.8	85
J-ZN1-0622	Zone-1	4109	27.4	90
J-ZN1-0479	Zone-1	4098	1.1	86
J-ZN1-0442	Zone-1	4206	10.8	44
J-ZN1-0719	Zone-1	4117	1.3	68
J-ZN1-0031	Zone-1	4145	16.8	62
J-ZN1-0490	Zone-1	4178	13.0	64
J-PRE-0006	Prescott	4306	3.5	30
J-ZN1-0756	Zone-1	4213	3.1	46
J-ZN1-0746	Zone-1	4109	18.2	76
J-PRV-2-ELD-0013	PRV-2	4208	27.8	67
J-ZN1-0374	Zone-1	4100	0.0	55
J-ZN1-0335	Zone-1	4102	13.1	75
J-CR-0001	Crown Ridge	4436	42.8	91
J-ZN1-0633	Zone-1	4112	1.3	72
J-ZN1-0388	Zone-1	4099	0.0	79
J-ZN1-0421	Zone-1	4092	1.2	73
J-ZN1-0679	Zone-1	4100	21.3	79
J-PRV-HWY-0011	PRV-2-HWY	4184	15.0	74
J-ZN1-0828	Zone-1	4195	2.9	54
J-ZN1-0797	Zone-1	4098	0.7	80
J-ZN1-0724	Zone-1	4201	2.8	45
J-ZN1-0446	Zone-1	4108	22.9	84
J-ZN1-0693	Zone-1	4194	15.4	43
J-ZN1-0244	Zone-1	4140	5.5	63
J-PRV-MOY-0001	PRV-13	4276	1.6	79
J-ZN1-0068	Zone-1	4185	13.1	45
J-ZN1-0308	Zone-1	4097	6.1	80
J-ZN1-0272	Zone-1	4108	7.8	73
J-ZN1-0079	Zone-1	4137	3.8	67
J-UL-0008	Upper Lynnewood	4230	10.7	77
J-HOS-0057	URH-HOSP-HLVL	4386	4.4	42
J-PRV-2-ELD-0012	PRV-2	4219	27.8	63
J-ZN1-0818	Zone-1	4098	47.1	59
J-ZN1-0343	Zone-1	4104	12.3	75
J-HOS-0033	URH-HOSP-HLVL	4320	0.0	74
J-ZN1-0520	Zone-1	4172	4.3	62
J-ZN1-0106	Zone-1	4152	20.6	60

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRV-2-ELD-0004	PRV-2	4252	19.6	48
J-HOS-0048	URH-HOSP-HLVL	4268	0.3	107
J-ZN1-0059	Zone-1	4156	43.6	60
J-ZN1-0647	Zone-1	4194	6.5	42
J-ZN1-0139	Zone-1	4142	20.9	61
J-ZN1-0652	Zone-1	4173	12.9	50
J-PAT-0027	Patterson	4314	25.7	78
J-ZN1-0550	Zone-1	4150	9.7	75
J-ZN1-0697	Zone-1	4197	6.5	62
J-ZN1-0667	Zone-1	4094	46.1	83
J-ZN1-0596	Zone-1	4204	7.0	60
J-ZN1-0170	Zone-1	4158	0.0	51
J-WO-0003	West Oregon	4224	15.0	107
J-ZN1-0415	Zone-1	4094	0.7	69
J-PAT-0012	Patterson	4274	12.9	95
J-ZN1-0849	Zone-1	4110	0.7	77
J-ZN1-0620	Zone-1	4140	14.6	68
J-ZN1-0821	Zone-1	4156	0.0	75
J-PRE-0021	Prescott	4265	5.7	51
J-ZN1-0866	Zone-1	4118	15.8	69
J-SL-0082	Lindley	4204	24.5	77
J-ZN1-0488	Zone-1	4202	6.1	53
J-ZN1-0582	Zone-1	4167	0.0	48
J-ZN1-0302	Zone-1	4104	2.8	75
J-ZN1-0028	Zone-1	4138	0.3	54
J-HOS-0012	URH-HOSP-HLVL	4338	3.1	66
J-SL-0092	Lindley	4210	12.6	74
J-PRV-3-UMO-0007	PRV-3	4321	0.0	76
J-ZN1-0372	Zone-1	4128	12.0	66
J-ZN1-0333	Zone-1	4103	26.5	75
J-WO-0005	West Oregon	4223	5.0	108
J-ZN1-0534	Zone-1	4141	1.7	72
J-ZN1-0419	Zone-1	4092	2.5	73
J-ZN1-0386	Zone-1	4098	2.3	79
J-ZN1-0133	Zone-1	4150	9.5	58
J-ZN1-0826	Zone-1	4202	7.6	54
J-ZN1-0795	Zone-1	4128	11.2	74
J-PAT-0016	Patterson	4313	13.1	77
J-ZN1-0722	Zone-1	4162	7.7	73

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0691	Zone-1	4228	19.3	31
J-ZN1-0755	Zone-1	4098	17.0	60
J-ZN1-0238	Zone-1	4139	2.7	59
J-ZN1-0460	Zone-1	4290	0.0	7
J-ZN1-0306	Zone-1	4116	5.9	70
J-ZN1-0270	Zone-1	4112	9.9	71
J-ZN1-0321	Zone-1	4104	0.0	74
J-HOS-0031	URH-HOSP-HLVL	4273	34.6	94
J-PRE-0001	Prescott	4269	3.7	43
J-ZN1-0390	Zone-1	4100	9.0	80
J-ZN1-0357	Zone-1	4114	12.6	70
J-HOS-0046	URH-HOSP-HLVL	4287	21.1	89
J-ZN1-0041	Zone-1	4100	11.4	76
J-ZN1-0137	Zone-1	4151	8.0	57
J-FHH-0007	Foothill_Homedale	4266	22.1	79
J-HOS-0007	URH-HOSP-HLVL	4380	2.2	115
J-ZN1-0053	Zone-1	4140	9.7	65
J-ZN1-0064	Zone-1	4114	0.0	80
J-ZN1-0153	Zone-1	4150	0.0	55
J-ZN1-0665	Zone-1	4094	3.6	86
J-ZN1-0595	Zone-1	4141	0.0	60
J-ZN1-0167	Zone-1	4159	31.3	51
J-ZN1-0565	Zone-1	4191	4.1	57
J-ZN1-0767	Zone-1	4110	9.0	54
J-ZN1-0275	Zone-1	4109	4.1	72
J-ZN1-0185	Zone-1	4166	1.0	48
J-ZN1-0606	Zone-1	4158	5.0	64
J-ZN1-0847	Zone-1	4092	0.9	88
J-UL-0010	Upper Lynnewood	4262	3.1	64
J-ZN1-0864	Zone-1	4151	6.6	55
J-SL-0080	Lindley	4105	3.1	120
J-ZN1-0651	Zone-1	4121	12.6	61
J-ZN1-0455	Zone-1	4182	11.2	54
J-ZN1-0486	Zone-1	4176	15.2	59
J-PAT-0003	Patterson	4321	1.4	75
J-ZN1-0076	Zone-1	4142	9.3	65
J-ZN1-0039	Zone-1	4226	37.1	33
J-ZN1-0089	Zone-1	4096	4.8	80
J-ZN1-0764	Zone-1	4146	31.8	76
J-PRV-3-UMO-0005	PRV-3	4309	0.0	82

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0567	Zone-1	4167	3.3	67
J-ZN1-0532	Zone-1	4152	4.2	67
J-PAT-0044	Patterson	4426	0.0	15
J-ZN1-0384	Zone-1	4116	0.8	79
J-ZN1-0351	Zone-1	4102	9.8	75
J-ZN1-0824	Zone-1	4164	1.4	71
J-ZN1-0793	Zone-1	4111	20.9	49
J-ZN1-0690	Zone-1	4171	11.1	53
J-ZN1-0660	Zone-1	4169	2.9	72
J-PRV-2-ELD-0018	PRV-2	4240	41.8	54
J-ZN1-0458	Zone-1	4267	3.7	17
J-ZN1-0698	Zone-1	4096	19.7	69
J-ZN1-0304	Zone-1	4109	12.5	72
J-ZN1-0268	Zone-1	4110	5.5	72
J-PAT-0032	Patterson	4394	0.5	45
J-ZN1-0319	Zone-1	4102	4.3	76
J-PRV-OFR-0003	PRV-6	4225	16.3	74
J-SL-0074	Lindley	4213	22.0	72
J-HOS-0059	URH-HOSP-HLVL	4312	11.7	74
J-PRE-0045	Prescott	4272	1.0	35
J-ZN1-0355	Zone-1	4110	27.4	72
J-ZN1-0721	Zone-1	4097	1.5	60
J-ZN1-0135	Zone-1	4133	7.9	65
J-ZN1-0108	Zone-1	4122	0.8	76
J-ZN1-0034	Zone-1	4108	7.2	73
J-ZN1-0046	Zone-1	4144	13.0	60
J-ZN1-0151	Zone-1	4168	1.4	47
J-ZN1-0663	Zone-1	4094	3.4	87
J-ZN1-0593	Zone-1	4187	6.9	43
J-ZN1-0563	Zone-1	4204	10.7	51
J-ZN1-0703	Zone-1	4100	11.4	69
J-ZN1-0675	Zone-1	4098	13.0	80
J-ZN1-0604	Zone-1	4150	3.4	66
J-ZN1-0183	Zone-1	4116	53.8	69
J-ZN1-0427	Zone-1	4092	0.0	79
J-PAT-0042	Patterson	4306	5.0	80
J-PAT-0034	Patterson	4463	0.0	17
J-ZN1-0862	Zone-1	4163	0.9	50
J-SL-0078	Lindley	4154	16.7	98

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0484	Zone-1	4190	2.2	53
J-ZN1-0453	Zone-1	4251	1.1	25
J-SL-0091	Lindley	4180	11.5	87
J-UL-0007	Upper Lynnewood	4228	8.5	78
J-FHH-0009	Foothill_Homedale	4310	11.7	60
J-ZN1-0021	Zone-1	4187	10.8	48
J-ZN1-0500	Zone-1	4214	2.7	49
J-ZN1-0069	Zone-1	4154	18.7	60
J-PAT-0022	Patterson	4298	2.1	84
J-UM-0012	Upper Moyina	4375	15.2	82
J-ZN1-0530	Zone-1	4160	6.1	74
J-ZN1-0349	Zone-1	4106	29.4	73
J-ZN1-0609	Zone-1	4157	17.5	64
J-ZN1-0579	Zone-1	4224	0.0	53
J-ZN1-0048	Zone-1	4140	12.4	61
J-ZN1-0634	Zone-1	4113	25.0	71
J-ZN1-0398	Zone-1	4093	19.0	85
J-ZN1-0791	Zone-1	4105	112.6	52
J-ZN1-0014	Zone-1	4150	2.0	74
J-SL-0069	Lindley	4232	16.7	64
J-PRE-0054	Prescott	4265	4.5	38
J-ZN1-0807	Zone-1	4128	28.5	62
J-ZN1-0457	Zone-1	4106	15.2	87
J-HOS-0055	URH-HOSP-HLVL	4337	31.4	67
J-ZN1-0266	Zone-1	4110	7.9	72
J-ZN1-0176	Zone-1	4118	7.7	68
J-ZN1-0504	Zone-1	4215	11.8	47
J-ZN1-0473	Zone-1	4098	27.2	91
J-ZN1-0317	Zone-1	4090	9.1	82
J-ZN1-0283	Zone-1	4114	35.5	70
J-ZN1-0543	Zone-1	4147	2.3	79
J-UM-0015	Upper Moyina	4446	25.2	51
J-PRE-0043	Prescott	4263	1.5	39
J-ZN1-0823	Zone-1	4098	49.5	61
J-ZN1-0353	Zone-1	4110	0.0	72
J-ZN1-0639	Zone-1	4091	5.0	82
J-HOS-0043	URH-HOSP-HLVL	4415	2.2	100
J-PAT-0017	Patterson	4357	14.6	89
J-FHH-0004	Foothill_Homedale	4232	20.6	94
J-ZN1-0084	Zone-1	4137	6.0	67

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0401	Zone-1	4090	8.8	55
J-ZN1-0369	Zone-1	4100	6.4	81
J-PAT-0011	Patterson	4376	16.8	58
J-ZN1-0149	Zone-1	4134	15.0	62
J-ZN1-0096	Zone-1	4175	0.0	65
J-ZN1-0662	Zone-1	4198	7.7	55
J-ZN1-0701	Zone-1	4100	10.8	67
J-ZN1-0673	Zone-1	4096	21.6	81
J-ZN1-0602	Zone-1	4160	16.6	53
J-ZN1-0181	Zone-1	4112	65.7	71
J-ZN1-0574	Zone-1	4233	0.0	44
J-ZN1-0287	Zone-1	4110	11.6	72
J-ZN1-0224	Zone-1	4121	19.8	67
J-ZN1-0860	Zone-1	4175	5.6	45
J-SL-0076	Lindley	4188	2.8	84
J-PRE-0050	Prescott	4232	3.1	52
J-SL-0089	Lindley	4284	2.8	42
J-UL-0005	Upper Lynnewood	4259	6.5	64
J-PRE-0064	Prescott	4256	10.8	48
J-ZN1-0498	Zone-1	4273	0.9	27
J-ZN1-0016	Zone-1	4175	21.0	53
J-ZN1-0592	Zone-1	4114	5.3	72
J-ZN1-0118	Zone-1	4164	4.3	53
J-ZN1-0103	Zone-1	4155	6.3	60
J-PRV-2-ELD-0016	PRV-2	4224	0.9	60
J-ZN1-0528	Zone-1	4146	4.5	77
J-ZN1-0733	Zone-1	4097	7.0	67
J-ZN1-0544	Zone-1	4164	3.3	71
J-ZN1-0577	Zone-1	4163	0.7	71
J-HOS-0050	URH-HOSP-HLVL	4333	0.0	81
J-ZN1-0396	Zone-1	4094	9.3	84
J-ZN1-0789	Zone-1	4168	4.5	54
J-PRE-0004	Prescott	4243	5.9	55
J-ZN1-0055	Zone-1	4180	16.9	47
J-PRE-0052	Prescott	4259	14.9	40
J-ZN1-0805	Zone-1	4137	2.2	60
J-TW-0005	Tanglewood	4772	4.4	94
J-ZN1-0843	Zone-1	4106	1.6	87
J-ZN1-0471	Zone-1	4190	11.6	55
J-ZN1-0436	Zone-1	4099	0.4	86

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0315	Zone-1	4096	2.4	80
J-ZN1-0281	Zone-1	4114	16.0	70
J-ZN1-0608	Zone-1	4122	11.9	66
J-PRE-0041	Prescott	4250	3.5	44
J-PRE-0037	Prescott	4242	4.2	48
J-HOS-0041	URH-HOSP-HLVL	4422	0.0	33
J-ZN1-0637	Zone-1	4092	3.7	81
J-ZN1-0780	Zone-1	4140	11.0	63
J-ZN1-0760	Zone-1	4190	8.0	56
J-ZN1-0066	Zone-1	4096	62.3	81
J-ZN1-0400	Zone-1	4092	38.1	46
J-ZN1-0367	Zone-1	4115	28.0	75
J-PAT-0006	Patterson	4349	30.8	62
J-PAT-0041	Patterson	4227	18.9	141
J-ZN1-0112	Zone-1	4182	9.0	47
J-ZN1-0147	Zone-1	4144	14.1	60
J-PAT-0077	Patterson	4445	0.0	6
J-ZN1-1248	Zone-1	4174	3.6	45
J-ZN1-1243	Zone-1	4285	0.0	9
J-ZN1-1251	Zone-1	4111	0.1	49
J-ZN1-1247	Zone-1	4215	0.0	45
J-ZN1-1249	Zone-1	4197	0.0	34
J-ZN1-1252	Zone-1	4092	0.0	46
J-ZN1-1245	Zone-1	4223	0.0	44
J-ZN1-1244	Zone-1	4162	0.0	66
J-HOS-0101	URH-HOSP-HLVL	4372	2.7	47
J-PAT-0082	Patterson	4280	0.0	91
J-PAT-0079	Patterson	4314	6.0	85
J-UM-0021	Upper Moyina	4336	19.0	98
J-HOS-0105	URH-HOSP-HLVL	4260	12.7	98
J-HOS-0108	URH-HOSP-HLVL	4259	1.3	96
J-HOS-0102	URH-HOSP-HLVL	4266	5.6	93
J-PAT-0080	Patterson	4288	8.8	89
J-HOS-0106	URH-HOSP-HLVL	4314	27.6	77
J-HOS-0103	URH-HOSP-HLVL	4274	15.2	95
J-PAT-0076	Patterson	4286	0.0	90
J-SL-0108	Lindley	4166	0.0	93
J-WO-0013	West Oregon	4247	3.5	97
J-HOS-0100	URH-HOSP-HLVL	4311	0.3	79
J-PRE-0089	Prescott	4220	3.3	65

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-CR-0008	Crown Ridge	4396	18.3	109
J-TW-0008	Tanglewood	4179	11.7	351
J-UM-0020	Upper Moyina	4458	0.0	46
J-PAT-0078	Patterson	4212	0.0	147
J-ZN1-1250	Zone-1	4111	0.0	82
J-ZN1-1253	Zone-1	4092	2.0	95
J-FHH-0017	Foothill_Homedale	4300	0.0	65
J-PRV-3-UMO-0008	PRV-3	4325	0.0	75
J-FHH-0018	Foothill_Homedale	4301	7.2	64
J-PAT-0081	Patterson	4306	2.0	83
J-PRV-2-OGD-0008	PRV_Ogden	4282	2.2	74
J-PRV-2-ELD-0020	PRV-2	4253	20.6	50
J-PRV-MOY-0015	PRV-13	4278	0.0	78
J-PRV-OFR-0008	PRV-6	4254	6.4	61
J-PRV-2-ELD-0021	PRV-2	4238	25.7	54
J-HOS-0104	URH-HOSP-HLVL	4227	0.0	126
J-PRV-HWY-0022	PRV-2-HWY	4189	0.0	72
J-PRV-3-UMO-0009	PRV-3	4343	2.7	67
J-HOS-0107	URH-HOSP-HLVL	4268	5.7	97
J-PRV-2-ELD-0022	PRV-2	4250	12.2	49
J-ZN1-0816	Zone-1	4254	8.4	22
J-SL-0052	Stewart_Lenox	4188	0.0	97
J-SL-0012	Stewart_Lenox	4227	13.6	69
J-SL-0010	Stewart_Lenox	4199	5.0	85
J-SL-0004	Stewart_Lenox	4190	0.0	85
J-SL-0015	Stewart_Lenox	4188	0.0	86
J-SL-0024	Stewart_Lenox	4192	4.3	84
J-PRV-SL-0002	Stewart_Lenox_PRV	4215	0.0	41
J-PRV-SL-0004	Stewart_Lenox_PRV	4134	7.5	75
J-PRV-SL-0003	Stewart_Lenox_PRV	4212	2.3	42
J-SL-0006	Stewart_Lenox	4227	0.6	69
J-SL-0032	Stewart_Lenox	4198	5.0	82
J-SL-0008	Stewart_Lenox	4212	3.7	75
J-SL-0036	Stewart_Lenox	4210	3.0	77
J-SL-0007	Stewart_Lenox	4220	5.2	72
J-SL-0044	Stewart_Lenox	4226	6.7	69

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-SL-0049	Stewart_Lenox	4235	4.5	66
J-SL-0016	Stewart_Lenox	4178	0.2	91
J-SL-0009	Stewart_Lenox	4247	0.6	60
J-SL-0013	Stewart_Lenox	4220	2.5	73
J-SL-0014	Stewart_Lenox	4178	29.1	90
J-SL-0050	Stewart_Lenox	4219	4.9	73
J-SL-0051	Stewart_Lenox	4227	1.3	69
J-SL-0005	Stewart_Lenox	4246	3.2	61
J-SL-0011	Stewart_Lenox	4200	8.1	81
J-SL-0018	Stewart_Lenox	4228	9.2	69
J-SL-0019	Stewart_Lenox	4242	2.9	63
J-SL-0020	Stewart_Lenox	4248	8.5	60
J-SL-0021	Stewart_Lenox	4236	3.7	65
J-SL-0022	Stewart_Lenox	4189	8.5	96
J-SL-0023	Stewart_Lenox	4198	7.6	92
J-SL-0025	Stewart_Lenox	4187	12.9	94
J-SL-0026	Stewart_Lenox	4188	0.0	94
J-SL-0027	Stewart_Lenox	4226	3.8	73
J-SL-0028	Stewart_Lenox	4238	1.3	68
J-SL-0029	Stewart_Lenox	4232	4.8	67
J-SL-0030	Stewart_Lenox	4234	1.3	66
J-SL-0031	Stewart_Lenox	4276	8.5	48
J-PRV-SL-0005	Stewart_Lenox_PRV	4225	2.3	36
J-PRV-SL-0006	Stewart_Lenox_PRV	4216	1.0	40
J-PRV-SL-0007	Stewart_Lenox_PRV	4230	0.5	34
J-PRV-SL-0008	Stewart_Lenox_PRV	4204	1.1	45
J-PRV-SL-0009	Stewart_Lenox_PRV	4141	2.4	72
J-PRV-SL-0010	Stewart_Lenox_PRV	4126	3.1	79
J-PRV-SL-0011	Stewart_Lenox_PRV	4145	4.1	70
J-PRV-SL-0012	Stewart_Lenox_PRV	4157	8.2	65
J-PRV-SL-0013	Stewart_Lenox_PRV	4114	67.3	84
J-SL-0033	Stewart_Lenox	4247	0.0	61
J-SL-0034	Stewart_Lenox	4187	0.0	87
J-SL-0035	Stewart_Lenox	4182	3.1	89
J-SL-0037	Stewart_Lenox	4181	5.1	89
J-SL-0038	Stewart_Lenox	4185	6.1	87
J-SL-0039	Stewart_Lenox	4224	3.8	71
J-SL-0040	Stewart_Lenox	4189	3.6	86
J-SL-0041	Stewart_Lenox	4249	0.0	60
J-SL-0042	Stewart_Lenox	4242	3.1	63

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-SL-0043	Stewart_Lenox	4247	3.2	61
J-PRV-SL-0014	Stewart_Lenox_PRV	4117	0.2	83
J-PRV-SL-0015	Stewart_Lenox_PRV	4114	0.0	84
J-PRV-SL-0016	Stewart_Lenox_PRV	4213	0.4	41
J-SL-0053	Stewart_Lenox	4211	0.1	76
J-PRV-SL-0017	Stewart_Lenox_PRV	4214	0.0	41
J-SL-0045	Stewart_Lenox	4228	6.6	69
J-SL-0046	Stewart_Lenox	4241	0.0	63
J-SL-0048	Stewart_Lenox	4209	1.5	77
J-ZN1-0168	Zone-1	4090	2.1	81
J-ZN1-0325	Zone-1	4090	0.0	81
J-ZN1-0326	Zone-1	4088	0.0	82
J-ZN1-0327	Zone-1	4089	69.6	81
J-ZN1-0339	Zone-1	4198	0.0	40
J-ZN1-0340	Zone-1	4179	0.0	49
J-ZN1-0341	Zone-1	4198	0.0	40
J-ZN1-0342	Zone-1	4197	0.0	41
J-ZN1-0328	Zone-1	4198	0.0	40
J-HC-0001	Havencrest	4417	30.8	91
J-BV5-0004	Zone-5	4493	0.0	93
J-HOS-0001	URH-HOSP-HLVL	4292	0.0	98
J-HOS-0002	URH-HOSP-HLVL	4364	0.0	67
J-ESI-0001	ESI	4369	0.0	82
J-ESI-0002	ESI	4388	94.5	74
J-ESI-0003	ESI	4354	0.0	89
J-HOS-0109	URH-HOSP-HLVL	4187	0.0	146
J-SL-0063	Lindley	4138	0.4	106
J-ZN1-0001	Zone-1	4197	0.0	36
J-HOS-0003	URH-HOSP-HLVL	4213	0.0	117
J-ZN1-1258	Zone-1	4175	0.3	52
J-ZN1-0928	Zone-1	4179	48.9	50
J-ZN1-0927	Zone-1	4180	0.0	50
J-ZN1-0165	Zone-1	4177	0.5	51
J-ZN1-0164	Zone-1	4194	0.0	45
J-SH-0001	Sierra Heights	4232	6.5	74
J-ZN1-0192	Zone-1	4198	17.7	43
J-PAT-0023	Patterson	4187	3.5	146
J-SL-0071	Lindley	4214	0.0	73
J-SL-0002	Stewart_Lenox	4186	0.0	98
J-ZN1-0933	Zone-1	4153	9.7	88

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0935	Zone-1	4151	0.0	89
J-PAT-0040	Patterson	4244	0.0	121
J-PAT-0039	Patterson	4197	0.0	144
J-BV5-0001	Zone-5	4590	0.0	47
J-TW-0007	Tanglewood	4822	4.2	73
J-ZN1-1241	Zone-1	4174	15.8	61
J-FHH-0003	Foothill_Homedale	4285	43.1	71
J-ZN1-0449	Zone-1	4117	7.2	81
J-HOS-0013	URH-HOSP-HLVL	4307	15.9	79
J-SL-0084	Lindley	4146	0.0	102
J-SL-0064	Lindley	4147	27.1	101
J-ZN1-0003	Zone-1	4092	88.0	81
J-ZN1-0004	Zone-1	4092	4.7	73
J-ZN1-0005	Zone-1	4146	3.9	67
J-ZN1-0006	Zone-1	4145	7.0	66
J-ZN1-0007	Zone-1	4144	0.6	68
J-FHH-0001	Foothill_Homedale	4289	7.7	69
J-SL-0047	Stewart_Lenox	4210	0.0	76
J-TW-0001	Tanglewood	4549	0.0	191
J-SL-0065	Lindley	4124	0.0	112
J-SL-0066	Lindley	4184	97.2	85
J-SL-0070	Lindley	4221	0.0	71
J-HOS-0004	URH-HOSP-HLVL	4373	11.5	47
J-HOS-0005	URH-HOSP-HLVL	4409	76.3	37
J-HOS-0014	URH-HOSP-HLVL	4356	19.4	60
J-PRV-HWY-0002	PRV-2-HWY	4218	3.9	60
J-PRV-HWY-0003	PRV-2-HWY	4216	3.0	61
J-PRV-HWY-0004	PRV-2-HWY	4243	5.2	49
J-PRV-HWY-0005	PRV-2-HWY	4238	4.1	51
J-PRV-HWY-0006	PRV-2-HWY	4222	2.4	58
J-HOS-0015	URH-HOSP-HLVL	4451	0.0	84
J-WO-0001	West Oregon	4226	2.0	106
J-ZN1-0228	Zone-1	4175	13.0	61
J-HOS-0016	URH-HOSP-HLVL	4322	7.8	73
J-PRV-2-ELD-0005	PRV-2	4218	10.6	63
J-HOS-0017	URH-HOSP-HLVL	4324	14.8	68
J-ZN1-0230	Zone-1	4214	11.0	49

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0015	Prescott	4247	21.3	45
J-ZN1-0233	Zone-1	4218	3.0	52
J-ZN1-0234	Zone-1	4231	1.5	45
J-ZN1-0235	Zone-1	4224	4.4	54
J-ZN1-0236	Zone-1	4246	2.6	41
J-ZN1-0237	Zone-1	4224	1.1	45
J-PRE-0016	Prescott	4258	1.8	41
J-HOS-0018	URH-HOSP-HLVL	4269	1.7	92
J-HOS-0019	URH-HOSP-HLVL	4320	4.4	75
J-ZN1-0245	Zone-1	4162	2.8	51
J-ZN1-0246	Zone-1	4150	0.0	63
J-ZN1-0248	Zone-1	4162	2.3	74
J-ZN1-0249	Zone-1	4184	3.6	69
J-ZN1-0250	Zone-1	4196	3.0	64
J-ZN1-0251	Zone-1	4097	0.0	97
J-PRE-0020	Prescott	4300	0.2	35
J-ZN1-0253	Zone-1	4189	3.5	53
J-ZN1-0254	Zone-1	4149	3.6	69
J-ZN1-0255	Zone-1	4102	1.1	84
J-ZN1-0256	Zone-1	4118	12.8	68
J-ZN1-0258	Zone-1	4122	3.6	66
J-BV-0001	Zone-5	4546	13.0	66
J-UM-0007	Upper Moyina	4434	5.2	56
J-ZN1-0194	Zone-1	4206	2.2	40
J-ZN1-0195	Zone-1	4189	7.5	47
J-ZN1-0196	Zone-1	4175	2.0	53
J-ZN1-0199	Zone-1	4155	22.5	62
J-ZN1-0200	Zone-1	4116	8.0	63
J-ZN1-0201	Zone-1	4098	18.6	67
J-ZN1-0202	Zone-1	4134	0.0	55
J-ZN1-0203	Zone-1	4110	34.1	54
J-ZN1-0205	Zone-1	4095	2.2	68
J-ZN1-0206	Zone-1	4098	102.3	67
J-ZN1-0207	Zone-1	4095	0.1	60
J-ZN1-0208	Zone-1	4100	2.7	59
J-PRV-MOY-0013	PRV-13	4275	9.3	80
J-PAT-0024	Patterson	4247	0.0	107
J-PAT-0025	Patterson	4246	0.4	107
J-ZN1-0210	Zone-1	4181	20.5	48
J-ZN1-0211	Zone-1	4095	21.6	82

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0212	Zone-1	4091	9.4	88
J-ZN1-0214	Zone-1	4092	6.8	85
J-ZN1-0215	Zone-1	4094	1.1	83
J-ZN1-0216	Zone-1	4096	23.5	82
J-ZN1-0217	Zone-1	4158	0.0	53
J-ZN1-0218	Zone-1	4164	3.2	50
J-ZN1-0220	Zone-1	4141	0.0	59
J-ZN1-0221	Zone-1	4094	13.5	82
J-ZN1-0222	Zone-1	4096	14.0	80
J-ZN1-0223	Zone-1	4090	0.0	82
J-ZN1-0225	Zone-1	4088	0.0	83
J-ZN1-0226	Zone-1	4090	0.0	82
J-ZN1-0227	Zone-1	4088	0.0	83
J-PRV-HWY-0012	PRV-2-HWY	4234	0.0	53
J-PRV-HWY-0013	PRV-2-HWY	4217	0.4	60
J-PRV-HWY-0014	PRV-2-HWY	4221	5.0	58
J-PRV-HWY-0015	PRV-2-HWY	4216	11.5	61
J-PRV-HWY-0016	PRV-2-HWY	4238	3.8	51
J-PRV-HWY-0017	PRV-2-HWY	4241	23.1	50
J-PRV-HWY-0018	PRV-2-HWY	4216	0.0	61
J-PRV-HWY-0019	PRV-2-HWY	4222	2.0	58
J-PRV-HWY-0021	PRV-2-HWY	4238	2.8	51
J-HOS-0088	URH-HOSP-HLVL	4364	0.0	67
J-HOS-0089	URH-HOSP-HLVL	4292	3.4	98
J-HOS-0090	URH-HOSP-HLVL	4316	0.8	88
J-HOS-0091	URH-HOSP-HLVL	4331	1.1	81
J-HOS-0092	URH-HOSP-HLVL	4284	0.0	101
J-HOS-0093	URH-HOSP-HLVL	4315	6.1	88
J-HOS-0094	URH-HOSP-HLVL	4328	0.0	76
J-HOS-0095	URH-HOSP-HLVL	4454	3.7	83
J-HOS-0096	URH-HOSP-HLVL	4452	0.0	84
J-HOS-0097	URH-HOSP-HLVL	4365	9.6	55
J-HOS-0098	URH-HOSP-HLVL	4352	157.5	59
J-HOS-0099	URH-HOSP-HLVL	4318	25.1	75
J-ZN1-1065	Zone-1	4148	28.1	74
J-ZN1-1066	Zone-1	4146	18.0	75

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1070	Zone-1	4168	5.5	67
J-ZN1-1079	Zone-1	4174	64.2	64
J-ZN1-1084	Zone-1	4173	5.1	64
J-ZN1-1090	Zone-1	4171	4.1	65
J-ZN1-1099	Zone-1	4189	22.8	58
J-ZN1-1110	Zone-1	4204	3.6	51
J-ZN1-1119	Zone-1	4204	1.2	51
J-ZN1-1129	Zone-1	4216	7.6	46
J-ZN1-1137	Zone-1	4205	1.6	51
J-ZN1-1146	Zone-1	4208	13.6	49
J-ZN1-1153	Zone-1	4211	9.9	48
J-ZN1-1172	Zone-1	4220	9.3	44
J-ZN1-1181	Zone-1	4220	5.4	44
J-ZN1-1192	Zone-1	4207	7.2	50
J-ZN1-1202	Zone-1	4208	8.4	50
J-ZN1-1212	Zone-1	4205	13.2	51
J-WO-0011	West Oregon	4242	16.2	99
J-WO-0012	West Oregon	4244	2.9	99
J-ZN1-0874	Zone-1	4214	9.3	47
J-HOS-0062	URH-HOSP-HLVL	4274	91.3	95
J-HOS-0063	URH-HOSP-HLVL	4314	9.4	77
J-HOS-0064	URH-HOSP-HLVL	4302	0.4	82
J-HOS-0065	URH-HOSP-HLVL	4344	13.8	59
J-HOS-0066	URH-HOSP-HLVL	4401	9.7	35
J-CR-0004	Crown Ridge	4444	10.0	87
J-CR-0005	Crown Ridge	4435	10.3	91
J-CR-0006	Crown Ridge	4439	4.5	89
J-HOS-0067	URH-HOSP-HLVL	4385	0.0	113
J-HOS-0068	URH-HOSP-HLVL	4253	17.0	99
J-HOS-0069	URH-HOSP-HLVL	4361	9.8	52
J-HOS-0070	URH-HOSP-HLVL	4346	11.1	59
J-HOS-0071	URH-HOSP-HLVL	4286	15.8	85
J-ZN1-0875	Zone-1	4238	3.9	38
J-PRE-0065	Prescott	4246	4.6	50
J-PRE-0066	Prescott	4232	1.9	53
J-PRE-0067	Prescott	4298	1.8	23
J-ZN1-0876	Zone-1	4231	4.3	48
J-ZN1-0877	Zone-1	4245	2.2	38
J-ZN1-0878	Zone-1	4226	2.2	45
J-ZN1-0879	Zone-1	4287	1.9	21

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-PRE-0068	Prescott	4299	13.9	23
J-PRE-0069	Prescott	4257	7.3	41
J-PRE-0070	Prescott	4261	5.4	40
J-PRE-0071	Prescott	4186	12.9	72
J-PRE-0072	Prescott	4194	4.0	69
J-PRE-0073	Prescott	4196	10.5	68
J-HOS-0081	URH-HOSP-HLVL	4236	58.6	108
J-HOS-0082	URH-HOSP-HLVL	4296	54.2	82
J-HOS-0083	URH-HOSP-HLVL	4274	7.5	90
J-HOS-0084	URH-HOSP-HLVL	4309	11.3	75
J-HOS-0085	URH-HOSP-HLVL	4257	22.2	98
J-HOS-0086	URH-HOSP-HLVL	4276	0.0	94
J-HOS-0087	URH-HOSP-HLVL	4301	0.0	83
J-ZN1-1000	Zone-1	4184	24.9	41
J-ZN1-1001	Zone-1	4168	44.7	48
J-ZN1-1002	Zone-1	4201	13.2	34
J-PRV-OFR-0005	PRV-6	4210	17.8	80
J-PRV-OFR-0006	PRV-6	4198	17.8	85
J-PRV-OFR-0007	PRV-6	4231	9.0	71
J-ZN1-1003	Zone-1	4118	0.9	77
J-ZN1-1004	Zone-1	4112	52.3	80
J-ZN1-1005	Zone-1	4112	16.1	75
J-ZN1-1006	Zone-1	4118	8.8	72
J-ZN1-1007	Zone-1	4155	14.5	61
J-ZN1-1008	Zone-1	4150	13.1	63
J-ZN1-1009	Zone-1	4150	2.9	63
J-ZN1-1010	Zone-1	4188	37.1	46
J-ZN1-1011	Zone-1	4152	0.0	63
J-ZN1-1012	Zone-1	4154	0.0	62
J-ZN1-1013	Zone-1	4184	6.8	66
J-ZN1-1014	Zone-1	4166	7.8	74
J-PRE-0085	Prescott	4242	13.6	48
J-ZN1-1015	Zone-1	4225	9.4	43
J-PRE-0086	Prescott	4210	6.2	49
J-UL-0012	Upper Lynnewood	4212	6.0	79
J-PRE-0087	Prescott	4300	1.3	35
J-PRE-0088	Prescott	4256	3.5	55
J-ZN1-1016	Zone-1	4219	2.3	41
J-ZN1-1017	Zone-1	4250	1.5	27

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1018	Zone-1	4169	2.8	62
J-ZN1-1019	Zone-1	4148	7.6	71
J-ZN1-1020	Zone-1	4130	0.0	77
J-ZN1-1021	Zone-1	4195	3.3	49
J-ZN1-1022	Zone-1	4092	1.9	88
J-ZN1-1023	Zone-1	4090	0.0	89
J-ZN1-1024	Zone-1	4090	0.0	89
J-ZN1-1025	Zone-1	4119	21.7	70
J-ZN1-1026	Zone-1	4120	2.7	69
J-ZN1-1027	Zone-1	4119	2.6	70
J-ZN1-1028	Zone-1	4122	0.0	68
J-ZN1-1029	Zone-1	4108	4.6	76
J-ZN1-1030	Zone-1	4106	0.3	77
J-ZN1-1031	Zone-1	4110	4.2	74
J-ZN1-1032	Zone-1	4106	2.9	75
J-ZN1-1033	Zone-1	4149	20.7	56
J-ZN1-1034	Zone-1	4164	1.3	50
J-ZN1-1035	Zone-1	4120	1.4	63
J-ZN1-1036	Zone-1	4129	7.9	59
J-PAT-0049	Patterson	4223	16.0	140
J-PAT-0050	Patterson	4236	12.4	134
J-PAT-0051	Patterson	4342	12.8	73
J-PAT-0052	Patterson	4334	7.1	76
J-PAT-0053	Patterson	4361	6.5	65
J-PAT-0054	Patterson	4322	10.0	82
J-PAT-0055	Patterson	4373	18.1	58
J-FHH-0015	Foothill_Homedale	4249	51.8	86
J-FHH-0016	Foothill_Homedale	4248	2.1	87
J-PAT-0056	Patterson	4326	24.6	75
J-PAT-0057	Patterson	4318	20.4	78
J-PAT-0058	Patterson	4348	15.0	65
J-PAT-0059	Patterson	4377	3.2	53
J-PAT-0060	Patterson	4357	8.1	61
J-PAT-0061	Patterson	4349	21.5	65
J-PAT-0062	Patterson	4373	0.0	54
J-PAT-0063	Patterson	4396	1.5	45
J-PAT-0064	Patterson	4413	7.2	37
J-BV-0002	Zone-5	4401	7.8	129
J-BV-0003	Zone-5	4442	20.9	111
J-BV-0004	Zone-5	4460	0.0	103

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-BV-0005	Zone-5	4547	0.0	66
J-BV-0006	Zone-5	4543	0.0	67
J-BV-0007	Zone-5	4486	26.4	92
J-BV-0008	Zone-5	4548	6.7	65
J-BV-0009	Zone-5	4503	6.1	85
J-BV-0010	Zone-5	4494	0.0	89
J-PAT-0065	Patterson	4383	37.0	50
J-PAT-0066	Patterson	4420	16.0	34
J-PAT-0067	Patterson	4389	12.0	75
J-PAT-0068	Patterson	4386	7.0	48
J-PAT-0069	Patterson	4322	14.7	73
J-PAT-0070	Patterson	4381	15.9	50
J-ZN1-1037	Zone-1	4175	13.9	53
J-ZN1-1038	Zone-1	4162	7.5	59
J-ZN1-1039	Zone-1	4158	12.1	60
J-ZN1-1040	Zone-1	4160	0.0	60
J-ZN1-1041	Zone-1	4159	7.9	60
J-ZN1-1042	Zone-1	4150	0.3	64
J-ZN1-1043	Zone-1	4151	4.4	64
J-ZN1-1044	Zone-1	4138	24.6	39
J-ZN1-1045	Zone-1	4140	10.3	38
J-ZN1-1046	Zone-1	4112	27.3	65
J-ZN1-1047	Zone-1	4104	1.3	58
J-ZN1-1048	Zone-1	4109	21.6	56
J-ZN1-1049	Zone-1	4120	49.5	59
J-ZN1-1050	Zone-1	4122	8.8	59
J-ZN1-1051	Zone-1	4092	8.8	73
J-ZN1-1052	Zone-1	4095	19.4	72
J-ZN1-1053	Zone-1	4094	24.2	71
J-ZN1-1054	Zone-1	4092	1.8	72
J-ZN1-1055	Zone-1	4092	2.5	73
J-ZN1-1056	Zone-1	4094	12.0	73
J-SL-0102	Lindley	4224	5.7	68
J-SL-0103	Lindley	4231	2.4	65
J-ZN1-1057	Zone-1	4108	5.4	90
J-SL-0104	Lindley	4218	1.5	71
J-SL-0105	Lindley	4209	2.7	74
J-ZN1-1058	Zone-1	4094	3.2	58
J-ZN1-1059	Zone-1	4094	2.7	58
J-ZN1-1060	Zone-1	4098	12.4	61

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1061	Zone-1	4100	2.5	60
J-ZN1-1062	Zone-1	4100	4.7	59
J-ZN1-1063	Zone-1	4101	18.3	58
J-ZN1-1064	Zone-1	4099	23.3	59
J-KL-0001	Katie Lane	4232	3.2	84
J-KL-0002	Katie Lane	4232	5.3	84
J-KL-0003	Katie Lane	4233	6.5	84
J-KL-0004	Katie Lane	4234	18.5	83
J-KL-0005	Katie Lane	4212	0.0	93
J-KL-0006	Katie Lane	4202	41.6	97
J-PRV-2-OGD-0004	PRV_Ogden	4266	4.5	81
J-PRV-2-OGD-0005	PRV_Ogden	4242	5.9	91
J-PRV-2-OGD-0006	PRV_Ogden	4236	11.9	94
J-PRV-2-OGD-0007	PRV_Ogden	4250	3.8	87
J-PAT-0071	Patterson	4247	0.0	107
J-PAT-0072	Patterson	4256	0.0	103
J-PAT-0073	Patterson	4238	0.2	111
J-PAT-0074	Patterson	4333	36.0	68
J-PAT-0075	Patterson	4243	0.0	107
J-ZN1-1067	Zone-1	4209	4.6	39
J-SH-0004	Sierra Heights	4250	23.3	66
J-SH-0005	Sierra Heights	4252	25.8	65
J-SH-0006	Sierra Heights	4242	26.0	69
J-SH-0007	Sierra Heights	4262	14.9	61
J-SH-0008	Sierra Heights	4274	19.5	56
J-ZN1-1068	Zone-1	4186	2.8	47
J-ZN1-1069	Zone-1	4191	2.5	46
J-ZN1-1071	Zone-1	4176	17.4	49
J-ZN1-1072	Zone-1	4176	24.1	49
J-ZN1-1073	Zone-1	4166	8.8	52
J-ZN1-1074	Zone-1	4182	1.0	46
J-ZN1-1075	Zone-1	4173	10.4	51
J-ZN1-1076	Zone-1	4161	37.7	55
J-ZN1-1077	Zone-1	4172	27.8	51
J-ZN1-1078	Zone-1	4172	14.6	51
J-ZN1-1080	Zone-1	4178	11.3	50
J-ZN1-1081	Zone-1	4092	2.2	83
J-ZN1-1082	Zone-1	4092	7.8	83

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1083	Zone-1	4094	0.0	83
J-SL-0106	Lindley	4203	0.0	78
J-SL-0107	Lindley	4188	6.0	84
J-ZN1-1085	Zone-1	4090	14.8	88
J-ZN1-1086	Zone-1	4090	0.1	88
J-ZN1-1087	Zone-1	4091	1.1	88
J-ZN1-1088	Zone-1	4090	27.8	89
J-ZN1-1089	Zone-1	4090	5.4	90
J-ZN1-1091	Zone-1	4092	2.4	87
J-ZN1-1092	Zone-1	4088	0.0	89
J-ZN1-1093	Zone-1	4093	0.3	85
J-ZN1-1094	Zone-1	4094	15.7	83
J-ZN1-1095	Zone-1	4092	0.4	83
J-ZN1-1096	Zone-1	4092	7.0	83
J-ZN1-1097	Zone-1	4100	45.9	80
J-ZN1-1098	Zone-1	4100	17.1	80
J-ZN1-1100	Zone-1	4098	1.0	81
J-ZN1-1101	Zone-1	4100	0.0	80
J-ZN1-1102	Zone-1	4100	0.0	80
J-ZN1-1103	Zone-1	4099	4.3	80
J-ZN1-1104	Zone-1	4126	7.3	65
J-ZN1-1105	Zone-1	4125	0.0	66
J-ZN1-1106	Zone-1	4122	10.6	67
J-ZN1-1107	Zone-1	4130	79.2	63
J-ZN1-1108	Zone-1	4119	9.1	68
J-ZN1-1109	Zone-1	4120	13.6	68
J-ZN1-1111	Zone-1	4138	11.8	63
J-ZN1-1112	Zone-1	4138	10.9	63
J-ZN1-1113	Zone-1	4138	23.5	63
J-ZN1-1114	Zone-1	4157	18.1	57
J-ZN1-1115	Zone-1	4177	12.8	49
J-ZN1-1116	Zone-1	4156	25.3	58
J-ZN1-1117	Zone-1	4156	22.4	58
J-ZN1-1118	Zone-1	4154	3.5	59
J-ZN1-1120	Zone-1	4162	19.0	55
J-ZN1-1121	Zone-1	4163	19.5	55
J-ZN1-1122	Zone-1	4166	17.3	54
J-ZN1-1123	Zone-1	4170	7.0	52
J-ZN1-1124	Zone-1	4164	10.5	54
J-ZN1-1125	Zone-1	4166	9.2	54

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1126	Zone-1	4168	1.4	51
J-ZN1-1127	Zone-1	4170	3.1	50
J-ZN1-1128	Zone-1	4165	3.5	50
J-ZN1-1130	Zone-1	4153	1.9	56
J-ZN1-1131	Zone-1	4154	8.6	55
J-ZN1-1132	Zone-1	4158	0.0	54
J-ZN1-1133	Zone-1	4162	6.0	52
J-ZN1-1134	Zone-1	4162	20.7	50
J-ZN1-1135	Zone-1	4172	2.4	46
J-ZN1-1136	Zone-1	4171	4.1	46
J-ZN1-1138	Zone-1	4178	0.0	43
J-ZN1-1139	Zone-1	4175	3.3	44
J-ZN1-1140	Zone-1	4168	13.0	47
J-ZN1-1141	Zone-1	4156	11.9	52
J-ZN1-1142	Zone-1	4159	2.3	51
J-ZN1-1143	Zone-1	4149	5.6	55
J-ZN1-1144	Zone-1	4151	3.5	54
J-ZN1-1145	Zone-1	4107	35.2	73
J-ZN1-1147	Zone-1	4108	16.6	73
J-ZN1-1148	Zone-1	4108	8.1	73
J-ZN1-1149	Zone-1	4100	7.4	76
J-ZN1-1150	Zone-1	4101	18.1	76
J-ZN1-1151	Zone-1	4110	2.6	72
J-ZN1-1152	Zone-1	4110	0.2	72
J-ZN1-1154	Zone-1	4110	0.0	72
J-ZN1-1155	Zone-1	4104	9.2	75
J-ZN1-1156	Zone-1	4110	2.7	72
J-ZN1-1157	Zone-1	4109	6.5	72
J-ZN1-1158	Zone-1	4117	12.6	69
J-ZN1-1159	Zone-1	4117	5.1	69
J-ZN1-1160	Zone-1	4139	17.6	59
J-ZN1-1161	Zone-1	4108	29.8	73
J-ZN1-1162	Zone-1	4109	13.1	72
J-ZN1-1163	Zone-1	4104	0.0	74
J-ZN1-1164	Zone-1	4105	20.3	74
J-ZN1-1165	Zone-1	4106	10.9	74
J-ZN1-1166	Zone-1	4108	25.9	73
J-ZN1-1167	Zone-1	4108	6.2	73
J-ZN1-1168	Zone-1	4110	25.7	72
J-ZN1-1169	Zone-1	4108	21.2	73

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1170	Zone-1	4110	13.4	72
J-ZN1-1171	Zone-1	4108	34.5	73
J-ZN1-1173	Zone-1	4106	0.0	74
J-ZN1-1174	Zone-1	4106	0.0	74
J-ZN1-1175	Zone-1	4106	0.0	74
J-ZN1-1176	Zone-1	4137	13.1	60
J-ZN1-1177	Zone-1	4138	19.0	60
J-ZN1-1178	Zone-1	4136	19.4	61
J-ZN1-1179	Zone-1	4168	30.1	47
J-ZN1-1180	Zone-1	4165	47.5	48
J-ZN1-1182	Zone-1	4164	0.0	48
J-ZN1-1183	Zone-1	4158	11.2	51
J-ZN1-1184	Zone-1	4176	2.6	43
J-ZN1-1185	Zone-1	4159	4.1	51
J-ZN1-1186	Zone-1	4166	1.2	48
J-ZN1-1187	Zone-1	4168	25.6	47
J-ZN1-1188	Zone-1	4149	7.1	55
J-ZN1-1189	Zone-1	4152	3.2	54
J-ZN1-1190	Zone-1	4148	0.0	55
J-ZN1-1191	Zone-1	4109	10.2	72
J-ZN1-1193	Zone-1	4109	7.2	72
J-ZN1-1194	Zone-1	4107	18.4	73
J-ZN1-1195	Zone-1	4104	28.6	74
J-ZN1-1196	Zone-1	4105	11.5	74
J-ZN1-1197	Zone-1	4105	17.6	74
J-ZN1-1198	Zone-1	4104	12.6	75
J-ZN1-1199	Zone-1	4102	0.2	75
J-ZN1-1200	Zone-1	4088	0.0	82
J-ZN1-1201	Zone-1	4090	0.0	82
J-ZN1-1203	Zone-1	4090	0.0	82
J-ZN1-1204	Zone-1	4090	27.1	81
J-ZN1-1205	Zone-1	4086	0.0	83
J-ZN1-1206	Zone-1	4089	2.2	82
J-ZN1-1207	Zone-1	4094	1.9	80
J-ZN1-1208	Zone-1	4090	0.0	82
J-ZN1-1209	Zone-1	4089	0.2	82
J-ZN1-1210	Zone-1	4093	0.0	81
J-ZN1-1211	Zone-1	4090	0.0	82
J-ZN1-1213	Zone-1	4089	0.0	83
J-ZN1-1214	Zone-1	4088	0.0	83

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-1215	Zone-1	4089	3.8	82
J-ZN1-1216	Zone-1	4090	36.3	82
J-ZN1-1217	Zone-1	4090	0.0	82
J-ZN1-1218	Zone-1	4090	0.0	82
J-ZN1-1219	Zone-1	4090	0.0	82
J-ZN1-1220	Zone-1	4090	0.0	82
J-ZN1-1221	Zone-1	4090	0.0	82
J-ZN1-1222	Zone-1	4090	0.0	82
J-ZN1-1223	Zone-1	4090	0.0	82
J-ZN1-1224	Zone-1	4090	0.0	82
J-ZN1-1225	Zone-1	4090	0.0	82
J-ZN1-1226	Zone-1	4090	0.0	82
J-ZN1-1227	Zone-1	4090	0.0	82
J-ZN1-1228	Zone-1	4089	0.0	82
J-ZN1-1229	Zone-1	4090	0.0	82
J-ZN1-1230	Zone-1	4089	0.0	82
J-ZN1-1231	Zone-1	4089	0.0	82
J-ZN1-1232	Zone-1	4088	0.0	83
J-ZN1-1233	Zone-1	4084	0.0	85
J-ZN1-1234	Zone-1	4090	0.0	82
J-ZN1-1235	Zone-1	4089	0.0	82
J-ZN1-1236	Zone-1	4090	0.0	82
J-ZN1-1237	Zone-1	4088	0.0	83
J-ZN1-1238	Zone-1	4088	0.2	83
J-ZN1-1239	Zone-1	4088	0.0	83
J-ZN1-1240	Zone-1	4088	1.6	83
J-ZN1-0870	Zone-1	4088	0.0	83
J-ZN1-0871	Zone-1	4088	0.0	83
J-ZN1-0872	Zone-1	4088	0.5	83
J-ZN1-0873	Zone-1	4088	0.0	83
J-ZN1-0239	Zone-1	4164	0.0	51
J-ZN1-0240	Zone-1	4108	2.9	76
J-ZN1-0241	Zone-1	4112	0.9	72
J-ZN1-0242	Zone-1	4219	3.1	51
J-PRE-0017	Prescott	4284	3.0	42
J-PRE-0018	Prescott	4290	12.6	27
J-PRE-0019	Prescott	4254	3.8	43
J-ZN1-0880	Zone-1	4092	0.0	80
J-ZN1-0881	Zone-1	4094	10.4	69
J-HOS-0072	URH-HOSP-HLVL	4338	0.0	67

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0193	Zone-1	4108	41.8	73
J-PRV-2-ELD-0019	PRV-2	4215	2.5	64
J-ZN1-0882	Zone-1	4144	15.0	65
J-ZN1-0883	Zone-1	4110	1.5	75
J-ZN1-0884	Zone-1	4114	8.7	65
J-PAT-0045	Patterson	4356	9.1	58
J-ZN1-0885	Zone-1	4144	8.7	67
J-ZN1-0886	Zone-1	4096	12.1	68
J-ZN1-0887	Zone-1	4092	0.0	80
J-ZN1-0888	Zone-1	4090	0.0	89
J-ZN1-0889	Zone-1	4094	0.0	90
J-ZN1-0890	Zone-1	4169	2.4	54
J-ZN1-0891	Zone-1	4178	0.5	50
J-ZN1-0892	Zone-1	4194	13.7	43
J-ZN1-0893	Zone-1	4182	12.7	48
J-ZN1-0894	Zone-1	4203	2.7	38
J-ZN1-0895	Zone-1	4182	0.2	46
J-ZN1-0896	Zone-1	4182	1.0	46
J-ZN1-0897	Zone-1	4098	19.1	80
J-ZN1-0898	Zone-1	4096	10.2	82
J-ZN1-0899	Zone-1	4100	6.9	55
J-ZN1-0900	Zone-1	4104	0.0	52
J-ZN1-0901	Zone-1	4092	24.7	94
J-SL-0094	Lindley	4149	8.0	100
J-SL-0001	Stewart_Lenox	4225	0.2	70
J-ZN1-0902	Zone-1	4090	15.9	88
J-ZN1-0903	Zone-1	4098	3.5	81
J-ZN1-0904	Zone-1	4104	8.1	75
J-ZN1-0905	Zone-1	4167	4.1	52
J-ZN1-0906	Zone-1	4149	12.4	59
J-ZN1-0907	Zone-1	4163	2.6	53
J-ZN1-0908	Zone-1	4144	9.6	60
J-ZN1-0909	Zone-1	4121	3.5	67
J-ZN1-0910	Zone-1	4110	12.2	72
J-PRV-SL-0001	Stewart_Lenox_PRV	4118	10.0	82
J-ZN1-0911	Zone-1	4093	0.0	81
J-ZN1-0912	Zone-1	4092	6.5	82
J-ZN1-0913	Zone-1	4092	0.1	81
J-ZN1-0914	Zone-1	4093	0.0	81
J-ZN1-0915	Zone-1	4093	0.0	81

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0916	Zone-1	4100	0.0	77
J-ZN1-0917	Zone-1	4102	1.7	76
J-ZN1-0918	Zone-1	4098	11.5	78
J-ZN1-0919	Zone-1	4097	19.8	81
J-ZN1-0920	Zone-1	4104	2.0	75
J-ZN1-0921	Zone-1	4114	0.0	80
J-ZN1-0922	Zone-1	4122	15.5	75
J-ZN1-0923	Zone-1	4179	3.1	43
J-PRE-0074	Prescott	4280	0.9	40
J-PRE-0075	Prescott	4269	3.9	36
J-ZN1-0924	Zone-1	4164	3.1	71
J-ZN1-0925	Zone-1	4198	4.9	47
J-ZN1-0926	Zone-1	4223	4.7	32
J-ZN1-0936	Zone-1	4098	0.9	60
J-ZN1-0939	Zone-1	4137	7.5	61
J-SL-0095	Lindley	4188	3.5	84
J-SL-0096	Lindley	4272	0.9	48
J-ZN1-0929	Zone-1	4182	8.9	49
J-HOS-0073	URH-HOSP-HLVL	4334	54.2	81
J-HOS-0074	URH-HOSP-HLVL	4334	0.0	81
J-ZN1-0930	Zone-1	4090	0.0	82
J-ZN1-0931	Zone-1	4090	12.7	82
J-ZN1-0932	Zone-1	4088	0.0	83
J-ZN1-0934	Zone-1	4088	0.0	83
J-UM-0016	Upper Moyina	4353	6.9	91
J-UM-0017	Upper Moyina	4419	15.7	63
J-UM-0018	Upper Moyina	4377	10.3	81
J-PRE-0076	Prescott	4212	14.3	63
J-ZN1-0937	Zone-1	4247	0.3	40
J-ZN1-0938	Zone-1	4234	0.3	46
J-PRE-0077	Prescott	4269	2.2	36
J-PRE-0078	Prescott	4253	6.3	43
J-PRE-0079	Prescott	4254	13.5	42
J-ZN1-0940	Zone-1	4151	3.1	89
J-ZN1-0941	Zone-1	4181	1.8	63
J-ZN1-0942	Zone-1	4170	0.0	68
J-ZN1-0943	Zone-1	4161	0.0	71
J-SH-0002	Sierra Heights	4212	0.0	82
J-ZN1-0944	Zone-1	4212	0.0	38
J-ZN1-0945	Zone-1	4290	0.0	7

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0946	Zone-1	4095	64.0	65
J-HOS-0075	URH-HOSP-HLVL	4249	10.8	105
J-HOS-0076	URH-HOSP-HLVL	4263	35.2	99
J-HOS-0077	URH-HOSP-HLVL	4303	6.3	82
J-HOS-0078	URH-HOSP-HLVL	4324	14.0	73
J-HOS-0079	URH-HOSP-HLVL	4381	53.5	44
J-HOS-0080	URH-HOSP-HLVL	4283	16.9	86
J-ZN1-0949	Zone-1	4210	3.8	48
J-ZN1-0950	Zone-1	4215	2.6	47
J-ZN1-0951	Zone-1	4158	8.8	52
J-ZN1-0952	Zone-1	4142	22.2	59
J-ZN1-0953	Zone-1	4102	8.2	70
J-ZN1-0954	Zone-1	4104	36.4	71
J-ZN1-0955	Zone-1	4090	0.0	80
J-FHH-0010	Foothill_Homedale	4307	0.0	61
J-FHH-0011	Foothill_Homedale	4279	4.0	73
J-FHH-0012	Foothill_Homedale	4256	0.0	83
J-FHH-0013	Foothill_Homedale	4306	0.0	62
J-FHH-0014	Foothill_Homedale	4236	10.5	92
J-ZN1-0956	Zone-1	4094	0.4	82
J-ZN1-0957	Zone-1	4098	2.7	79
J-ZN1-0958	Zone-1	4097	1.1	79
J-ZN1-0959	Zone-1	4098	0.0	98
J-ZN1-0960	Zone-1	4095	26.4	99
J-ZN1-0961	Zone-1	4098	0.3	97
J-ZN1-0962	Zone-1	4100	0.0	97
J-ZN1-0963	Zone-1	4103	1.4	95
J-SH-0003	Sierra Heights	4225	14.2	77
J-PAT-0046	Patterson	4394	5.2	49
J-SL-0017	Stewart_Lenox	4183	0.7	88
J-ZN1-0964	Zone-1	4093	0.0	103
J-ZN1-0965	Zone-1	4095	0.0	100
J-CR-0007	Crown Ridge	4415	0.0	100
J-SL-0097	Lindley	4203	8.6	77
J-PRE-0080	Prescott	4206	15.6	63
J-ZN1-0966	Zone-1	4170	8.1	68
J-PAT-0047	Patterson	4426	0.0	15
J-PRE-0081	Prescott	4202	0.3	65
J-SL-0098	Lindley	4227	3.3	67
J-ZN1-0967	Zone-1	4090	2.7	95

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0968	Zone-1	4110	1.4	72
J-ZN1-0969	Zone-1	4090	1.3	82
J-ZN1-0970	Zone-1	4104	1.8	75
J-ZN1-0971	Zone-1	4108	16.5	73
J-ZN1-0972	Zone-1	4123	22.6	66
J-ZN1-0973	Zone-1	4152	9.9	58
J-PAT-0048	Patterson	4343	16.1	65
J-UM-0019	Upper Moyina	4437	3.9	55
J-TW-0006	Tanglewood	4807	21.2	79
J-PRV-HWY-0020	PRV-2-HWY	4233	0.5	53
J-PRE-0082	Prescott	4211	7.6	61
J-ZN1-0974	Zone-1	4204	12.3	45
J-ZN1-0975	Zone-1	4125	0.0	78
J-ZN1-0976	Zone-1	4178	10.2	55
J-ZN1-0977	Zone-1	4094	13.9	83
J-ZN1-0978	Zone-1	4092	0.0	69
J-ZN1-0979	Zone-1	4096	0.3	74
J-SL-0099	Lindley	4146	4.4	102
J-SL-0100	Lindley	4138	0.0	106
J-SL-0101	Lindley	4130	0.0	109
J-SL-0003	Stewart_Lenox	4214	4.4	75
J-PRE-0083	Prescott	4243	3.3	51
J-ZN1-0980	Zone-1	4178	0.0	64
J-ZN1-0981	Zone-1	4178	0.0	64
J-ZN1-0982	Zone-1	4156	220.6	69
J-ZN1-0983	Zone-1	4096	1.9	64
J-ZN1-0984	Zone-1	4102	23.4	79
J-ZN1-0985	Zone-1	4125	46.2	65
J-ZN1-0986	Zone-1	4102	7.2	76
J-PRE-0084	Prescott	4250	6.9	44
J-ZN1-0988	Zone-1	4175	0.4	66
J-ZN1-0989	Zone-1	4175	2.7	65
J-ZN1-0990	Zone-1	4156	0.0	68
J-ZN1-0991	Zone-1	4161	1.9	66
J-ZN1-0992	Zone-1	4150	7.0	64
J-ZN1-0993	Zone-1	4150	5.7	64
J-ZN1-0994	Zone-1	4150	7.3	64
J-ZN1-0995	Zone-1	4140	43.1	68
J-ZN1-0996	Zone-1	4140	1.2	66
J-ZN1-0997	Zone-1	4092	2.1	85

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
J-ZN1-0998	Zone-1	4094	20.4	84
J-ZN1-0999	Zone-1	4134	8.6	62
J-HC-0002	Havencrest	4396	10.9	100
J-SL-0111	Stewart_Lenox	4215	0.9	78
J-SL-0112	Stewart_Lenox	4259	6.1	56
J-TW-0019	Tanglewood	4777	2.2	92
J-ZN1-1280	Zone-1	4091	0.0	68
J2554	Zone-1	4184	7.0	59
J2556	Zone-1	4188	0.9	57
J2558	Zone-1	4220	0.0	45
J2560	Zone-1	4200	18.9	54
J2564	Zone-1	4164	37.7	64
J2566	Zone-1	4174	5.4	66
J-ZN1-4005	Zone-1	4192	12.3	61
J-ZN1-4007	Zone-1	4186	6.0	64
J-ZN1-4008	Zone-1	4230	3.1	44
J-ZN1-4013	Zone-1	4096	6.2	82
J-ZN1-4015	Zone-1	4088	0.0	83
J-ZN1-4017	Zone-1	4088	13.2	83
J-ZN1-1436	Zone-1	4178	2.6	64
J2568	Zone-1	4198	2.0	56
J2570	Zone-1	4100	22.0	80
J2572	Prescott	4202	5.1	65
J-ZN1-0528A	Zone-1	4162	9.4	71
P-ZN1-0856B	Zone-1	4162	55.6	59
P-ZN1-0798A	Zone-1	4170	12.0	51
P-ZN1-0798B	Zone-1	4172	14.2	50
J-ZN1-0306A	Zone-1	4124	5.8	66
J-ZN1-0306B	Zone-1	4144	6.9	58
J-SH-0100	Sierra Heights	4282	1.0	52
J-SH-0105	Sierra Heights	4282	1.9	52
J-SH-0110	Sierra Heights	4268	14.1	58
J-SH-115	Sierra Heights	4248	0.0	67
J-SH-120	Sierra Heights	4271	0.0	57
J-SH-125	Sierra Heights	4246	1.4	68
HYDRANT597	Zone-3	4426	81.8	95
J-ZN1-1281	Zone-1	4111	8.5	72
HYD494	Zone-1	4172	9.3	92
HYD1168	Zone-1	4097	11.7	82
HYD157	Zone-1	4174	0.0	53

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
HYD1167	Zone-1	4097	0.0	82
HYD148	Zone-1	4122	0.0	75
HYD1005	Zone-1	4090	0.0	88

ID	Zone	Elevation (ft)	Demand (gpm)	Pressure (psi)
HYD1006	Zone-1	4090	0.0	88
HYD595	Zone-1	4428	0.0	94
J2578	Upper Moyina	4372	0.0	82

Appendix K. Fire Flow at Maximum-Day Demand with Phase 1 and Phase 2 Improvements

K. Fire Flow at Maximum-Day Demand with Phase 1 and Phase 2 Improvements

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-CR-0001	Crown Ridge	4436	26.8	1986
J-CR-0002	Crown Ridge	4417	13.1	1791
J-CR-0003	Crown Ridge	4422	7.0	2042
J-CR-0004	Crown Ridge	4444	6.3	1667
J-CR-0005	Crown Ridge	4435	6.4	1964
J-CR-0006	Crown Ridge	4439	2.8	1900
J-CR-0007	Crown Ridge	4415	0.0	1975
J-CR-0008	Crown Ridge	4396	11.4	2276
J-ESI-0001	ESI	4369	0.0	109
J-ESI-0002	ESI	4388	59.1	161
J-ESI-0003	ESI	4354	0.0	115
J-FHH-0001	Foothill_Homedale	4289	4.8	3369
J-FHH-0002	Foothill_Homedale	4270	11.2	4041
J-FHH-0003	Foothill_Homedale	4285	26.9	3483
J-FHH-0004	Foothill_Homedale	4232	12.9	4441
J-FHH-0005	Foothill_Homedale	4252	11.7	2177
J-FHH-0006	Foothill_Homedale	4296	7.5	3942
J-FHH-0007	Foothill_Homedale	4266	13.8	3921
J-FHH-0008	Foothill_Homedale	4257	3.3	4339
J-FHH-0009	Foothill_Homedale	4310	7.3	644
J-FHH-0010	Foothill_Homedale	4307	0.0	3385
J-FHH-0011	Foothill_Homedale	4279	2.5	3608
J-FHH-0012	Foothill_Homedale	4256	0.0	3640
J-FHH-0013	Foothill_Homedale	4306	0.0	3106
J-FHH-0014	Foothill_Homedale	4236	6.5	4119
J-FHH-0015	Foothill_Homedale	4249	32.4	4090
J-FHH-0016	Foothill_Homedale	4248	1.3	3749
J-FHH-0017	Foothill_Homedale	4300	0.0	4020
J-FHH-0018	Foothill_Homedale	4301	4.5	3852
J-HC-0001	Havencrest	4417	19.2	505
J-HC-0002	Havencrest	4396	6.8	514

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-KL-0001	Katie Lane	4232	2.0	3361
J-KL-0002	Katie Lane	4232	3.3	2692
J-KL-0003	Katie Lane	4233	4.0	3030
J-KL-0004	Katie Lane	4234	11.5	2953
J-KL-0005	Katie Lane	4212	0.0	2920
J-KL-0006	Katie Lane	4202	26.0	2614
J-SL-0063	Lindley	4138	0.3	2466
J-SL-0064	Lindley	4147	17.0	1542
J-SL-0065	Lindley	4124	0.0	5705
J-SL-0066	Lindley	4184	60.8	2051
J-SL-0067	Lindley	4216	10.1	2354
J-SL-0068	Lindley	4235	8.1	2095
J-SL-0069	Lindley	4232	10.4	2161
J-SL-0070	Lindley	4221	0.0	7075
J-SL-0071	Lindley	4214	0.0	12429
J-SL-0072	Lindley	4260	0.0	1015
J-SL-0073	Lindley	4239	24.0	1648
J-SL-0074	Lindley	4213	13.8	5461
J-SL-0075	Lindley	4233	0.9	5182
J-SL-0076	Lindley	4188	1.7	8769
J-SL-0077	Lindley	4185	8.1	4568
J-SL-0078	Lindley	4154	10.4	4663
J-SL-0079	Lindley	4148	6.0	4218
J-SL-0080	Lindley	4105	1.9	5395
J-SL-0081	Lindley	4108	8.4	4895
J-SL-0082	Lindley	4204	15.3	1175
J-SL-0083	Lindley	4151	4.1	2226
J-SL-0084	Lindley	4146	0.0	1997
J-SL-0085	Lindley	4134	0.0	1866
J-SL-0086	Lindley	4217	20.5	1091
J-SL-0087	Lindley	4195	8.7	462

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-SL-0088	Lindley	4098	9.0	5510
J-SL-0089	Lindley	4284	1.7	1029
J-SL-0090	Lindley	4236	2.0	2331
J-SL-0091	Lindley	4180	7.2	3104
J-SL-0092	Lindley	4210	7.9	3379
J-SL-0093	Lindley	4173	0.0	5582
J-SL-0094	Lindley	4149	5.0	4473
J-SL-0095	Lindley	4188	2.2	9115
J-SL-0096	Lindley	4272	0.5	11364
J-SL-0097	Lindley	4203	5.4	3023
J-SL-0098	Lindley	4227	2.0	2858
J-SL-0099	Lindley	4146	2.7	2685
J-SL-0100	Lindley	4138	0.0	2482
J-SL-0101	Lindley	4130	0.0	2791
J-SL-0102	Lindley	4224	3.6	2618
J-SL-0103	Lindley	4231	1.5	2615
J-SL-0104	Lindley	4218	0.9	2254
J-SL-0105	Lindley	4209	1.7	1459
J-SL-0106	Lindley	4203	0.0	6843
J-SL-0107	Lindley	4188	3.8	4383
J-SL-0108	Lindley	4166	0.0	5454
J-PAT-0001	Patterson	4232	3.7	4002
J-PAT-0002	Patterson	4281	7.1	1757
J-PAT-0003	Patterson	4321	0.9	3871
J-PAT-0004	Patterson	4332	22.6	3069
J-PAT-0005	Patterson	4311	6.3	3047
J-PAT-0006	Patterson	4349	19.2	2093
J-PAT-0007	Patterson	4332	11.8	2572
J-PAT-0008	Patterson	4372	5.1	3295
J-PAT-0009	Patterson	4368	0.0	5021
J-PAT-0010	Patterson	4326	0.0	6387
J-PAT-0011	Patterson	4376	10.5	3054
J-PAT-0012	Patterson	4274	8.1	4077
J-PAT-0013	Patterson	4315	1.1	2696
J-PAT-0014	Patterson	4435	17.4	17
J-PAT-0015	Patterson	4431	2.2	2
J-PAT-0016	Patterson	4313	8.2	1921
J-PAT-0017	Patterson	4357	9.1	361
J-PAT-0018	Patterson	4396	3.5	2846
J-PAT-0019	Patterson	4393	2.0	2329
J-PAT-0020	Patterson	4255	0.0	1737
J-PAT-0021	Patterson	4437	18.5	19
J-PAT-0022	Patterson	4298	1.3	3228
J-PAT-0023	Patterson	4187	2.2	3332
J-PAT-0024	Patterson	4247	0.0	4031
J-PAT-0025	Patterson	4246	0.3	3987
J-PAT-0026	Patterson	4288	0.0	3973
J-PAT-0027	Patterson	4314	16.1	3874
J-PAT-0028	Patterson	4367	2.9	5826
J-PAT-0029	Patterson	4344	0.6	6722
J-PAT-0030	Patterson	4350	0.0	6961
J-PAT-0031	Patterson	4391	0.0	6952
J-PAT-0032	Patterson	4394	0.3	3339
J-PAT-0033	Patterson	4470	28.6	28
J-PAT-0034	Patterson	4463	0.0	0
J-PAT-0035	Patterson	4346	10.2	6157
J-PAT-0036	Patterson	4321	0.0	6349
J-PAT-0037	Patterson	4378	0.0	4721
J-PAT-0038	Patterson	4211	2.8	6222
J-PAT-0039	Patterson	4197	0.0	6829
J-PAT-0040	Patterson	4244	0.0	6452
J-PAT-0041	Patterson	4227	11.8	5836
J-PAT-0042	Patterson	4306	3.1	3095
J-PAT-0043	Patterson	4310	1.4	2658
J-PAT-0044	Patterson	4426	0.0	0
J-PAT-0045	Patterson	4356	5.7	1919
J-PAT-0046	Patterson	4394	3.2	3137
J-PAT-0047	Patterson	4426	0.0	0
J-PAT-0048	Patterson	4343	10.0	2069
J-PAT-0049	Patterson	4223	10.0	5960
J-PAT-0050	Patterson	4236	7.7	1824
J-PAT-0051	Patterson	4342	8.0	5738
J-PAT-0052	Patterson	4334	4.4	2990
J-PAT-0053	Patterson	4361	4.1	1493
J-PAT-0054	Patterson	4322	6.2	2047
J-PAT-0055	Patterson	4373	11.3	1344
J-PAT-0056	Patterson	4326	15.4	2850
J-PAT-0057	Patterson	4318	12.7	2298

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PAT-0058	Patterson	4348	9.4	3111
J-PAT-0059	Patterson	4377	2.0	3016
J-PAT-0060	Patterson	4357	5.1	2140
J-PAT-0061	Patterson	4349	13.4	2795
J-PAT-0062	Patterson	4373	0.0	2393
J-PAT-0063	Patterson	4396	1.0	3577
J-PAT-0064	Patterson	4413	4.5	1429
J-PAT-0065	Patterson	4383	23.1	1627
J-PAT-0066	Patterson	4420	10.0	645
J-PAT-0067	Patterson	4389	7.5	471
J-PAT-0068	Patterson	4386	4.4	1502
J-PAT-0069	Patterson	4322	9.2	2202
J-PAT-0070	Patterson	4381	9.9	3497
J-PAT-0071	Patterson	4247	0.0	3960
J-PAT-0072	Patterson	4256	0.0	3365
J-PAT-0073	Patterson	4238	0.1	2488
J-PAT-0074	Patterson	4333	22.5	1587
J-PAT-0075	Patterson	4243	0.0	1556
J-PAT-0076	Patterson	4286	0.0	3972
J-PAT-0077	Patterson	4445	0.0	0
J-PAT-0078	Patterson	4212	0.0	5978
J-PAT-0079	Patterson	4314	3.7	5431
J-PAT-0080	Patterson	4288	5.5	3830
J-PAT-0081	Patterson	4306	1.3	2608
J-PAT-0082	Patterson	4280	0.0	1730
J2572	Prescott	4202	3.2	1441
J-PRE-0001	Prescott	4269	2.3	2087
J-PRE-0002	Prescott	4252	2.6	4803
J-PRE-0003	Prescott	4250	1.3	1528
J-PRE-0004	Prescott	4243	3.7	5195
J-PRE-0005	Prescott	4277	2.1	3508
J-PRE-0006	Prescott	4306	2.2	734
J-PRE-0007	Prescott	4303	2.5	1772
J-PRE-0008	Prescott	4290	1.6	2791
J-PRE-0009	Prescott	4282	0.0	3367
J-PRE-0010	Prescott	4291	2.1	1293
J-PRE-0011	Prescott	4213	2.0	6623
J-PRE-0012	Prescott	4206	1.7	4590
J-PRE-0013	Prescott	4218	0.7	6311

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRE-0014	Prescott	4224	1.0	11667
J-PRE-0015	Prescott	4247	13.3	5558
J-PRE-0016	Prescott	4258	1.1	3679
J-PRE-0017	Prescott	4284	1.8	3129
J-PRE-0018	Prescott	4290	7.9	1796
J-PRE-0019	Prescott	4254	2.4	2392
J-PRE-0020	Prescott	4300	0.2	1990
J-PRE-0021	Prescott	4265	3.6	4216
J-PRE-0022	Prescott	4241	2.6	6765
J-PRE-0023	Prescott	4255	4.5	3632
J-PRE-0024	Prescott	4230	9.6	1194
J-PRE-0025	Prescott	4248	1.8	10301
J-PRE-0026	Prescott	4234	2.5	3767
J-PRE-0027	Prescott	4261	21.1	2542
J-PRE-0028	Prescott	4240	3.7	5601
J-PRE-0029	Prescott	4237	4.8	5850
J-PRE-0030	Prescott	4244	6.2	4451
J-PRE-0031	Prescott	4223	0.0	3953
J-PRE-0032	Prescott	4263	2.1	1239
J-PRE-0033	Prescott	4202	0.9	5015
J-PRE-0034	Prescott	4243	4.5	5224
J-PRE-0035	Prescott	4236	4.5	6879
J-PRE-0036	Prescott	4306	1.4	957
J-PRE-0037	Prescott	4242	2.6	3338
J-PRE-0038	Prescott	4184	0.0	2193
J-PRE-0039	Prescott	4224	6.8	3470
J-PRE-0040	Prescott	4232	20.6	3832
J-PRE-0041	Prescott	4250	2.2	3730
J-PRE-0042	Prescott	4258	0.0	3773
J-PRE-0043	Prescott	4263	0.9	3700
J-PRE-0044	Prescott	4289	2.4	40
J-PRE-0045	Prescott	4272	0.7	1625
J-PRE-0046	Prescott	4256	2.2	956
J-PRE-0047	Prescott	4246	0.7	5730
J-PRE-0048	Prescott	4269	6.2	643
J-PRE-0049	Prescott	4271	0.3	3403
J-PRE-0050	Prescott	4232	1.9	1348
J-PRE-0051	Prescott	4249	4.1	10901
J-PRE-0052	Prescott	4259	9.3	3844

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRE-0053	Prescott	4279	1.0	321
J-PRE-0054	Prescott	4265	2.8	3339
J-PRE-0055	Prescott	4229	4.1	388
J-PRE-0056	Prescott	4233	4.0	2018
J-PRE-0057	Prescott	4311	0.8	78
J-PRE-0058	Prescott	4313	1.4	1
J-PRE-0059	Prescott	4257	0.4	3633
J-PRE-0060	Prescott	4248	3.9	3187
J-PRE-0061	Prescott	4268	4.6	2330
J-PRE-0062	Prescott	4218	5.5	7212
J-PRE-0063	Prescott	4230	2.8	4554
J-PRE-0064	Prescott	4256	6.7	4623
J-PRE-0065	Prescott	4246	2.9	1837
J-PRE-0066	Prescott	4232	1.2	7555
J-PRE-0067	Prescott	4298	1.1	1387
J-PRE-0068	Prescott	4299	8.7	1206
J-PRE-0069	Prescott	4257	4.5	1809
J-PRE-0070	Prescott	4261	3.4	825
J-PRE-0071	Prescott	4186	8.0	2316
J-PRE-0072	Prescott	4194	2.5	1462
J-PRE-0073	Prescott	4196	6.6	1223
J-PRE-0074	Prescott	4280	0.5	12178
J-PRE-0075	Prescott	4269	2.4	3944
J-PRE-0076	Prescott	4212	8.9	4095
J-PRE-0077	Prescott	4269	1.4	2415
J-PRE-0078	Prescott	4253	3.9	2206
J-PRE-0079	Prescott	4254	8.4	3047
J-PRE-0080	Prescott	4206	9.8	3312
J-PRE-0081	Prescott	4202	0.2	3279
J-PRE-0082	Prescott	4211	4.8	2866
J-PRE-0083	Prescott	4243	2.0	5422
J-PRE-0084	Prescott	4250	4.3	3392
J-PRE-0085	Prescott	4242	8.5	6583
J-PRE-0086	Prescott	4210	3.9	2499
J-PRE-0087	Prescott	4300	0.8	1988
J-PRE-0088	Prescott	4256	2.2	1693
J-PRE-0089	Prescott	4220	2.0	5593
J-PRV-2-OGD-0001	PRV_Ogden	4266	1.3	1277
J-PRV-2-OGD-0002	PRV_Ogden	4281	48.5	2830
J-PRV-2-OGD-0003	PRV_Ogden	4255	2.8	1072
J-PRV-2-OGD-0004	PRV_Ogden	4266	2.8	1130
J-PRV-2-OGD-0005	PRV_Ogden	4242	3.7	1065
J-PRV-2-OGD-0006	PRV_Ogden	4236	7.5	983
J-PRV-2-OGD-0007	PRV_Ogden	4250	2.4	1216
J-PRV-2-OGD-0008	PRV_Ogden	4282	1.4	3079
J-PRV-MOY-0001	PRV-13	4276	1.0	1723
J-PRV-MOY-0002	PRV-13	4298	7.3	310
J-PRV-MOY-0003	PRV-13	4269	10.5	55
J-PRV-MOY-0004	PRV-13	4281	12.0	111
J-PRV-MOY-0005	PRV-13	4268	15.9	513
J-PRV-MOY-0006	PRV-13	4295	5.5	616
J-PRV-MOY-0007	PRV-13	4255	12.2	115
J-PRV-MOY-0008	PRV-13	4248	5.2	1636
J-PRV-MOY-0009	PRV-13	4269	1.5	882
J-PRV-MOY-0010	PRV-13	4274	2.1	1646
J-PRV-MOY-0011	PRV-13	4292	5.1	1450
J-PRV-MOY-0012	PRV-13	4293	0.9	927
J-PRV-MOY-0013	PRV-13	4275	5.8	1593
J-PRV-MOY-0014	PRV-13	4239	8.6	1687
J-PRV-MOY-0015	PRV-13	4278	0.0	1726
J-PRV-2-ELD-0001	PRV-2	4229	4.2	3450
J-PRV-2-ELD-0002	PRV-2	4248	6.7	1000
J-PRV-2-ELD-0003	PRV-2	4226	1.0	2423
J-PRV-2-ELD-0004	PRV-2	4252	12.2	1933

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-2-ELD-0005	PRV-2	4218	6.6	3311
J-PRV-2-ELD-0006	PRV-2	4232	10.9	1646
J-PRV-2-ELD-0007	PRV-2	4228	6.1	1946
J-PRV-2-ELD-0008	PRV-2	4218	8.4	2684
J-PRV-2-ELD-0009	PRV-2	4231	10.5	2163
J-PRV-2-ELD-0010	PRV-2	4219	10.9	2325
J-PRV-2-ELD-0011	PRV-2	4202	6.3	1361
J-PRV-2-ELD-0012	PRV-2	4219	17.4	1495
J-PRV-2-ELD-0013	PRV-2	4208	17.4	593
J-PRV-2-ELD-0014	PRV-2	4192	3.9	527
J-PRV-2-ELD-0015	PRV-2	4200	0.8	588
J-PRV-2-ELD-0016	PRV-2	4224	0.6	2475
J-PRV-2-ELD-0017	PRV-2	4203	7.4	2521
J-PRV-2-ELD-0018	PRV-2	4240	26.1	2136
J-PRV-2-ELD-0019	PRV-2	4215	1.6	2322
J-PRV-2-ELD-0020	PRV-2	4253	12.9	2447
J-PRV-2-ELD-0021	PRV-2	4238	16.0	3502
J-PRV-2-ELD-0022	PRV-2	4250	7.6	471
J-PRE-1254	PRV-2-HWY	4195	0.0	3325
J-PRV-HWY-0001	PRV-2-HWY	4234	23.5	3867
J-PRV-HWY-0002	PRV-2-HWY	4218	2.4	3128
J-PRV-HWY-0003	PRV-2-HWY	4216	1.8	3072
J-PRV-HWY-0004	PRV-2-HWY	4243	3.3	2628
J-PRV-HWY-0005	PRV-2-HWY	4238	2.5	2987
J-PRV-HWY-0006	PRV-2-HWY	4222	1.5	3059
J-PRV-HWY-0007	PRV-2-HWY	4191	8.5	5938
J-PRV-HWY-0008	PRV-2-HWY	4233	0.3	3553
J-PRV-HWY-0009	PRV-2-HWY	4206	1.5	2545
J-PRV-HWY-0011	PRV-2-HWY	4184	9.4	1705
J-PRV-HWY-0012	PRV-2-HWY	4234	0.0	3647
J-PRV-HWY-0013	PRV-2-HWY	4217	0.3	2466
J-PRV-HWY-0014	PRV-2-HWY	4221	3.1	2854
J-PRV-HWY-0015	PRV-2-HWY	4216	7.2	2910
J-PRV-HWY-0016	PRV-2-HWY	4238	2.4	2534
J-PRV-HWY-0017	PRV-2-HWY	4241	14.5	2399
J-PRV-HWY-0018	PRV-2-HWY	4216	0.0	2960
J-PRV-HWY-0019	PRV-2-HWY	4222	1.3	3035
J-PRV-HWY-0020	PRV-2-HWY	4233	0.3	2714
J-PRV-HWY-0021	PRV-2-HWY	4238	1.7	2961
J-PRV-HWY-0022	PRV-2-HWY	4189	0.0	6261
J-PRV-3-UMO-0001	PRV-3	4285	11.1	1839
J-PRV-3-UMO-0002	PRV-3	4317	12.5	2288
J-PRV-3-UMO-0003	PRV-3	4300	4.6	2200
J-PRV-3-UMO-0004	PRV-3	4324	39.3	2019
J-PRV-3-UMO-0005	PRV-3	4309	0.0	1198
J-PRV-3-UMO-0006	PRV-3	4337	3.5	2249
J-PRV-3-UMO-0007	PRV-3	4321	0.0	1689
J-PRV-3-UMO-0008	PRV-3	4325	0.0	1657
J-PRV-3-UMO-0009	PRV-3	4343	1.7	2271
J-PRV-OFR-0001	PRV-6	4264	5.6	1978
J-PRV-OFR-0002	PRV-6	4248	5.9	1716
J-PRV-OFR-0003	PRV-6	4225	10.2	2003

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-OFR-0004	PRV-6	4185	2.4	1881
J-PRV-OFR-0005	PRV-6	4210	11.2	1658
J-PRV-OFR-0006	PRV-6	4198	11.1	1776
J-PRV-OFR-0007	PRV-6	4231	5.6	1560
J-PRV-OFR-0008	PRV-6	4254	4.0	917
J-SH-0001	Sierra Heights	4232	4.0	2160
J-SH-0002	Sierra Heights	4212	0.0	2745
J-SH-0003	Sierra Heights	4225	8.9	2528
J-SH-0004	Sierra Heights	4250	14.6	2045
J-SH-0005	Sierra Heights	4252	16.1	1948
J-SH-0006	Sierra Heights	4242	16.2	2111
J-SH-0007	Sierra Heights	4262	9.3	1065
J-SH-0008	Sierra Heights	4274	12.2	921
J-SH-0100	Sierra Heights	4282	0.7	1098
J-SH-0105	Sierra Heights	4282	1.2	1080
J-SH-0110	Sierra Heights	4268	8.8	1489
J-SH-115	Sierra Heights	4248	0.0	1698
J-SH-120	Sierra Heights	4271	0.0	1198
J-SH-125	Sierra Heights	4246	0.9	1482
J-SL-0001	Stewart_Lenox	4225	0.1	619
J-SL-0002	Stewart_Lenox	4186	0.0	2116
J-SL-0003	Stewart_Lenox	4214	2.8	2424
J-SL-0004	Stewart_Lenox	4190	0.0	3890
J-SL-0005	Stewart_Lenox	4246	2.0	68
J-SL-0006	Stewart_Lenox	4227	0.4	4350
J-SL-0007	Stewart_Lenox	4220	3.3	478
J-SL-0008	Stewart_Lenox	4212	2.3	224
J-SL-0009	Stewart_Lenox	4247	0.4	4052
J-SL-0010	Stewart_Lenox	4199	3.1	3161
J-SL-0011	Stewart_Lenox	4200	5.1	4859
J-SL-0012	Stewart_Lenox	4227	8.5	4121
J-SL-0013	Stewart_Lenox	4220	1.6	4261
J-SL-0014	Stewart_Lenox	4178	18.2	3972
J-SL-0015	Stewart_Lenox	4188	0.0	2819
J-SL-0016	Stewart_Lenox	4178	0.1	3422
J-SL-0017	Stewart_Lenox	4183	0.4	4483
J-SL-0018	Stewart_Lenox	4228	5.7	4686
J-SL-0019	Stewart_Lenox	4242	1.8	4827
J-SL-0020	Stewart_Lenox	4248	5.3	5190
J-SL-0021	Stewart_Lenox	4236	2.3	212
J-SL-0022	Stewart_Lenox	4189	5.3	2523
J-SL-0023	Stewart_Lenox	4198	4.7	2032
J-SL-0024	Stewart_Lenox	4192	2.7	1881
J-SL-0025	Stewart_Lenox	4187	8.0	2710
J-SL-0026	Stewart_Lenox	4188	0.0	2438
J-SL-0027	Stewart_Lenox	4226	2.4	2239
J-SL-0028	Stewart_Lenox	4238	0.8	1769
J-SL-0029	Stewart_Lenox	4232	3.0	3825
J-SL-0030	Stewart_Lenox	4234	0.8	3677
J-SL-0031	Stewart_Lenox	4276	5.3	1934
J-SL-0032	Stewart_Lenox	4198	3.1	266
J-SL-0033	Stewart_Lenox	4247	0.0	4293
J-SL-0034	Stewart_Lenox	4187	0.0	4370
J-SL-0035	Stewart_Lenox	4182	2.0	4725
J-SL-0036	Stewart_Lenox	4210	1.9	247
J-SL-0037	Stewart_Lenox	4181	3.2	4708
J-SL-0038	Stewart_Lenox	4185	3.8	2463
J-SL-0039	Stewart_Lenox	4224	2.4	563
J-SL-0040	Stewart_Lenox	4189	2.2	238
J-SL-0041	Stewart_Lenox	4249	0.0	4348
J-SL-0042	Stewart_Lenox	4242	1.9	4837
J-SL-0043	Stewart_Lenox	4247	2.0	4149
J-SL-0044	Stewart_Lenox	4226	4.2	573
J-SL-0045	Stewart_Lenox	4228	4.1	4750
J-SL-0046	Stewart_Lenox	4241	0.0	61
J-SL-0047	Stewart_Lenox	4210	0.0	3049
J-SL-0048	Stewart_Lenox	4209	0.9	2898
J-SL-0049	Stewart_Lenox	4235	2.8	147
J-SL-0050	Stewart_Lenox	4219	3.0	836
J-SL-0051	Stewart_Lenox	4227	0.8	86
J-SL-0052	Stewart_Lenox	4188	0.0	2477
J-SL-0053	Stewart_Lenox	4211	0.1	2857
J-SL-0111	Stewart_Lenox	4215	0.6	443
J-SL-0112	Stewart_Lenox	4259	3.8	1544
J-PRV-SL-0001	Stewart_Lenox_PRV	4118	6.3	348
J-PRV-SL-0002	Stewart_Lenox_PRV	4215	0.0	2575

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-PRV-SL-0003	Stewart_Lenox_PRV	4212	1.4	54
J-PRV-SL-0004	Stewart_Lenox_PRV	4134	4.7	152
J-PRV-SL-0005	Stewart_Lenox_PRV	4225	1.4	797
J-PRV-SL-0006	Stewart_Lenox_PRV	4216	0.7	279
J-PRV-SL-0007	Stewart_Lenox_PRV	4230	0.3	201
J-PRV-SL-0008	Stewart_Lenox_PRV	4204	0.7	271
J-PRV-SL-0009	Stewart_Lenox_PRV	4141	1.5	1975
J-PRV-SL-0010	Stewart_Lenox_PRV	4126	1.9	75
J-PRV-SL-0011	Stewart_Lenox_PRV	4145	2.5	170
J-PRV-SL-0012	Stewart_Lenox_PRV	4157	5.1	116
J-PRV-SL-0013	Stewart_Lenox_PRV	4114	42.1	1702
J-PRV-SL-0014	Stewart_Lenox_PRV	4117	0.1	1700
J-PRV-SL-0015	Stewart_Lenox_PRV	4114	0.0	285
J-PRV-SL-0016	Stewart_Lenox_PRV	4213	0.3	2627
J-PRV-SL-0017	Stewart_Lenox_PRV	4214	0.0	2707
J-TW-0001	Tanglewood	4549	0.0	3424
J-TW-0002	Tanglewood	4183	0.0	2744
J-TW-0003	Tanglewood	4820	12.8	5306
J-TW-0004	Tanglewood	4814	27.4	3035
J-TW-0005	Tanglewood	4772	2.7	3040
J-TW-0006	Tanglewood	4807	13.3	2806
J-TW-0007	Tanglewood	4822	2.6	2538
J-TW-0008	Tanglewood	4179	7.3	2727
J-TW-0019	Tanglewood	4777	1.4	3809
J-UL-0001	Upper Lynnewood	4296	3.0	2562
J-UL-0002	Upper Lynnewood	4295	8.8	2168
J-UL-0003	Upper Lynnewood	4306	8.3	920
J-UL-0004	Upper Lynnewood	4269	0.4	3649
J-UL-0005	Upper Lynnewood	4259	4.1	3994
J-UL-0006	Upper Lynnewood	4230	30.4	3746
J-UL-0007	Upper Lynnewood	4228	5.3	1472
J-UL-0008	Upper Lynnewood	4230	6.7	4059
J-UL-0009	Upper Lynnewood	4270	3.1	3616
J-UL-0010	Upper Lynnewood	4262	1.9	3065
J-UL-0011	Upper Lynnewood	4283	2.4	1753
J-UL-0012	Upper Lynnewood	4212	3.8	4696
J2578	Upper Moyina	4372	0.0	1744
J-UM-0001	Upper Moyina	4417	5.7	2051
J-UM-0002	Upper Moyina	4353	8.2	1967

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-UM-0003	Upper Moyina	4364	8.7	1661
J-UM-0004	Upper Moyina	4429	9.9	273
J-UM-0005	Upper Moyina	4417	4.7	364
J-UM-0006	Upper Moyina	4369	10.4	1527
J-UM-0007	Upper Moyina	4434	3.2	2411
J-UM-0008	Upper Moyina	4362	15.9	2324
J-UM-0009	Upper Moyina	4360	19.7	2070
J-UM-0010	Upper Moyina	4384	19.9	1182
J-UM-0011	Upper Moyina	4485	0.0	1603
J-UM-0012	Upper Moyina	4375	9.5	1928
J-UM-0013	Upper Moyina	4401	19.4	1925
J-UM-0014	Upper Moyina	4400	19.1	2111
J-UM-0015	Upper Moyina	4446	15.8	881
J-UM-0016	Upper Moyina	4353	4.3	1990
J-UM-0017	Upper Moyina	4419	9.8	1985
J-UM-0018	Upper Moyina	4377	6.4	2086
J-UM-0019	Upper Moyina	4437	2.5	2249
J-UM-0020	Upper Moyina	4458	0.0	2024
J-UM-0021	Upper Moyina	4336	11.9	2208
J-HOS-0001	URH-HOSP-HLVL	4292	0.0	5298
J-HOS-0002	URH-HOSP-HLVL	4364	0.0	3338
J-HOS-0003	URH-HOSP-HLVL	4213	0.0	2526
J-HOS-0004	URH-HOSP-HLVL	4373	7.2	1541
J-HOS-0005	URH-HOSP-HLVL	4409	47.7	1895
J-HOS-0006	URH-HOSP-HLVL	4281	8.5	3352
J-HOS-0007	URH-HOSP-HLVL	4380	1.4	2248
J-HOS-0008	URH-HOSP-HLVL	4279	3.5	2806
J-HOS-0009	URH-HOSP-HLVL	4319	0.0	1957
J-HOS-0010	URH-HOSP-HLVL	4410	18.7	1040
J-HOS-0011	URH-HOSP-HLVL	4224	3.3	4835
J-HOS-0012	URH-HOSP-HLVL	4338	1.9	2708
J-HOS-0013	URH-HOSP-HLVL	4307	9.9	2968
J-HOS-0014	URH-HOSP-HLVL	4356	12.1	3328
J-HOS-0015	URH-HOSP-HLVL	4451	0.0	1815
J-HOS-0016	URH-HOSP-HLVL	4322	4.9	3317
J-HOS-0017	URH-HOSP-HLVL	4324	9.3	2027
J-HOS-0018	URH-HOSP-HLVL	4269	1.0	3139
J-HOS-0019	URH-HOSP-HLVL	4320	2.7	4772
J-HOS-0020	URH-HOSP-HLVL	4228	1.6	2722

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0021	URH-HOSP-HLVL	4261	4.3	3366
J-HOS-0022	URH-HOSP-HLVL	4253	4.3	2774
J-HOS-0023	URH-HOSP-HLVL	4267	4.5	2813
J-HOS-0024	URH-HOSP-HLVL	4300	11.7	2476
J-HOS-0025	URH-HOSP-HLVL	4322	6.2	5295
J-HOS-0026	URH-HOSP-HLVL	4271	3.4	3270
J-HOS-0027	URH-HOSP-HLVL	4313	7.6	2667
J-HOS-0028	URH-HOSP-HLVL	4317	19.4	2317
J-HOS-0029	URH-HOSP-HLVL	4344	9.1	1841
J-HOS-0030	URH-HOSP-HLVL	4357	0.7	1554
J-HOS-0031	URH-HOSP-HLVL	4273	21.6	3914
J-HOS-0032	URH-HOSP-HLVL	4269	3.1	3509
J-HOS-0033	URH-HOSP-HLVL	4320	0.0	3346
J-HOS-0034	URH-HOSP-HLVL	4378	0.2	1980
J-HOS-0035	URH-HOSP-HLVL	4367	6.5	2769
J-HOS-0036	URH-HOSP-HLVL	4383	2.7	2915
J-HOS-0037	URH-HOSP-HLVL	4420	18.5	2394
J-HOS-0038	URH-HOSP-HLVL	4345	0.0	3988
J-HOS-0039	URH-HOSP-HLVL	4330	0.0	6560
J-HOS-0040	URH-HOSP-HLVL	4462	0.0	0
J-HOS-0041	URH-HOSP-HLVL	4422	0.0	2129
J-HOS-0042	URH-HOSP-HLVL	4431	0.0	2516
J-HOS-0043	URH-HOSP-HLVL	4415	1.4	2084
J-HOS-0044	URH-HOSP-HLVL	4431	5.2	1998
J-HOS-0045	URH-HOSP-HLVL	4414	10.5	2094
J-HOS-0046	URH-HOSP-HLVL	4287	13.2	3510
J-HOS-0047	URH-HOSP-HLVL	4311	0.0	6571
J-HOS-0048	URH-HOSP-HLVL	4268	0.2	6527
J-HOS-0049	URH-HOSP-HLVL	4254	0.0	6574
J-HOS-0050	URH-HOSP-HLVL	4333	0.0	3923
J-HOS-0051	URH-HOSP-HLVL	4252	0.0	4131
J-HOS-0052	URH-HOSP-HLVL	4322	13.5	3148
J-HOS-0053	URH-HOSP-HLVL	4369	39.7	1997
J-HOS-0054	URH-HOSP-HLVL	4388	23.5	1237
J-HOS-0055	URH-HOSP-HLVL	4337	19.6	2008
J-HOS-0056	URH-HOSP-HLVL	4225	4.4	145
J-HOS-0057	URH-HOSP-HLVL	4386	2.7	1147
J-HOS-0058	URH-HOSP-HLVL	4369	2.9	1425
J-HOS-0059	URH-HOSP-HLVL	4312	7.3	2367
J-HOS-0060	URH-HOSP-HLVL	4251	3.8	3237
J-HOS-0061	URH-HOSP-HLVL	4253	8.4	2903
J-HOS-0062	URH-HOSP-HLVL	4274	57.1	2246
J-HOS-0063	URH-HOSP-HLVL	4314	5.9	3342
J-HOS-0064	URH-HOSP-HLVL	4302	0.3	2752
J-HOS-0065	URH-HOSP-HLVL	4344	8.6	1142
J-HOS-0066	URH-HOSP-HLVL	4401	6.1	970
J-HOS-0067	URH-HOSP-HLVL	4385	0.0	2030
J-HOS-0068	URH-HOSP-HLVL	4253	10.6	1859
J-HOS-0069	URH-HOSP-HLVL	4361	6.1	1958
J-HOS-0070	URH-HOSP-HLVL	4346	6.9	2209
J-HOS-0071	URH-HOSP-HLVL	4286	9.9	2639
J-HOS-0072	URH-HOSP-HLVL	4338	0.0	1543
J-HOS-0073	URH-HOSP-HLVL	4334	33.9	4021
J-HOS-0074	URH-HOSP-HLVL	4334	0.0	3881
J-HOS-0075	URH-HOSP-HLVL	4249	6.7	3153
J-HOS-0076	URH-HOSP-HLVL	4263	22.0	4723
J-HOS-0077	URH-HOSP-HLVL	4303	3.9	3286
J-HOS-0078	URH-HOSP-HLVL	4324	8.7	2440
J-HOS-0079	URH-HOSP-HLVL	4381	33.4	1640
J-HOS-0080	URH-HOSP-HLVL	4283	10.6	2675
J-HOS-0081	URH-HOSP-HLVL	4236	36.6	3974
J-HOS-0082	URH-HOSP-HLVL	4296	33.9	1833
J-HOS-0083	URH-HOSP-HLVL	4274	4.7	2327
J-HOS-0084	URH-HOSP-HLVL	4309	7.1	1447
J-HOS-0085	URH-HOSP-HLVL	4257	13.9	3427
J-HOS-0086	URH-HOSP-HLVL	4276	0.0	2226
J-HOS-0087	URH-HOSP-HLVL	4301	0.0	1878
J-HOS-0088	URH-HOSP-HLVL	4364	0.0	3341
J-HOS-0089	URH-HOSP-HLVL	4292	2.1	2319
J-HOS-0090	URH-HOSP-HLVL	4316	0.5	2300
J-HOS-0091	URH-HOSP-HLVL	4331	0.7	1919
J-HOS-0092	URH-HOSP-HLVL	4284	0.0	2106
J-HOS-0093	URH-HOSP-HLVL	4315	3.8	1849
J-HOS-0094	URH-HOSP-HLVL	4328	0.0	3263
J-HOS-0095	URH-HOSP-HLVL	4454	2.3	1796
J-HOS-0096	URH-HOSP-HLVL	4452	0.0	1807
J-HOS-0097	URH-HOSP-HLVL	4365	6.0	2771
J-HOS-0098	URH-HOSP-HLVL	4352	98.4	951

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-HOS-0099	URH-HOSP-HLVL	4318	15.7	2403
J-HOS-0100	URH-HOSP-HLVL	4311	0.2	2894
J-HOS-0101	URH-HOSP-HLVL	4372	1.7	1350
J-HOS-0102	URH-HOSP-HLVL	4266	3.5	2794
J-HOS-0103	URH-HOSP-HLVL	4274	9.5	2372
J-HOS-0104	URH-HOSP-HLVL	4227	0.0	6845
J-HOS-0105	URH-HOSP-HLVL	4260	8.0	3283
J-HOS-0106	URH-HOSP-HLVL	4314	17.3	2284
J-HOS-0107	URH-HOSP-HLVL	4268	3.6	2364
J-HOS-0108	URH-HOSP-HLVL	4259	0.8	1163
J-HOS-0109	URH-HOSP-HLVL	4187	0.0	4821
J-WO-0001	West Oregon	4226	1.3	2064
J-WO-0002	West Oregon	4209	4.3	2127
J-WO-0003	West Oregon	4224	9.4	2075
J-WO-0004	West Oregon	4238	16.1	2200
J-WO-0005	West Oregon	4223	3.1	2110
J-WO-0006	West Oregon	4230	5.9	2001
J-WO-0007	West Oregon	4268	2.3	2248
J-WO-0008	West Oregon	4219	1.5	831
J-WO-0009	West Oregon	4213	1.7	1778
J-WO-0010	West Oregon	4194	3.4	1820
J-WO-0011	West Oregon	4242	10.1	2096
J-WO-0012	West Oregon	4244	1.8	2194
J-WO-0013	West Oregon	4247	2.2	2850
HYD1005	Zone-1	4090	0.0	8105
HYD1006	Zone-1	4090	0.0	8066
HYD1167	Zone-1	4097	0.0	10165
HYD1168	Zone-1	4097	7.3	10220
HYD148	Zone-1	4122	0.0	4865
HYD157	Zone-1	4174	0.0	5278
HYD494	Zone-1	4172	5.8	4585
HYD595	Zone-1	4428		
J2554	Zone-1	4184	4.4	4626
J2556	Zone-1	4188	0.6	4733
J2558	Zone-1	4220	0.0	4142
J2560	Zone-1	4200	11.8	5754
J2564	Zone-1	4164	23.6	3444
J2566	Zone-1	4174	3.4	10403
J2568	Zone-1	4198	1.3	8158

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J2570	Zone-1	4100	13.7	6541
J-ZN1-0001	Zone-1	4197	0.0	4671
J-ZN1-0003	Zone-1	4092	55.0	2104
J-ZN1-0004	Zone-1	4092	2.9	1680
J-ZN1-0005	Zone-1	4146	2.4	4717
J-ZN1-0006	Zone-1	4145	4.4	4412
J-ZN1-0007	Zone-1	4144	0.4	2010
J-ZN1-0008	Zone-1	4239	0.2	3494
J-ZN1-0009	Zone-1	4153	0.2	1765
J-ZN1-0010	Zone-1	4148	15.8	1838
J-ZN1-0011	Zone-1	4251	0.0	1803
J-ZN1-0012	Zone-1	4179	11.5	3074
J-ZN1-0013	Zone-1	4194	0.0	1403
J-ZN1-0014	Zone-1	4150	1.2	4345
J-ZN1-0015	Zone-1	4183	3.4	3656
J-ZN1-0016	Zone-1	4175	13.1	5251
J-ZN1-0017	Zone-1	4186	9.8	3394
J-ZN1-0018	Zone-1	4111	4.8	7162
J-ZN1-0019	Zone-1	4114	0.0	5991
J-ZN1-0020	Zone-1	4122	3.7	5083
J-ZN1-0021	Zone-1	4187	6.7	5254
J-ZN1-0022	Zone-1	4122	20.3	4731
J-ZN1-0023	Zone-1	4125	92.8	5265
J-ZN1-0024	Zone-1	4146	0.0	5305
J-ZN1-0025	Zone-1	4147	0.0	6078
J-ZN1-0026	Zone-1	4096	6.3	7094
J-ZN1-0027	Zone-1	4123	2.7	2959
J-ZN1-0028	Zone-1	4138	0.2	567
J-ZN1-0029	Zone-1	4208	12.4	4128
J-ZN1-0030	Zone-1	4144	2.5	7214
J-ZN1-0031	Zone-1	4145	10.5	3215
J-ZN1-0032	Zone-1	4136	6.4	2693
J-ZN1-0033	Zone-1	4157	7.1	4489
J-ZN1-0034	Zone-1	4108	4.5	1929
J-ZN1-0035	Zone-1	4108	6.8	33170
J-ZN1-0036	Zone-1	4092	0.9	11163
J-ZN1-0037	Zone-1	4104	4.6	3614
J-ZN1-0038	Zone-1	4104	1.2	6356
J-ZN1-0039	Zone-1	4226	23.2	3800

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0040	Zone-1	4100	6.4	2426
J-ZN1-0041	Zone-1	4100	7.1	535
J-ZN1-0042	Zone-1	4104	2.5	1704
J-ZN1-0043	Zone-1	4100	11.1	405
J-ZN1-0044	Zone-1	4098	4.0	8425
J-ZN1-0045	Zone-1	4110	11.0	3850
J-ZN1-0046	Zone-1	4144	8.1	3721
J-ZN1-0047	Zone-1	4168	0.1	7139
J-ZN1-0048	Zone-1	4140	7.7	4470
J-ZN1-0049	Zone-1	4138	11.4	5512
J-ZN1-0050	Zone-1	4138	18.7	3805
J-ZN1-0051	Zone-1	4142	7.2	2240
J-ZN1-0052	Zone-1	4142	4.5	3272
J-ZN1-0053	Zone-1	4140	6.1	3765
J-ZN1-0054	Zone-1	4145	2.7	7712
J-ZN1-0055	Zone-1	4180	10.6	5938
J-ZN1-0056	Zone-1	4143	0.7	7030
J-ZN1-0057	Zone-1	4178	0.0	6861
J-ZN1-0058	Zone-1	4143	6.0	2140
J-ZN1-0059	Zone-1	4156	27.3	7644
J-ZN1-0061	Zone-1	4205	3.5	1854
J-ZN1-0062	Zone-1	4174	5.8	5226
J-ZN1-0063	Zone-1	4114	0.0	7276
J-ZN1-0064	Zone-1	4114	0.0	4993
J-ZN1-0065	Zone-1	4182	7.3	7112
J-ZN1-0066	Zone-1	4096	38.9	10252
J-ZN1-0067	Zone-1	4116	24.9	4687
J-ZN1-0068	Zone-1	4185	8.2	6154
J-ZN1-0069	Zone-1	4154	11.7	2233
J-ZN1-0070	Zone-1	4140	6.3	3020
J-ZN1-0071	Zone-1	4134	48.8	1370
J-ZN1-0072	Zone-1	4148	0.3	2980
J-ZN1-0073	Zone-1	4140	5.9	2894
J-ZN1-0074	Zone-1	4152	19.2	7808
J-ZN1-0075	Zone-1	4152	3.6	2449
J-ZN1-0076	Zone-1	4142	5.8	3043
J-ZN1-0077	Zone-1	4150	8.7	7320
J-ZN1-0078	Zone-1	4151	3.8	2286
J-ZN1-0079	Zone-1	4137	2.4	1544

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0080	Zone-1	4138	6.6	251
J-ZN1-0081	Zone-1	4135	7.1	2197
J-ZN1-0082	Zone-1	4141	6.0	2933
J-ZN1-0083	Zone-1	4169	25.1	6078
J-ZN1-0084	Zone-1	4137	3.8	1860
J-ZN1-0085	Zone-1	4092	0.0	7941
J-ZN1-0086	Zone-1	4124	0.0	5646
J-ZN1-0087	Zone-1	4112	0.2	6479
J-ZN1-0088	Zone-1	4134	1.3	3650
J-ZN1-0089	Zone-1	4096	3.0	18298
J-ZN1-0090	Zone-1	4186	7.9	1819
J-ZN1-0091	Zone-1	4142	0.0	4868
J-ZN1-0092	Zone-1	4114	25.3	5605
J-ZN1-0093	Zone-1	4176	5.9	5766
J-ZN1-0094	Zone-1	4148	1.3	4602
J-ZN1-0095	Zone-1	4148	0.0	4609
J-ZN1-0096	Zone-1	4175	0.0	2026
J-ZN1-0097	Zone-1	4173	2.6	2557
J-ZN1-0098	Zone-1	4136	1.5	1219
J-ZN1-0099	Zone-1	4139	5.5	7131
J-ZN1-0100	Zone-1	4254	1.4	1268
J-ZN1-0101	Zone-1	4257	0.0	868
J-ZN1-0102	Zone-1	4174	1.7	3562
J-ZN1-0103	Zone-1	4155	3.9	3622
J-ZN1-0104	Zone-1	4144	8.4	3001
J-ZN1-0105	Zone-1	4121	1.7	2788
J-ZN1-0106	Zone-1	4152	12.9	6126
J-ZN1-0107	Zone-1	4159	22.0	3387
J-ZN1-0108	Zone-1	4122	0.5	2079
J-ZN1-0109	Zone-1	4217	0.8	1649
J-ZN1-0110	Zone-1	4192	8.5	2509
J-ZN1-0111	Zone-1	4184	5.0	2823
J-ZN1-0112	Zone-1	4182	5.6	5909
J-ZN1-0113	Zone-1	4180	4.2	1924
J-ZN1-0114	Zone-1	4193	1.3	2973
J-ZN1-0115	Zone-1	4192	3.5	1529
J-ZN1-0116	Zone-1	4166	2.7	4475
J-ZN1-0117	Zone-1	4168	3.5	3846
J-ZN1-0118	Zone-1	4164	2.7	4079

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0119	Zone-1	4166	2.5	3178
J-ZN1-0120	Zone-1	4167	13.7	2829
J-ZN1-0121	Zone-1	4170	4.7	3545
J-ZN1-0122	Zone-1	4164	7.2	2135
J-ZN1-0123	Zone-1	4162	5.6	2179
J-ZN1-0124	Zone-1	4144	3.4	5945
J-ZN1-0125	Zone-1	4151	5.5	4960
J-ZN1-0126	Zone-1	4141	8.7	6287
J-ZN1-0127	Zone-1	4149	17.2	6778
J-ZN1-0128	Zone-1	4138	8.9	3636
J-ZN1-0129	Zone-1	4140	11.8	4060
J-ZN1-0130	Zone-1	4134	5.4	4230
J-ZN1-0131	Zone-1	4144	9.9	3861
J-ZN1-0132	Zone-1	4142	10.3	3950
J-ZN1-0133	Zone-1	4150	5.9	7046
J-ZN1-0134	Zone-1	4136	10.3	4006
J-ZN1-0135	Zone-1	4133	4.9	4816
J-ZN1-0136	Zone-1	4145	11.5	5169
J-ZN1-0137	Zone-1	4151	5.0	6638
J-ZN1-0138	Zone-1	4148	15.7	5198
J-ZN1-0139	Zone-1	4142	13.1	5224
J-ZN1-0140	Zone-1	4134	12.8	5553
J-ZN1-0141	Zone-1	4140	3.6	3821
J-ZN1-0142	Zone-1	4136	7.6	4083
J-ZN1-0143	Zone-1	4144	8.7	4649
J-ZN1-0144	Zone-1	4139	8.9	4308
J-ZN1-0145	Zone-1	4134	8.2	5763
J-ZN1-0146	Zone-1	4150	9.7	6097
J-ZN1-0147	Zone-1	4144	8.8	4362
J-ZN1-0148	Zone-1	4146	10.4	4197
J-ZN1-0149	Zone-1	4134	9.4	6447
J-ZN1-0150	Zone-1	4155	2.0	3464
J-ZN1-0151	Zone-1	4168	0.8	2698
J-ZN1-0152	Zone-1	4160	23.6	3434
J-ZN1-0153	Zone-1	4150	0.0	3817
J-ZN1-0154	Zone-1	4139	3.4	4427
J-ZN1-0155	Zone-1	4134	9.4	5412
J-ZN1-0156	Zone-1	4136	11.4	3197
J-ZN1-0157	Zone-1	4138	16.3	2484
J-ZN1-0158	Zone-1	4140	6.1	1425
J-ZN1-0159	Zone-1	4140	16.6	3251
J-ZN1-0160	Zone-1	4143	10.6	2887
J-ZN1-0161	Zone-1	4144	12.2	2700
J-ZN1-0162	Zone-1	4146	3.7	2373
J-ZN1-0163	Zone-1	4154	6.8	2754
J-ZN1-0164	Zone-1	4194	0.0	5417
J-ZN1-0165	Zone-1	4177	0.3	5871
J-ZN1-0166	Zone-1	4169	5.2	6449
J-ZN1-0167	Zone-1	4159	19.6	2988
J-ZN1-0168	Zone-1	4090	1.3	7052
J-ZN1-0169	Zone-1	4173	16.3	1211
J-ZN1-0170	Zone-1	4158	0.0	1906
J-ZN1-0171	Zone-1	4120	6.0	6978
J-ZN1-0172	Zone-1	4120	5.0	4380
J-ZN1-0173	Zone-1	4122	7.9	3598
J-ZN1-0174	Zone-1	4118	23.6	6905
J-ZN1-0175	Zone-1	4118	8.5	6959
J-ZN1-0176	Zone-1	4118	4.8	7031
J-ZN1-0177	Zone-1	4114	10.0	6959
J-ZN1-0178	Zone-1	4265	4.9	5
J-ZN1-0179	Zone-1	4112	17.9	6850
J-ZN1-0180	Zone-1	4107	0.0	6230
J-ZN1-0181	Zone-1	4112	41.0	3771
J-ZN1-0182	Zone-1	4112	4.9	3209
J-ZN1-0183	Zone-1	4116	33.6	3803
J-ZN1-0184	Zone-1	4112	5.6	3331
J-ZN1-0185	Zone-1	4166	0.6	2640
J-ZN1-0186	Zone-1	4164	0.8	2597
J-ZN1-0187	Zone-1	4160	0.7	2603
J-ZN1-0188	Zone-1	4152	0.0	2662
J-ZN1-0189	Zone-1	4236	13.6	3266
J-ZN1-0190	Zone-1	4160	2.2	1555
J-ZN1-0191	Zone-1	4167	2.4	1686
J-ZN1-0192	Zone-1	4198	11.0	2750
J-ZN1-0193	Zone-1	4108	26.2	6268
J-ZN1-0194	Zone-1	4206	1.4	4220
J-ZN1-0195	Zone-1	4189	4.7	5133
J-ZN1-0196	Zone-1	4175	1.3	4762

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0197	Zone-1	4172	7.2	2418
J-ZN1-0198	Zone-1	4120	6.0	4026
J-ZN1-0199	Zone-1	4155	14.1	5298
J-ZN1-0200	Zone-1	4116	5.0	2731
J-ZN1-0201	Zone-1	4098	11.6	8072
J-ZN1-0202	Zone-1	4134	0.0	6010
J-ZN1-0203	Zone-1	4110	21.3	2820
J-ZN1-0204	Zone-1	4118	5.1	4433
J-ZN1-0205	Zone-1	4095	1.4	6977
J-ZN1-0206	Zone-1	4098	63.9	8152
J-ZN1-0207	Zone-1	4095	0.0	9707
J-ZN1-0208	Zone-1	4100	1.7	2446
J-ZN1-0209	Zone-1	4117	7.6	5375
J-ZN1-0210	Zone-1	4181	12.8	6676
J-ZN1-0211	Zone-1	4095	13.5	8916
J-ZN1-0212	Zone-1	4091	5.9	16593
J-ZN1-0213	Zone-1	4116	4.7	5389
J-ZN1-0214	Zone-1	4092	4.3	17605
J-ZN1-0215	Zone-1	4094	0.7	9919
J-ZN1-0216	Zone-1	4096	14.7	10564
J-ZN1-0217	Zone-1	4158	0.0	3109
J-ZN1-0218	Zone-1	4164	2.0	2687
J-ZN1-0219	Zone-1	4114	3.1	5762
J-ZN1-0220	Zone-1	4141	0.0	4262
J-ZN1-0221	Zone-1	4094	8.4	15987
J-ZN1-0222	Zone-1	4096	8.7	23099
J-ZN1-0223	Zone-1	4090	0.0	3859
J-ZN1-0224	Zone-1	4121	12.3	2668
J-ZN1-0225	Zone-1	4088	0.0	1922
J-ZN1-0226	Zone-1	4090	0.0	1743
J-ZN1-0227	Zone-1	4088	0.0	8285
J-ZN1-0228	Zone-1	4175	8.1	4083
J-ZN1-0229	Zone-1	4122	11.3	1583
J-ZN1-0230	Zone-1	4214	6.9	5968
J-ZN1-0231	Zone-1	4232	9.9	3525
J-ZN1-0232	Zone-1	4136	12.2	4705
J-ZN1-0233	Zone-1	4218	1.8	4576
J-ZN1-0234	Zone-1	4231	0.9	3342
J-ZN1-0235	Zone-1	4224	2.8	11186
J-ZN1-0236	Zone-1	4246	1.6	6565
J-ZN1-0237	Zone-1	4224	0.7	6590
J-ZN1-0238	Zone-1	4139	1.7	3644
J-ZN1-0239	Zone-1	4164	0.0	2398
J-ZN1-0240	Zone-1	4108	1.8	2351
J-ZN1-0241	Zone-1	4112	0.6	5599
J-ZN1-0242	Zone-1	4219	1.9	3856
J-ZN1-0243	Zone-1	4138	0.0	3179
J-ZN1-0244	Zone-1	4140	3.5	3187
J-ZN1-0245	Zone-1	4162	1.8	4915
J-ZN1-0246	Zone-1	4150	0.0	4918
J-ZN1-0247	Zone-1	4140	11.3	1307
J-ZN1-0248	Zone-1	4162	1.4	5498
J-ZN1-0249	Zone-1	4184	2.3	8734
J-ZN1-0250	Zone-1	4196	1.9	8841
J-ZN1-0251	Zone-1	4097	0.0	35313
J-ZN1-0252	Zone-1	4134	7.8	2711
J-ZN1-0253	Zone-1	4189	2.2	2896
J-ZN1-0254	Zone-1	4149	2.2	6296
J-ZN1-0255	Zone-1	4102	0.7	6920
J-ZN1-0256	Zone-1	4118	8.0	5491
J-ZN1-0257	Zone-1	4112	28.0	3543
J-ZN1-0258	Zone-1	4122	2.2	4654
J-ZN1-0259	Zone-1	4110	13.1	4729
J-ZN1-0260	Zone-1	4110	27.2	4312
J-ZN1-0261	Zone-1	4109	10.9	4943
J-ZN1-0262	Zone-1	4224	16.2	3962
J-ZN1-0263	Zone-1	4108	5.0	3952
J-ZN1-0264	Zone-1	4108	5.9	3411
J-ZN1-0265	Zone-1	4108	8.3	3802
J-ZN1-0266	Zone-1	4110	5.0	4811
J-ZN1-0267	Zone-1	4110	7.7	5508
J-ZN1-0268	Zone-1	4110	3.5	4978
J-ZN1-0269	Zone-1	4112	8.9	4625
J-ZN1-0270	Zone-1	4112	6.2	2835
J-ZN1-0271	Zone-1	4108	36.0	4864
J-ZN1-0272	Zone-1	4108	4.9	4989
J-ZN1-0273	Zone-1	4207	6.8	5054
J-ZN1-0274	Zone-1	4108	7.6	5001

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0275	Zone-1	4109	2.5	4153
J-ZN1-0276	Zone-1	4109	4.5	3362
J-ZN1-0277	Zone-1	4110	9.2	2401
J-ZN1-0278	Zone-1	4110	3.6	1684
J-ZN1-0279	Zone-1	4110	2.5	4424
J-ZN1-0280	Zone-1	4112	5.6	3964
J-ZN1-0281	Zone-1	4114	10.0	4645
J-ZN1-0282	Zone-1	4113	10.7	1921
J-ZN1-0283	Zone-1	4114	22.2	4377
J-ZN1-0284	Zone-1	4108	7.3	4432
J-ZN1-0285	Zone-1	4108	8.8	5207
J-ZN1-0286	Zone-1	4110	6.0	1860
J-ZN1-0287	Zone-1	4110	7.2	5315
J-ZN1-0288	Zone-1	4104	0.4	6191
J-ZN1-0289	Zone-1	4107	30.9	6231
J-ZN1-0290	Zone-1	4104	3.4	6093
J-ZN1-0291	Zone-1	4102	6.4	3745
J-ZN1-0292	Zone-1	4104	4.1	4923
J-ZN1-0293	Zone-1	4106	7.2	3825
J-ZN1-0294	Zone-1	4098	6.7	1706
J-ZN1-0295	Zone-1	4096	4.5	2584
J-ZN1-0296	Zone-1	4101	3.8	3523
J-ZN1-0297	Zone-1	4099	7.3	3253
J-ZN1-0298	Zone-1	4100	7.3	3358
J-ZN1-0299	Zone-1	4098	12.8	3021
J-ZN1-0300	Zone-1	4099	5.7	4303
J-ZN1-0301	Zone-1	4098	3.1	10323
J-ZN1-0302	Zone-1	4104	1.8	8572
J-ZN1-0303	Zone-1	4108	8.2	483
J-ZN1-0304	Zone-1	4109	7.8	440
J-ZN1-0305	Zone-1	4104	1.4	6633
J-ZN1-0306	Zone-1	4116	3.7	2828
J-ZN1-0306A	Zone-1	4124	3.6	2400
J-ZN1-0306B	Zone-1	4144	4.3	1825
J-ZN1-0307	Zone-1	4098	6.6	6164
J-ZN1-0308	Zone-1	4097	3.8	7850
J-ZN1-0309	Zone-1	4100	9.1	6793
J-ZN1-0310	Zone-1	4100	8.1	2092
J-ZN1-0311	Zone-1	4096	14.6	6040
J-ZN1-0312	Zone-1	4094	4.0	19784
J-ZN1-0313	Zone-1	4286	0.0	0
J-ZN1-0314	Zone-1	4096	3.9	18435
J-ZN1-0315	Zone-1	4096	1.5	18929
J-ZN1-0316	Zone-1	4090	0.1	12082
J-ZN1-0317	Zone-1	4090	5.7	12621
J-ZN1-0318	Zone-1	4092	1.3	4887
J-ZN1-0319	Zone-1	4102	2.7	6161
J-ZN1-0320	Zone-1	4100	1.1	6701
J-ZN1-0321	Zone-1	4104	0.0	6859
J-ZN1-0322	Zone-1	4102	7.5	7155
J-ZN1-0323	Zone-1	4159	21.5	3529
J-ZN1-0324	Zone-1	4100	1.6	6572
J-ZN1-0325	Zone-1	4090	0.0	2686
J-ZN1-0326	Zone-1	4088	0.0	2301
J-ZN1-0327	Zone-1	4089	43.5	1417
J-ZN1-0328	Zone-1	4198	0.0	3063
J-ZN1-0329	Zone-1	4098	4.4	6156
J-ZN1-0330	Zone-1	4103	0.0	2928
J-ZN1-0331	Zone-1	4105	0.0	2453
J-ZN1-0332	Zone-1	4103	0.5	922
J-ZN1-0333	Zone-1	4103	16.6	7098
J-ZN1-0334	Zone-1	4104	6.3	7187
J-ZN1-0335	Zone-1	4102	8.2	6149
J-ZN1-0336	Zone-1	4102	11.3	5970
J-ZN1-0337	Zone-1	4102	6.5	6208
J-ZN1-0338	Zone-1	4102	9.7	4662
J-ZN1-0339	Zone-1	4198	0.0	3459
J-ZN1-0340	Zone-1	4179	0.0	3662
J-ZN1-0341	Zone-1	4198	0.0	3406
J-ZN1-0342	Zone-1	4197	0.0	3245
J-ZN1-0343	Zone-1	4104	7.7	4264
J-ZN1-0344	Zone-1	4104	13.2	4417
J-ZN1-0345	Zone-1	4102	1.7	5612
J-ZN1-0346	Zone-1	4104	8.8	4951
J-ZN1-0347	Zone-1	4107	11.7	4395
J-ZN1-0348	Zone-1	4109	14.5	5030
J-ZN1-0349	Zone-1	4106	18.4	5182
J-ZN1-0350	Zone-1	4104	16.3	5491

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0351	Zone-1	4102	6.1	4198
J-ZN1-0352	Zone-1	4110	5.6	6275
J-ZN1-0353	Zone-1	4110	0.0	7323
J-ZN1-0354	Zone-1	4110	5.1	6767
J-ZN1-0355	Zone-1	4110	17.1	3247
J-ZN1-0356	Zone-1	4108	12.2	5195
J-ZN1-0357	Zone-1	4114	7.9	3122
J-ZN1-0358	Zone-1	4124	7.1	2187
J-ZN1-0359	Zone-1	4120	11.8	1333
J-ZN1-0360	Zone-1	4102	55.5	2523
J-ZN1-0361	Zone-1	4116	8.8	2884
J-ZN1-0362	Zone-1	4104	4.9	2815
J-ZN1-0363	Zone-1	4104	2.4	1796
J-ZN1-0364	Zone-1	4108	32.4	1355
J-ZN1-0365	Zone-1	4115	8.2	856
J-ZN1-0366	Zone-1	4107	4.2	2710
J-ZN1-0367	Zone-1	4115	17.5	2621
J-ZN1-0368	Zone-1	4110	12.1	1337
J-ZN1-0369	Zone-1	4100	4.0	1129
J-ZN1-0370	Zone-1	4115	17.8	1398
J-ZN1-0371	Zone-1	4119	24.5	1194
J-ZN1-0372	Zone-1	4128	7.5	861
J-ZN1-0373	Zone-1	4101	1.6	587
J-ZN1-0374	Zone-1	4100	0.0	3759
J-ZN1-0375	Zone-1	4096	3.1	7544
J-ZN1-0376	Zone-1	4096	19.4	7845
J-ZN1-0377	Zone-1	4098	13.0	10415
J-ZN1-0378	Zone-1	4098	3.3	10257
J-ZN1-0379	Zone-1	4108	8.1	5570
J-ZN1-0380	Zone-1	4092	6.9	6922
J-ZN1-0381	Zone-1	4092	20.0	6104
J-ZN1-0382	Zone-1	4122	1.3	6100
J-ZN1-0383	Zone-1	4120	0.0	4512
J-ZN1-0384	Zone-1	4116	0.5	2805
J-ZN1-0385	Zone-1	4098	4.1	2370
J-ZN1-0386	Zone-1	4098	1.4	12102
J-ZN1-0387	Zone-1	4096	0.0	27114
J-ZN1-0388	Zone-1	4099	0.0	23898
J-ZN1-0389	Zone-1	4100	8.3	15392
J-ZN1-0390	Zone-1	4100	5.6	1483
J-ZN1-0391	Zone-1	4092	0.2	17395
J-ZN1-0392	Zone-1	4092	6.3	12097
J-ZN1-0393	Zone-1	4094	11.0	2987
J-ZN1-0394	Zone-1	4091	1.1	16607
J-ZN1-0395	Zone-1	4091	0.0	8053
J-ZN1-0396	Zone-1	4094	5.8	7363
J-ZN1-0397	Zone-1	4093	1.2	8696
J-ZN1-0398	Zone-1	4093	11.9	6715
J-ZN1-0399	Zone-1	4092	9.3	15611
J-ZN1-0400	Zone-1	4092	23.8	6344
J-ZN1-0401	Zone-1	4090	5.5	5275
J-ZN1-0402	Zone-1	4090	3.6	5232
J-ZN1-0403	Zone-1	4092	17.1	7717
J-ZN1-0404	Zone-1	4096	0.1	9351
J-ZN1-0405	Zone-1	4094	0.9	9987
J-ZN1-0406	Zone-1	4094	0.6	1199
J-ZN1-0407	Zone-1	4092	0.1	19060
J-ZN1-0408	Zone-1	4091	1.5	2584
J-ZN1-0409	Zone-1	4091	0.0	21295
J-ZN1-0410	Zone-1	4092	11.1	23995
J-ZN1-0411	Zone-1	4093	0.0	25567
J-ZN1-0412	Zone-1	4099	34.0	28168
J-ZN1-0413	Zone-1	4094	9.0	13184
J-ZN1-0414	Zone-1	4104	0.0	18646
J-ZN1-0415	Zone-1	4094	0.4	7988
J-ZN1-0416	Zone-1	4096	9.0	2530
J-ZN1-0417	Zone-1	4092	0.8	1889
J-ZN1-0418	Zone-1	4094	0.7	9149
J-ZN1-0419	Zone-1	4092	1.5	8506
J-ZN1-0420	Zone-1	4092	0.0	9137
J-ZN1-0421	Zone-1	4092	0.7	668
J-ZN1-0422	Zone-1	4093	1.3	5516
J-ZN1-0423	Zone-1	4092	0.0	3262
J-ZN1-0424	Zone-1	4092	2.9	2238
J-ZN1-0425	Zone-1	4094	0.0	15827
J-ZN1-0426	Zone-1	4093	0.0	9991
J-ZN1-0427	Zone-1	4092	0.0	9796
J-ZN1-0428	Zone-1	4182	0.2	6539

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0429	Zone-1	4093	16.9	9068
J-ZN1-0430	Zone-1	4104	6.4	20535
J-ZN1-0431	Zone-1	4106	3.5	12674
J-ZN1-0432	Zone-1	4112	9.2	6600
J-ZN1-0433	Zone-1	4106	2.4	9578
J-ZN1-0434	Zone-1	4106	1.8	5477
J-ZN1-0435	Zone-1	4099	4.3	18477
J-ZN1-0436	Zone-1	4099	0.2	18888
J-ZN1-0437	Zone-1	4093	3.5	13965
J-ZN1-0438	Zone-1	4102	8.3	5750
J-ZN1-0439	Zone-1	4106	0.7	3270
J-ZN1-0440	Zone-1	4094	0.8	7247
J-ZN1-0441	Zone-1	4236	6.4	1981
J-ZN1-0442	Zone-1	4206	6.7	5475
J-ZN1-0443	Zone-1	4159	3.4	8894
J-ZN1-0444	Zone-1	4121	4.3	13919
J-ZN1-0445	Zone-1	4107	7.0	26769
J-ZN1-0446	Zone-1	4108	14.3	24993
J-ZN1-0447	Zone-1	4237	0.8	1892
J-ZN1-0448	Zone-1	4125	2.5	10893
J-ZN1-0449	Zone-1	4117	4.5	9089
J-ZN1-0450	Zone-1	4114	1.2	13528
J-ZN1-0451	Zone-1	4109	8.9	23012
J-ZN1-0452	Zone-1	4185	8.6	21062
J-ZN1-0453	Zone-1	4251	0.7	9359
J-ZN1-0454	Zone-1	4225	11.5	14380
J-ZN1-0455	Zone-1	4182	7.0	20733
J-ZN1-0456	Zone-1	4145	3.6	24981
J-ZN1-0457	Zone-1	4106	9.5	32272
J-ZN1-0458	Zone-1	4267	2.3	2
J-ZN1-0459	Zone-1	4282	2.6	2
J-ZN1-0460	Zone-1	4290	0.0	-1
J-ZN1-0461	Zone-1	4103	5.6	36708
J-ZN1-0462	Zone-1	4099	0.0	40060
J-ZN1-0463	Zone-1	4198	7.6	3739
J-ZN1-0464	Zone-1	4185	10.1	3942
J-ZN1-0465	Zone-1	4166	8.9	5742
J-ZN1-0466	Zone-1	4178	0.0	5897
J-ZN1-0467	Zone-1	4139	21.4	11917

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0468	Zone-1	4172	2.7	3192
J-ZN1-0469	Zone-1	4150	14.0	3561
J-ZN1-0470	Zone-1	4223	12.3	1066
J-ZN1-0471	Zone-1	4190	7.3	4944
J-ZN1-0472	Zone-1	4117	2.6	28906
J-ZN1-0473	Zone-1	4098	17.0	32734
J-ZN1-0474	Zone-1	4120	17.3	10184
J-ZN1-0475	Zone-1	4130	2.2	8422
J-ZN1-0476	Zone-1	4111	2.4	18975
J-ZN1-0477	Zone-1	4200	0.0	3079
J-ZN1-0478	Zone-1	4102	8.4	4135
J-ZN1-0479	Zone-1	4098	0.7	3620
J-ZN1-0480	Zone-1	4102	4.6	5976
J-ZN1-0481	Zone-1	4159	5.7	2902
J-ZN1-0482	Zone-1	4262	0.6	205
J-ZN1-0483	Zone-1	4194	0.0	3946
J-ZN1-0484	Zone-1	4190	1.4	2628
J-ZN1-0485	Zone-1	4187	7.1	2837
J-ZN1-0486	Zone-1	4176	9.5	2630
J-ZN1-0487	Zone-1	4217	3.0	1231
J-ZN1-0488	Zone-1	4202	3.8	4882
J-ZN1-0489	Zone-1	4205	15.3	5355
J-ZN1-0490	Zone-1	4178	8.1	13263
J-ZN1-0491	Zone-1	4182	3.2	10296
J-ZN1-0492	Zone-1	4181	7.1	8450
J-ZN1-0493	Zone-1	4146	96.4	5455
J-ZN1-0494	Zone-1	4202	3.4	10720
J-ZN1-0495	Zone-1	4208	2.6	8032
J-ZN1-0496	Zone-1	4215	3.9	7233
J-ZN1-0497	Zone-1	4244	1.0	5956
J-ZN1-0498	Zone-1	4273	0.6	3086
J-ZN1-0499	Zone-1	4219	2.1	6040
J-ZN1-0500	Zone-1	4214	1.7	6429
J-ZN1-0501	Zone-1	4219	2.9	4016
J-ZN1-0502	Zone-1	4134	22.3	6050
J-ZN1-0503	Zone-1	4213	5.9	3429
J-ZN1-0504	Zone-1	4215	7.4	3411
J-ZN1-0505	Zone-1	4114	10.0	16593
J-ZN1-0506	Zone-1	4111	7.9	12722

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0507	Zone-1	4104	4.6	5214
J-ZN1-0508	Zone-1	4109	1.7	3349
J-ZN1-0509	Zone-1	4126	4.4	8800
J-ZN1-0510	Zone-1	4138	1.5	7291
J-ZN1-0511	Zone-1	4130	3.8	3796
J-ZN1-0512	Zone-1	4132	3.6	8412
J-ZN1-0513	Zone-1	4153	0.0	3637
J-ZN1-0514	Zone-1	4114	0.3	10934
J-ZN1-0515	Zone-1	4121	5.9	9480
J-ZN1-0516	Zone-1	4150	7.9	4849
J-ZN1-0517	Zone-1	4122	6.7	8032
J-ZN1-0518	Zone-1	4136	3.5	4705
J-ZN1-0519	Zone-1	4141	1.7	3054
J-ZN1-0520	Zone-1	4172	2.7	4732
J-ZN1-0521	Zone-1	4140	7.2	5077
J-ZN1-0522	Zone-1	4148	7.7	6521
J-ZN1-0523	Zone-1	4211	1.6	2845
J-ZN1-0524	Zone-1	4164	1.3	4227
J-ZN1-0525	Zone-1	4104	16.5	9385
J-ZN1-0526	Zone-1	4227	0.4	2044
J-ZN1-0527	Zone-1	4162	2.4	5496
J-ZN1-0528	Zone-1	4146	2.8	4441
J-ZN1-0528A	Zone-1	4162	5.9	4545
J-ZN1-0529	Zone-1	4160	0.0	6085
J-ZN1-0530	Zone-1	4160	3.8	6153
J-ZN1-0531	Zone-1	4162	0.1	7196
J-ZN1-0532	Zone-1	4152	2.6	4823
J-ZN1-0533	Zone-1	4164	2.1	3322
J-ZN1-0534	Zone-1	4141	1.0	2701
J-ZN1-0535	Zone-1	4196	4.9	5926
J-ZN1-0536	Zone-1	4137	0.0	6263
J-ZN1-0537	Zone-1	4207	10.2	4318
J-ZN1-0538	Zone-1	4225	10.5	1236
J-ZN1-0539	Zone-1	4192	8.0	6847
J-ZN1-0540	Zone-1	4206	4.7	4628
J-ZN1-0541	Zone-1	4220	4.6	1021
J-ZN1-0542	Zone-1	4162	15.7	961
J-ZN1-0543	Zone-1	4147	1.5	8709
J-ZN1-0544	Zone-1	4164	2.1	8200
J-ZN1-0545	Zone-1	4194	4.5	4816
J-ZN1-0546	Zone-1	4150	8.1	6312
J-ZN1-0547	Zone-1	4179	5.1	2630
J-ZN1-0548	Zone-1	4207	5.4	4468
J-ZN1-0549	Zone-1	4158	0.0	9070
J-ZN1-0550	Zone-1	4150	6.1	5130
J-ZN1-0551	Zone-1	4156	3.9	4263
J-ZN1-0552	Zone-1	4153	2.7	4410
J-ZN1-0553	Zone-1	4149	3.3	4365
J-ZN1-0554	Zone-1	4148	32.1	2989
J-ZN1-0555	Zone-1	4148	13.8	1715
J-ZN1-0556	Zone-1	4152	5.8	3430
J-ZN1-0557	Zone-1	4161	6.6	5693
J-ZN1-0558	Zone-1	4148	13.6	4499
J-ZN1-0559	Zone-1	4149	3.3	3783
J-ZN1-0560	Zone-1	4192	10.3	3642
J-ZN1-0561	Zone-1	4167	0.5	3938
J-ZN1-0562	Zone-1	4185	8.4	3396
J-ZN1-0563	Zone-1	4204	6.7	3024
J-ZN1-0564	Zone-1	4216	1.8	2861
J-ZN1-0565	Zone-1	4191	2.6	3184
J-ZN1-0566	Zone-1	4142	0.0	6326
J-ZN1-0567	Zone-1	4167	2.1	3945
J-ZN1-0568	Zone-1	4181	12.5	3038
J-ZN1-0569	Zone-1	4166	2.3	4746
J-ZN1-0570	Zone-1	4178	9.9	4183
J-ZN1-0571	Zone-1	4216	1.4	5302
J-ZN1-0572	Zone-1	4176	0.0	4040
J-ZN1-0573	Zone-1	4209	5.0	5992
J-ZN1-0574	Zone-1	4233	0.0	3437
J-ZN1-0575	Zone-1	4143	0.5	6519
J-ZN1-0576	Zone-1	4217	1.4	4933
J-ZN1-0577	Zone-1	4163	0.5	9532
J-ZN1-0578	Zone-1	4218	6.1	3993
J-ZN1-0579	Zone-1	4224	0.0	5085
J-ZN1-0580	Zone-1	4234	2.9	8423
J-ZN1-0581	Zone-1	4193	0.1	2284
J-ZN1-0582	Zone-1	4167	0.0	5655
J-ZN1-0583	Zone-1	4154	13.7	4299

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0584	Zone-1	4221	8.0	2831
J-ZN1-0585	Zone-1	4172	11.7	4998
J-ZN1-0586	Zone-1	4180	6.8	3350
J-ZN1-0587	Zone-1	4218	23.3	3162
J-ZN1-0588	Zone-1	4133	12.8	7522
J-ZN1-0589	Zone-1	4118	5.9	9791
J-ZN1-0590	Zone-1	4153	5.3	6036
J-ZN1-0591	Zone-1	4165	7.8	3979
J-ZN1-0592	Zone-1	4114	3.3	10742
J-ZN1-0593	Zone-1	4187	4.3	2062
J-ZN1-0594	Zone-1	4209	8.8	1405
J-ZN1-0595	Zone-1	4141	0.0	5675
J-ZN1-0596	Zone-1	4204	4.4	4052
J-ZN1-0597	Zone-1	4205	3.8	5194
J-ZN1-0598	Zone-1	4207	2.0	4178
J-ZN1-0599	Zone-1	4116	10.9	8964
J-ZN1-0600	Zone-1	4184	1.3	8991
J-ZN1-0602	Zone-1	4160	10.4	2968
J-ZN1-0603	Zone-1	4156	5.6	4573
J-ZN1-0604	Zone-1	4150	2.2	1954
J-ZN1-0605	Zone-1	4166	9.2	3982
J-ZN1-0606	Zone-1	4158	3.1	4469
J-ZN1-0607	Zone-1	4165	6.2	3881
J-ZN1-0608	Zone-1	4122	7.4	8105
J-ZN1-0609	Zone-1	4157	11.0	3959
J-ZN1-0610	Zone-1	4160	5.2	4091
J-ZN1-0611	Zone-1	4179	2.3	2647
J-ZN1-0612	Zone-1	4187	6.2	2008
J-ZN1-0613	Zone-1	4156	4.8	4184
J-ZN1-0614	Zone-1	4170	16.5	4383
J-ZN1-0615	Zone-1	4142	7.7	2997
J-ZN1-0616	Zone-1	4092	0.6	6060
J-ZN1-0617	Zone-1	4145	1.3	7692
J-ZN1-0618	Zone-1	4118	9.5	8411
J-ZN1-0619	Zone-1	4163	7.7	5103
J-ZN1-0620	Zone-1	4140	9.1	4887
J-ZN1-0621	Zone-1	4140	1.7	20578
J-ZN1-0622	Zone-1	4109	17.2	33214
J-ZN1-0623	Zone-1	4104	15.8	31949
J-ZN1-0624	Zone-1	4096	4.5	37829
J-ZN1-0625	Zone-1	4100	15.3	10088
J-ZN1-0626	Zone-1	4100	14.9	8027
J-ZN1-0627	Zone-1	4101	4.5	8370
J-ZN1-0628	Zone-1	4148	0.8	5749
J-ZN1-0629	Zone-1	4110	3.5	8627
J-ZN1-0630	Zone-1	4151	7.9	2439
J-ZN1-0631	Zone-1	4148	5.9	4741
J-ZN1-0632	Zone-1	4152	0.6	7645
J-ZN1-0633	Zone-1	4112	0.8	5913
J-ZN1-0634	Zone-1	4113	15.6	5323
J-ZN1-0635	Zone-1	4090	0.0	9588
J-ZN1-0636	Zone-1	4090	0.0	9215
J-ZN1-0637	Zone-1	4092	2.3	6283
J-ZN1-0638	Zone-1	4092	0.3	5789
J-ZN1-0639	Zone-1	4091	3.1	6988
J-ZN1-0640	Zone-1	4089	0.6	1834
J-ZN1-0641	Zone-1	4112	14.4	2348
J-ZN1-0642	Zone-1	4095	0.3	2078
J-ZN1-0643	Zone-1	4215	0.0	1205
J-ZN1-0644	Zone-1	4116	16.3	8463
J-ZN1-0645	Zone-1	4118	14.1	6008
J-ZN1-0646	Zone-1	4104	25.8	1863
J-ZN1-0647	Zone-1	4194	4.0	4979
J-ZN1-0648	Zone-1	4116	7.5	2548
J-ZN1-0650	Zone-1	4184	11.8	5985
J-ZN1-0651	Zone-1	4121	7.9	2735
J-ZN1-0652	Zone-1	4173	8.1	4250
J-ZN1-0653	Zone-1	4147	6.4	6127
J-ZN1-0654	Zone-1	4148	10.1	4606
J-ZN1-0655	Zone-1	4160	12.4	2210
J-ZN1-0656	Zone-1	4137	8.0	3465
J-ZN1-0657	Zone-1	4134	10.7	3261
J-ZN1-0658	Zone-1	4138	15.3	2806
J-ZN1-0659	Zone-1	4094	32.0	4418
J-ZN1-0660	Zone-1	4169	1.8	6982
J-ZN1-0661	Zone-1	4123	2.9	2267
J-ZN1-0662	Zone-1	4198	4.8	5912
J-ZN1-0663	Zone-1	4094	2.1	5296

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0664	Zone-1	4096	13.9	5412
J-ZN1-0665	Zone-1	4094	2.3	5547
J-ZN1-0666	Zone-1	4104	2.4	3483
J-ZN1-0667	Zone-1	4094	28.8	3457
J-ZN1-0668	Zone-1	4110	0.0	11492
J-ZN1-0669	Zone-1	4118	74.6	2303
J-ZN1-0670	Zone-1	4186	0.0	2465
J-ZN1-0671	Zone-1	4098	19.6	7559
J-ZN1-0672	Zone-1	4098	17.2	5125
J-ZN1-0673	Zone-1	4096	13.5	5681
J-ZN1-0674	Zone-1	4100	18.7	8631
J-ZN1-0675	Zone-1	4098	8.1	693
J-ZN1-0676	Zone-1	4098	7.1	2704
J-ZN1-0677	Zone-1	4106	32.3	1951
J-ZN1-0678	Zone-1	4099	2.4	2481
J-ZN1-0679	Zone-1	4100	13.3	2357
J-ZN1-0680	Zone-1	4102	6.0	2493
J-ZN1-0681	Zone-1	4100	1.4	7055
J-ZN1-0682	Zone-1	4102	29.0	176
J-ZN1-0683	Zone-1	4098	3.5	130
J-ZN1-0684	Zone-1	4146	6.1	7082
J-ZN1-0685	Zone-1	4161	11.4	5251
J-ZN1-0686	Zone-1	4115	7.4	5715
J-ZN1-0687	Zone-1	4150	8.2	5327
J-ZN1-0688	Zone-1	4190	9.8	6334
J-ZN1-0689	Zone-1	4182	8.2	3621
J-ZN1-0690	Zone-1	4171	6.9	2560
J-ZN1-0691	Zone-1	4228	12.1	3744
J-ZN1-0692	Zone-1	4179	6.6	1834
J-ZN1-0693	Zone-1	4194	9.6	1924
J-ZN1-0694	Zone-1	4185	3.7	5051
J-ZN1-0695	Zone-1	4119	5.6	3599
J-ZN1-0696	Zone-1	4199	2.6	8747
J-ZN1-0697	Zone-1	4197	4.1	5311
J-ZN1-0698	Zone-1	4096	12.3	3113
J-ZN1-0699	Zone-1	4129	0.1	628
J-ZN1-0700	Zone-1	4097	6.7	1983
J-ZN1-0701	Zone-1	4100	6.7	8271
J-ZN1-0702	Zone-1	4098	8.2	2266
J-ZN1-0703	Zone-1	4100	7.1	2299
J-ZN1-0704	Zone-1	4101	8.9	5561
J-ZN1-0705	Zone-1	4103	4.7	8209
J-ZN1-0706	Zone-1	4108	6.8	8983
J-ZN1-0707	Zone-1	4099	8.9	6030
J-ZN1-0708	Zone-1	4101	3.8	8678
J-ZN1-0709	Zone-1	4098	5.3	3598
J-ZN1-0710	Zone-1	4096	6.5	9208
J-ZN1-0711	Zone-1	4096	8.5	1752
J-ZN1-0712	Zone-1	4092	7.1	5049
J-ZN1-0713	Zone-1	4122	3.7	4768
J-ZN1-0714	Zone-1	4125	2.1	4522
J-ZN1-0715	Zone-1	4158	13.8	3586
J-ZN1-0716	Zone-1	4111	3.3	5151
J-ZN1-0717	Zone-1	4111	7.8	11173
J-ZN1-0718	Zone-1	4138	4.1	7216
J-ZN1-0719	Zone-1	4117	0.8	5333
J-ZN1-0720	Zone-1	4115	12.6	2921
J-ZN1-0721	Zone-1	4097	0.9	9140
J-ZN1-0722	Zone-1	4162	4.8	5174
J-ZN1-0723	Zone-1	4200	2.4	2134
J-ZN1-0724	Zone-1	4201	1.8	1992
J-ZN1-0725	Zone-1	4172	0.3	17475
J-ZN1-0726	Zone-1	4090	0.0	9983
J-ZN1-0727	Zone-1	4090	0.0	9784
J-ZN1-0728	Zone-1	4090	1825.2	13827
J-ZN1-0729	Zone-1	4214	1.0	3342
J-ZN1-0730	Zone-1	4225	0.4	6466
J-ZN1-0731	Zone-1	4161	3.9	8673
J-ZN1-0732	Zone-1	4196	0.9	3655
J-ZN1-0733	Zone-1	4097	4.4	8035
J-ZN1-0735	Zone-1	4218	3.6	3891
J-ZN1-0736	Zone-1	4222	5.3	3471
J-ZN1-0737	Zone-1	4246	1.8	1759
J-ZN1-0738	Zone-1	4212	4.5	3671
J-ZN1-0739	Zone-1	4221	2.4	3454
J-ZN1-0740	Zone-1	4104	3.4	4029
J-ZN1-0741	Zone-1	4220	2.0	1350
J-ZN1-0743	Zone-1	4120	4.0	405

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0744	Zone-1	4092	1.0	3257
J-ZN1-0745	Zone-1	4092	2.2	7328
J-ZN1-0746	Zone-1	4109	11.4	5495
J-ZN1-0747	Zone-1	4121	7.7	40
J-ZN1-0748	Zone-1	4220	4.5	2496
J-ZN1-0749	Zone-1	4124	24.8	6654
J-ZN1-0750	Zone-1	4098	41.4	6262
J-ZN1-0751	Zone-1	4220	9.5	2205
J-ZN1-0752	Zone-1	4162	11.0	5036
J-ZN1-0753	Zone-1	4139	4.1	1596
J-ZN1-0754	Zone-1	4098	2.4	3958
J-ZN1-0755	Zone-1	4098	10.6	5028
J-ZN1-0756	Zone-1	4213	2.0	2178
J-ZN1-0757	Zone-1	4215	0.9	3061
J-ZN1-0758	Zone-1	4217	2.2	3002
J-ZN1-0759	Zone-1	4223	1.2	1383
J-ZN1-0760	Zone-1	4190	5.0	1512
J-ZN1-0761	Zone-1	4106	11.7	4261
J-ZN1-0762	Zone-1	4186	4.9	3584
J-ZN1-0763	Zone-1	4163	5.7	4432
J-ZN1-0764	Zone-1	4146	19.8	3717
J-ZN1-0765	Zone-1	4151	4.9	3649
J-ZN1-0766	Zone-1	4199	9.1	438
J-ZN1-0767	Zone-1	4110	5.6	2946
J-ZN1-0768	Zone-1	4120	5.6	2172
J-ZN1-0769	Zone-1	4185	0.0	5397
J-ZN1-0770	Zone-1	4178	4.0	6524
J-ZN1-0771	Zone-1	4165	28.6	4000
J-ZN1-0772	Zone-1	4180	13.3	6638
J-ZN1-0773	Zone-1	4100	9.6	4139
J-ZN1-0774	Zone-1	4092	5.7	10109
J-ZN1-0775	Zone-1	4116	19.2	1574
J-ZN1-0776	Zone-1	4102	4.0	17391
J-ZN1-0777	Zone-1	4097	5.9	8295
J-ZN1-0778	Zone-1	4096	7.4	10694
J-ZN1-0779	Zone-1	4109	4.1	5130
J-ZN1-0780	Zone-1	4140	6.9	2071
J-ZN1-0781	Zone-1	4141	3.9	2245
J-ZN1-0782	Zone-1	4143	8.2	6551
J-ZN1-0783	Zone-1	4176	1.3	6896
J-ZN1-0784	Zone-1	4162	18.2	6024
J-ZN1-0785	Zone-1	4178	24.8	5723
J-ZN1-0786	Zone-1	4204	3.9	4460
J-ZN1-0787	Zone-1	4122	29.6	1692
J-ZN1-0788	Zone-1	4175	42.1	6875
J-ZN1-0789	Zone-1	4168	2.8	4699
J-ZN1-0790	Zone-1	4115	0.3	6642
J-ZN1-0791	Zone-1	4105	70.4	3362
J-ZN1-0792	Zone-1	4104	13.1	2558
J-ZN1-0793	Zone-1	4111	13.1	3129
J-ZN1-0794	Zone-1	4111	0.0	7487
J-ZN1-0795	Zone-1	4128	7.0	6140
J-ZN1-0796	Zone-1	4132	0.0	7226
J-ZN1-0797	Zone-1	4098	0.4	900
J-ZN1-0798	Zone-1	4100	0.0	4012
J-ZN1-0799	Zone-1	4106	15.9	3545
J-ZN1-0800	Zone-1	4098	8.4	309
J-ZN1-0801	Zone-1	4092	1.5	14256
J-ZN1-0802	Zone-1	4092	0.0	6297
J-ZN1-0803	Zone-1	4096	36.6	6985
J-ZN1-0804	Zone-1	4096	2.8	5102
J-ZN1-0805	Zone-1	4137	1.4	5308
J-ZN1-0806	Zone-1	4149	6.3	6314
J-ZN1-0807	Zone-1	4128	17.8	4367
J-ZN1-0808	Zone-1	4098	67.8	1478
J-ZN1-0809	Zone-1	4096	0.0	11247
J-ZN1-0810	Zone-1	4098	2.3	9044
J-ZN1-0811	Zone-1	4094	1.4	6001
J-ZN1-0812	Zone-1	4094	0.0	10683
J-ZN1-0813	Zone-1	4092	0.2	7449
J-ZN1-0814	Zone-1	4094	17.1	4828
J-ZN1-0815	Zone-1	4136	10.8	235
J-ZN1-0816	Zone-1	4254	5.2	1007
J-ZN1-0818	Zone-1	4098	29.5	6172
J-ZN1-0819	Zone-1	4162	1.5	3548
J-ZN1-0820	Zone-1	4289	0.2	697
J-ZN1-0821	Zone-1	4156	0.0	9068
J-ZN1-0822	Zone-1	4149	0.0	8466

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0823	Zone-1	4098	30.9	4438
J-ZN1-0824	Zone-1	4164	0.9	8636
J-ZN1-0825	Zone-1	4199	1.7	5028
J-ZN1-0826	Zone-1	4202	4.8	4482
J-ZN1-0827	Zone-1	4178	5.5	527
J-ZN1-0828	Zone-1	4195	1.8	3324
J-ZN1-0829	Zone-1	4194	4.7	3203
J-ZN1-0830	Zone-1	4186	1.4	12395
J-ZN1-0831	Zone-1	4179	1.8	10094
J-ZN1-0832	Zone-1	4211	3.2	1551
J-ZN1-0833	Zone-1	4099	6.1	2791
J-ZN1-0834	Zone-1	4214	0.0	3333
J-ZN1-0835	Zone-1	4197	4.1	4942
J-ZN1-0836	Zone-1	4227	2.3	624
J-ZN1-0837	Zone-1	4136	14.7	3279
J-ZN1-0838	Zone-1	4215	1.9	2578
J-ZN1-0839	Zone-1	4192	0.6	4116
J-ZN1-0840	Zone-1	4242	3.1	200
J-ZN1-0841	Zone-1	4134	4.0	3810
J-ZN1-0842	Zone-1	4111	5.6	20813
J-ZN1-0843	Zone-1	4106	1.0	32160
J-ZN1-0844	Zone-1	4100	0.3	14632
J-ZN1-0845	Zone-1	4150	0.0	4971
J-ZN1-0846	Zone-1	4094	1.6	5378
J-ZN1-0847	Zone-1	4092	0.6	3607
J-ZN1-0848	Zone-1	4090	0.0	3658
J-ZN1-0849	Zone-1	4110	0.5	12078
J-ZN1-0850	Zone-1	4108	5.0	3113
J-ZN1-0851	Zone-1	4103	5.5	8562
J-ZN1-0852	Zone-1	4104	14.3	5899
J-ZN1-0853	Zone-1	4093	0.1	14910
J-ZN1-0854	Zone-1	4093	0.0	7173
J-ZN1-0855	Zone-1	4110	3.2	1096
J-ZN1-0856	Zone-1	4144	9.5	3722
J-ZN1-0857	Zone-1	4140	2.4	4146
J-ZN1-0858	Zone-1	4154	0.4	6418
J-ZN1-0859	Zone-1	4152	1.8	5032
J-ZN1-0860	Zone-1	4175	3.5	2492
J-ZN1-0861	Zone-1	4200	5.3	787

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0862	Zone-1	4163	0.6	1142
J-ZN1-0863	Zone-1	4158	2.8	1529
J-ZN1-0864	Zone-1	4151	4.1	6617
J-ZN1-0865	Zone-1	4137	0.3	8018
J-ZN1-0866	Zone-1	4118	9.9	5890
J-ZN1-0867	Zone-1	4146	25.4	2410
J-ZN1-0868	Zone-1	4137	8.4	3123
J-ZN1-0869	Zone-1	4183	5.6	4097
J-ZN1-0870	Zone-1	4088	0.0	8224
J-ZN1-0871	Zone-1	4088	0.0	7574
J-ZN1-0872	Zone-1	4088	0.3	3937
J-ZN1-0873	Zone-1	4088	0.0	5019
J-ZN1-0874	Zone-1	4214	5.8	2893
J-ZN1-0875	Zone-1	4238	2.5	970
J-ZN1-0876	Zone-1	4231	2.7	9106
J-ZN1-0877	Zone-1	4245	1.4	5582
J-ZN1-0878	Zone-1	4226	1.4	4768
J-ZN1-0879	Zone-1	4287	1.2	947
J-ZN1-0880	Zone-1	4092	0.0	12635
J-ZN1-0881	Zone-1	4094	6.5	3410
J-ZN1-0882	Zone-1	4144	9.4	119
J-ZN1-0883	Zone-1	4110	1.0	917
J-ZN1-0884	Zone-1	4114	5.4	5709
J-ZN1-0885	Zone-1	4144	5.4	3621
J-ZN1-0886	Zone-1	4096	7.6	1648
J-ZN1-0887	Zone-1	4092	0.0	12676
J-ZN1-0888	Zone-1	4090	0.0	23168
J-ZN1-0889	Zone-1	4094	0.0	13331
J-ZN1-0890	Zone-1	4169	1.5	3994
J-ZN1-0891	Zone-1	4178	0.3	6854
J-ZN1-0892	Zone-1	4194	8.6	1976
J-ZN1-0893	Zone-1	4182	7.9	7113
J-ZN1-0894	Zone-1	4203	1.7	4359
J-ZN1-0895	Zone-1	4182	0.2	6562
J-ZN1-0896	Zone-1	4182	0.6	6575
J-ZN1-0897	Zone-1	4098	11.9	695
J-ZN1-0898	Zone-1	4096	6.3	7533
J-ZN1-0899	Zone-1	4100	4.3	3695
J-ZN1-0900	Zone-1	4104	0.0	3327

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0901	Zone-1	4092	15.4	14283
J-ZN1-0902	Zone-1	4090	9.9	8116
J-ZN1-0903	Zone-1	4098	2.2	11049
J-ZN1-0904	Zone-1	4104	5.0	2765
J-ZN1-0905	Zone-1	4167	2.6	4505
J-ZN1-0906	Zone-1	4149	7.7	5155
J-ZN1-0907	Zone-1	4163	1.6	4745
J-ZN1-0908	Zone-1	4144	6.0	5702
J-ZN1-0909	Zone-1	4121	2.2	3516
J-ZN1-0910	Zone-1	4110	7.6	4350
J-ZN1-0911	Zone-1	4093	0.0	23887
J-ZN1-0912	Zone-1	4092	4.1	23625
J-ZN1-0913	Zone-1	4092	0.0	10237
J-ZN1-0914	Zone-1	4093	0.0	10137
J-ZN1-0915	Zone-1	4093	0.0	9878
J-ZN1-0916	Zone-1	4100	0.0	8990
J-ZN1-0917	Zone-1	4102	1.1	7935
J-ZN1-0918	Zone-1	4098	7.2	9779
J-ZN1-0919	Zone-1	4097	12.4	8210
J-ZN1-0920	Zone-1	4104	1.3	5941
J-ZN1-0921	Zone-1	4114	0.0	7325
J-ZN1-0922	Zone-1	4122	9.7	4392
J-ZN1-0923	Zone-1	4179	2.0	3464
J-ZN1-0924	Zone-1	4164	1.9	8095
J-ZN1-0925	Zone-1	4198	3.1	1934
J-ZN1-0926	Zone-1	4223	2.9	2829
J-ZN1-0927	Zone-1	4180	0.0	4167
J-ZN1-0928	Zone-1	4179	30.6	3485
J-ZN1-0929	Zone-1	4182	5.6	2697
J-ZN1-0930	Zone-1	4090	0.0	5892
J-ZN1-0931	Zone-1	4090	8.0	8053
J-ZN1-0932	Zone-1	4088	0.0	925
J-ZN1-0933	Zone-1	4153	6.1	1645
J-ZN1-0934	Zone-1	4088	0.0	1344
J-ZN1-0935	Zone-1	4151	0.0	1222
J-ZN1-0936	Zone-1	4098	0.6	9260
J-ZN1-0937	Zone-1	4247	0.2	6445
J-ZN1-0938	Zone-1	4234	0.2	7047
J-ZN1-0939	Zone-1	4137	4.7	6168

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0940	Zone-1	4151	1.9	1325
J-ZN1-0941	Zone-1	4181	1.1	10440
J-ZN1-0942	Zone-1	4170	0.0	13652
J-ZN1-0943	Zone-1	4161	0.0	7104
J-ZN1-0944	Zone-1	4212	0.0	4624
J-ZN1-0945	Zone-1	4290	0.0	-1
J-ZN1-0946	Zone-1	4095	40.0	8864
J-ZN1-0949	Zone-1	4210	2.4	2793
J-ZN1-0950	Zone-1	4215	1.6	2811
J-ZN1-0951	Zone-1	4158	5.5	5587
J-ZN1-0952	Zone-1	4142	13.9	7351
J-ZN1-0953	Zone-1	4102	5.1	2820
J-ZN1-0954	Zone-1	4104	22.8	7817
J-ZN1-0955	Zone-1	4090	0.0	1704
J-ZN1-0956	Zone-1	4094	0.3	19543
J-ZN1-0957	Zone-1	4098	1.7	11229
J-ZN1-0958	Zone-1	4097	0.7	11554
J-ZN1-0959	Zone-1	4098	0.0	40221
J-ZN1-0960	Zone-1	4095	16.5	38305
J-ZN1-0961	Zone-1	4098	0.2	39045
J-ZN1-0962	Zone-1	4100	0.0	39719
J-ZN1-0963	Zone-1	4103	0.9	38694
J-ZN1-0964	Zone-1	4093	0.0	9748
J-ZN1-0965	Zone-1	4095	0.0	31901
J-ZN1-0966	Zone-1	4170	5.0	1721
J-ZN1-0967	Zone-1	4090	1.7	11273
J-ZN1-0968	Zone-1	4110	0.9	7329
J-ZN1-0969	Zone-1	4090	0.8	6580
J-ZN1-0970	Zone-1	4104	1.1	3497
J-ZN1-0971	Zone-1	4108	10.3	865
J-ZN1-0972	Zone-1	4123	14.1	1833
J-ZN1-0973	Zone-1	4152	6.2	1650
J-ZN1-0974	Zone-1	4204	7.7	5667
J-ZN1-0975	Zone-1	4125	0.0	11006
J-ZN1-0976	Zone-1	4178	6.4	2829
J-ZN1-0977	Zone-1	4094	8.7	9791
J-ZN1-0978	Zone-1	4092	0.0	9839
J-ZN1-0979	Zone-1	4096	0.2	8868
J-ZN1-0980	Zone-1	4178	0.0	13149

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-0981	Zone-1	4178	0.0	2260
J-ZN1-0982	Zone-1	4156	137.9	4260
J-ZN1-0983	Zone-1	4096	1.2	7628
J-ZN1-0984	Zone-1	4102	14.6	2438
J-ZN1-0985	Zone-1	4125	28.9	1647
J-ZN1-0986	Zone-1	4102	4.5	6148
J-ZN1-0988	Zone-1	4175	0.3	4602
J-ZN1-0989	Zone-1	4175	1.7	3209
J-ZN1-0990	Zone-1	4156	0.0	1943
J-ZN1-0991	Zone-1	4161	1.2	1895
J-ZN1-0992	Zone-1	4150	4.4	5042
J-ZN1-0993	Zone-1	4150	3.5	5049
J-ZN1-0994	Zone-1	4150	4.6	4698
J-ZN1-0995	Zone-1	4140	26.9	2535
J-ZN1-0996	Zone-1	4140	0.7	3001
J-ZN1-0997	Zone-1	4092	1.3	10714
J-ZN1-0998	Zone-1	4094	12.8	10075
J-ZN1-0999	Zone-1	4134	5.4	6389
J-ZN1-1000	Zone-1	4184	15.6	1259
J-ZN1-1001	Zone-1	4168	27.9	1945
J-ZN1-1002	Zone-1	4201	8.2	1052
J-ZN1-1003	Zone-1	4118	0.6	9806
J-ZN1-1004	Zone-1	4112	32.7	1521
J-ZN1-1005	Zone-1	4112	10.1	3701
J-ZN1-1006	Zone-1	4118	5.5	4765
J-ZN1-1007	Zone-1	4155	9.1	6382
J-ZN1-1008	Zone-1	4150	8.2	4811
J-ZN1-1009	Zone-1	4150	1.8	5071
J-ZN1-1010	Zone-1	4188	23.2	3708
J-ZN1-1011	Zone-1	4152	0.0	4128
J-ZN1-1012	Zone-1	4154	0.0	3982
J-ZN1-1013	Zone-1	4184	4.3	5510
J-ZN1-1014	Zone-1	4166	4.9	3142
J-ZN1-1015	Zone-1	4225	5.9	3636
J-ZN1-1016	Zone-1	4219	1.5	1164
J-ZN1-1017	Zone-1	4250	0.9	514
J-ZN1-1018	Zone-1	4169	1.8	3206
J-ZN1-1019	Zone-1	4148	4.7	3007
J-ZN1-1020	Zone-1	4130	0.0	5605

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1021	Zone-1	4195	2.1	1646
J-ZN1-1022	Zone-1	4092	1.2	2020
J-ZN1-1023	Zone-1	4090	0.0	3594
J-ZN1-1024	Zone-1	4090	0.0	2231
J-ZN1-1025	Zone-1	4119	13.5	9388
J-ZN1-1026	Zone-1	4120	1.7	1540
J-ZN1-1027	Zone-1	4119	1.6	1558
J-ZN1-1028	Zone-1	4122	0.0	1472
J-ZN1-1029	Zone-1	4108	2.9	3521
J-ZN1-1030	Zone-1	4106	0.2	1419
J-ZN1-1031	Zone-1	4110	2.6	1566
J-ZN1-1032	Zone-1	4106	1.8	1197
J-ZN1-1033	Zone-1	4149	12.9	1249
J-ZN1-1034	Zone-1	4164	0.8	1142
J-ZN1-1035	Zone-1	4120	0.9	4863
J-ZN1-1036	Zone-1	4129	4.9	1260
J-ZN1-1037	Zone-1	4175	8.7	4716
J-ZN1-1038	Zone-1	4162	4.7	1836
J-ZN1-1039	Zone-1	4158	7.5	1207
J-ZN1-1040	Zone-1	4160	0.0	5235
J-ZN1-1041	Zone-1	4159	4.9	4753
J-ZN1-1042	Zone-1	4150	0.2	5358
J-ZN1-1043	Zone-1	4151	2.8	5006
J-ZN1-1044	Zone-1	4138	15.4	1346
J-ZN1-1045	Zone-1	4140	6.5	1218
J-ZN1-1046	Zone-1	4112	17.1	2103
J-ZN1-1047	Zone-1	4104	0.8	4136
J-ZN1-1048	Zone-1	4109	13.5	1522
J-ZN1-1049	Zone-1	4120	30.9	2863
J-ZN1-1050	Zone-1	4122	5.5	1335
J-ZN1-1051	Zone-1	4092	5.5	5453
J-ZN1-1052	Zone-1	4095	12.1	2198
J-ZN1-1053	Zone-1	4094	15.1	8138
J-ZN1-1054	Zone-1	4092	1.1	6234
J-ZN1-1055	Zone-1	4092	1.6	1763
J-ZN1-1056	Zone-1	4094	7.5	1461
J-ZN1-1057	Zone-1	4108	3.4	4477
J-ZN1-1058	Zone-1	4094	2.0	8943
J-ZN1-1059	Zone-1	4094	1.7	3463

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1060	Zone-1	4098	7.8	3749
J-ZN1-1061	Zone-1	4100	1.6	1939
J-ZN1-1062	Zone-1	4100	2.9	2443
J-ZN1-1063	Zone-1	4101	11.4	2152
J-ZN1-1064	Zone-1	4099	14.6	1905
J-ZN1-1065	Zone-1	4148	17.5	2844
J-ZN1-1066	Zone-1	4146	11.3	1995
J-ZN1-1067	Zone-1	4209	2.9	5435
J-ZN1-1068	Zone-1	4186	1.8	5607
J-ZN1-1069	Zone-1	4191	1.5	2116
J-ZN1-1070	Zone-1	4168	3.5	3898
J-ZN1-1071	Zone-1	4176	10.9	3671
J-ZN1-1072	Zone-1	4176	15.1	1807
J-ZN1-1073	Zone-1	4166	5.5	3872
J-ZN1-1074	Zone-1	4182	0.6	1580
J-ZN1-1075	Zone-1	4173	6.5	3700
J-ZN1-1076	Zone-1	4161	23.6	947
J-ZN1-1077	Zone-1	4172	17.4	3340
J-ZN1-1078	Zone-1	4172	9.1	3593
J-ZN1-1079	Zone-1	4174	40.1	1581
J-ZN1-1080	Zone-1	4178	7.0	2330
J-ZN1-1081	Zone-1	4092	1.4	8224
J-ZN1-1082	Zone-1	4092	4.9	9687
J-ZN1-1083	Zone-1	4094	0.0	318
J-ZN1-1084	Zone-1	4173	3.2	3607
J-ZN1-1085	Zone-1	4090	9.2	9780
J-ZN1-1086	Zone-1	4090	0.0	12664
J-ZN1-1087	Zone-1	4091	0.7	4828
J-ZN1-1088	Zone-1	4090	17.4	16212
J-ZN1-1089	Zone-1	4090	3.4	2453
J-ZN1-1090	Zone-1	4171	2.5	2814
J-ZN1-1091	Zone-1	4092	1.5	8017
J-ZN1-1092	Zone-1	4088	0.0	7338
J-ZN1-1093	Zone-1	4093	0.2	8811
J-ZN1-1094	Zone-1	4094	9.8	8788
J-ZN1-1095	Zone-1	4092	0.2	6687
J-ZN1-1096	Zone-1	4092	4.4	3199
J-ZN1-1097	Zone-1	4100	28.7	4556
J-ZN1-1098	Zone-1	4100	10.7	3803

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1099	Zone-1	4189	14.2	3692
J-ZN1-1100	Zone-1	4098	0.6	6459
J-ZN1-1101	Zone-1	4100	0.0	4758
J-ZN1-1102	Zone-1	4100	0.0	4626
J-ZN1-1103	Zone-1	4099	2.7	4505
J-ZN1-1104	Zone-1	4126	4.5	3312
J-ZN1-1105	Zone-1	4125	0.0	3371
J-ZN1-1106	Zone-1	4122	6.6	3353
J-ZN1-1107	Zone-1	4130	49.5	3365
J-ZN1-1108	Zone-1	4119	5.7	3088
J-ZN1-1109	Zone-1	4120	13.6	3079
J-ZN1-1110	Zone-1	4204	2.3	3146
J-ZN1-1111	Zone-1	4138	7.4	4448
J-ZN1-1112	Zone-1	4138	6.8	3984
J-ZN1-1113	Zone-1	4138	14.7	1658
J-ZN1-1114	Zone-1	4157	11.3	3394
J-ZN1-1115	Zone-1	4177	8.0	6347
J-ZN1-1116	Zone-1	4156	15.8	4375
J-ZN1-1117	Zone-1	4156	14.0	3695
J-ZN1-1118	Zone-1	4154	2.2	3163
J-ZN1-1119	Zone-1	4204	0.7	2415
J-ZN1-1120	Zone-1	4162	11.9	3949
J-ZN1-1121	Zone-1	4163	12.2	3126
J-ZN1-1122	Zone-1	4166	10.8	4100
J-ZN1-1123	Zone-1	4170	4.4	2116
J-ZN1-1124	Zone-1	4164	6.6	3597
J-ZN1-1125	Zone-1	4166	5.7	1898
J-ZN1-1126	Zone-1	4168	0.8	3675
J-ZN1-1127	Zone-1	4170	1.9	1932
J-ZN1-1128	Zone-1	4165	2.2	2584
J-ZN1-1129	Zone-1	4216	4.8	3055
J-ZN1-1130	Zone-1	4153	1.2	3796
J-ZN1-1131	Zone-1	4154	5.4	1857
J-ZN1-1132	Zone-1	4158	0.0	2750
J-ZN1-1133	Zone-1	4162	3.8	2469
J-ZN1-1134	Zone-1	4162	13.0	2681
J-ZN1-1135	Zone-1	4172	1.5	2322
J-ZN1-1136	Zone-1	4171	2.5	2286
J-ZN1-1137	Zone-1	4205	1.0	2925

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1138	Zone-1	4178	0.0	1863
J-ZN1-1139	Zone-1	4175	2.1	2033
J-ZN1-1140	Zone-1	4168	8.1	1735
J-ZN1-1141	Zone-1	4156	7.4	2118
J-ZN1-1142	Zone-1	4159	1.4	1607
J-ZN1-1143	Zone-1	4149	3.5	2692
J-ZN1-1144	Zone-1	4151	2.2	1858
J-ZN1-1145	Zone-1	4107	22.0	3309
J-ZN1-1146	Zone-1	4208	8.5	3033
J-ZN1-1147	Zone-1	4108	10.4	3477
J-ZN1-1148	Zone-1	4108	5.1	1549
J-ZN1-1149	Zone-1	4100	4.6	2079
J-ZN1-1150	Zone-1	4101	11.3	506
J-ZN1-1151	Zone-1	4110	1.6	3163
J-ZN1-1152	Zone-1	4110	0.1	740
J-ZN1-1153	Zone-1	4211	6.2	2891
J-ZN1-1154	Zone-1	4110	0.0	763
J-ZN1-1155	Zone-1	4104	5.7	5330
J-ZN1-1156	Zone-1	4110	1.7	770
J-ZN1-1157	Zone-1	4109	4.1	430
J-ZN1-1158	Zone-1	4117	7.9	1609
J-ZN1-1159	Zone-1	4117	3.2	1646
J-ZN1-1160	Zone-1	4139	11.0	1039
J-ZN1-1161	Zone-1	4108	18.7	6720
J-ZN1-1162	Zone-1	4109	8.2	7077
J-ZN1-1163	Zone-1	4104	0.0	4525
J-ZN1-1164	Zone-1	4105	12.7	7117
J-ZN1-1165	Zone-1	4106	6.8	2024
J-ZN1-1166	Zone-1	4108	16.2	7069
J-ZN1-1167	Zone-1	4108	3.8	7016
J-ZN1-1168	Zone-1	4110	16.1	7164
J-ZN1-1169	Zone-1	4108	13.3	6396
J-ZN1-1170	Zone-1	4110	8.4	7025
J-ZN1-1171	Zone-1	4108	21.5	6177
J-ZN1-1172	Zone-1	4220	5.8	1515
J-ZN1-1173	Zone-1	4106	0.0	3462
J-ZN1-1174	Zone-1	4106	0.0	3538
J-ZN1-1175	Zone-1	4106	0.0	3012
J-ZN1-1176	Zone-1	4137	8.2	2168
J-ZN1-1177	Zone-1	4138	11.9	2121
J-ZN1-1178	Zone-1	4136	12.1	2424
J-ZN1-1179	Zone-1	4168	18.8	2216
J-ZN1-1180	Zone-1	4165	29.7	2159
J-ZN1-1181	Zone-1	4220	3.4	2975
J-ZN1-1182	Zone-1	4164	0.0	2589
J-ZN1-1183	Zone-1	4158	7.0	2624
J-ZN1-1184	Zone-1	4176	1.6	2720
J-ZN1-1185	Zone-1	4159	2.5	1327
J-ZN1-1186	Zone-1	4166	0.8	2626
J-ZN1-1187	Zone-1	4168	16.0	2269
J-ZN1-1188	Zone-1	4149	4.4	2788
J-ZN1-1189	Zone-1	4152	2.0	1522
J-ZN1-1190	Zone-1	4148	0.0	2531
J-ZN1-1191	Zone-1	4109	6.4	3384
J-ZN1-1192	Zone-1	4207	4.5	2499
J-ZN1-1193	Zone-1	4109	4.5	3745
J-ZN1-1194	Zone-1	4107	11.5	3920
J-ZN1-1195	Zone-1	4104	17.9	4105
J-ZN1-1196	Zone-1	4105	7.2	4046
J-ZN1-1197	Zone-1	4105	11.0	4758
J-ZN1-1198	Zone-1	4104	7.9	2608
J-ZN1-1199	Zone-1	4102	0.1	6468
J-ZN1-1200	Zone-1	4088	0.0	4080
J-ZN1-1201	Zone-1	4090	0.0	1863
J-ZN1-1202	Zone-1	4208	5.3	2915
J-ZN1-1203	Zone-1	4090	0.0	1869
J-ZN1-1204	Zone-1	4090	16.9	1707
J-ZN1-1205	Zone-1	4086	0.0	3071
J-ZN1-1206	Zone-1	4089	1.4	1092
J-ZN1-1207	Zone-1	4094	1.2	6046
J-ZN1-1208	Zone-1	4090	0.0	9141
J-ZN1-1209	Zone-1	4089	0.1	8405
J-ZN1-1210	Zone-1	4093	0.0	10111
J-ZN1-1211	Zone-1	4090	0.0	9135
J-ZN1-1212	Zone-1	4205	8.2	3250
J-ZN1-1213	Zone-1	4089	0.0	8389
J-ZN1-1214	Zone-1	4088	0.0	8137
J-ZN1-1215	Zone-1	4089	2.4	8257

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1216	Zone-1	4090	22.7	8447
J-ZN1-1217	Zone-1	4090	0.0	4253
J-ZN1-1218	Zone-1	4090	0.0	2554
J-ZN1-1219	Zone-1	4090	0.0	2538
J-ZN1-1220	Zone-1	4090	0.0	2994
J-ZN1-1221	Zone-1	4090	0.0	2950
J-ZN1-1222	Zone-1	4090	0.0	4137
J-ZN1-1223	Zone-1	4090	0.0	5705
J-ZN1-1224	Zone-1	4090	0.0	3322
J-ZN1-1225	Zone-1	4090	0.0	2995
J-ZN1-1226	Zone-1	4090	0.0	2405
J-ZN1-1227	Zone-1	4090	0.0	2801
J-ZN1-1228	Zone-1	4089	0.0	2740
J-ZN1-1229	Zone-1	4090	0.0	2789
J-ZN1-1230	Zone-1	4089	0.0	2046
J-ZN1-1231	Zone-1	4089	0.0	2015
J-ZN1-1232	Zone-1	4088	0.0	2260
J-ZN1-1233	Zone-1	4084	0.0	1560
J-ZN1-1234	Zone-1	4090	0.0	1845
J-ZN1-1235	Zone-1	4089	0.0	1730
J-ZN1-1236	Zone-1	4090	0.0	7750
J-ZN1-1237	Zone-1	4088	0.0	1229
J-ZN1-1238	Zone-1	4088	0.1	8329
J-ZN1-1239	Zone-1	4088	0.0	8338
J-ZN1-1240	Zone-1	4088	1.0	1875
J-ZN1-1241	Zone-1	4174	9.9	3857
J-ZN1-1243	Zone-1	4285	0.0	0
J-ZN1-1244	Zone-1	4162	0.0	3484
J-ZN1-1245	Zone-1	4223	0.0	2634
J-ZN1-1247	Zone-1	4215	0.0	3270
J-ZN1-1248	Zone-1	4174	2.2	4197
J-ZN1-1249	Zone-1	4197	0.0	3487
J-ZN1-1250	Zone-1	4111	0.0	7476
J-ZN1-1251	Zone-1	4111	0.0	3114
J-ZN1-1252	Zone-1	4092	0.0	6294
J-ZN1-1253	Zone-1	4092	1.2	14218
J-ZN1-1258	Zone-1	4175	0.2	2856
J-ZN1-1280	Zone-1	4091	0.0	9564
J-ZN1-1281	Zone-1	4111	5.3	2268

ID	Zone	Elevation (ft)	Static Demand (gpm)	Available Flow (gpm)
J-ZN1-1436	Zone-1	4178	1.6	11373
J-ZN1-4005	Zone-1	4192	7.7	4726
J-ZN1-4007	Zone-1	4186	3.7	4481
J-ZN1-4008	Zone-1	4230	1.9	1940
J-ZN1-4013	Zone-1	4096	3.8	7253
J-ZN1-4015	Zone-1	4088	0.0	8744
J-ZN1-4017	Zone-1	4088	8.3	8330
P-ZN1-0798A	Zone-1	4170	7.5	3888
P-ZN1-0798B	Zone-1	4172	8.9	2449
P-ZN1-0856B	Zone-1	4162	34.8	3842
HYDRANT597	Zone-3	4426	51.1	2079
J-BV-0001	Zone-5	4546	8.1	2224
J-BV-0002	Zone-5	4401	4.9	6417
J-BV-0003	Zone-5	4442	13.1	6618
J-BV-0004	Zone-5	4460	0.0	5305
J-BV-0005	Zone-5	4547	0.0	2096
J-BV-0006	Zone-5	4543	0.0	2097
J-BV-0007	Zone-5	4486	16.5	6601
J-BV-0008	Zone-5	4548	4.2	2170
J-BV-0009	Zone-5	4503	3.8	4022
J-BV-0010	Zone-5	4494	0.0	3594
J-BV5-0001	Zone-5	4590	0.0	7535
J-BV5-0004	Zone-5	4493	0.0	7536

Appendix L. Coliform Monitoring Plan

City of Klamath Falls

Water System Coliform Sampling Plan

November 2015





Per Oregon Administrative Rules 333-061-0036 (6);
Samples shall be collected and analyzed for the purpose of determining compliance with the maximum contaminate levels for coliform bacteria.

Samples must be collected at sites that are representative of water throughout the distribution system and from points which are representative of conditions, including impacts of multiple sources, within the distribution system at regular time intervals throughout the reporting period (i.e. monthly).
Per population served the Klamath Falls Water System must monitor at a frequency no less than 40 samples per month.

Per OAR 333-061-0036 (6) (a) (A), (E), (G), and (b) (A)
When a routine sample is total coliform-positive a set of repeat samples must be collected within 24 hours of being notified of the positive results by the certified laboratory. No less than three (3) repeat samples of each must be collected for each total coliform-positive routine sample found. At least one (1) repeat sample must be collected from the sampling tap where the original total coliform-positive sample was taken and at least one (1) repeat sample at a tap within five service connections upstream and at least one (1) repeat sample at a tap within five services downstream of the original sampling site (see sample collection sites and associated repeat sites list).

Per OAR 333-061-0036 (6) (r) (B)
When a routine sample is total coliform-positive at least one (1) source water sample must be collected within 24 hours of notification of the positive results by the certified laboratory. Where the water system has more than one groundwater source at least one (1) triggered source water sample must be collected from a representative source(s) as approved by the Oregon Health Authority Drinking Water Program and per the water system's approved coliform sampling plan and triggered source water monitoring plan.

Per OAR 333-061-036 (6) (w) (A) (i) (ii)
The water system must collect at least one (1) annual groundwater source sample; and must collect samples from each groundwater source unless the water system obtains written approval to conduct monitoring at one or more representative groundwater sources within the system that draw water from the same hydrogeologic setting.

Coliform sample collection procedures as follows:

- Using a propane torch heat sample tap nozzle sufficient to sterilize the sample tap nozzle

- Turn water full on and allow to flow for minimum 5 minutes.

- Using proper chlorine residual sample kit fill tubes to appropriate level and add correct free residual reagent. Shake tube to dissolve reagent, allow to stand for recommended

time, read and record chlorine residual. Repeat procedure using total chlorine residual reagent.

- Using properly sealed bottle supplied by certified laboratory, remove seal and cap being careful not to touch rim of bottle or cap. Fill bottle to 100ml level and replace cap.

- Complete sample collection form for each corresponding sample and return to lab with sample.

Distribution System SAMPLE SITES	REPEAT/TRIGGERED SAMPLE LOCATION	ADDRESS / LOCATION
#1	REPEAT SITE 1	ELDORADO PARK
	REPEAT SITE 2	1927 ESPLANADE AVE
ELDORADO PARK	REPEAT SITE 3	1845 ESPLANADE AVE
	TRIGGERED SOURCE	EP-A
#2	REPEAT SITE 1	MEMORIAL SAMPLE STAND
	REPEAT SITE 2	2527 FAIRWAY
MEMORIAL / FAIRWAY	REPEAT SITE 3	3090 MEMORIAL DR
	TRIGGERED SOURCE	EP-I, EP-J / EP-A*
#3	REPEAT SITE 1	LYNNEWOOD BOOSTER
	REPEAT SITE 2	1070 CEDAR RIDGE DR
LYNNEWOOD BOOSTER	REPEAT SITE 3	1030 CEDAR RIDGE DR
	TRIGGERED SOURCE	EP-C/ EP-A*
#4	REPEAT SITE 1	CONGER WELL IN LEAD
	REPEAT SITE 2	976 HARBOR ISLES
HARBOR ISLES / ANCHOR	REPEAT SITE 3	973 HARBOR ISLES
	TRIGGERED SOURCE	EP-C / EP-A*
#5	REPEAT SITE 1	HWY 97 / MOLLIES SAMPLE STAND
	REPEAT SITE 2	3939 HWY 97
HWY 97 @ PILOT	REPEAT SITE 3	3817 HWY 97
	TRIGGERED SOURCE	EP-H/ EP-A*
#6	REPEAT SITE 1	HARRIMAN SAMPLE STAND
	REPEAT SITE 2	1918 HARRIMAN
HARRIMAN BOOSTER	REPEAT SITE 3	1936 HARRIMAN
	TRIGGERED SOURCE	EP-A
#7	REPEAT SITE 1	BIRCH BOOSTER
	REPEAT SITE 2	1535 LEXINGTON
LEXINGTON ST @ MAR ST	REPEAT SITE 3	1400 BLOCK OF LEXINGTON
	TRIGGERED SOURCE	SOURCE EP-H/SOURCE EP-A*
#8	REPEAT SITE 1	MAIN / WILLIAMS SAMPLE STAND
	REPEAT SITE 2	2316 MAIN
MAIN / WILLIAMS	REPEAT SITE 3	114 WILLIAMS
	TRIGGERED SOURCE	EP-A
#9	REPEAT SITE 1	KIWANIS PARK SAMPLE STAND
	REPEAT SITE 2	2353 APPLEGATE
2300BLK APPLEGATE AVE @ KIWANIS PARK	REPEAT SITE 3	2363 APPLEGATE
	TRIGGERED SOURCE	EP-A
#10	REPEAT SITE 1	DAYTON BOOSTER
	REPEAT SITE 2	3840 SHASTA WAY
DAYTON BOOSTER	REPEAT SITE 3	1724 DAYTON
	TRIGGERED SOURCE	EP-A
#11	REPEAT SITE 1	HOMEDALE SAMPLE STAND
	REPEAT SITE 2	1414 HOMEDALE
HOMEDALE WELL SITE	REPEAT SITE 3	1450 HOMEDALE
	TRIGGERED SOURCE	SOURCE EP-E / SOURCE EP-A

#12 MOYINA BOOSTER	REPEAT SITE 1	MOYINA BOOSTER
	REPEAT SITE 2	1441 KIMBERLY
	REPEAT SITE 3	6748 EBERLEIN AVE
	TRIGGERED SOURCE	EP-A
#13 KELLER RD @ ALT WAY	REPEAT SITE 1	KELLER / ALT WAY SAMPLE STAND
	REPEAT SITE 2	4603 ALT WAY
	REPEAT SITE 3	7136 TURNER CT
	TRIGGERED SOURCE	EP-F/EP-A
#14 CAMBRIDGE / GLENWOOD	REPEAT SITE 1	GLENWOOD SAMPLE STAND
	REPEAT SITE 2	5101 LAURELWOOD
	REPEAT SITE 3	5278 GLENWOOD
	TRIGGERED SOURCE	SOURCE EP-A
#15 ALTAMONT / WINGS WAY	REPEAT SITE 1	ALTAMONT/ WINGS SAMPLE STAND
	REPEAT SITE 2	KFI LIFT STATION
	REPEAT SITE 3	6775 ARNOLD DR
	TRIGGERED SOURCE	SOURCE EP-A
#16 4520 BRISTOL AVE	REPEAT SITE 1	BRISTOL / FARGO SAMPLE STAND
	REPEAT SITE 2	4525 BRISTOL
	REPEAT SITE 3	4430 BRISTOL
	TRIGGERED SOURCE	EP-A
#17 THOMPSON AVE @GETTLE	REPEAT SITE 1	THOMPSON SAMPLE STAND
	REPEAT SITE 2	2728 GETTLE
	REPEAT SITE 3	4513 THOMPSON
	TRIGGERED SOURCE	EP-A
#18 KLAMATH AVE @ 12TH ST	REPEAT SITE 1	KLAMATH / 12TH SAMPLE STAND
	REPEAT SITE 2	1100 KLAMATH
	REPEAT SITE 3	200 COMMERCIAL
	TRIGGERED SOURCE	EP-A
#19 3808 OLD FORT RD (NORTHRIDGE)	REPEAT SITE 1	TANGLEWOOD SAMPLE STAND
	REPEAT SITE 2	3930 OLD FORT RD
	REPEAT SITE 3	3442 OLD FORT RD
	TRIGGERED SOURCE	EP-A
#20 HILYARD AVE @ BARNES WAY	REPEAT SITE 1	HILYARD / BARNES SAMPLE STAND
	REPEAT SITE 2	6649 HILYARD
	REPEAT SITE 3	6517 HILYARD
	TRIGGERED SOURCE	EP-F/EP-A*
#21 5610 BENCHWOOD DR	REPEAT SITE 1	BASIN VIEW SAMPLE STAND
	REPEAT SITE 2	5700 BLOCK OF BENCHWOOD
	REPEAT SITE 3	5610 BENCHWOOD
	TRIGGERED SOURCE	EP-A
#22 CORTEZ ST @ BALSAM DR	REPEAT SITE 1	BALSAM/ CORTEZ SAMPLE STAND
	REPEAT SITE 2	4041 BALSAM
	REPEAT SITE 3	3254 CORTEZ
	TRIGGERED SOURCE	EP-I / EP-J/EP-A*
#23	REPEAT SITE 1	DEBBIE / SUE SAMPLE STAND
	REPEAT SITE 2	4951 SUE DR

DEBBIE DR @ SUE DR	REPEAT SITE 3	2626 DEBBIE DR
	TRIGGERED SOURCE	EP-I / EP-J/EP-A*
#24 MAHAN @ WEYERHAEUSER RD	REPEAT SITE 1	MAHAN SAMPLE STAND
	REPEAT SITE 2	4887 WEYERHAUSER RD
	REPEAT SITE 3	4911 WEYERHAUSER RD
	TRIGGERED SOURCE	EP-I /EP-J/EP-A*

REPEAT SITE 1 = ORIGINAL SAMPLE SITE
REPEAT SITE 2 = LOCATION WITHIN 5 SERVICE CONNECTIONS UPSTREAM FROM ORIGINAL SITE
REPEAT SITE 3 = LOCATION WITHIN 5 SERVICE CONNECTIONS DOWNSTREAM FROM ORIGINAL SITE
TRIGGERED SOURCE = SAMPLE DIRECTLY FROM WELL SOURCE IMMEDIATELY AFTER TREATMENT
TRIGGERED SOURCE EP-A* - CONGER WELL FIELD USED SEASONALLY DURING OFF PEAK DEMAND PERIODS

Source Water Coliform Sample Locations

FACILITY ID	FACILITY NAME
EP-A	CONGER WELL FIELD year round and seasonal source for all pressure zones through various booster pump sta.
SRC-AA	WELL #10 - permanent source year-round availability
SRC-AB	WELL #7 - permanent source year-round availability
SRC-AC	WELL #9 - permanent source year-round availability
SRC-AD	WELL #25 - permanent source year-round availability
SRC-AE	WELL #8 - permanent source year-round availability
EP-B	WELL#18 - UNITY WELL - emergency source
EP-C	WELL #11 - FREMONT WELL permanent source year-round availability used seasonally during peak and moderate demand periods. Seasonal source for pressure zone 1 - Lynnewood, Harbor Isles, Pelican City service area
EP-D	WELL #12 - HENLEY WELL - emergency source
EP-E	WELL #13 - HOMEDALE WELL permanent source year-round availability used seasonally during peak and moderate demand periods. Seasonal source for pressure zone 1 - Ogden service area
EP-F	WELL #19 - HILYARD WELL permanent source year-round availability used seasonally during peak and moderate demand periods. Seasonal source for pressure zone 1 - East Hilyard, Sunset Village service area
EP-G	WELL #2 - MOYINA WELL - emergency source
EP-H	WELL #1 - WOCUS WELL permanent source year-round availability used seasonally during peak and moderate demand periods. Seasonal source for pressure zone 3 - Hospital, College Industrial, Nob Hill service zone.
EP-I	WELL #22 - DEBBIE WELL permanent source year-round availability used seasonally during peak and moderate demand periods. Seasonal source for pressure zone 2 - Stewart Lenox, Lindley, West Klamath service zone
EP-J	WELL #20 - BALSAM WELL permanent source year-round availability used seasonally during peak and moderate demand periods. Seasonal source for pressure zone 2 - Stewart Lenox, Lindley, West Klamath service zone

Source water samples are collected monthly prior to treatment and/or chlorination. Results are not reported and are for the Water System's information only

At least once annually and during the peak demand period source water samples are collected from each groundwater source, analyzed for the purpose of determining compliance with the maximum contaminant levels for coliform bacteria with the results reported to DHS DWP as required by OAR 333-061-0036.

Sampling Schedule

SAMPLE SITE #	SAMPLE STAND LOCATION	1ST WEEK	2ND WEEK	3RD WEEK	4TH WEEK
1	ESPLANADE ST @ ELDORADO PARK	X		X	
2	MEMORIAL DR @ FAIRWAY DR		X		X
3	LYNNEWOOD BOOSTER STATION	X		X	
4	HARBOR ILSE @ ANCHOR WAY		X		X
5	HWY 97N @ PILOT	X		X	
6	HARRIMAN ST BOOSTER SITE			X	
7	LEXINGTON ST @ MAR ST		X		X
8	MAIN ST @ WILLIAMS ST	X		X	
9	2300 BLK RECLAMATION AVE @ KIWANIS PARK				X
10	DAYTON BOOSTER STATION		X		X
11	HOMEDALE WELL SITE	X			
12	MOYINA BOOSTER STATION			X	
13	KELLER RD @ ALT WAY	X		X	
14	GLENWOOD DR @ CAMBRIDGE ST		X		X
15	ALTAMONT DR @ BRETT WAY	X		X	
16	4520 BRISTOL AVE	X		X	
17	THOMPSON AVE @ GETTLE ST		X		X
18	KLAMATH AVE @ 12TH ST		X		X
19	3808 OLD FORT RD (NORTHRIDGE)		X		X
20	HILYARD AVE @ BARNES WAY		X		X
21	5610 BENCHWOOD DR	X			
22	CORTEZ ST @ BALSAM DR	X			
23	DEBBIE DR @ SUE DR		X		
24	MAHAN ST @ WEYERHAUESER RD			X	

SAMPLE SITE #	SAMPLE STAND LOCATION
1	ESPLANADE ST @ ELDORADO PARK
2	MEMORIAL DR @ FAIRWAY DR
3	LYNNEWOOD BOOSTER STATION
4	HARBOR ILSE @ ANCHOR WAY
5	HWY 97N @ PILOT
6	HARRIMAN ST BOOSTER SITE
7	LEXINGTON ST @ MAR ST
8	MAIN ST @ WILLIAMS ST
9	2300 BLK APPLEGATE AVE @ KIWANIS PARK
10	DAYTON BOOSTER STATION
11	HOMEDALE WELL SITE
12	MOYINA BOOSTER STATION
13	KELLER RD @ ALT WAY
14	GLENWOOD DR @ CAMBRIDGE ST
15	ALTAMONT DR @ BRETT WAY
16	4520 BRISTOL AVE
17	THOMPSON AVE @ GETTLE ST
18	KLAMATH AVE @ 12TH ST
19	3808 OLD FORT RD (NORTHRIDGE)
20	HILYARD AVE @ BARNES WAY
21	5610 BENCHWOOD DR
22	CORTEZ ST @ BALSAM DR
23	DEBBIE DR @ SUE DR
24	MAHAN ST @ WEYERHAUESER RD

SAMPLE SITE #	SAMPLE STAND LOCATION	1ST WEEK	2ND WEEK	3RD WEEK	4TH WEEK
1	ESPLANADE ST @ ELDORADO PARK	X		X	
2	MEMORIAL DR @ FAIRWAY DR		X		X
3	LYNNEWOOD BOOSTER STATION	X		X	
4	HARBOR ILSE @ ANCHOR WAY		X		X
5	HWY 97N @ PILOT	X		X	
6	HARRIMAN ST BOOSTER SITE			X	
7	LEXINGTON ST @ MAR ST		X		X
8	MAIN ST @ WILLIAMS ST	X		X	
9	2300 BLK RECLAMATION AVE @ KIWANIS PARK				X
10	DAYTON BOOSTER STATION		X		X
11	HOMEDALE WELL SITE	X			
12	MOYINA BOOSTER STATION			X	
13	KELLER RD @ ALT WAY	X		X	
14	GLENWOOD DR @ CAMBRIDGE ST		X		X
15	ALTAMONT DR @ BRETT WAY	X		X	
16	4520 BRISTOL AVE	X		X	
17	THOMPSON AVE @ GETTLE ST		X		X
18	KLAMATH AVE @ 12TH ST		X		X
19	3808 OLD FORT RD (NORTHRIDGE)		X		X
20	HILYARD AVE @ BARNES WAY		X		X
21	5610 BENCHWOOD DR	X			
22	CORTEZ ST @ BALSAM DR	X			
23	DEBBIE DR @ SUE DR		X		
24	MAHAN ST @ WEYERHAUESER RD			X	

Appendix M. Lead and Copper Rule Monitoring Plan and Results

ADDRESS	COPPER	LEAD		COPPER		LEAD	
193 Peach	0.0155	ND		0.0988		0.00114	
2926 Front	0.0191	0.000259		0.0931		0.00109	
5540 Valleywood Dr	0.0227	0.000133		0.0875		0.00102	
416 Pelican	0.00621	0.000176		0.0266		0.000823	90th percentile
4641 Cleveland	0.00265	0.0005		0.0227		0.000653	
2110 Watson	0.0266	ND		0.0191		0.000575	
6801 Waggoner	0.00188	ND		0.0187		0.0005	
3727 Diamond	0.0875	0.00102		0.018		0.000361	
4044 Douglas	0.0155	0.000361		0.0171		0.000326	
2536 Hawkins	0.0149	0.000154		0.0155		0.000301	
3938 Greesprings	0.00654	0.00114		0.0155		0.000259	
1312 Kane	0.0146	0.00109		0.0149		0.000213	
4722 Barney	0.0103	0.00011		0.0146		0.000176	
642 Front	0.0187	0.00016		0.0103		0.00016	
4302 Denver	0.00367	0.000141		0.0102		0.000154	
4311 Weherhauser	0.00707	0.000147		0.00902		0.000147	
891 Ponderosa	0.0171	0.000301		0.00707		0.000141	
4727 Barney	0.0102	0.000326		0.00654		0.000141	
2470 Lindley	0.0931	0.000575		0.00621		0.000133	
1663 Lakeshore	0.00315	0.000141		0.00613		0.000124	
1145 Maple	0.0988	0.000124		0.00562		0.00011	
2245 Hughes	0.00448	0.000109		0.00481		0.00011	
3130 Front	0.018	0.000213		0.00448		0.000109	
2654 Patterson	0.00613	0.000108		0.00417		0.000108	
405 N4th	0.00417	ND		0.00367		0	
7136 Turner	0.00303	ND		0.00315		0	
4422 Bryant	0.00179	0.000823		0.00303		0	
2007 Watson	0.00481	0.00011		0.00265		0	
1259 Buck Island	0.00902	ND		0.00188		0	
3031 Butte	0.00562	0.000653		0.00179		0	

Samples Collected 6/2017

City of Klamath Falls 2020 Water Master Plan

Appendix N. Compliance Monitoring Results

CITY KLAMATH FALLS WATER DIVISION								
ANALYTE		WELL SOURCE - SOURCE SAMPLE						
INORGANICS	**MCL**	**CONGER WELLFIELD**	**BALSAM WELL**	**DEBBIE WELL**	**FREMONT WELL**	**HILYARD WELL**	**HOMEDALE WELL**	**WOCUS WELL**
Chloride	250mg/l	5.1 mg/l	9.5 mg/l	4.6 mg/l	5.1 mg/l	3.4 mg/l	3.9 mg/l	4.7 mg/l
Fluoride	4 mg/l	0.307 mg/l	0.209 mg/l	0.223 mg/l	0.212 mg/l	0.311 mg/l	0.344 mg/l	0.196 mg/l
Nitrate **	10 mg/l	0.205mg/l	.637mg/l	N/D	.162mg/l	.567mg/l	.550mg/l	.280mg/l
Sulfate	unregulated	2.22mg/l	16.8 mg/l	6.7 mg/l	2.04 mg/l	12.5 mg/l	19.7 mg/l	3.67 mg/l
Nitrite	1 mg/l	N/D	N/D	N/D	N/D	0.97 mg/l	0.94 mg/l	N/D
Corrosivity Langlier Index	unregulated	-0.660	-0.260	-0.190	-0.94	-0.400	-0.800	-0.800
Color	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Odor	unregulated	1.00	1.00	1.00	4.00	1.00	1.00	1.40
Alkalinity	unregulated	112mg/l	191 mg/l	142 mg/l	128 mg/l	137 mg/l	143 mg/l	110 mg/l
Hardness as Calcium Carb.	unregulated	50.0 mg/l	130 mg/l	66.0 mg/l	74.0 mg/l	76.0 mg/l	140 mg/l	66.0 mg/l
Conductivity	unregulated	208	390	272	234	276	308	204
Total Solids	unregulated	124mg/l	232 mg/l	162 mg/l	140 mg/l	204 mg/l	232 mg/l	134 mg/l
Total Desolved Solids	unregulated	102 mg/l	200 mg/l	146 mg/l	124 mg/l	188 mg/l	196 mg/l	114 mg/l
Cyanide	0.2 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
pH	unregulated	8.1	7.8	8.2	7.7	8.2	7.6	8
Methylene Blue Active Substances	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D

N/D = None Detected at Minimum Recovery Level

MCL = Maximum Contaminate Level measured in milligrams per liter (mg/l)

samples for above contaminates required once every 9 years - last sample date for all above 07/06/2011

** Nitrate samples collected annually - last sample date 07/12/2017

CITY KLAMATH FALLS WATER DIVISION

ANALYTE		WELL SOURCE - SOURCE SAMPLE						
METALS	MCL	CONGER WELLFIELD	BALSAM WELL	DEBBIE WELL	FREMONT WELL	HILYARD WELL	HOMEDALE WELL	WOCUS WELL
Mercury	0.002mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Iron	0.3 mg/l	N/D	0.115 mg/l	ND	0.156 mg/l	ND	N/D	N/D
Silver	0.1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Sodium	unregulated	22.7 mg/l	27.6 mg/l	30.3 mg/l	19.2 mg/l	28.4 mg/l	ND	23.2 mg/l
Zinc	unregulated	N/D	N/D	0.030 mg/l	N/D	N/D	N/D	N/D
Aluminum	unregulated	N/D	0.109	N/D	N/D	N/D	N/D	N/D
Calcium	unregulated	12.0 mg/l	37.7 mg/l	23.1 mg/l	14.1 mg/l	14.9 mg/l	22.8 mg/l	11.1 mg/l
Antimony	0.006 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Arsenic	0.01 mg/l	N/D	N/D	N/D	N/D	.0033 mg/l	0.007 mg/l	0.0074 mg/l
Barium	2 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Beryllium	0.004 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Cadmium	0.005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Chromium	0.1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Copper	1.3 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Lead	0.015 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Manganese	unregulated	N/D	0.022 mg/l	0.013 mg/l	0.230 mg/l	ND	N/D	N/D
Nickel	0.1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Selenium	0.05 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Thallium	0.002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Uranium	0.03 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Uranium Activity	20 pCi/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D

samples for above contaminates required once every 9 years - last sample date for all above 07/06/2011

CITY OF KLAMATH FALLS

REGULATED ANALYTE		WELL SOURCE - SOURCE SAMPLE						
ORGANICS	MCL	CONGER WELLFIELD	BALSAM WELL	DEBBIE WELL	FREMONT WELL	HILYARD WELL	HOMEDALE WELL	WOCUS WELL
Dibromochloropropane	0.0002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Ethylene dibromide	0.00005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Chlordane	0.002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Toxaphene	0.003 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aroclor-1016	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aroclor-1221	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aroclor-1232	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aroclor-1242	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aroclor-1248	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aroclor-1254	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aroclor-1260	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
2 4-D	0.07 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
2,4,5-TP (Silvex)	0.05 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Dinoseb	0.007 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Pentachlorophenol	0.001 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Picloram	0.5 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Dalapon	0.2 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Alachlor	0.0004 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Atrazine	0.003 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D

samples for above contaminates required once every 3 years - last sample date for all above 08/11/2015

CITY KLAMATH FALLS WATER DIVISION

REGULATED ANALYTE		WELL SOURCE - SOURCE SAMPLE						
ORGANICS	MCL	CONGER WELLFIELD	BALSAM WELL	DEBBIE WELL	FREMONT WELL	HILYARD WELL	HOMEDALE WELL	WOCUS WELL
Benzo (a) pyrene	0.0002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
gamma-BHC (Lindane)	0.0002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Bis-(2-ethylhexyl) adipate	0.4 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Bis-(2-ethylhexyl) phthalate	0.006 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Endrin	0.002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Heptachlor	0.0004 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Heptachlor epoxide	0.0002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Hexachlorobenzene	0.001 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Hexachlorocyclopentadiene	0.05 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Methoxychlor	0.04 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Simazine	0.004 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Carbofuran	0.04 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Oxamyl (Vydate)	0.2 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Glyphosaate	0.7 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Endothall	0.1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Diquat Dibromide	0.0004 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D

samples for above contaminates required once every 3 years - last sample date for all above 08/11/2015

CITY KLAMATH FALLS WATER DIVISION

UNREGULATED ANALYTE		WELL SOURCE - SOURCE SAMPLE						
ORGANICS	MCL	CONGER WELLFIELD	BALSAM WELL	DEBBIE WELL	FREMONT WELL	HILYARD WELL	HOMEDALE WELL	WOCUS WELL
Dicamba	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aldrin	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Butachlor	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Dieldrin	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Metolachlor	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Metribuzin	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Proachlor	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aldicarb	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aldicarb sulfone	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Aldicarb sulfoxide	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Carbaryl	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
3-Hydroxycarbofuran	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Methomyl	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D

samples for above contaminates required once every 3 years - last sample date for all above 08/11/2015

CITY KLAMATH FALLS WATER DIVISION

REGULATED ANALYTE		WELL SOURCE - SOURCE SAMPLE						
VOLATILE ORGANICS	MCL	CONGER WELLFIELD	BALSAM WELL	DEBBIE WELL	FREMONT WELL	HILYARD WELL	HOMEDALE WELL	WOCUS WELL
1,1,1-Trichloroethane	0.2 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,1,2-Trichloroethane	0.005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,1-Dichloroethylene	0.007 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,2,4-Trichlorobenzene	0.07 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,2-Dichlorobenzene	0.6 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,2-Dichloroethane	0.005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,2-Dichloropropane	0.0005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,4-Dichlorobenzene	0.075 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Benzene	0.005	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Carbon Tetrachloride	0.005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Chlorobenzene	0.1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
cis-1,2-Dichloroethylene	0.07 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Ethyl Benzene	0.7 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Methylene Chloride	0.005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Styrene	0.1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Tetrachloroethylene	0.005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Toulene	1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
trans-1,2-Dichloroethylene	0.1 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Trichloroethylene	0.005 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D

samples for above contaminates required once every 3 years - last sample date for all above 07/11/2017

CITY KLAMATH FALLS WATER DIVISION

REGULATED ANALYTE		WELL SOURCE - SOURCE SAMPLE						
VOLATILE ORGANICS	**MCL**	**CONGER WELLFIELD**	**BALSAM WELL**	**DEBBIE WELL**	**FREMONT WELL**	**HILYARD WELL**	**HOMEDALE WELL**	**WOCUS WELL**
Vinyl chloride	0.002 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Total Xylenes	10 mg/l	N/D	N/D	N/D	N/D	N/D	N/D	N/D
UNREGULATED ANALYTE								
VOLATILE ORGANICS								
1,1,1,2-Tetrachloroehtane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,1,2,2-Tetrachloroethane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,1-Dichloroethane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,1-Dichloropropene	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,2,3-Trichloropropane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,3-Dichlorobenzene	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
1,3-Dichloropropane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
2,2-Dichloropropane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
2-Chlorotoluene	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
4-Chlorotoluene	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Bromovnezene	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Bromodichloromethane	unregulated	N/D	N/D	N/D	N/D	0.0005	0.001	N/D
Bromoform	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Chloroethane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D

samples for above contaminates required once every 3 years - last sample date for all above 07/11/2017

CITY KLAMATH FALLS WATER DIVISION 2014

UNREGULATED ANALYTE		WELL SOURCE - SOURCE SAMPLE						
VOLATILE ORGANICS	MCL	CONGER WELLFIELD	BALSAM WELL	DEBBIE WELL	FREMONT WELL	HILYARD WELL	HOMEDALE WELL	WOCUS WELL
Chloroform	unregulated	N/D	N/D	N/D	N/D	N/D	0.0034	N/D
Chloromethane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
cis-1,3-Dichloropropene	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Dibromochloromethane	unregulated	N/D	N/D	N/D	N/D	0.0007	0.0005	N/D
Dibromomethane	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D
trans-1,3-Dichlropropene	unregulated	N/D	N/D	N/D	N/D	N/D	N/D	N/D

N/D = None Detected at Minimum Recovery Level

MCL = Maximum Contaminate Level measured in milligrams per liter (mg/l)

samples for above contaminates required once every 3 years - last sample date for all above 07/11/2017

CITY KLAMATH FALLS WATER DIVISION 2014								
ANALYTE		WELL SOURCE - SOURCE SAMPLE						
Radionuclides	**MCL**	**CONGER WELLFIELD**	**BALSAM WELL**	**DEBBIE WELL**	**FREMONT WELL**	**HILYARD WELL**	**HOMEDALE WELL**	**WOCUS WELL**
Gross Alpha	15 MCL/QCL	1.6 pCi/L	3.3 pCi/L	2.9 pCi/L	2.8 pCi/L	3.9 pCi/L	2.5 pCi/L	2.9 pCi/L
Gross Alpha precision		1 pCi/L	1.4 pCi/L	1.2 pCi/L	1.1 pCi/L	1.3 pCi/L	1.2 pCi/L	1.1 pCi/L
Gross Alpha MDC		0.9 pCi/L	1.3 pCi/L	1.0 pCi/L	1.0 pCi/L	1.1 pCi/L	1.1 pCi/L	0.9 pCi/L
Radium 226		minus .1 pCi/L	minus .1 pCi/L	minus .1 pCi/L	minus .1 pCi/L	minus .06 pCi/L	minus .09 pCi/L	minus .01 pCi/L
Radium 266 precision		0.08 pCi/L	0.08 pCi/L	0.07 pCi/L	0.08 pCi/L	0.08 pCi/L	0.08 pCi/L	0.07 pCi/L
Radium 226 MDC		0.1 pCi/L	0.1 pCi/L	0.1 pCi/L	0.1 pCi/L	0.1 pCi/L	0.1 pCi/L	0.1 pCi/L
Radium 228		0.4 pCi/L	0.3 pCi/L	0.2 pCi/L	1.2 pCi/L	0.02 pCi/L	1.2 pCi/L	0.2 pCi/L
Radium 228 precision		0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.8 pCi/L	0.9 pCi/L	0.7 pCi/L
Radium 228 MDC		0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.9 pCi/L	0.9 pCi/L	0.7 pCi/L
Radium 226 + Radium 228	5 MCL/QCL	0.4 pCi/L	0.4 pCi/L	0.4 pCi/L	1.2 pCi/L	0.5 pCi/L	1.3 pCi/L	0.4 pCi/L
Radium 226 + Radium 228 precision		0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.9 pCi/L	0.9 pCi/L	0.7 pCi/L
Radium 226 + Radium 228 MDC		0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.7 pCi/L	0.9 pCi/L	0.9 pCi/L	0.7 pCi/L

samples for above contaminates required once every 6 years - last sample date for all above 07/06/2011

CITY KLAMATH FALLS WATER DIVISION

ANALYTE		DISINFECTION BYPRODUCTS STAGE II DISTRIBUTION SYSTEM SAMPLE	
Disinfection By-products	**MCL**	**1450 HOMEDALE RD**	**LYNNEWOOD BOOSTER STATION**
Total Trihalomethanes (TTHMs)	0.08	ND	0.00116
Haloacetic acids (HAAs)	0.06	N/D	N/D

Disinfection By-products samples required annually from representative distribution system locations - last samples collected 07/12/2017

CITY KLAMATH FALLS WATER DIVISION

COLIFORM SAMPLE ANALYSIS		WELL SOURCE - DISTRIBUTION SYSTEM SAMPLE				
PERIOD END DATE	SAMPLES REPORTED	ROUTINE TC+	ROUTINE FC+	REPEATS REPORTED	REPEAT TC+	REPEAT FC+
May-17	40	**0**	**0**	**0**	**0**	**0**
Apr-17	40	0	0	0	0	0
Mar-17	40	0	0	0	0	0
Feb-17	40	0	0	0	0	0
Jan-17	40	0	0	0	0	0
Dec-16	40	0	0	0	0	0
Nov-16	40	0	0	0	0	0
Oct-16	40	0	0	0	0	0
Sep-16	40	0	0	0	0	0
Aug-16	40	0	0	0	0	0
Jul-16	40	0	0	0	0	0
Jun-16	40	0	0	0	0	0
May-16	40	0	0	0	0	0
Apr-16	40	0	0	0	0	0
Mar-16	40	0	0	0	0	0
Feb-16	40	0	0	0	0	0
Jan-16	40	0	0	0	0	0
Dec-15	40	0	0	0	0	0
Nov-15	40	0	0	0	0	0
Oct-15	40	1	0	3	0	0
Sep-15	40	0	0	0	0	0
Aug-15	40	0	0	0	0	0
Jul-15	40	0	0	0	0	0
Jun-15	40	0	0	0	0	0
May-15	40	0	0	0	0	0
Apr-15	40	0	0	0	0	0
Mar-15	40	0	0	0	0	0
Feb-15	40	0	0	0	0	0
Jan-15	40	0	0	0	0	0

Appendix O. Oregon Drinking Water Program Hauling Guidelines

Oregon Health Services - Drinking Water Program

Drinking Water Hauling Guidelines

June, 2008

INTRODUCTION

Hauling water for drinking purposes is not regulated in the State of Oregon. The mission of the Drinking Water Program is to *assure all Oregonians safe drinking water*. The Program is solely responsible for administering both state and federal drinking water regulations, with the philosophy *to emphasize prevention activities*, which promote voluntary compliance with drinking water standards over the use of formal enforcement. These guidelines have been developed by the Drinking Water Program to help provide the "hauler" an effective means to ensure the delivery of safe drinking water.

SOURCE OF WATER

The Drinking Water Program recommends utilizing a public water system for the water supply source. The hauler should complete the following steps before utilizing the public water system:

1... **Contact the Drinking Water Program** at (971) 673-0405, or through their website at http://www.oregon.gov/DHS/ph/dwp/index.shtml and request a Compliance Status Report for the water system be sent to you. This report will indicate if the water system is current with drinking water monitoring requirements. This report will also help demonstrate to the customer that the water you're hauling is "safe" and comes from a reliable source.

2... **Contact the public water system** that is going to serve as your source of supply for the following reasons:

A... Generally, they already have a location in their distribution system set-up for supplying tanks with water.

B... They may require payment for the water to off-set their operating costs.

C... They may operate a wastewater treatment facility. If you use their wastewater collection system to dispose of an emulsifying detergent used to clean your tank, or high levels of chlorinated water used for disinfection, you may affect their treatment process.

EQUIPMENT PREPARATION

Tanks used for hauling drinking water should be of an acceptable type. The Drinking Water Program recommends using tanks previously used for ONLY hauling water or food grade materials.

The Drinking Water Program STRONGLY recommends NOT using tanks that have previously hauled ANY FUELS because lead and other materials in the fuels can be "absorbed" into the tank over time and leach back out into the water during transport. To use fuel tanks, they would need to be steam cleaned for a minimum of 90 minutes. Also, lead and volatile organic chemical (VOC) analysis of water that has been "standing" inside the fuel tank for a period of 24 hours would need to be completed. The results from the analysis would need to be below maximum contaminant levels (MCLs) established in the Drinking Water Program regulations.

All tanks should be visually inspected, scrubbed, flushed, and disinfected before hauling water to customers as follows:

1... All equipment should be visually inspected to ensure its integrity.

2a.. TANKS PREVIOUSLY USED FOR HAULING WATER should be scrubbed, flushed, and disinfected with chlorine as follows:

A... To ensure that water hauling equipment is adequately disinfected, all rust and sediment from the tank should be scrubbed with water containing 200 parts per million (ppm) chlorine. Chlorine bleach can be used for the scrubbing solution as follows:

200 ppm chlorine = 2.5 ounces (1/3 cup) of chlorine bleach for every 5 gallons of water used in the solution.

All hoses, pumps, and other equipment which will be in contact with the water should be disinfected in the same manner. After the tank and equipment has been scrubbed, everything should be rinsed.

B... After scrubbing and rinsing the tank, fill it with water containing 50 ppm chlorine for disinfection purposes. The chlorinated water should stand in the tank until you're ready to begin hauling (minimum period of 30 minutes). Chlorine bleach can be used as follows:

50 ppm chlorine = 2 quarts of chlorine bleach for every 500 gallons of water used to fill the tank.

All hoses, pumps, and other equipment which will be in contact with the water should be disinfected in the same manner.

C... When you are ready to begin hauling water, the chlorinated water should be drained and rinsed from the tank.

2b.. TANKS USED PREVIOUSLY FOR HAULING FOOD GRADE MATERIALS should be scrubbed, flushed, and disinfected with an emulsifying detergent and chlorine as follows:

A... Scrub and flush the tank and equipment with warm water.

B... clean with the injection of an approved (written on the manufacturer's label) emulsifying detergent until the tank and equipment are clean:

a... Use the amount specified on the manufacturer's label.

b... Maintain a minimum temperature of 140 degrees.

c... Change the location of the nozzle to continuously keep the interior wet from top to bottom until the tank is clean.

C... Rinse the tank thoroughly using warm water.

D... Fill the tank for disinfection purposes with water containing 50 ppm chlorine (described in part 2aB) until ready for hauling (minimum period of 30 minutes). All hoses, pumps, and other equipment which will be in contact with the water should be disinfected in the same manner.

E... When you are ready to begin hauling water, the chlorinated water should be drained and rinsed from the tank.

Note: The food industry has facilities for cleaning and disinfecting tanks used in hauling food grade materials. You may want to contact these facilities to make arrangements for cleaning and disinfecting your tank and equipment.

Note: Aluminum tanks, and tanks having plastic or other types of organic coatings, may be affected by heat or alkaline materials. When these types of tanks are to be cleaned using emulsifying detergents, the manufacturer of these tanks should be contacted and their recommendations followed.

TRANSPORTATION

After everything has been inspected, scrubbed, flushed, and disinfected, your equipment should be adequately prepared for hauling water. To ensure the water being transporting is safe for drinking purposes, it should carry a "free" chlorine residual of 1 ppm before transporting. The chlorine serves to disinfect organisms which may be present in the water and can cause illness. These organisms may be introduced into the water through the handling of equipment. The following steps should be followed to make sure the water is adequately disinfected:

1... You should have a chlorine test kit available that is able to measure "free" chlorine residuals. These test kits are available at swimming pool and spa supply stores. The Drinking Water Program recommends using a "DPD" test kit that can measure a free chlorine residual between 0.2 milligrams per liter (mg/L) and 3.0 mg/L.

Note: One milligram per liter (mg/L) is equal to one part per million (ppm).

2... A majority of public water systems chlorinate their water for disinfection purposes; therefore, you should measure their water for a free chlorine residual before filling your tank. If the measured residual is between 0.5 ppm and 1.0 ppm, you have adequate disinfection for hauling. Be sure to record the date, time, and measured free chlorine residual.

3... If the source of water does not have a chlorine residual measured between 0.5 ppm and 1.0 ppm, disinfect the water at 1 ppm by adding chlorine bleach while filling the tank as follows:

1 ppm chlorine = 2.5 ounces (1/3 cup) of chlorine bleach for every 1000 gallons of water used to fill the tank.

Once the tank is filled, check the free chlorine residual. Be sure to record the date, time, and measured free chlorine residual.

4... Your tank should be filled through an air gap to prevent possible backflow conditions from occurring. Once the tank is filled, it should be covered and "tightly" sealed.

5... All hoses utilized in the operation should be stored off the ground at all times. The hoses should be capped at both ends when they are not being used.

6... Haul the drinking water to the customer's location. The following steps should be followed after arriving:

A... Measure the free chlorine residual upon arrival. Be sure to record the date, time, and measured free chlorine residual.

B... Inspect the customer's receiving tank(s) with the customer before filling. The customer should have cleaned, disinfected, etc., the receiving tank(s) before your arrival. Comments regarding the condition of the receiving tank(s) should be documented in your records.

6... C... The customer's receiving tank(s) should be filled through an air gap to prevent possible backflow conditions from occurring.

REPEAT HAULING

If you haul drinking water on a day-to-day basis, you do not need to scrub, flush, and disinfect your tank and equipment between each haul. For each trip, you should repeat the guidelines described in the TRANSPORTATION section.

If you have stopped hauling drinking water for a period of several days, and have not hauled anything else, you should disinfect your tank and equipment with water containing 50 ppm chlorine before hauling again. Disinfecting with 50 ppm chlorine is described in Part 2aB of the EQUIPMENT PREPARATION section. After disinfecting the tank and equipment, you should repeat the guidlelines described in the TRANSPORTATION section for day-to-day operation.

If you have stopped hauling drinking water, and have since hauled food grade materials in your tank, you should repeat everything described in the guidelines.

RECORD KEEPING

Record keeping should be done at all times. By keeping records, liability issues surrounding "disease" outbreaks at your customer's location are greatly reduced. You will also be able to provide the customer with pertinent information regarding the "safety" of the water being hauled. Records should include the following information:

1... Public water system utilized for the source of water. The Program's Compliance Status Report has this information and is suitable for record keeping.

2... Name and address (location) of customer.

3... Date, time, and free chlorine residual after filling the tank with water for hauling.

4... Date, time, and free chlorine residual after arriving at the destination.

5... Notes regarding the receiving tank and any other significant items.

Attached to the guidelines is a form that can be used for keeping records. Make additional copies of this form for your use.

Drinking Water Hauling Records

Name of Company:	Address:	Phone:
Name of Driver:	Address:	Phone:
Name of Customer:	Address:	Phone:
Name of Source:	Approved Public Water System: O Yes O No	Compliance Monitoring Report attached: O Yes O No

Date	Time	Departing Free Cl_2 Residual	Arriving Free Cl_2 Residual	Comments	Driver's Initials

OAR 333-150 Food Sanitation Rules

Effective Date: January 1, 2002
Revised March 2008

5-3 MOBILE WATER TANK AND MOBILE FOOD ESTABLISHMENT WATER TANK

Subparts 5-301 Materials

5-302 Design and Construction
5-303 Numbers and Capacities
5-304 Operation and Maintenance
5-305 Water System Requirements

5-301.11 Approved.

Materials, that are used in the construction of a mobile water tank, mobile food establishment water tank, and appurtenances shall be:
(A) Safe;
(B) Durable, corrosion-resistant, and nonabsorbent; and
(C) Finished to have a smooth, easily cleanable surface.

5-302.11 Enclosed System, Sloped to Drain.

A mobile water tank shall be:
(A) Enclosed from the filling inlet to the discharge outlet; and
(B) Sloped to an outlet that allows complete drainage of the tank.

5-302.12 Inspection and Cleaning Port, Protected and Secured.

If a water tank is designed with an access port for inspection and cleaning, the opening shall be in the top of the tank and:
(A) Flanged upward at least 13 mm (one-half inch); and
(B) Equipped with a port cover assembly that is:
(1) Provided with a gasket and a device for securing the cover in place, and
(2) Flanged to overlap the opening and sloped to drain.

5-302.13 "V" Type Threads, Use Limitation.

A fitting with "V" type threads on a water tank inlet or outlet shall be allowed only when a hose is permanently attached.

5-302.14 Tank Vent, Protected.

If provided, a water tank vent shall terminate in a downward direction and shall be covered with:
(A) 16 mesh to 25.4 mm (16 mesh to 1 inch) screen or equivalent when the vent is in a protected area; or
(B) A protective filter when the vent is in an area that is not protected from windblown dirt and debris.

5-302.15 Inlet and Outlet, Sloped to Drain.

(A) A water tank and its inlet and outlet shall be sloped to drain.
(B) A water tank inlet shall be positioned so that it is protected from contaminants such as waste discharge, road dust, oil, or grease.

5-302.16 Hose, Construction and Identification.

A food grade hose shall be used for conveying drinking water from a water tank and shall be:
(A) Safe;
(B) Durable, corrosion-resistant, and nonabsorbent;
(C) Resistant to pitting, chipping, crazing, scratching, scoring, distortion, and decomposition;
(D) Finished with a smooth interior surface; and
(E) Clearly and durably identified as to its use if not permanently attached.

5-303.11 Filter, Compressed Air.

A filter that does not pass oil or oil vapors shall be installed in the air supply line between the compressor and drinking water system when compressed air is used to pressurize the water tank system.

5-303.12 Protective Cover or Device.

A cap and keeper chain, closed cabinet, closed storage tube, or other approved protective cover or device shall be provided for a water inlet, outlet, and hose.

5-303.13 Mobile Food Establishment Tank Inlet.

A mobile food establishment's water tank inlet shall be:
(A) 19.1 mm (three-fourths inch) in inner diameter or less; and
(B) Provided with a hose connection of a size or type that will prevent its use for any other service.

5-304.11 System Flushing and Disinfection. *

A water tank, pump, and hoses shall be flushed and sanitized before being placed in service after construction, repair, modification, and periods of nonuse.

5-304.12 Using a Pump and Hoses, Backflow Prevention.

A person shall operate a water tank, pump, and hoses so that backflow and other contamination of the water supply are prevented.

5-304.13 Protecting Inlet, Outlet, and Hose Fitting.

If not in use, a water tank and hose inlet and outlet fitting shall be protected using a cover or device as specified under § 5-303.12.

5-304.14 Tank, Pump, and Hoses, Dedication.

(A) Except as specified in ¶ (B) of this section, a water tank, pump, and hoses used for conveying drinking water shall be used for no other purpose.

(B) Water tanks, pumps, and hoses approved for liquid foods may be used for conveying drinking water if they are cleaned and sanitized before they are used to convey water.

5-305.11 Water System Requirements.*

(A) A Class IV mobile food unit must have a potable water system under pressure. The system must be of sufficient capacity to furnish enough hot and cold water for food preparation, warewashing, and handwashing, and the requirements of these rules. This supply must consist of a minimum of five gallons of water for handwashing and 30 gallons of water for warewashing.

(B) Class II and III mobile food units must have a water supply that provides sufficient water for food preparation, handwashing, warewashing or any other requirements as set forth in these rules. If warewashing is conducted on the unit, a minimum of 30 gallons of water must be dedicated for this purpose. A minimum of five gallons of water must be provided for handwashing.

(C) Except relating to handwashing as provided for in subparagraph 5-203.11(D)(2), all mobile food units must be designed with integral potable and waste water tanks on board the unit. A mobile unit may connect to water and sewer if it is available at the operating location, however, the tanks must remain on the unit at all times. N

Appendix P. Water System Emergency Response Plan

Final Report for

City of Klamath Falls

Water System Emergency Response Plan

April 2005





Presented by:

HDR | ees

111 SW 5th Avenue, Suite 1670
Portland, Oregon 97204
(503) 223-3033

Revised April 2016

Emergency Response Plan Acknowledgement

This plan is officially in effect when reviewed and acknowledged by the following:

Plan Acknowledgement – Signature Form		
Name/Title	**Signature**	**Date**

Section 1
Plan Overview

1.1 Overview

This document presents an Emergency Response Plan (ERP) for City of Klamath Falls Water Utility (Utility) water system for emergencies that may occur as a result of operational disruptions from natural disasters and human-caused events. It is imperative that public utilities plan for emergency disruptions, in order to be able to quickly restore service to customers.

While water utilities cannot plan for every possible emergency, they can prepare reasonable approaches to handling the most probable risks. This plan identifies:

- Potential risks to the water system,
- How the event would most likely impact service,
- Important management instructions and operations procedures to take in order to continue to provide or restore service as soon as possible,
- Proactive measures the Utility can take to properly prepare for emergencies

This plan was developed in accordance with the guidance provided by the State of Oregon Department of Human Services Drinking Water Program (DHS-DWP); *Draft 333-061-0064 Emergency Plan for Water System Operations Manual Requirements*, and requirements defined in the *State Model Emergency Response Plan.*

1.2 Regulatory Requirements

Prior to this ERP, the Utility completed a Vulnerability Assessment (VA) for its water system in June 2004, as is required by the federal Public Health Security and Bioterrorism Preparedness and Response Act (Bioterrorism Act) under authority of the U.S. Protection Agency (USEPA). As a follow-up to the VA the Bioterrorism Act requires water utilities to develop or enhance an existing ERP within six months of completing VA. Written certification that the ERP has been developed must be submitted to USEPA within that six month period and no later than December 31, 2004.

1.3 Plan Organization

This report is organized into the following sections

- Section 1 – Plan Overview
- Section 2 – Hazard Analysis
- Section 3 – Water System Hazard Review

- Section 4 – Hazard Mitigation and Annual Hazard Review
- Section 5 – Emergency Communication and Authority
- Section 6 – Emergency Response Procedures
- Section 7 – Emergency Equipment and Water Supplies
- Section 8 – Training, Exercise, and Rehearsals

Appendices are included at the end of this report detailing various emergency contacts, critical site schematics, emergency operational details, and forms for use in preparation for and during a response to an incident.

1.4 Coordination with Other Emergency Planning Efforts

The City of Klamath Falls has its own City-wide Emergency Operations Plan (EOP) developed under the concept of integrated emergency management, intended to address hazards, disciplines, emergency phases and agencies, and services. This plan provides a basic framework to guide departments, agencies and organizations having emergency capabilities in their efforts to mitigate, prepare for, respond to, and recover from any major emergency or disaster which may affect all or parts of the City.

The EOP identifies authorities and references, defines operational conditions, describes the City's Emergency Management Organization, provides guidance and assigns emergency responsibilities and activities to be taken by City departments and other public and private agencies in the case of emergency.

It is important to note that this Emergency Response Plan focuses on contingency plans for short-term, acute reduction in water supply and is intended to be an addition to existing City's Emergency Operation Plan, not duplicative.

1.5 Hazard Analysis and Vulnerabilities

This plan focuses on response planning for short-term, acute reduction in water supply. This report addresses the most likely natural or human-caused hazards and their potential impacts to the system's primary water system components. From a comprehensive list of potential hazards, the most likely hazards were considered to be the following:

- Hazardous-material release/spill
- Earthquakes
- Floods
- Vandalism
- Terrorism

The following components were identified as the most critical to the water system:

- Conger Complex
- Wocus Well

- Ogden Complex
- Debbie Well
- Patterson Complex
- Lytton Booster Station

1.6 Mitigation Actions

In order to reduce the Utility's risk exposure, mitigation actions have been developed for each of the Utility's critical facilities. The highest priority facilities are summarized in Table 1-1.

Table 1-1
City of Klamath Falls Water System
Priority Mitigation Actions

System Component	Description and Condition	Vulnerability	Improvements or Mitigating Actions
Conger Well Field	Located on bank of Link River. Five wells developed between 1926 and 1992. Well depth ranges from 370-830 ft.	Flood Earthquakes Hazardous Spill Vandalism Terrorism	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
Wocus Well	Drilled in 1991 at depth of 530 ft. Capacity of 1.1 mgd.	Earthquakes Hazardous Spill Vandalism Terrorism	
Debbie Well	Drilled 1987 at depth of 380 ft. Capacity of 0.6 mgd.		
Ogden Complex	1.02 MG capacity; Zone 1	Earthquakes Landslides Vandalism Terrorism	
Patterson #1	0.40 MG capacity; Zone 3		
Patterson #2	1.32 MG capacity; Zone 3		
Lytton	Two 700 gpm pumps controlled by Prescott Reservoir water level.	Earthquakes Vandalism Terrorism Fire	

1.7 Emergency Response Planning

The purpose of preparedness planning is to be prepared for any type of emergency that may impact water system operations as a result of a natural or human-caused hazard. This ensures that the Utility can maintain or return services to full operational condition at the soonest possible opportunity. An effective emergency response plan includes a framework that provides utility staff the knowledge and tools required to efficiently handle emergency events. The inherently chaotic nature of emergency events demands a

plan that allows staff to react in as timely a manner as possible. The main topics included within this Emergency Response Plan include the following and are discussed in greater detail within this document.

- Emergency Response Mission and Goals
- System Information
- Chain of Command – Lines of Authority
- Severity of Emergencies
- Emergency Notification
- Notification Procedures
- Water Quality Sampling
- Effective Communication
- Response Actions for Specific Events
- Alternative Water Sources
- Curtailing Water Use
- Returning to Normal Operation

1.8 Training and Rehearsals

Effective emergency preparedness demands that staff understand their roles and responsibilities during emergency events. The response actions for various staff should be constantly refined and evaluated. As a result, staff should plan training events on a recurring basis; subject to the experience levels of various staff members. Large scale training events done less frequently should be supplemented by smaller rehearsals and training events at more frequent intervals. As a result of these training events, this document should also be evaluated and refined to reflect changing conditions and to improve its relevance for potential future events.

1.9 Summary

Use of this plan should provide Utility staff with basic guidelines for responding to water system emergency events and help the Utility to achieve its goals of providing safe drinking water under emergency circumstances. This plan will aid in the conduct of responding to emergency events by identifying the system's vulnerability to specific natural and man-made hazards, developing mitigation, protection and backup plans, and structuring general and specific actions and associated training requirements for different emergency events.

The Utility must keep plans such as this ERP active. As system or staff changes occur updates to the plan must follow accordingly. Additional training should also be provided to ensure that current staff is familiar with the latest plan updates The ERP should also be an integral part of water system routine operations.

Section 2
Hazard Analysis

2.1 Introduction

There are generally two types of hazards that can interrupt supply to water system customers: natural and human-caused. This section identifies and describes the various types of hazards that can lead to emergency water shortages or other water system impacts (water quality issues, contamination, etc.). It is important to note that multiple hazards can lead to emergency water shortages at any given time. For example, snow and windstorms can knock out power, which can impact water distribution; fires and power and communication outages can occur as a result of an earthquake. By addressing the probability of each hazard, and how it can impact the City's water system, the City will be more prepared to meet the challenges posed by such hazards. At the end of this section the relative probability of each type of hazard potentially impacting the Klamath Falls water system is provided.

2.2 Natural Emergency Hazards

Within the region there are a number of natural, potentially hazardous, events that could occur. These events are described both in general terms and in a higher level of detail as to their potential for occurrence within the Klamath Falls area.

2.2.1 Earthquakes

Earthquake impacts occur in a number of different ways. The degree of damage is related to the magnitude of the earthquake, distance from the epicenter (the location of earth's surface directly above the subsurface focus of the earthquake), types of soil conditions and types of earthquakes and faults that exist. Significant research and effort has been made in determining potential fault lines and impact areas. The impacts to a water system are varied depending on the type of earthquake and its effects, as described below.

Faults

A fault rupture is the movement of two land masses along a fault. These land movements generally occur along existing fault lines. The region is criss-crossed by both identified and theorized and yet to be identified, fault lines. Fault lines are sometimes visible from aerial photographs and occasionally at ground level. In addition, they may be mapped by agencies such as the United States Geological Survey (USGS). Any facilities built on or across fault lines are susceptible to structural failure.

Readily available USGS seismic information indicates that there are at least seven known fault lines within a 60-mile radius of the city identified as Klamath Graben (843), Modoc

Plateau (840), Sky Lakes (844), Cedar Mountain (2a-c), Gillem-Big Crack (3), and Stoney Creek (172). Exhibit 2-1 provides a map of these faults lines located in Oregon and Northern California. Information from the USGS indicates that there could be many other unidentified fault lines along which earthquakes can occur.

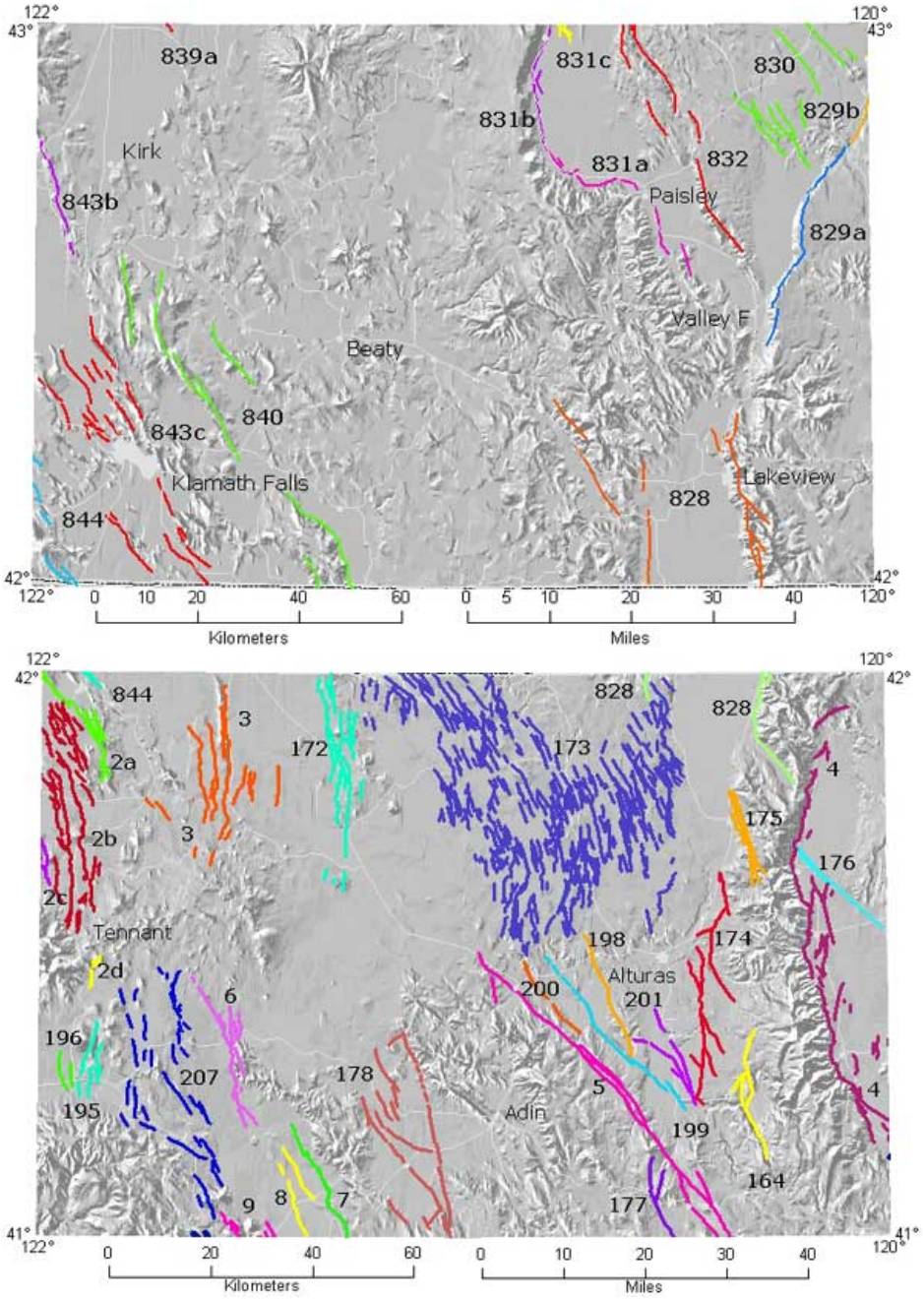


Exhibit 2-1
USGS Quarternary Fault and Fold Maps

Ground Shaking

The energy generated by an earthquake radiates out from the fault line, central point, or epicenter like ripples caused by a stone thrown into a pond. The waves cause the ground to shake. The closer to the epicenter, the more violent and vertical the ground shaking, and likewise, the farther from the epicenter, the less impact from the earthquake and the more rolling the ground shaking will be. The energy released from an earthquake produces both vertical and horizontal accelerations that can damage water system components. For example, elevated storage tanks can be susceptible to failure from tipping due to water "sloshing" from the ground movement. Or, a waterline without flexible joints adjoining a concrete structure can be subject to shear force, and failure. While the earthquake epicenter may not occur within city limits, the damage can still be significant, depending on the depth of the movement, distance from the epicenter, and the duration of the earthquake.

Liquefaction



This phenomenon occurs when the water particles located in the space between soil particles, gain pressure in excess of the frictional forces between the soil particles. The result is water-soil slurry that has reduced shear strength. Damage from such action can include foundation failure, differential settlement, lateral spreading, or floating of underground components. Liquefaction can also result in a loss of slope stability and lead to landslides. Soils where this is most likely to occur include loose, sandier soils, particularly with high water content. Fill sites are often subject to liquefaction.

Densification and Consolidations

Conversely, some soils can become denser from the ground shaking of the earthquake. Ground subsidence can occur as a result. Foundation and structural failures can occur and shear forces can impact pipelines.

Landslides

As noted earlier, landslides can occur as a slope loses it shear strength and stability. Typically, earthquake-induced landslides are the result of ground shaking or liquefaction.

Tsunami and Seiche

A tsunami is a tidal wave caused by an earthquake or volcanic explosion. A seiche is an oscillation of the surface of a lake or reservoir due to an earthquake. This phenomenon is similar to the "sloshing" that can occur in an elevated tank, but is transferred directly to the water body from the ground shaking in the surrounding land. A seiche can damage

dam inlet and outlet facilities or overtop dams, and lead to dam failure. Tsunamis and seiches are dangerous, high waves. They can also be caused by landslides, resulting from an earthquake. They can cause moderate to severe damage along coastal and shoreline areas.

2.2.2 Volcanic Eruptions

Volcanic activity occurs along the entire western coast of the United States. Most recently, Mt. St. Helens erupted in 1980 and 2004. All the volcanic peaks in the region have potential to turn active, although there is no known significant activity currently, other than Mt. St. Helens. The closest volcanoes to Klamath Falls, are Mt. Shasta and Medicine Lake in California and Crater Lake in Oregon. Crater Lake has not shown any recorded activity in the last 4000 years. Medicine Lake and Mt. Shasta are both recorded activity, but only Mt. Shasta has shown activity in the past 200 years. Hazards from eruptions can include explosive winds, pyroclastic flows containing hot gases, mudflows, falling rock, floods due to mud and snowmelt, and ash.

2.2.3 Flooding

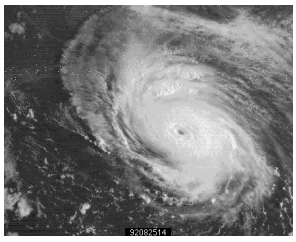


Klamath Falls is classified as a high desert area, receiving only 14 inches of precipitation annually. The greatest flooding event would be from flash flooding occasionally occurs as a result unusually intense rainfall that causes rivers, streams and drainages to overflow. In addition, floods can be caused by dam failure due to earthquakes, volcanic eruption impacts, tsunami and seiches. Rapid snowmelt, particularly when combined with high levels of rainfall, can also cause flooding. Flooding not only impacts facilities directly, it can prevent access for repair and maintenance and can lead to poor water quality when sources are compromised.

2.2.4 Hurricanes/Typhoons, Tornados, and Windstorms

While tornados typically impact areas with heavy winds, hurricanes and windstorms also bring rains, hail, and other extreme weather patterns. This weather can damage water system components which can reduce source availability or quality. The impacts of each storm type are briefly described below.

Hurricanes/Typhoons



For a storm to be named a hurricane (typhoon when occurring in the Pacific Ocean) winds must exceed 70 mph. Winds from hurricanes have been recorded as high as 200 mph. These storms also bring devastating rains as well. In the Pacific Northwest, these storms are extremely rare. Typhoons can be tracked by

radar, providing a relatively early warning system that aids in the conduct of various mitigation activities prior to a potential emergency condition. However, despite preparation afforded by an early warning, most above ground water system facilities are not built to withstand the forces these storms exert and will most likely still be susceptible to damage.

Tornados



Tornados devastate anything in the direct path of the storm funnel. Areas 100 feet from the funnel can be completely safe from damage. Therefore, damage is isolated to a relatively narrow swath. Unfortunately, these storms move in unpredictable patterns and sometimes materialize unexpectedly. However, most of time these storms can also be tracked by radar and warnings provided. Scientists theorize that winds in tornados reach 300 mph, but have little recorded data because wind gauges can't survive the strength of the winds. These storms also are very uncommon in the region area.

Windstorms



These storms are most often accompanied by rains and occasionally by hail or electrical storms. Winds of 50 mph or higher can occur. Most often temperatures are mild, but temperatures can drop below freezing as well. (Impacts from electrical storms and freezing conditions are discussed below.)

These storms typically knock out power when trees and limbs fall on power lines. This can impact operation of the water system to various degrees from transmission and through the distribution system. In addition, storms can impede staff from operating and maintaining the system when fallen trees and debris in the roadways prevent access to areas.

2.2.5 Other Severe Weather (Intense Cold, Ice, Snow, and Electrical Storms)



Occasionally, snow, freezing rain, and ice can prevent maintenance crews from accessing facilities needing repair or maintenance. This can occasionally impact water system operations, and the ability to perform routine maintenance and operational checks on system components.



The typical impact, caused by heavy snow or ice, is fallen trees and power lines and the associated debris on roadways or facilities. Occasionally, this area will experience temperatures below freezing for more than three days. This can lead to difficulty in operating

some facilities, valves and waterline leaks, and ruptured pipes at private residences. These impacts are usually temporary in nature.

Electrical storms have relatively the same impacts as storms that cause fallen trees. In extremely dry conditions electrical storms can also lead to fires. Occasionally electrical storms can cause power outages due to electrical strikes on transformers. Power outages can impact source, transmission and treatment facilities without standby or backup power supplies. Outages can also affect the ability to monitor and manage the facilities through a telemetry system.

2.2.6 Mudslides/Landslides

Mudslides and landslides can occur on unstable or steep slopes at anytime, but typically occur after extended periods of rainfall or due to earthquakes. In Klamath Falls those areas with steeper slopes are more prone to landslides. Breakage or blockage of lines can occur as the support around them gives way, or pulls them down with the surrounding earth.



2.2.7 Forest or Brush Fires

The City of Klamath Falls faces the treat of wildland/urban interface brush fires from large areas of undeveloped property and continuing construction in the interface zones in the City. If water supply is used in fighting these fires, supply can be strained.



2.2.8 Waterborne Disease

Outbreaks of parasites such as *Giardia* or Cryptosporidium are hazards to surface water systems. Groundwater systems that are under the influence of surface water can also be threatened by outbreaks of microbial and viral activity. However, under normal conditions the probability of such a threat to the City's distribution system is known. However, the impacts of storms and flooding could negatively affect the City's groundwater systems and, as such, should be considered during emergency preparedness planning.

2.3 Human-Caused Hazards

Along with the hazards described above, there are numerous other hazards caused by a variety of human activities. Human-caused hazards, both intentional and accidental, that impact the ability of a utility to supply safe drinking water are described below.

2.3.1 Hazardous Material Release

The definition for hazardous material used within this plan includes any chemical that can cause harm to humans through contamination of the water supply. Some chemicals that are used in water systems, such as chlorine, can be hazardous if an excessive concentration is reached. Spills of hazardous materials can occur from pipelines and any mode of transportation, including ships, boats, airplanes, cars, trucks, or trains. Spills can be liquid, solid, or gaseous. The more difficult releases to manage are typically liquid and gaseous spills. The most likely threat to the water supply is that of a liquid spill.

2.3.2 Structural Fires

Fire can impact a water system in a number of ways. If the fire is at a key water system location, such as a pump house or treatment facility, the ability to provide water will be impacted. Key computer control systems can also be affected by fire and may require repair before operations can return to normal. In addition, water supplies can be depleted due to firefighting efforts for a large fire involving a wide area of the City. Temporary short-term conservation measures may need implementation to meet all priority water consumption needs.

2.3.3 Construction or Transportation Accidents

System components can be, and often are, damaged when construction occurs near facilities. The most typical impact is damage to pipelines during construction activities. Facilities can also be damaged by transportation accidents. For example, elevated reservoirs or pump stations can be struck by motor vehicles or airplanes. Service can be curtailed if a system component is off-line due to a transportation or construction accident. These impacts are usually short in duration, with repairs usually made within 24 — 48 hours of the incident. The staff's ability to arrive at their place of work or to gain access to key facilities is another likely impact which can result from major transportation accidents. Major freeways or arterials may be closed down which may delay planned response actions. Again, these types of situations are usually handled within at least a 24-hour period, with the roadway made at least partially accessible or with detours identified.

2.3.4 Vandalism, Civil Unrest, and Labor Disputes

Vandalism and riots would most likely affect structural facilities, such as pump stations, treatment plants, dams, storage reservoirs, and City office buildings. There are a number of measures that can be taken to limit exposure to this type of hazard. Strikes of union operations staff can impact water service, but normally management employees can fill in on operational tasks until union issues are resolved. In most cases impacts will be temporary. However, physical damage to a facility could result in longer outages. In the event of union issues, access to facilities by union employees may be restricted to reduce the potential for damage. From a water system perspective, primary consideration should be given to how vandalism, protests, riots and/or strikes could block access to

transportation routes used by water system personnel. Normally, these types of events will not directly affect water system facilities, but may indirectly affect the ability to conduct maintenance or other operational tasks. A direct malicious threat to the water system will normally be referred to as terrorism.

2.3.5 Terrorism

Terrorism is a real threat. Prior to the international terrorist attack on the World Trade Center in New York City on September 11, 2001, this threat was considered less likely than local vandalism. However, the threat of such a hazard must be addressed seriously for the potential of supply contamination or damage to water facilities. Additionally, local terrorism, including "copycat" events, may potentially pose a threat to Klamath Falls. In addition to destruction of facilities, release of chemical or biological agents into the water system is a hazard.

2.3.6 Computer System Failure or Attack

Computer failure can occur from widespread or isolated electric outages. As noted above, this can impact operation of instrumentation and controls, and ultimately the functioning of facilities. Again, with power out, additional staff resources are required to manage the system manually.

One example of potential computer system failure is the Y2K situation. Agencies responsible for a variety of services upgraded systems in order to avoid errors and possible failure of computer systems.

Another real hazard to any computer system used to manage, monitor, or maintain records are computer virus and hacker attacks. These attacks can prevent a system from functioning temporarily, or can completely wipe out entire systems. There is also the potential to malevolently operate the system without destroying it. These threats are real and unpredictable. The City's vulnerability assessment discusses measures to protect the system from these types of threats.

2.3.7 Nuclear Power Plant Accidents, Nuclear Explosions, and "Dirty Bombs"

An accident at a nuclear power facility could potentially release airborne radiation, with effects on personnel, water sources, and facilities in the downwind direction. The nearest nuclear facility is at Hanford, in south central Washington. Usual prevailing winds would not pose a threat to Klamath Falls's water supply.

Another type of potential nuclear hazard is contamination by detonation of nuclear devices at facilities such as Bangor Nuclear Submarine Station in Bremerton, Washington or possibly nuclear warheads at Fort Lewis or McCord Air Force Base south of Seattle, WA. While such possibilities are remote, the utility must be prepared to respond to such an emergency.

A “dirty bomb” combines a conventional explosive, such as dynamite, with radioactive material. In most instances, the conventional explosive itself would have more immediate lethality than the radioactive material. At the levels created by most probable sources, not enough radiation would be present in a dirty bomb to kill people or cause severe illness. For example, most radioactive material employed in hospitals for diagnosis or treatment of cancer is sufficiently benign that about 100,000 patients a day are released with comparable levels of material in their bodies.

However, certain other radioactive materials, dispersed in the air, could contaminate up to several city blocks, creating fear and possibly panic and requiring potentially costly cleanup. Prompt, accurate, non-emotional public information might prevent the panic sought by terrorists using these types of explosive devices. The water system’s operators should be prepared to isolate and limit potential exposure of radiation by covering and closing all potential pathways, either existing or event driven, to the distribution system and other key treatment and storage facilities.

2.4 Summary of Hazard Analysis

Given the various types of hazards a water utility must address, an estimate of the likelihood of occurrence that would directly impact the City’s water system was made. Table 2-1 presents the hazards described above with the estimate of likelihood within Klamath Falls’ water service area. The estimate is relative and based on general common knowledge of storm systems and weather patterns, past history regarding the City's vulnerability to earthquakes, geological information, landslide data, pertinent maps of the Klamath Falls area, and the consultant’s interpretation of this data. None of the hazards described above are deemed to be of a high probability for the City's water system.

Those hazards that are identified as having a low – moderate or moderate probability of occurring in the Klamath Falls area are considered along with potential impacts to critical operational components of the system.

Table 2-1 City of Klamath Falls Hazard Analysis		
Type of Hazard	**Estimated Probability**	**Comments**
Natural Hazards		
Earthquake Fault rupture	Moderate	Klamath Falls sits directly over the Klamath Graben fault system
Ground shaking	Moderate	3.0 – 6.0 typical
Liquefaction	Low – moderate	7.0 – 9.0 unlikely
Densification	Low	Alluvial till
Landslide	Low	
Tsunami and seiche	Very low	No critical facilities below dam or along the lakeshore
Volcanic eruptions	Low	Low volcanic activity in the immediate area
Hurricane/Typhoon	Very low	
Tornados	Very low	
Wind	Moderate	
Floods	Low-moderate	The Conger Wellfield is susceptible to flooding
Other severe weather Lightning Snow or ice	 Low Moderate	
Mudslides/Landslides	Low	
Waterborne diseases	Low	All sources are groundwater
Human Caused Hazards		
Hazardous-material release/spill	Low	Minimal industrial activity around wellheads. An impacting spill would likely be intentional.
Chlorine Injection	Moderate	
Other Spills	Low	
Structure fires	Moderate	
Construction accidents	Moderate	
Transportation accidents Road	 Low-moderate	Very few water facilities are located on high traffic roadways. The Conger Wellfield is located adjacent to a two lane road where the potential for a transportation spill exists.
Rail	Low	
Water	Low	
Air	Low	
Computer failure or attack	Very low	
Vandalism, Riots and Strikes	Low	
Terrorism	Low	Addressed in detail in Vulnerability Assessment
Nuclear power plant accidents	Very Low	
Nuclear bomb explosions	Very Low	

Section 3
Potential Vulnerabilities of System Components

3.1 Introduction

In this section the vulnerability of major components of the City's water system is addressed. The vulnerability assessment presented is a two-step process. First, key components of the water supply system potentially impacted by hazards described in the previous section are identified. Secondly, after identifying each system component, an estimate of the potential impacts if that component is compromised.

3.2 Water System General Description

The City relies on fourteen groundwater wells at nine different locations for 100% of its supply. The Conger Complex Wellfield, produces 70% of the City's water through five existing wells. The nine remaining wells, located throughout the distribution system produce the remaining 30% of supply. Some of these wells are relatively isolated and serve a specific portion of the service area.

The existing water system can be divided into two distinct sections: the Main System and the Stewart Lennox System. The main system is comprised of Zone 1, the lowest elevation and largest zone in the water system, and several outlying smaller zones at higher elevations that are served through Zone 1.

Zone 1 in the main system is supplied primarily from Conger Complex Wellfield and some smaller wells. Of the systems twenty-two storage reservoirs, nine serve Zone 1. Several outlying smaller zones at higher elevations are supplied from Zone 1 through booster pump stations. These smaller zones and subzones are located around the periphery of Zone 1 and are typically isolated from each other in a "hub and spoke" configuration. Some of the small subzones have separate reservoir storage. Some very small isolated areas are served only from booster pumps or PRVs and have no storage.

The existing Stewart Lennox system is located on the west side of the City and is hydraulically isolated from the remainder of the distribution system. The system is supplied from two wells located within its service area, and has its own storage reservoir.

The existing total water distribution system includes 265 miles of distribution pipelines and twenty-two storage reservoirs. Appendix A includes a system map and hydraulic profile of the water system. Appendix B includes site diagrams of water system facilities

3.3 System Vulnerabilities

The vulnerabilities of the system's major components to natural and human-caused hazards are summarized in the following sections. In considering these vulnerabilities the system has been divided into the following subcategories: personnel, source of supply, storage tanks and reservoirs, pump stations, transmission and distribution system, electric power, transportation, communication records, and instrumentation and controls.

3.3.1 Personnel

Aside from access to clean water, personnel are the most important resource for any water system. City crews maintain, operate, and repair facilities that provide water to the customers. Management manages the system and leads emergency efforts. Management can also assist in routine duties when necessary. The staff's ability to carry out their responsibilities is dependent on measures taken for personnel safety and to allow unhindered access to system components. Many of the hazards previously described can cause serious injuries to staff, customers, and, in some cases, innocent bystanders. Others may result in substantial destruction of personal property, such as homes, cars, and other structures. Roadways can have blockages from debris and damage caused by flooding, earthquakes, volcanic eruptions, and/or mudslides. Also, hazardous spills can close roadways for hours. In these situations, staff access to facilities, or ability to get to work, can be impacted. In addition, vandalism to either the buildings that house facilities and supplies or to vehicles can also impede the ability to perform routine duties.

In the case of storms causing power outages and roadway blockages, staff will be required to manually operate some system components but may have limited access to them due to road conditions. Depending on access to components, the impact to the system will vary. Situations with multiple impacts must be considered in developing preparedness plans and will be discussed in greater detail in Sections 4 and 5.

3.3.2 Source of Supply

The five wells comprising the Conger Wellfield, which provides approximately 70% percent of Klamath Falls's water is susceptible to natural and manmade events and conditions that could affect water quantity and quality. Natural events include earthquakes, landslides, flooding, vandalism and terrorism. These events could all affect the reliability of the water supply. The nine remaining wells, located throughout the distribution system produce the remaining 30% of supply. Some of these wells are relatively isolated and serve a specific portion of the service area and vulnerable to the same hazards as the Conger Wells.

3.3.3 Storage Tanks and Reservoirs

Due to the hydraulic complexity of the system the City operates twenty-two storage reservoirs. The storage capacity of the reservoirs is 16.3 million gallons. The reservoirs range in size from 0.12 to 1.47 million gallons. Based on summer demands the detention

time in some reservoirs is very short, some reservoirs may turnover more than once a day during high demand periods. Many of these facilities are located in remote locations and on or below hillsides. These facilities would be vulnerable to earthquake, landslides, vandalism and terrorism. Because of the small size of many of the reservoirs and the sole source of storage for certain areas the loss of a facility could restrict fire fighting activities. Power to some facilities may be vulnerable to weather conditions as well.

3.3.4 Pump Stations

In addition to the reservoirs the system includes twenty-three booster pump stations. The booster stations are located at key locations throughout the distribution system and are used to fill reservoirs and provide adequate system pressure to customers at higher elevations or more isolated outlying reaches of the system. The system also includes sixteen pressure regulating stations operated to reduce service pressure in lower elevations served by higher elevation storage.

The Utility uses a unique below grade vault design for pump stations. The design of these facilities makes them potentially vulnerable to flooding, vandalism and terrorism. Some facilities may also be vulnerable to loss of power during fire or weather conditions.

3.3.5 Transmission and Distribution System

The existing total water distribution system includes 265 miles of distribution pipelines ranging in size from 2-inch to 20-inch in diameter. The transmission and distribution systems are susceptible to both manmade and natural disasters such as vandalism/terrorism, contamination, erosion, earthquake, and material failure. To reduce the number of breaks to the system, standards for pipeline construction and materials have been established and must be followed. In addition, standards are in place to require the strategic placement of valves and looping lines so broken pipes can be isolated while continuing water service.

3.3.6 Electric Power

Electrical power is required for operation of the City's water system. It powers the pumps, instrumentation, and controls. Currently there are permanently installed diesel powered generators at Conger Wellfield and at the Wocus Well that can provide emergency power to a total of 4 wells capable of producing up to 8900gpm under full load for a minimum of 24 hours without refueling. Wide spread loss of power could reduce production and transmission depending on the duration of power loss. The result and impact would be similar to that described above for loss of supply and transmission, with need for emergency demand reductions and re-routing of supply, depending on which systems are affected. Fire flow could also be reduced in effected areas.

3.3.7 Transportation

Earthquake or floods can affect roadway infrastructure directly, or bridges can be

vandalized or damaged through acts of terrorism, or damaged in floods. Any damage to roadways limits staff access to facilities for maintenance and operations, particularly in times of emergencies. Impacts due to hazards of this nature cannot be easily quantified, except to note there is potential limitation to facility access if this type of emergency occurs. Additionally, roadway blockages caused by storms can limit access to system facilities and can impede system operations. Appendix C includes maps of alternative access to Klamath Falls's critical facilities from the operations center.

Vehicles can be affected by, floods, fire, vandalism, debris falling during storms, and ash from volcanic eruptions. The same impact occurs, where some limited access to system facilities can occur. However, alternative transportation can be obtained. Therefore, impact in this area is more manageable and less severe to service and system operation.

Hazards most likely to impact the Maintenance Facility and access to supplies include structural fire, vandalism/terrorism, storms, and earthquakes. The water system can operate independent of this facility except that telemetry could be impacted. This in turn, could result in the need for manual adjustment of system components for flow. However, access to supplies for repair and maintenance could be temporarily limited by any of the noted hazards. Hazardous material spills also have potential to occur at this site, which could also temporarily limit access to information and supplies. Appendix C includes primary and alternate directions to Utility facilities from the Maintenance Yard.

3.3.8 Communication Records

Impacts to communications are similar to those for electrical power systems. Communication wires for telephones can be damaged as a result of storm damage. Today, with cell phones, two-way radio and email, other modes of communication limit the impacts of any one system from most of the hazards noted above. However, if a large storm or earthquake occurs, and causes multiple impacts (mudslides, flooding, communications line damage) or multiple hazards occur at once (a computer virus affecting email and a storm affecting telephone communications, including cell phones) the impacts could be greater. In this case, staff resources could be affected because it could require reporting in person to a central location to share information about facility operational status in order to manage the system properly.

If facilities containing records are damaged, records may also be damaged or lost. In most cases there would be little impact relating to supply of safe drinking water. The same types of hazards as those noted above for transportation would apply to records.

One other component to communication is the computer network that provides internal and external communication as well as maintaining continuity in system control. These systems are susceptible to failure from power outages caused by any of the hazards, but more recently a new and real threat is cyber attacks. Network hacking, unauthorized use, viruses, etc. can limit access to system information on one or all connected computers. Malicious activity involving the Utility's computing networks can result restrict or preclude staff from using or controlling control systems until network integrity is

reestablished and some or all network components are repaired or replaced.

3.3.9 Instrumentation and Controls

Instrumentation and controls are essential to efficient operation of integrated, modern water systems. While system components can operate when the telemetry system is off-line for any of the reasons described above, manual operation and management is required. Manual operation takes additional staff resources and sometimes a greater level of system knowledge to safely and properly operate the system. In some cases, it may be necessary to use alternate modes of operation to accommodate such outages. Because of the remoteness the instrumentation and controls for some facilities may be vulnerable to vandalism and terrorism as identified in the *2004 Security Vulnerability Assessment.*

3.4 Summary

This section of the WERP has identified vulnerabilities of Klamath Falls's water system to those hazards noted in Section 2 as either low-moderate or higher in probability of occurrence. Critical system components and impacts of their failure were identified, as well as general impacts from hazard generated emergencies. The next section presents structural mitigation measures the City can take in proactively preparing for these potential hazards and the impacts caused by emergency situations they generate.

Section 4
Vulnerability Mitigation Plan

4.1 Introduction

A mitigation plan lays out various measures the Utility can take to ensure the safety and continuous operation of the water system. In this section proactive actions are described to enable the Utility to minimize impacts to the water system due to natural and man-made hazards noted earlier. A mitigation plan includes three elements: prevention, protection, and mitigation actions. One-hundred percent prevention of the hazards described is virtually impossible. Earthquakes occur with little warning. Occasionally 24-hour notice may be given for severe weather patterns as they develop, including flooding. Riot or civil demonstrations can turn in a matter of an hour and terrorist activity will occur without warning.

The Utility's Emergency Response Plan identifies specific measures that can be taken for each type of hazard generated emergency. Protective measures are those actions that can be taken proactively, prior to the hazard, to minimize potential damage. Protective measures of critical components can be quantified. Suggested protective measures are identified below. Lastly, if a critical component is lost, or temporarily out of service, the Utility can take steps to mitigate the consequences resulting from the loss of a critical facility. These activities and operational protocols can enable the Utility to continue to meet demand while repairs are made. Since hazards and resulting water emergencies can not be prevented, mitigation is an essential element of emergency response. Training programs, resources, and personnel related issues, which are another form of water system mitigation, are presented in Section 5.

4.2 Mitigation Actions by Critical Components

There are many critical components to continuous operation of a water system. The following facilities have been identified as most critical to water system operations. These components are listed below in order of priority:

Table 4-1 provides a list of critical components categorized by facility type. A description is provided for each component along with their vulnerability to natural hazards and a mitigation plan or action to reduce these vulnerabilities. On-site inspections of facilities were not conducted as part of this assessment.

Table 4-1 City of Klamath Falls Mitigation Plan			
System Component	**Description**	**Vulnerability**	**Improvements or Mitigating Actions**
Source			
Conger Well Field	Located on bank of Link River. Five wells developed between 1926 and 1992. Well depth ranges from 370-830 ft.	Flood Earthquakes Hazardous Spill Vandalism Terrorism	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
Debbie Well	Drilled 1987 at depth of 380 ft. Capacity of 0.6 mgd.	Earthquakes Hazardous Spill Vandalism Terrorism	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
Balsam Well	Drilled 1989 at depth of 438 ft. Capacity of 0.4 mgd		Improvements identified as part of 2004 Security Vulnerability Assessment.
Wocus Well	Drilled in 1991 at depth of 530 ft. Capacity of 1.1 mgd.		
Moyina Well	Drilled 1961. Not in use.		
Fremont Well	Drilled in 1961 at depth of 701 ft. Capacity of 1.6 mgd.		
Henley Well	Drilled in 1993 at depth of 155 ft. Capacity of 0.5 mgd		
Homedale Well	Drilled in 1981 at depth of 427 ft. Capacity of 0.6 mgd.		
Unity Well	Drilled in 1977 at depth of 1000 ft. Capacity of 0.5 mgd.		
Hilyard Well	Drilled in 1993 at depth of 732 ft. Capacity of 1.0 mgd.		

Table 4-1 (Continued) City of Klamath Falls Mitigation Plan			
System Component	**Description and Service Zone**	**Vulnerability**	**Improvements or Mitigating Actions**
Storage Reservoirs			
Lower Lynnewood	0.15 MG capacity; Zone 1	Earthquakes Landslides Vandalism Terrorism	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
North	0.50 MG capacity; Zone 1		
Center #1and #2	0.78 MG capacity (each); Zone 1		
Melrose	0.76 MG capacity; Zone 1		
Bowen	1.45 MG capacity; Zone 1		
Ogden	1.02 MG capacity; Zone 1		
Hilyard	1.04 MG capacity; Zone 1		
Burns	1.3 MG capacity; Zone 1		
Lindley	0.51 MG capacity; Zone 2		
Upper Lynnewood	0.15 MG capacity; Zone 2		
Prescott	1.47 MG capacity; Zone 2		
Stewart Lennox	1.24 MG capacity; Zone 2		

Table 4-1 (Continued) City of Klamath Falls Mitigation Plan			
System Component	**Description and Condition**	**Vulnerability**	**Improvements or Mitigating Actions**
Uhrman	1.32 MG capacity; Zone 3	Earthquakes Landslides Vandalism Terrorism	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
Hospital	0.50 MG capacity; Zone 3		
High Level	0.40 MG capacity; Zone 3		
Patterson #1	0.40 MG capacity; Zone 3		
Patterson #2	1.32 MG capacity; Zone 3		
Moyina	0.13 MG capacity; Zone 3		
Upper Moyina	0.29 MG capacity; Zone 4		
Basin View	0.52 MG capacity; Zone 5		
Tanglewood	0.29 MG capacity; Zone 8		
Booster Pump Stations			
Lynnewood.	Two 160 gpm pumps controlled by Upper Lynnewood Reservoir water level	Earthquakes Vandalism Terrorism Fire	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
Ogden	Lead station with one 215 gpm and one 430 gpm pump controlled by Patterson Reservoir level.		
Melrose	One 425 gpm pump controlled by Melrose Reservoir level.		
Burns	1000 gpm pump controlled by Burns Reservoir water level.		

Table 4-1 (Continued) City of Klamath Falls Mitigation Plan			
System Component	**Description and Condition**	**Vulnerability**	**Improvements or Mitigating Actions**
Washburn	Three 3200 gpm pumps, 6400gpm firm capacity controlled by Bowen Reservoir water level. In the summer works with South 6th and Dayton Station.	Earthquakes Vandalism Terrorism Fire	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
West Oregon	One 50, one 200 and one 600 gpm pump. Controlled by discharge pressure. Pumps to zone without storage.		
Patterson	Two 750 gpm pumps controlled by Basinview Reservoir water level. Not currently in use.		
Moyina	One 500 gpm and one 250 gpm pump controlled by Upper Moyina Reservoir water level.		
Havencrest	One 150 gpm, one 225 gpm, and one 375 gpm pump controlled by discharge pressure. Station pumps to zone with no storage.		
South 6th/Dayton	Two 1000 gpm pumps controlled by Ogden Reservoir water level.		
Beverly	Lead station with two 750 gpm pumps controlled by Patterson Reservoir water level.		
Tanglewood	Two 290 gpm pumps controlled by Tanglewood Reservoir water level.		
Lytton	Two 700 gpm pumps controlled by Prescott Reservoir water level.		
High Level	One 225 and one 425 gpm pump controlled by High Level Reservoir water level.		
Riverside	Two 440 gpm pumps controlled by Lindley Reservoir water level.		

Table 4-1 (Continued) City of Klamath Falls Mitigation Plan			
System Component	**Description and Condition**	**Vulnerability**	**Improvements or Mitigating Actions**
		Earthquakes Vandalism Terrorism Fire	Improvements identified as part of 2004 Security Vulnerability Assessment and Water Master Plan.
Center	One 140 and one 200 gpm pump manually operated.		
ESI	One 60, one 250, and one 1500 pump controlled by discharge pressure. Pumps to zone without storage.		
Crown Ridge/Quail Ridge	Five pumps of 160, 600, 80, 240, and 430 gpm controlled by discharge pressure. Pumps to zone without storage.		
Electric Power		Vandalism Terrorism Flooding Earthquakes	
Communication Records		Flooding Earthquakes Landslides Fire	
Instrumentation and Controls		Earthquakes Landslides Fire	SCADA review conducted as part of 2004 Vulnerability Assessment.

Section 5
Emergency Response Planning

5.1 Introduction

The purpose of preparedness planning is to be prepared for any type of emergency that may impact water system operations as a result of a natural or human-caused hazard. This ensures that the Utility can maintain or return services to full operational condition at the soonest possible opportunity. The steps that should be taken to respond effectively to emergency situations include the following:

- Notification
- Confirm and analyze the type and severity of the emergency
- Take immediate actions to save lives
- Take action to reduce injuries and system damage
- Make repairs based on priority demand
- Return the system to normal operation

An effective emergency response plan includes a framework that provides utility staff the knowledge and tools required to efficiently handle emergency events. The inherently chaotic nature of emergency events demands a plan that allows staff to react in as timely a manner as possible. The main topics included within this Emergency Response Plan include the following and are discussed in greater detail in subsequent sections.

- Emergency Response Mission and Goals
- System Information
- Chain of Command – Lines of Authority
- Severity of Emergencies
- Emergency Notification
- Notification Procedures
- Water Quality Sampling
- Effective Communication
- Response Actions for Specific Events
- Alternative Water Sources
- Curtailing Water Use
- Returning to Normal Operation
- Plan, Implementation, and Practice

5.2 Emergency Response Mission and Goals

The Utility's ERP was established to provide guidelines for Utility personnel to follow in case of an emergency. The purpose of the plan is to protect life, health, and property and maintain health and safety services to the maximum extent possible. The actions identified within the Utility ERP are intended first to protect life and property and to minimize damage as much as possible. The secondary focus is to return impacted services to full operations as soon as possible.

5.3 Chain of Command – Lines of Authority

Table 5-1 provides a summary of the chain of command and their associated roles and responsibilities during an emergency event.

Table 5-1
City of Klamath Falls
Chain of Command – Lines of Authority

Title	Responsibility During an Emergency
Public Works Director	Responsible for overall management and decision-making for the City's public works facilities.
Water Division Manager	Responsible for operations management for the City's public works facilities.
Operations/Infrastructure Supervisor(s)	Responsible overall management and decision-making for the City's water system.
Operations Supervisor (Water Quality)	Responsible for managing source and distribution system water quality.
Operations Supervisor (Infrastructure)	In charge of water system operations.

5.4 Severity of Emergencies

This ERP stipulates the order and priority under which actions should be taken under emergency conditions. Essentially, life threatening situations are addressed first. Then situations in which personnel or citizens are injured or the potential for injury is high are addressed. Attention must be paid to priority water service customers. These would be customers on dialysis, hospitals, and other customers where lack of water can pose a potentially life threatening situation. Appendix D provides a form for the Utility to use in identifying these customers by address. This list should be updated periodically. Then, when an emergency occurs, those Utility staff handling this aspect of the response can utilize the list of priority locations for water service. Priority for addressing these customers should be added to the step by step procedures documented in the ERP.

The severity of the emergency should be categorized into one of the four levels shown below:

- Level I (Routine Emergency)
- Level II (Minor Emergency – Alert Status)
- Level III (Significant Emergency)
- Level IV (Catastrophic Disaster/Major Emergency)

A brief discussion of each is presented in the sections below.

Level I (Routine Emergency)

This level of emergency can be categorized as a situation that involves minimal outside assistance. The situation is also not likely to cause public health problems and the risks of personal injury are relatively small. Normally this type of problem can be solved in less than 24 hours. Examples of a Level I emergency include distribution line breaks, short power outages, and minor mechanical problems.

Level II (Minor Emergency – Alert Status)

The system experiences minor disruption in supply and may require coordination with outside agencies. The risk to public health is elevated. These events can usually be resolved in less than 72 hours. Examples of a Level II emergency include transmission main line break, storage not adequate to handle disruption in supply, positive coliform or E. Coli sample, or disruption in disinfection capabilities.

Level III (Significant Emergency)

The system experiences a major disruption in supply or a contamination event that requires significant external coordination and issuance of a health advisory. The risk to personal injury and general public health is high. Significant emergencies take longer than 72 hours to resolve. Examples of a Level III emergency include verified coliform sample requiring a public health advisory, an act of vandalism or terrorism that causes significant damage to a primary facility, or a severe disruption in supply resulting from problems with key facilities such as a transmission line break or storage tank failure.

Level IV (Catastrophic Disaster/Major Emergency)

An emergency of this magnitude requires immediate notification of law enforcement and local and other emergency management services to aid in efficient response actions. Effective communication with the customers is necessary to prevent injury or loss of life. These events can take several days or weeks to resolve. Examples of a Level IV emergency include disruption of groundwater due to earth shifts resulting from an earthquake, a severe act of terrorism resulting in contamination of the system with life-

threatening chemicals or biological activity, or a large scale hazardous material spill near the system's well(s).

Table 5-2 provides a matrix that identifies the likely level of severity of the hazards identified as both likely to occur in the Utility service area and likely to impact the water supply system components. This matrix was used to identify the most pertinent emergency events for which specific response actions are developed in Section 5.

Table 5-2
City of Klamath Falls Water Utility
Estimated Severity Level of Identified Hazards

Hazard (low-moderate or moderate probability; significant impact) / Severity Level	Earthquake	Severe Storm	Waterborne Disease	Hazardous Material Release	Structural Fires, Construction / Transportation Accidents	Vandalism / Terrorism
Level I (Routine)	■	■	■	■	■	■
Level II (Minor – Alert Status)	■	■	■	■	■	■
Level III (Significant)	■	■	■	■		■
Level IV (Catastrophic/Major)	■					■

When assessing the severity of an emergency, it is critical that all available information about the situation be collected and considered in the assessment. Appendix E provides tools and procedures for collecting and documenting information in an emergency.

In the early stages of an emergency effective response depends on critical staff understanding and carrying out their assigned roles. Specific actions are assigned to each staff group in the Emergency Response Checklists included as Appendix F. These checklists can be used to verify that critical responsibilities have been addressed during an emergency. Checklists are provided for the Public Works Director, Water Division Manager, Operations/Infrastructure Supervisor(s), Operations Supervisor (Water Quality), Operations Supervisor (Infrastructure), and other support staff. Generally, the checklist items should be implemented in the order in which they appear in this document; however, the sequence of notifications or actions that occur will vary depending on the circumstances.

An Emergency Response Decision Tree (Appendix F) has been developed to assist primary contacts in determining the type and severity of an event, appropriate

notifications and immediate actions that are warranted by an emergency. The decision tree is designed for use by primary contacts; however, any person attempting to initiate the response should use the decision tree to determine the appropriate order of notifications and actions that should take place.

Finally, a Discovery Checklist and a System-wide Emergency Checklist (Appendix F) provide initial instruction to any Utility employee who first discovers an emergency situation. This Discovery Checklist is designed to guide immediate response to a potential emergency they may become aware of during routine duties, such as a transmission line break or evidence of a security breach at a facility. The System-wide Emergency Checklist is designed to provide guidance for response to a large scale, regional emergency, such as an earthquake or other natural disaster. Such events disrupt normal communications, transportation and other infrastructure, and require a cohesive response from on- and off-duty personnel. These checklists should be distributed to all employees and posted as appropriate throughout Utility facilities.

5.5 Emergency Notification Call-up List

The sequence of notification is provided in Appendix G, Table G-1 (Public Water Section Call-up List). A copy of this list should be kept at the following locations: City Maintenance Center, Public Works Dispatch, and City Fire and Police Departments.

In the event of an emergency, additional personnel should be assigned as deemed necessary by the supervisors. A summary of emergency notification lists is presented in Table 5-2. These lists should be referenced and used based on the type of experience and level of effort required. Different emergency situations will require special resources. The ability to notify and make use of the proper resources in a timely manner is imperative for an organization's emergency preparedness; thus, the contact lists are intended to increase the Utility's ability to respond rapidly and efficiently.

5.6 Notification Procedures

The proper notification procedures are dependent on the severity of emergency encountered. Table 5-4 provides a matrix of who and when to call based on the initial assessment of severity.

Priority Service Customer List

A Priority Service List (Appendix D) is recommended to protect individuals and/or organizations that depend on an uninterrupted supply of water and/or have strict water quality requirements. Possible candidates for this service include individuals on home care kidney dialysis equipment, medical facilities, and organizations requiring uninterrupted water for specialized commercial or industrial processes.

Table 5-3 City of Klamath Falls Additional Notification Lists	
Notification List	**Table Location**
Public works employees with knowledge of water system or communications.	Appendix G, Table G-2
City Water Department	Appendix G, Table G-1
Night Shift	Appendix G, Table G-3
Regulatory Contacts	Appendix G, Table G-4
Others	Appendix G, Table G-5

Public information and education concerning priority service is important so those in need of continuous water service know that they can contact the Utility and request that they be included on the list. Locations currently identified for this list include:

- Sky Lakes Medical Center
- Sky Lakes Cancer Treatment Center
- DaVita Klamath Falls Dialysis Center

In addition, the City Public Works Department has on file a list of individuals who require priority service. A warning marker is attached to the water meter warning staff not to discontinue service for these residents (See Appendix D).

Regulator and Public Notification

The Water System Supervisor or designee should immediately notify the Klamath County Department of Health at (541) 883-1122 and the Oregon Department of Human Services Drinking Water Program at 541-776-6229 ext. 284 if:

- A water shutdown is threatened or required for more than 24 hours
- Water quality is determined to be unacceptable, or
- A public health risk associated with the water system is detected.

Events requiring an immediate response by the police or fire departments may involve public water systems and pose a threat to the quality or quantity of drinking water. Examples of events of this kind include a chemical spill near a water source, intrusion, vandalism, terrorism, a fire in WTP, or a pump house. In these cases, the person(s) observing the event should call 9-1-1 any time day or night.

Other events not requiring an immediate response by the police or fire departments could affect public drinking water. Examples of these events are suspected water-borne disease outbreaks or disruptions of water system treatment/supply due to equipment failure. Whether or not the event requires an immediate response by the fire or police departments, if there is a known or suspected threat to a public water system, the person

Table 5-4 City of Klamath Falls Notification Matrix		
Level of Severity	**Personnel to Notify**	**When to Notify**
Level I (Routine Emergency)	First Responder	Immediately
	Other as required	Immediately
	Water Division Supervisor(s)	At the earliest opportunity during work hours
	Water Division Manager	At the earliest opportunity during work hours
Level II (Minor Emergency)	First Responder	Immediately
	Other as required	Immediately
	Water Division Supervisor(s)	Immediately
	Water Division Manager	At the earliest opportunity during work hours
	Public Works Director	At the earliest opportunity during work hours
Level III (Significant Emergency)	First Responder	Immediately
	Water Division Supervisor(s)	Immediately
	Other as required	Immediately
	Water Division Manager	Immediately
	Public Works Director	Immediately
	Public Officials	As soon as reasonably possible
Level IV (Catastrophic Disaster/ Major Emergency)	Water Division Supervisor(s)	Immediately
	Water Division Manager	Immediately
	Other as required	Immediately
	Public Works Director	Immediately
	Public Officials	Immediately

observing the event should contact the emergency phone numbers as soon as possible after contacting any emergency services.

If the caller cannot contact any of the emergency phone numbers, the caller should contact the Oregon Health Authority, Drinking Water Program:

Drinking Water Program
(8:00 am to 5:00 pm, Monday through Friday) **(971) 673-0405**

Drinking Water Program
(after normal business hours or on weekends and holidays) **(800) 452-0311**

The person observing the event should be prepared to give the following information when they call:

- The name, address, phone number, and present location of the person(s) observing the event.

- Type of incident (i.e., toxic spill, radiological incident, ruptured main, interruption of treatment, or other emergency disruption of a public water supply.), substance spilled (if spill), magnitude of incident, and number of injured or contaminated persons.
- The exact location of the incident.
- The time frame between the incident and the point when it was recognized.
- The date of the incident.
- The recognized or perceived threat to the water system and/or user.

Contacting the emergency phone numbers or the Drinking Water Program as soon as possible is critical because technical assistance to protect your drinking water can be provided until the situation returns to normal.

The Public Notification Rule revisions were implemented in June 2002. Included in these changes was a reduction in the time (from 72 hours to 24 hours) A utility is required to notify its customers of a Tier 1 violation. Tier 1 violations include fecal coliform-positive samples, failure to confirm a positive total coliform for fecal coliform bacteria, maximum contaminant level (MCL) violation for nitrates and waterborne disease outbreak. The Utility has developed a series of templates and fact sheets that include all required language. These fact sheets are available from a database and can be prepared within minutes of implementing the emergency procedures. Fact sheets are included in Appendix H.

The Media

Notifying customers through newspaper, radio, or television announcements may, in some cases, be the most efficient means of communication. The emergency response plan includes basic information for contacting the media, including phone numbers and contact persons. These media Outlets and contact numbers are shown in Table 5-5.

5.7 Effective Communication

A key spokesperson should be identified as the lead person for information sharing and communication with both the media and the public in general. At Klamath Falls the designated utility spokesperson is the Water Division Manager. The Public Works Administrative Assistant will lead the tasks of public notification, media interviews, and development of public notice announcements.

The following basic elements must be included in a public notice as a minimum; however, the details will vary according to the situation.

- Who (the utility or notifying agency).
- What (the nature of the violation).
- When (the time of the MCL violation or the date when a variance and/or exemption was granted).

Table 5-5 City of Klamath Falls Media Outlet Contact Numbers		
Media Outlet	Phone Number	Fax Number
Herald & News	541-885-4410	541-885-4456
KOTI Television	541-882-2222	541-883-7664
KDKF Television	541-883-3131	541-883-8931
KAGO Television	541-882-2551	541-883-6141
KFLS Radio	541-882-4656	541-884-2845
KLAD Radio	541-882-8833	541-882-8836
Charter Cable Television	No local number	541-884-4270

- Regulating authority
- Regulation involved (the standard involved and the related OAC number)
- Health significance (possible health effects involved).
- Precaution to be taken (actions to be taken by the consumer, such as boiling water).
- Action by water system (corrective measures that are proposed).

Appendix H provides sample notices as examples of proper format of a public health notice.

Section 6
Emergency Response Procedures

6.1 Introduction

The purpose of this section is to prepare operators to control the impact of any type of emergency that may affect water system operations as a result of a natural or human-caused hazard. This assists utility staff in maintaining or returning services to full operational condition at the soonest possible opportunity. The steps that should be taken to respond effectively to emergency situations include the following:

- Take immediate actions to save lives and reduce injuries
- Confirm and analyze the type and severity of the emergency
- Evaluate damage to the system and potential for contamination
- Isolate damaged facilities of the system and/or contaminated areas
- Notify water users and regulatory agencies with information regarding damage to the system and potential for contamination
- In contamination of water occurred, provide water users with a boil water advisory pamphlets, contaminant type, indication of disease, action taken by the Utility, etc.
- Repair damaged water system components and provide emergency disinfection of the contaminated system areas.
- Perform water quality sampling
- Notify water users that contamination of the system does not exist, and
- Return the system to normal operation

6.2 Response Actions for Specific Events

Since disasters or attacks on water systems cannot be eliminated completely, operators must be prepared to control the impact of such events on the water source and system infrastructure. Emergency response measures include isolating the contaminated area of the system, disinfecting the system, and boil water advisories.

Although the goal of this ERP is to prepare Utility staff to implement a unique response to any emergency, it is useful to develop a detailed response for several types of emergencies that might occur in the service area. The events detailed in the emergency response scenarios provided below were chosen based on the analysis of probability of occurrence of each hazard, vulnerability of system components to the hazard, and the likely severity of impact of the hazard on the system.

The scenarios presented in this section are intended to simulate a Level II or Level III emergency. It is assumed that preparation for these levels of emergency will adequately prepare Utility staff to respond to a Level I event. A Level IV emergency would be catastrophic and would require outside assistance to mount an effective response. Response actions listed in the scenarios below are organized by staff groups.

For a specific emergency, the framework for effective and timely response involves assessment, immediate actions, notifications, and follow-up actions. Under this framework, the Utility has developed a plan for responding to different events. These plans are provided below.

Earthquake

Description

A major earthquake, with the magnitude of 5.0 or greater on the Richter scale, could disrupt the source, transmission, pumping, storage and distribution components of the water system. In addition, power failures and interruption of conventional transportation and communication systems may occur.

Response

Water Utility staff should anticipate critical water use needs for firefighting or medical facilities resulting from an earthquake. These should be given due priority in assessing the emergency, preparing damage reports, and organizing repair efforts.

Pipelines and other buried facilities are hidden from view but are at least as susceptible to ground movement as above ground structures, so these facilities must be closely examined after an earthquake for any unexplained drop in line pressure, reduction in flow rate, pump failure, leakage, or other damage. Crews should be equipped to:

- Maintain constant contact with dispatch and other field personnel,
- Barricade hazardous areas,
- Shut off valves to isolate broken mains,
- Turn off water services,
- Make repairs, and
- Help residents secure a safe supply of drinking water.

Flooding

Description

The location of the Conger Wellfield on the banks of the Link River makes it vulnerable to floods. Other important impacts include overloading the wastewater plant, inundating other structures, disrupting transportation, and competing demands on City resources.

Response

Water Utility staff should anticipate which facilities will most likely be impaired by flooding. All major system components must be checked thoroughly to assess physical damage. Crews should be equipped to:

- Maintain constant contact with dispatch and other field personnel,
- Barricade hazardous areas,
- Shut off valves to isolate broken mains,
- Turn off water services,
- Make repairs, and
- Help residents secure a safe supply of drinking water.

Power Failure

Description

Short- and long-term interruptions in power can occur for a variety of reasons, which may or may not be associated with emergencies. Power outages may be localized to one or more city blocks or may affect the entire region. Facilities most affected by this type of emergency include water sources, booster pumping stations, telemetry equipment, and communication systems.

Response

In addition to their field response, Water Utility staff should immediately contact Pacific Power and Light (1-877-548-3768) to determine the nature, extent, and expected duration of the power outage. The reservoir system provides sufficient storage capacity for several days of water at average usage. In addition, all pumping and source facilities have either onsite auxiliary power or connections for portable auxiliary power units. These auxiliary power sources should be brought online and maintained until power is restored.

Water Supply Contamination

Description

Contamination can occur in surface water and groundwater supplies from human activities or natural occurrences. Contamination of the distribution system could occur through back-siphoning. Additional sources of contamination include: septic tank drain field effluent, urban storm water runoff, pesticide leachate, landfill leachate, petroleum storage leakage, chemical or petroleum spills, animal wastes, vandalism, and volcanic fallout.

Response

The first action should be to isolate the contaminated facility from the rest of the system. Other appropriate measures will be determined according to the type, location, nature, and entry path of the contaminant. The area of contamination and specific cause should be determined as quickly as possible and removed if feasible. This may be a simple matter, such as when a minor spill occurs, or a more complicated problem that requires significant resources and specialized assistance.

In addition to their field response, Utility staff should ensure that appropriate health authorities are contacted. At a minimum, this includes the ODHS Regional Engineer and Klamath County Environmental Health Director. These personnel will then work together to determine, if possible, the extent of the contamination and prepare the appropriate public information program.

Distribution Line Break

Description

Water distribution line breaks could result from an earthquake, pressure surge, vandalism, bomb blast, construction, soil scour, corrosion, or material failure. Due to the strategically placed valves and looped systems, most line breaks can be isolated to minimize service outages.

Response

Such an event requires prompt action by Utility staff to isolate the damaged section and minimize impacts to the rest of the system. The size and nature of the rupture must be evaluated promptly to ensure that adequate repair materials, excavation equipment, de-watering facilities, and proper personnel are deployed. In most cases, the initial response person will be able to assess the situation to determine the extent of the problem and course of action to make the repair. This person is also responsible for notifying emergency departments such as fire and police and the Water Division Supervisor(s) and/or Water Division Manager, if not already notified.

Water line repairs should be made in accordance with standard procedures. The Utility typically has sufficient materials on hand to address line break emergencies. Such materials include repair clamps for all types of pipe materials and sizes that are in the system, ductile iron pipe, various sizes of water main valves, chlorine for disinfection, bedding and backfill material, copper tubing, and service fittings.

Water Transmission Line Failure

Description

Rupture or leakage in the transmission line from any source could result from an earthquake, pressure surge, vandalism, bomb blast, construction, soil scour, and corrosion or material failure. A major break could interrupt the water source and present a flood and erosion threat to adjacent landowners.

Response

Such an event requires prompt action by Utility staff to isolate the damaged section of line and minimize the impacts to the rest of the system. The size and nature of the rupture must be evaluated promptly to ensure that adequate repair materials, excavation equipment, de-watering facilities, and proper personnel are deployed.

Loss of one source transmission line could present a water supply shortage depending on the damaged line and the are being served. If a shortage is possible use should be restricted, the Fire Department notified and arrangements made for delivering temporary potable water.

Gaseous Chlorine Leak

Description

Although the risk of chlorine leakage is low, chlorine facilities could be ruptured and leak gaseous chlorine. The cause of the rupture could vary from a natural disaster to operator error or even vandalism.

Response

Because chlorine gas is highly toxic, a self-contained breathing apparatus must be worn by personnel who respond to such an emergency. Fire and police should be notified immediately of the leak and potential danger.

A repair kit for each chlorine cylinder is kept on site. After the leak is fixed, all areas in which the chlorine gas was dispersed should be fully ventilated. If large quantities of gas leak, residents within the area may have to be notified about the presence of chlorine gas and advised about proper precautionary measures.

No water should enter the Utility's water distribution system without receiving proper chlorination. Therefore, any failure of the chlorination facilities should be followed by a source shutdown until ODH has been notified.

Security Breach

Description

Like a potential contamination incident, a security breach requires an immediate response based on incomplete information. An intrusion, such as an unauthorized entry to a tank facility and forced tank hatch, may indicate a simple act of vandalism, or a calculated terrorist act. In either case, actions must be taken to ensure staff safety and assess the condition of the system as quickly as possible.

Response

In the event of a known security breach the discovering party should notify the on-call Supervisor. Law enforcement should be called before entering the site or facility. Utility staff should not conduct facility searches without appropriate law enforcement present. Following securing of the site the severity of the breach should be assessed using the Decision Tree in Appendix F.

If the potential for compromised water quality exists the facility should be isolated from the system and sampling conducted. As a security measure other facilities should be inspected for potential breach.

6.3 Water Quality Sampling

The primary goal of this emergency response plan is to protect life, health, and property. Therefore, staff must know how to act quickly and make decisions on whether to issue a health advisory. A key component of this decision-making process will often involve timely and proactive sampling procedures, especially in the event of suspected contamination. If there is reason to believe that the water has been contaminated, the Water System Manager should consult with ODH and consider issuing a health advisory as soon as possible – often before conducting water quality sampling.

The coliform monitoring plan is an integral part of this emergency response plan and provides details of designated sampling sites, procedures, laboratory requirements, and contact numbers, as required by drinking water regulations.

If an emergency involves a suspected contamination of the distribution system or its facilities, the consultation process with the ODH should include a discussion of what tests should be done. The following tests are recommended for consideration:

- Coliform Bacteria
- Heterotrophic Plate Count (HPC)
- Chlorine Residual
- Chlorine Demand
- Nitrate/Nitrite
- Total Organic Carbon (TOC)

- Cyanide

Table 6-1 provides a list of local laboratories available to conduct analyses on short notice. This list of laboratories should be maintained to provide a quick reference source in the case that an emergency water quality test is required.

Table 6-1
City of Klamath Falls
Local Laboratories to Contact in an Emergency

Company	Contact Number
Spring Street Analytical	541-882-6286 541-891-7834 (24-hour) 541-891-8976 (24-hour) 541-883-7467 (24-hour)

6.4 Returning to Normal Operation

The standard protocol for returning the system back to normal operation is provided in Table 6-2.

Table 6-2
City of Klamath Falls
Protocol for Returning to Normal Operations

Action	Description and Actions
Inspect, flush, and disinfect the system	Water System Operator II and support staff inspect all system facilities, ensure all water quality tests have been done and the system has been flushed and disinfected as necessary. Water System Operator II makes a report for the Water Division Operations Supervisor. Water Distribution Operator III makes a decision on current condition of the system.
Verification of water quality	Water Division Operations Supervisor verifies water quality sampling results.
Coordinate with DOH	Water Division Operations Supervisor coordinates with ODH on system condition and water quality results.
Notify customers	Water Distribution Operations Manager meets with operators and communications lead to write notice to customers. Water Division Operations Supervisor coordinates with Water Division Infrastructure Supervisor and prior to dissemination to the public.

Section 7
Emergency Equipment and Water Supplies

7.1 Introduction

A natural disaster or intentional attack could interrupt the normal power supply to the water system, and vital equipment and supplies may be damaged or destroyed. Preparations should be made to continue water system operations by having emergency power capability and an adequate inventory of extra equipment, parts and supplies in order to mitigate and shorten the interruption to the greatest extent possible.

The topics included within this section of Emergency Response Plan include the following:

- Emergency Power
- System Redundancy
- Alternative Water Supplies
- Mutual Aids
- Stored Emergency water
- Curtailing Water Use

7.2 Emergency Power Supply

Klamath Falls has an auxiliary power at the Conger Wellfield and the Wocus Well to provide emergency water production and distribution in the order of 12.8 mgd. The existing generator and other emergency power equipment should be checked at least monthly to ensure that they remain in good operating condition.

Utility may also provide additional auxiliary power through renting a portable generator that is capable of supplying additional electrical power the system requires. The names of rental companies that have the equipment needed with their addresses and phone numbers are included in Appendix I.

7.3 Redundancy

Redundancy means the water system has adequate "backup" for the essential equipment and supplies it needs to maintain normal operation. Klamath Falls maintains the following general essential equipment to provide operational redundancy:

- Spare pumps, filter assembles, testing devices – or spare parts and supplies.
- An extra supply of parts that need regular replacement and enough chemical stock to maintain operations for at least 30 days.

- A list of after-hours phone numbers for suppliers/technical assistance people. Arrangement with at least one water testing lab to provide after-hours/weekend testing services on an as-needed basis.
- Manual backup to SCADA in case the automated systems fail or are sabotaged.

7.4 Stored Emergency Water

Klamath Falls currently has approximately 16.3 MG of available storage in the system. This storage can provide 2.5 days of water supply under average day water demand conditions. However actual supply may vary in certain service zones and not all storage is available to all zones.

7.5 Alternative Sources

The Klamath Falls system is not intertied to any neighboring water provider. The only option for alternate supply during emergencies is the hauling of water.

The State of Oregon Drinking Water Program does not regulate hauling water for drinking purposes. The Drinking Water Program has published guidelines for those hauling drinking water to help them provide safe water, and these guidelines are available on-line at http://www.ohd.hr.state.or.us/dwp/docs/haulguide.pdf. A copy of these guidelines ant the names and phone numbers of haulers capable of delivering bulk quantities of drinking water are included in Appendix I.

7.6 Curtailing Water Usage

The Utility does not have a current Water Management and Conservation Plan (WMCP). Such a plan would detail the actions to take for various stages of drought or shortage of supply caused by other factors. The three stages include (1) Conservation alert, (2) Voluntary restriction alert and (3) Mandatory curtailment alert. Within each of the stages the objectives of curtailment, triggers, an example public message to its customers, and internal operating actions are discussed in detail. The Utility should consider completion of WMCP as an emergency response and conservation tool.

Section 8
Staff Training and Plan Updates

8.1 Staff Training

Staff position training needs and expectations are briefly summarized in Table 8-1. Detailed rehearsals should be planned and scheduled with an emphasis on training the tasks listed within this table.

Table 8-1
City of Klamath Falls
Training Needs and Emphasis

Position	Training Needs and Emphasis
Public Work Director	▪ Emergency response communications ▪ Emergency response planning ▪ Issuing health advisories ▪ Staff management and delegation
Water Division Operations Supervisor	▪ Emergency response communications ▪ Emergency response planning ▪ Issuing health advisories ▪ Staff management and delegation
Water Division Infrastructure Supervisor	▪ Emergency response communications ▪ Emergency response planning ▪ Issuing health advisories ▪ Staff management and delegation
Water Distribution System Operators	▪ Emergency response communications ▪ Emergency response planning ▪ Suspicious activity training ▪ Documentation of emergencies ▪ Emergency response roles, actions and responsibilities
Administrative Staff	▪ Emergency response communications ▪ Documentation of emergencies ▪ Emergency response roles, actions, and responsibilities

Table 8-2 provides a listing of recommended training sessions, a brief description of the purpose of the training, the staff involved, and the recommended frequency with which training events should be conducted.

Table 8-2 City of Klamath Falls Emergency Response Training			
Event	**Description**	**Staff Present**	**Frequency**
"War Room" Training	Review and role play of emergency response scenarios	All Utility staff	Annual
Review of specific areas of Emergency Response Procedures	Review of staff roles and responsibilities, emergency communication protocols, emergency sampling protocols, response to line breaks, etc.	All Utility staff	Quarterly

8.2 Plan Review and Updates

This document should be maintained and reviewed periodically to ensure its continued relevance. Table 8-3 provides a recommended schedule for review and updates of the ERP, staff responsible for completing reviews and updates, and the recommended frequency with which updates should occur.

Table 8-3 City of Klamath Falls Plan Review and Updates			
Event	**Description**	**Staff Present**	**Frequency**
Contact Information Update	Update all contact information provided in Appendix F	Special Programs Technician or designee	Semi-annual
Review of CERP	Review of all content and actions in the ERP	General Manager, Field Superintendent and Engineering Director	Annual
Emergency "Post-mortem"	Review of efficiency of response and efficacy of ERP following an emergency event	All Utility staff	As needed (following emergency)

Appendices

Appendix A
Site Map and Hydraulic Profile

To be supplied by City of Klamath Falls

Appendix B
Site Diagrams

Appendix C

Alternative Access to Key Water Facilities

Appendix D

List of Customers Requiring Priority Service

To be supplied by City of Klamath Falls

Appendix E
Emergency Documentation Forms

Threat Evaluation Worksheet

INSTRUCTIONS

The purpose of this worksheet is to help organize information about a contamination threat warning that would be used during the Threat Evaluation Process. The individual responsible for conducting the Threat Evaluation (e.g., the WUERM) should complete this worksheet. The worksheet is generic to accommodate information from different types of threat warnings; thus, there will likely be information that is unavailable or not immediately available. Other forms in the Appendices are provided to augment the information in this worksheet.

THREAT WARNING INFORMATION

Date/Time threat warning discovered: _____

Name of person who discovered threat warning: _____

Type of threat warning:

☐ Security breach	☐ Witness account	☐ Phone threat
☐ Written threat	☐ Law enforcement	☐ Unusual water quality
☐ News media	☐ Consumer complaints	☐ Public health notification

☐ Other _____

Identity of the contaminant: ☐ Known ☐ Suspected ☐ Unknown

If known or suspected, provide additional detail below

☐ Chemical ☐ Biological ☐ Radiological

Describe _____

_____

Time of contamination: ☐ Known ☐ Estimated ☐ Unknown

If known or estimated, provide additional detail below

Date and time of contamination: _____

Additional Information: _____

_____

Mode of contamination: ☐ Known ☐ Suspected ☐ Unknown

If known or suspected, provide additional detail below

Method of addition: ☐ Single dose ☐ Over time ☐ Other _____

Amount of material: _____

Additional Information: _____

_____

Site of contamination: ☐ Known ☐ Suspected ☐ Unknown

If known or suspected, provide additional detail below

Number of sites: _____

Provide the following information for each site.

Site #1

Site Name: _____

Type of facility

- ☐ Source water
- ☐ Treatment plant
- ☐ Pump station
- ☐ Ground storage tank
- ☐ Elevated storage tank
- ☐ Finished water reservoir
- ☐ Distribution main
- ☐ Hydrant
- ☐ Service connection
- ☐ Other _____

Address: _____

_____

Additional Site Information: _____

_____

Site #2

Site Name: _____

Type of facility

- ☐ Source water
- ☐ Treatment plant
- ☐ Pump station
- ☐ Ground storage tank
- ☐ Elevated storage tank
- ☐ Finished water reservoir
- ☐ Distribution main
- ☐ Hydrant
- ☐ Service connection
- ☐ Other _____

Address: _____

_____

Additional Site Information: _____

_____

Site #3

Site Name: _____

Type of facility

- ☐ Source water
- ☐ Treatment plant
- ☐ Pump station
- ☐ Ground storage tank
- ☐ Elevated storage tank
- ☐ Finished water reservoir
- ☐ Distribution main
- ☐ Hydrant
- ☐ Service connection
- ☐ Other _____

Address: _____

_____

Additional Site Information: _____

_____

ADDITIONAL INFORMATION

Has there been a breach of security at the suspected site? ☐ Yes ☐ No
If "Yes", review the completed 'Security Incident Report' (Appendix 8.3)

Are there any witness accounts of the suspected incident? ☐ Yes ☐ No
If "Yes", review the completed 'Witness Account Report' (Appendix 8.4)

Was the threat made verbally over the phone? ☐ Yes ☐ No
If "Yes", review the completed 'Phone Threat Report' (Appendix 8.5)

Was a written threat received? ☐ Yes ☐ No
If "Yes", review the completed 'Written Threat Report' (Appendix 8.6)

Are there unusual water quality data or consumer complaints? ☐ Yes ☐ No
If "Yes", review the completed 'Water Quality/Consumer Complaint Report' (Appendix 8.7)

Are there unusual symptoms or disease in the population? ☐ Yes ☐ No
If "Yes", review the completed 'Public Health Report' (Appendix 8.8)

Is a 'Site Characterization Report' available? ☐ Yes ☐ No
If "Yes", review the completed 'Site Characterization Report' (Module 3, Appendix 8.3)

Are results of sample analysis available? ☐ Yes ☐ No
If "Yes", review the analytical results report, including appropriate QA/QC data

Is a 'Contaminant Identification Report' available? ☐ Yes ☐ No
If "Yes", review the completed 'Sample Analysis Report' (Module 5, Appendix 8.1)

Is there relevant information available from external sources? ☐ Yes ☐ No
Check all that apply

☐ Local law enforcement	☐ FBI	☐ DW primacy agency
☐ Public health agency	☐ Hospitals / 911 call centers	☐ US EPA / Water ISAC
☐ Media reports	☐ Homeland security alerts	☐ Neighboring utilities

☐ Other _____

Point of Contact: _____

_____

Summary of key information from external sources (provide detail in attachments as necessary):

_____

_____

_____

_____

_____

_____

THREAT EVALUATION

Has normal activity been investigated as the cause of the threat warning? ☐ Yes ☐ No

Normal activities to consider

- ☐ Utility staff inspections
- ☐ Construction or maintenance
- ☐ Operational changes
- ☐ Other _____
- ☐ Routine water quality sampling
- ☐ Contractor activity
- ☐ Water quality changes with a known cause

Is the threat 'possible'? ☐ Yes ☐ No

Summarize the basis for this determination: _____

_____

_____

Response to a 'possible' threat:

- ☐ None
- ☐ Increased monitoring/security
- ☐ Site characterization
- ☐ Other _____
- ☐ Isolation/containment

Is the threat 'credible'? ☐ Yes ☐ No

Summarize the basis for this determination: _____

_____

_____

Response to a 'credible' threat:

- ☐ Sample analysis
- ☐ Partial EOC activation
- ☐ Other _____
- ☐ Site characterization
- ☐ Public notification
- ☐ Isolation/containment
- ☐ Provide alternate water supply

Has a contamination incident been confirmed? ☐ Yes ☐ No

Summarize the basis for this determination: _____

_____

_____

Response to a confirmed incident:

- ☐ Sample analysis
- ☐ Full EOC activation
- ☐ Initiate remediation and recovery
- ☐ Other _____
- ☐ Site characterization
- ☐ Public notification
- ☐ Isolation/containment
- ☐ Provide alternate water supply

How do other organizations characterize the threat?

Organization	Evaluation	Comment
☐ Local Law Enforcement	☐ Possible ☐ Credible ☐ Confirmed	
☐ FBI	☐ Possible ☐ Credible ☐ Confirmed	
☐ Public Health Agency	☐ Possible ☐ Credible ☐ Confirmed	
☐ Drinking Water Primacy Agency	☐ Possible ☐ Credible ☐ Confirmed	
☐ Other	☐ Possible ☐ Credible ☐ Confirmed	
☐ Other	☐ Possible ☐ Credible ☐ Confirmed	

SIGNOFF

Name of person responsible for threat evaluation:

Print name _____

Signature _____ Date/Time: _____

Site Characterization Plan Template

INSTRUCTIONS

This form is intended to support in the development of a customized site characterization plan developed in response to a specific water contamination threat. The incident commander and site characterization team leader should develop this plan jointly if possible. The completed form will be used to guide site characterization activities in the field; however, it may be necessary to revise the initial plan based on initial observations at the site. A form should be completed for each investigation site that will be characterized.

THREAT WARNING INFORMATION

Consult "Threat Evaluation Worksheet" for details about the threat.

INVESTIGATION SITE

Site Name: _____

Type of facility:

- ☐ Source water
- ☐ Treatment plant
- ☐ Pump station
- ☐ Ground storage tank
- ☐ Elevated storage tank
- ☐ Finished water reservoir
- ☐ Distribution main
- ☐ Hydrant
- ☐ Service connection
- ☐ Other _____

Address: _____

_____

Additional Site Information: _____

_____

INITIAL HAZARD ASSESSMENT

Are there any indicators of an explosive hazard? ☐ Yes ☐ No

If "Yes," notify law enforcement and do not send a team to the site.

Initial hazard categorization

- ☐ Low hazard
- ☐ Chemical hazard
- ☐ Radiological hazard
- ☐ Biological hazard

If the initial hazard assessment indicates a chemical, radiological, or biological hazard (as described in Module 3, Section 4.1.3), then only teams trained to deal with such hazards should be sent to the site.

SITE CHARACTERIZATION TEAM

Name & Affiliation of Site Characterization Team Leader:

_____

Drinking water utility staff:

- ☐ Water quality specialist Name: _____
- ☐ Security specialist Name: _____
- ☐ Operations specialist Name: _____
- ☐ Other _____ Name: _____

Representatives from other agencies:

- ☐ Local law enforcement ☐ Fire department ☐ HazMat
- ☐ US EPA ☐ FBI ☐ Other

COMMUNICATION PROCEDURES

Mode of communication:

- ☐ Phone ☐ 2-way radio ☐ Digital
- ☐ Facsimile ☐ Other _____

Reporting events:

- ☐ Upon arrival at site ☐ During approach ☐ Site entry
- ☐ After site evaluation ☐ After field testing ☐ Site exit
- ☐ Other _____

FIELD SCREENING CHECKLIST

✔	Parameter[1]	Screen[2]	Meter/Kit ID[3]	Check Date[4]	Reference Value[5]
	Radiation	Both			
	Chlorine residual	Water			
	pH / conductivity	Water			
	Cyanide	Water			
	Volatile chemicals	Safety			
	Chemical weapons	Both			
	Biotoxins	Water			
	Pathogens	Water			

1. List the parameters that will be evaluated as part of field screening (examples are listed).
2. Screening may be conducted for safety, rapid water testing, or both.
3. Report the unique identifier for the meter or kit used during screening.
4. Report date of last calibration, expiration date, or date of last equipment check as appropriate.
5. List any reference value that would trigger a particular action, such as exiting the site.

SAMPLING CHECKLIST

✔	Analyte[1]	No. Samples	Sample Preservation[2]
	Standard VOCs		
	Semi-volatiles		
	Quartenary nitrogen compounds		
	Cyanide		
	Carbamate pesticides		
	Metals/elements		
	Organometallic compounds		
	Cyanide		
	Radionuclides		
	Non-target VOCs		
	Non-target organic compounds		
	Non-target inorganic compounds		
	Immunoassays		
	Pathogens – culture		
	Pathogens – PCR		
	Water quality – bacteria		
	Water quality – chemistry		

1. List the parameters that will be sampled during site characterization (examples are listed).
2. List preservatives and dechlorinating agents and indicate if they are to be added in the field.

EQUIPMENT CHECKLIST

- ☐ Completed Site Characterization Plan
- ☐ Emergency Water Sampling Kit (Table 3-1)
- ☐ Reagents (if stored separately)
- ☐ Laboratory grade water (5 gal)
- ☐ Special equipment for the specific site
- ☐ Other _____
- ☐ Additional documentation
- ☐ Field Testing Kit (Table 3-3)
- ☐ Bags of ice or freezer packs
- ☐ Rinse water (20 liters)
- ☐ Disposable camera

SAMPLE HANDLING INSTRUCTIONS

Sample delivery:

- ☐ Return samples to water utility
- ☐ Ship samples to specified location
- ☐ Deliver samples to specified recipient (e.g., laboratory, law enforcement, shipping co., etc.)

Name of recipient: _____

Phone No.: _____ Fax No.: _____

Delivery address: _____

_____

Sample storage and security:

Describe any special precautions or instructions related to sample storage and security:

_____

_____

_____

SIGNOFF

Incident Commander (or designee responsible for developing Site Characterization Plan):

Print name _____

Signature _____ Date/Time: _____

Site Characterization Team Leader:

Print name _____

Signature _____ Date/Time: _____

Site Characterization Report Form

INSTRUCTIONS

Members of the site characterization team can use this form to record their observations at the investigation site. It also serves as a checklist for notifying incident command at key points during the characterization. Additional checklists are included in this form for sample collection and exiting the site. The completed form can also be used as a component of the site characterization report. A form should be completed for each investigation site that is characterized

GENERAL INFORMATION

Date: _____ **Time arrived investigation at site:** _____

Name of Site Characterization Team Leader: _____

Phone No.: _____ **Fax No.:** _____

LOCATION OF INVESTIGATION SITE

Site Name: _____

Type of facility:

- ☐ Source water
- ☐ Treatment plant
- ☐ Pump station
- ☐ Ground storage tank reservoir
- ☐ Elevated storage tank
- ☐ Finished water
- ☐ Distribution main
- ☐ Hydrant
- ☐ Service connection
- ☐ Other _____

Address: _____

_____

Weather Conditions at Site: _____

_____

Additional Site Information: _____

_____

APPROACH TO SITE

Time of Approach to Site: _____

Initial Field Safety Screening (as listed in the "Site Characterization Plan"):

☐ None ☐ Radiation ☐ Volatile chemicals
☐ HAZCAT ☐ Chemical weapons ☐ Biological agents
☐ Other _____

Report results of field safety screening in Appendix 8.3 "Field Testing Results Form."
If any field safety screening result is above the corresponding reference value, immediately notify incident command and do not proceed further into the site.

Initial Observation and Assessment of Immediate Hazards

☐ Unauthorized individuals present at the site
☐ Fire or other obvious hazard
☐ Signs of a potential explosive hazard (e.g., devices with exposed wires)
☐ Signs of a potential chemical hazard (e.g., dead animals, unusual fogs, unusual odors)
☐ Unusual and unexplained equipment at the site
☐ Other signs of immediate hazard _____

If there are any indicators of immediate hazard, immediately notify incident command and do not proceed further into the site.

Report initial observations and results to incident commander.
Approval granted to proceed further into the site? ☐ Yes ☐ No

SITE INVESTIGATION

Time of Entry to Site: _____

Repeat Field Safety Screening

☐ None ☐ Radiation ☐ Volatile chemicals
☐ HAZCAT ☐ Chemical weapons ☐ Biological agents
☐ Other _____

Report results of field safety screening in Appendix 8.3 "Field Testing Results Form."
If any field safety screening result is above the corresponding reference value, immediately notify incident command and do not proceed further into the site.

Signs of Hazard:

☐ None
☐ Unexplained dead or stressed vegetation
☐ Unexplained liquids
☐ Unexplained dead animals
☐ Unexplained clouds or vapors
☐ Other _____

Describe signs of hazard: _____

Unexplained or Unusual Odors:

☐ None
☐ Sulfur
☐ Sweet/Fruity
☐ Pungent
☐ Skunky
☐ New mown hay
☐ Irritating
☐ Bitter almond
☐ Other _____

Describe unusual odor: _____

Unusual Vehicles Found at the Site:

☐ Car/sedan
☐ Flatbed truck
☐ SUV
☐ Construction vehicle
☐ Pickup truck
☐ None
☐ Other _____

Describe vehicles (including make/model/year/color, license plate #, and logos or markings): _____

Signs of Tampering:

☐ None
☐ Open/damaged gates, doors, or windows
☐ Missing/damaged equipment
☐ Other _____
☐ Cut locks/fences
☐ Open/damaged access hatches
☐ Facility in disarray

Signs of sequential intrusion (e.g., locks removed from a gate and hatch)?

☐ Yes
☐ No

Describe signs of tampering: _____

Unusual Equipment:

☐ None
☐ Tools (e.g., wrenches, bolt cutters)
☐ Lab equipment (e.g., beakers, tubing)
☐ Other _____
☐ Discarded PPE (e.g., gloves, masks)
☐ Hardware (e.g., valves, pipe)
☐ Pumping equipment

Describe equipment: _____

_____

_____

_____

Unusual Containers:

Type of container:

☐ None
☐ Plastic bag
☐ Test Tube
☐ Drum/Barrel
☐ Box/Bin
☐ Bulk container
☐ Bottle/Jar
☐ Pressurized cylinder
☐ Other _____

_____

Condition of container:

☐ Opened
☐ Unopened
☐ New
☐ Old
☐ Damaged/leaking
☐ Intact/dry

Size of container: _____

Describe labeling on container: _____

_____

Describe visible contents of container: _____

_____

Rapid Field Testing of the Water

☐ None
☐ Cyanide
☐ Pesticides
☐ Other _____
☐ Residual disinfectant
☐ Radiation
☐ Biotoxins
☐ pH / conductivity
☐ VOCs and SVOCs
☐ General toxicity

Report results of rapid field testing of the water in Appendix 8.3 "Field Testing Results Form."

If any field test result is above the corresponding reference value, immediately notify incident command and wait for instruction regarding how to proceed.

Report findings of site investigation to incident commander.

Approval granted to proceed with sample collection? ☐ Yes ☐ No

SAMPLING

Time Sampling was Initiated / Completed: _____ /_____

Implement Sampling Procedures Appropriate for the Hazard Conditions at the Site:

- ☐ Low hazard
- ☐ Chemical hazard
- ☐ Radiological hazard
- ☐ Biological hazard

If the site is characterized as a chemical, radiological, or biological hazard (as described in Module 3, Section 4.1.3), then special sampling and safety procedures should be followed.

Safety Checklist:

- ☐ **Do not** eat, drink, or smoke at the site.
- ☐ **Do not** taste or smell the water samples.
- ☐ **Do** use the general PPE included in the emergency water sampling kit.
- ☐ **Avoid** all contact with the water, and flush immediately with clean water in the case of contact.
- ☐ **Slowly fill** sample bottles to avoid volatilization and aerosolization.
- ☐ **Minimize** the time that personnel are on site and collecting samples.

General Sampling Guidelines:

- ☐ Properly label each sample bottle.
- ☐ Carefully flush sample taps prior to sample collection, if applicable.
- ☐ Collect samples according to method requirements (e.g., without headspace for VOCs).
- ☐ Add preservatives or dechlorinating agents as specified.
- ☐ Carefully close sample containers and verify that they don't leak.
- ☐ Wipe the outside of sample containers with a mild bleach solution if there was any spillage.
- ☐ Place sample containers into a sealable plastic bag.
- ☐ Place samples into an appropriate, rigid shipping container.
- ☐ Pack container with frozen ice packs.
- ☐ Complete "Sample Documentation Form" (Appendix 8.4).
- ☐ Complete "Chain of Custody Form" (Appendix 8.5).
- ☐ Secure shipping container with custody tape.
- ☐ Comply with any other sample security provisions required by participating agencies.

EXITING THE SITE

Time of Site Exit: _____

Site Exit Checklist

- ☐ Verify that hatches, locks, etc. are properly secured.
- ☐ Remove all samples, equipment, and materials from the site.
- ☐ Verify that all samples are in the cooler and properly seal the cooler.
- ☐ Remove all PPE at site perimeter.
- ☐ Place disposable PPE and other trash into a heavy-duty plastic trash bag.
- ☐ Verify that the perimeter has been properly secured before leaving the site.
- ☐ Ensure that all documentation has been completed before leaving the site perimeter.
- ☐ Comply with any site control measures required by participating agencies.
- ☐ Contact incident commander and inform them that the team is leaving the site.

SIGNOFF

Site Characterization Team Leader:

Print name _____

Signature _____ Date/Time: _____

Field Testing Results Form

Date of Field Testing:		**Site Name:**			**Field Tester:**	**Phone No.**	
Parameter	**Units**	**Screen[1]**	**Meter/Kit ID[2]**	**Testing Location[3]**	**Testing Time[4]**	**Results[5]**	**Ref. Value[6]**

1: Screening may be conducted for safety, rapid water testing, or both.
2: Report the unique identifier for the meter or kit used during screening.
3: Report the specific location where the field testing was conducted.
4: Report the specific time at which the test was performed.
5: Results of field testing should include replicate analysis where appropriate.
6. Results should be compared with a reference value, if available, to determine whether or not the levels detected pose a hazard.

Sample Documentation Form

Collection Date:		**Site Name:**		**Sampler:**	**Phone No.**	
Sample ID	**No. Bottles**	**Sampling Time**	**Sampling Location**	**Sample Description**	**Analysis**	**Sample Additives[1]**

1: Report preservatives, dechlorinating agents, acid/base for pH adjustment, and any other sample additives.

Chain of Custody Form

Site Name:		**Sampler:**	
Sampler Phone No.:		**Signature:**	
Sample ID	**Collection Date**	**No. Bottles**	**Analysis**

Relinquished by:	**Received by:**	**Date/time:**
Relinquished by:	**Received by:**	**Date/time:**
Relinquished by:	**Received by:**	**Date/time:**
Relinquished by:	Received by:	**Date/time:**
Relinquished by:	**Received by:**	**Date/time:**

Dispatched by:	**Date/time:**	**Received for Laboratory by:**	**Date/time:**
Method of Sample Transport:			
Shipper:	**Phone No.:**	**Tracking No.:**	

Security Incident Report Form

INSTRUCTIONS

The purpose of this form is to help organize information about a security incident, typically a security breach, which may be related to a water contamination threat. The individual who discovered the security incident, such as a security supervisor, the WUERM, or another designated individual may complete this form. This form is intended to summarize information about a security breach that may be relevant to the threat evaluation process. This form should be completed for each location where a security incident was discovered.

DISCOVERY OF SECURITY INCIDENT

Date/Time security incident discovered: _____

Name of person who discovered security incident: _____

Mode of discovery:

- ☐ Alarm (building)
- ☐ Alarm (gate/fence)
- ☐ Alarm (access hatch)
- ☐ Video surveillance
- ☐ Utility staff discovery
- ☐ Citizen discovery
- ☐ Suspect confession
- ☐ Law enforcement discovery
- ☐ Other _____

Did anyone observe the security incident as it occurred? ☐ Yes ☐ No

If "Yes", complete the 'Witness Account Report' (Appendix 8.4)

SITE DESCRIPTION

Site Name: _____

Type of facility

- ☐ Source water
- ☐ Treatment plant
- ☐ Pump station
- ☐ Ground storage tank
- ☐ Elevated storage tank
- ☐ Finished water reservoir
- ☐ Distribution main
- ☐ Hydrant
- ☐ Service connection
- ☐ Other _____

Address: _____

_____

Additional Site Information: _____

_____

BACKGROUND INFORMATION

Have the following "normal activities" been investigated as potential causes of the security incident?

- ☐ Alarms with known and harmless causes
- ☐ Utility staff inspections
- ☐ Routine water quality sampling
- ☐ Construction or maintenance
- ☐ Contractor activity
- ☐ Other _____

Was this site recently visited *prior* to the security incident? ☐ Yes ☐ No
If "Yes," provide additional detail below

Date and time of previous visit: _____

Name of individual who visited the site: _____

Additional Information: _____
_____

Has *this location* been the site of previous security incidents? ☐ Yes ☐ No
If "Yes," provide additional detail below

Date and time of most recent security incident: _____

Description of incident: _____
_____
_____

What were the results of the threat evaluation for this incident?
☐ 'Possible' ☐ 'Credible' ☐ 'Confirmed'

Have security incidents occurred at *other locations* recently? ☐ Yes ☐ No
If "Yes", complete additional 'Security Incident Reports' (Appendix 8.3) for each site

Name of 1st additional site: _____
Name of 2nd additional site: _____
Name of 3rd additional site: _____

SECURITY INCIDENT DETAILS

Was there an alarm(s) associated with the security incident? ☐ Yes ☐ No
If "Yes," provide additional detail below

Are there sequential alarms (e.g., alarm on a gate and a hatch)? ☐ Yes ☐ No

Date and time of alarm(s): _____

Describe alarm(s): _____
_____

Is video surveillance available from the site of the security incident? ☐ Yes ☐ No
If "Yes," provide additional detail below

Date and time of video surveillance: _____

Describe surveillance: _____
_____
_____
_____

Unusual equipment found at the site and time of discovery of the security incident:

- ☐ Discarded PPE (e.g., gloves, masks)
- ☐ Tools (e.g., wrenches, bolt cutters)
- ☐ Lab equipment (e.g., beakers, tubing)
- ☐ None
- ☐ Empty containers (e.g., bottles, drums)
- ☐ Hardware (e.g., valves, pipe)
- ☐ Pumps or hoses
- ☐ Other _____

Describe equipment: _____

Unusual vehicles found at the site and time of discovery of the security incident:

- ☐ Car/sedan
- ☐ SUV
- ☐ Pickup truck
- ☐ Flatbed truck
- ☐ Construction vehicle
- ☐ None
- ☐ Other _____

Describe vehicles (including make/model/year/color, license plate #, and logos or markings): _____

Signs of tampering at the site and time of discovery of the security incident:

- ☐ Cut locks/fences
- ☐ Open/damaged access hatches
- ☐ Facility in disarray
- ☐ Open/damaged gates, doors, or windows
- ☐ Missing/damaged equipment
- ☐ None
- ☐ Other _____

Are there signs of sequential intrusion (e.g., locks removed from a gate and hatch)? ☐ Yes ☐ No

Describe signs of tampering: _____

Signs of hazard at the site and time of discovery of the security incident:

- ☐ Unexplained or unusual odors
- ☐ Unexplained dead or stressed vegetation
- ☐ Unexplained clouds or vapors
- ☐ Unexplained dead animals
- ☐ Unexplained liquids
- ☐ None
- ☐ Other _____

Describe signs of hazard: _____

SIGNOFF

Name of person responsible for documenting the security incident:

Print name _____

Signature _____ Date/Time: _____

Witness Account Report Form

INSTRUCTIONS

The purpose of this form is to document the observations of a witness to activities that might be considered an incident warning. The individual interviewing the witness, or potentially the witness, should complete this form. This may be the WUERM or an individual designated by incident command to perform the interview. If law enforcement is conducting the interview (which may often be the case), then this form may serve as a prompt for "utility relevant information" that should be pursued during the interview. This form is intended to consolidate the details of the witness account that may be relevant to the threat evaluation process. This form should be completed for each witness that is interviewed.

BASIC INFORMATION

Date/Time of interview: _____

Name of person interviewing the witness: _____

Witness contact information

Full Name: _____
Address: _____
Day-time phone: _____

Evening phone: _____
E-mail address: _____

Reason the witness was in the vicinity of the suspicious activity: _____
_____
_____

WITNESS ACCOUNT

Date/Time of activity: _____

Location of activity:

Site Name: _____

Type of facility

☐ Source water	☐ Treatment plant	☐ Pump station
☐ Ground storage tank	☐ Elevated storage tank	☐ Finished water reservoir
☐ Distribution main	☐ Hydrant	☐ Service connection
☐ Other _____		

Address: _____
_____

Additional Site Information: _____
_____

Type of activity

☐ Trespassing ☐ Vandalism ☐ Breaking and entering
☐ Theft ☐ Tampering ☐ Surveillance
☐ Other _____

Additional description of the activity _____

Description of suspects

Were suspects present at the site? ☐ Yes ☐ No

How many suspects were present? _____

Describe each suspect's appearance:

Suspect #	Sex	Race	Hair color	Clothing	Voice
1					
2					
3					
4					
5					
6					

Where any of the suspects wearing uniforms? ☐ Yes ☐ No
If "Yes," describe the uniform(s): _____

Describe any other unusual characteristics of the suspects: _____

Did any of the suspects notice the witness? ☐ Yes ☐ No
If "Yes," how did they respond: _____

Vehicles at the site

Were vehicles present at the site? ☐ Yes ☐ No

Did the vehicles appear to belong to the suspects? ☐ Yes ☐ No

How many vehicles were present? _____

Describe each vehicle:

Vehicle #	Type	Color	Make	Model	License plate
1					
2					
3					
4					
5					
6					

Where there any logos or distinguishing markings on the vehicles? ☐ Yes ☐ No
If "Yes," describe: _____

Provide any additional detail about the vehicles and how they were used (if at all): _____

Equipment at the site

Was any unusual equipment present at the site? ☐ Yes ☐ No

- ☐ Explosive or incendiary devices
- ☐ PPE (e.g., gloves, masks)
- ☐ Tools (e.g., wrenches, bolt cutters)
- ☐ Lab equipment (e.g., beakers, tubing)
- ☐ Firearms
- ☐ Containers (e.g., bottles, drums)
- ☐ Hardware (e.g., valves, pipe, hoses)
- ☐ Pumps and related equipment
- ☐ Other _____

Describe the equipment and how it was being used by the suspects (if at all): _____

Unusual conditions at the site

Were there any unusual conditions at the site? ☐ Yes ☐ No

- ☐ Explosions or fires
- ☐ Dead/stressed vegetation
- ☐ Fogs or vapors
- ☐ Dead animals
- ☐ Unusual odors
- ☐ Unusual noises
- ☐ Other _____

Describe the site conditions: _____

Additional observations

Describe any additional details from the witness account: _____

_____

_____

_____

_____

_____

SIGNOFF

Name of interviewer:

Print name _____

Signature _____ Date/Time: _____

Name of witness:

Print name _____

Signature _____ Date/Time: _____

Phone Threat Report Form

INSTRUCTIONS

This form is intended to be used by utility staff that regularly answers phone calls from the public (e.g., call center operators). The purpose of this form is to help these staff capturer as much information from a threatening phone call while the caller is on the line. It is important that the operator keep the caller on the line as long as possible in order to collect additional information. Since this form will be used during the call, it is important that operators become familiar with the content of the form. The sections of the form are organized with the information that should be collected during the call at the front of the form (i.e., Basic Call Information and Details of Threat) and information that can be completed immediately following the call at the end of the form (i.e., the description of the caller). The information collected on this form will be critical to the threat evaluation process.

Remember, tampering with a drinking water system is a crime under the SDWA Amendments!

THREAT NOTIFICATION

Name of person receiving the call: _____

Date phone call received: _____ **Time phone call received:** _____

Time phone call ended: _____ **Duration of phone call:** _____

Originating number: _____ **Originating name:** _____

*If the number/name is not displayed on the caller ID, press *57 (or call trace) at the end of the call and inform law enforcement that the phone company may have trace information.*

Is the connection clear? ☐ Yes ☐ No

Could call be from a wireless phone? ☐ Yes ☐ No

DETAILS OF THREAT

Has the water already been contaminated? ☐ Yes ☐ No

Date and time of contaminant introduction known? ☐ Yes ☐ No

Date and time if known: _____

Location of contaminant introduction known? ☐ Yes ☐ No

Site Name: _____

Type of facility

☐ Source water	☐ Treatment plant	☐ Pump station
☐ Ground storage tank	☐ Elevated storage tank	☐ Finished water reservoir
☐ Distribution main	☐ Hydrant	☐ Service connection
☐ Other _____		

Address: _____

_____

Additional Site Information: _____

_____

Name or type of contaminant known? ☐ Yes ☐ No

Type of contaminant

☐ Chemical ☐ Biological ☐ Radiological

Specific contaminant name/description: _____

_____

Mode of contaminant introduction known? ☐ Yes ☐ No

Method of addition: ☐ Single dose ☐ Over time ☐ Other _____

Amount of material: _____

Additional Information: _____

_____

Motive for contamination known? ☐ Yes ☐ No

☐ Retaliation/revenge ☐ Political cause ☐ Religious doctrine

☐ Other _____

Describe motivation: _____

_____

CALLER INFORMATION

Basic Information:

Stated name: _____

Affiliation: _____

Phone number: _____

Location/address: _____

Caller's Voice:

Did the voice sound disguised or altered? ☐ Yes ☐ No

Did the call sound like a recording? ☐ Yes ☐ No

Did the voice sound? ☐ Male / ☐ Female ☐ Young / ☐ Old

Did the voice sound familiar? ☐ Yes ☐ No

If 'Yes,' who did it sound like? _____

Did the caller have an accent? ☐ Yes ☐ No

If 'Yes,' what nationality? _____

How did the caller sound or speak?

☐ Educated ☐ Well spoken ☐ Illiterate

☐ Irrational ☐ Obscene ☐ Incoherent

☐ Reading a script ☐ Other _____

What was the caller's tone of voice?

☐ Calm	☐ Angry	☐ Lisping	☐ Stuttering/broken
☐ Excited	☐ Nervous	☐ Sincere	☐ Insincere
☐ Slow	☐ Rapid	☐ Normal	☐ Slurred
☐ Soft	☐ Loud	☐ Nasal	☐ Clearing throat
☐ Laughing	☐ Crying	☐ Clear	☐ Deep breathing
☐ Deep	☐ High	☐ Raspy	☐ Cracking

☐ Other _____

Were there background noises coming from the caller's end?

☐ Silence		
☐ Voices	describe	_____
☐ Children	describe	_____
☐ Animals	describe	_____
☐ Factory sounds	describe	_____
☐ Office sounds	describe	_____
☐ Music	describe	_____
☐ Traffic/street sounds	describe	_____
☐ Airplanes	describe	_____
☐ Trains	describe	_____
☐ Ships or large boats	describe	_____

☐ Other: _____

SIGNOFF

Name of call recipient:

Print name _____

Signature _____ Date/Time: _____

Name of person completing form (if different from call recipient):

Print name _____

Signature _____ Date/Time: _____

Written Threat Report Form

INSTRUCTIONS

The purpose of this form is to summarize significant information from a written threat received by a drinking water utility. This form should be completed by the WUERM or an individual designated by incident command to evaluate the written threat. The summary information provided in this form is intended to support the threat evaluation process; however, the completed form is not a substitute for the complete written threat, which may contain additional, significant details.

The written threat itself (e.g., the note, letter, e-mail message, etc.) may be considered evidence and thus should be minimally handled (or not handled at all) and placed into a clean plastic bag to preserve any forensic evidence.

Remember, tampering with a drinking water system is a crime under the SDWA Amendments!

SAFETY

A suspicious letter or package could pose a threat in and of itself, so caution should be exercised if such packages are received. The US Postal Service has issued guidance when dealing with suspicious packages (http://www.usps.com/news/2001/press/pr01_1022gsa.htm).

THREAT NOTIFICATION

Name of person receiving the written threat: _____

Person(s) to whom threat was addressed: _____

Date threat received: _____ **Time threat received:** _____

How was the written threat received?

☐ US Postal service ☐ Delivery service ☐ Courier
☐ Fax ☐ E-mail ☐ Hand delivered
☐ Other _____

If mailed, is the return address listed? ☐ Yes ☐ No

_____

_____

If mailed, what is the date and location of the postmark? _____

_____

If delivered, what was the service used (list any tracking numbers)? _____

_____

If Faxed, what is the number of the sending fax? _____

If E-mailed, what is the e-mail address of sender? _____

_____

If hand-delivered, who delivered the message? _____

_____

DETAILS OF THREAT

Has the water already been contaminated? ☐ Yes ☐ No

Date and time of contaminant introduction known? ☐ Yes ☐ No

Date and time if known: _____

Location of contaminant introduction known? ☐ Yes ☐ No

Site Name: _____

Type of facility

☐ Source water ☐ Treatment plant ☐ Pump station
☐ Ground storage tank ☐ Elevated storage tank ☐ Finished water reservoir
☐ Distribution main ☐ Hydrant ☐ Service connection
☐ Other _____

Address: _____

_____

Additional Site Information: _____

_____

Name or type of contaminant known? ☐ Yes ☐ No

Type of contaminant

☐ Chemical ☐ Biological ☐ Radiological

Specific contaminant name/description: _____

_____

Mode of contaminant introduction known? ☐ Yes ☐ No

Method of addition: ☐ Single dose ☐ Over time ☐ Other _____

Amount of material: _____

Additional Information: _____

_____

Motive for contamination known? ☐ Yes ☐ No

☐ Retaliation/revenge ☐ Political cause ☐ Religious doctrine
☐ Other _____

Describe motivation: _____

_____

NOTE CHARACTERISITCS

Perpetrator Information:

Stated name: _____
Affiliation: _____
Phone number: _____
Location/address: _____

Condition of paper/envelop:

- ☐ Marked personal
- ☐ Marked confidential
- ☐ Properly addressed
- ☐ Neatly typed or written
- ☐ Clean
- ☐ Corrected or marked-up
- ☐ Crumpled or wadded up
- ☐ Soiled/stained
- ☐ Torn/tattered
- ☐ Other: _____

How was the note prepared?

- ☐ Handwritten in print
- ☐ Handwritten in script
- ☐ Computer typed
- ☐ Machine typed
- ☐ Spliced (e.g., from other typed material)
- ☐ Other: _____

If handwritten, does writing look familiar? ☐ Yes ☐ No

_____

Language:

- ☐ Clear English
- ☐ Poor English
- ☐ Another language: _____
- ☐ Mixed languages: _____

Writing Style

- ☐ Educated
- ☐ Proper grammar
- ☐ Logical
- ☐ Uneducated
- ☐ Poor grammar/spelling
- ☐ Incoherent
- ☐ Use of slang
- ☐ Obscene
- ☐ Other: _____

Writing Tone

- ☐ Clear
- ☐ Direct
- ☐ Sincere
- ☐ Condescending
- ☐ Accusatory
- ☐ Angry
- ☐ Agitated
- ☐ Nervous
- ☐ Irrational
- ☐ Other: _____

SIGNOFF

Name of individual who received the threat:

Print name _____

Signature _____ Date/Time: _____

Name of person completing form (if different from written threat recipient):

Print name _____

Signature _____ Date/Time: _____

Water Quality/Consumer Complaint Report Form

INSTRUCTIONS

This form is provided to guide the individual responsible for evaluating unusual water quality data or consumer complaints. It is designed to prompt the analyst to consider various factors or information when evaluating the unusual data. The actual data used in this analysis should be compiled separately and appended to this form. The form can be used to support the threat evaluation due to a threat warning from unusual water quality or consumer complaints, or another type of threat warning in which water quality data or consumer complaints are used to support the evaluation.

Note that in this form, water quality refers to both specific water quality parameters and the general aesthetic characteristics of the water that might result in consumer complaints.

Threat warning is based on: ☐ Water quality ☐ Consumer complaints ☐ Other

What is the water quality parameter or complaint under consideration?

Are unusual consumer complaints corroborated by unusual water quality data?

Is the unusual water quality indicative of a particular contaminant of concern? For example, is the color, order, or taste associated with a particular contaminant?

Are consumers in the affected area experiencing any unusual health symptoms?

What is 'typical' for consumer complaints for the current season and water quality?

Number of complaints.
Nature of complaints.
Clustering of complaints

What is considered to be 'normal' water quality (i.e., what is the baseline water quality data or level of consumer complaints)?

What is reliability of the method or instrumentation used for the water quality analysis?

Are standards and reagents OK?
Is the method/instrument functioning properly?

Based on recent data, does the unusual water quality appear to be part of a gradual trend (i.e., occurring over several days or longer)?

Are the unusual water quality observations sporadic over a wide area, or are they clustered in a particular area?

What is the extent of the area? A pressure zone. A neighborhood. A city block. A street. A building.

If the unusual condition isolated to a specific area:

Is this area being supplied by a particular plant or source water?
Have there been any operational changes at the plant or in the affected area of the system?
Has there been any flushing or distribution system maintenance in the affected area?
Has there been any repair or construction in the area that could impact water quality?

SIGNOFF

Name of person completing form:

Print name _____

Signature _____ Date/Time: _____

Public Health Information Report Form

INSTRUCTIONS

The purpose of this form is to summarize significant information about a public health episode that could be linked to contaminated water. This form should be completed by the WUERM or an individual designated by incident command. The information compiled in this form is intended to support the threat evaluation process.

In the case of a threat warning due to a report from public health, it is likely that the public health agency will assume incident command during the investigation. The drinking water utility will likely play a support role during the investigation, specifically to help determine whether or not water might be the cause.

PUBLIC HEALTH NOTIFICATION

Date and Time of notification: _____ _____

Name of person who received the notification: _____

Contact information for individual providing the notification

Full Name: _____
Title: _____
Organization: _____
Address: _____
Day-time phone: _____

Evening phone: _____
Fax Number: _____
E-mail address: _____

Why is this person contacting the drinking water utility? _____
_____
_____

Has the state or local public health agency been notified? ☐ Yes ☐ No
If "No," the appropriate public health official should be immediately notified.

DESCRIPTION OF PUBLIC HEALTH EPISODE

Nature of public health episode:

☐ Unusual disease (mild) ☐ Unusual disease (severe) ☐ Death
☐ Other: _____

Symptoms:

☐ Diarrhea ☐ Vomiting/nausea ☐ Flu-like symptoms
☐ Fever ☐ Headache ☐ Breathing difficulty
☐ Other: _____

Describe symptoms: _____
_____

Causative Agent: ☐ Known ☐ Suspected ☐ Unknown
If known or suspected, provide additional detail below

☐ Chemical ☐ Biological ☐ Radiological
Describe _____
_____

Estimate of time between exposure and onset of symptoms: _____

Exposed Individuals:

Location where exposure is thought to have occurred

☐ Residence ☐ Work ☐ School
☐ Restaurant ☐ Shopping mall ☐ Social gathering
☐ Other: _____

Additional notes on location of exposure: _____

_____

Collect addresses for specific locations where exposure is thought to have occurred.

Is the pattern of exposure clustered in a specific area? ☐ Yes ☐ No

Extent of area

☐ Single building ☐ Complex (several buildings) ☐ City block
☐ Neighborhood ☐ Cluster of neighborhoods ☐ Large section of city
☐ Other: _____

Additional notes on extent of area: _____

_____

Do the exposed individuals represent a disproportionate number of:

☐ Immune compromised ☐ Elderly ☐ Children
☐ Infants ☐ Pregnant women ☐ Women
☐ Other: _____
☐ None, no specific groups dominate the makeup of exposed individuals

EVALUATION OF LINK TO WATER

Are the symptoms consistent with typical waterborne diseases, such as gastrointestinal disease, vomiting, or diarrhea? ☐ Yes ☐ No

Does the area of exposure coincide with a specific area of the system, such as a pressure zone or area feed by a specific plant? ☐ Yes ☐ No

Were there any consumer complaints within the affected area? ☐ Yes ☐ No

Were there any unusual water quality data within the affected area? ☐ Yes ☐ No

Were there any process upsets or operational changes? ☐ Yes ☐ No

Was there any construction/maintenance within the affected area? ☐ Yes ☐ No

Were there any security incidents within the affected area? ☐ Yes ☐ No

SIGNOFF

Name of person completing form:

Print name _____

Signature _____ **Date/Time:** _____

Appendix F
Emergency Response Checklists and Decision Tree

Water Division Manager Emergency Checklist

Emergency Response Checklist Incident Commander		
Step	**Action Completed**	**Activity**
1		Confirm and analyze the severity of the emergency
2		Decide if law enforcement should be contacted (see decision tree criteria Exhibit 5-7 and Appendix F)
3		Contact Water Division Supervisors
4		If Water Division Supervisors are unavailable, take action to isolate affected system components
5		LEVEL IV EMERGENCY
		■ Notify City Officials, and state and federal agencies as appropriate
		■ Take action to minimize risk to personnel and damage to system until assistance is available
6		LEVEL IV, III OR II EMERGENCY
		■ Direct Water Division Supervisors or designee to initiate appropriate decision tree branch (Exhibit 5-7)
		■ Notify priority customers as appropriate
		■ Notify agencies, neighboring purveyors, etc. as appropriate
		■ Notify local emergency management as appropriate (Appendix F)
		■ Notify City Officials as appropriate (Appendix F)
		■ Inform staff of the event and appropriate response to public/customer inquiries
		■ Notify all customers and general public as appropriate
		■ Prepare press release / public announcement as appropriate
7		LEVEL I EMERGENCY
		■ Decide if City Officials, media and/or public should be notified
		■ Initiate Level I decision tree branch (Exhibit 5-7) and appropriate follow-up procedures

Water Division Operations and Infrastructure Supervisors
Emergency Checklist

Emergency Response Checklist Water Division Supervisors		
Step	**Action Completed**	**Activity**
1		Contact Water Division Manager.
2		Take action to isolate affected system components
3		Implement appropriate decision tree branch (Exhibit 5-7) for severity of emergency as directed by Water Division Manager
4		LEVEL IV EMERGENCY
		■ Take action to minimize risk to personnel and damage to system until assistance is available
5		LEVEL II OR III EMERGENCY
		■ Inform Operations and Engineering Staff and coordinate field response
		■ Maintain communication with field crews and Water Division Manager on status of event and response
		■ Coordinate emergency water quality sampling (see decision tree and Appendix H)
		■ Implement appropriate follow-up procedures
		■ Ensure record of event is kept
6		LEVEL I EMERGENCY
		■ Implement appropriate follow-up procedures

Distribution Operations Staff Emergency Checklist

Emergency Response Checklist Distribution Operations Staff		
Step	**Completion**	**Activity**
1		Isolate affected system components
2		Initiate appropriate field response as directed by Water Division Supervisors
3		Maintain communication with Water Division Supervisors on status of event and response.

Engineering Staff Emergency Checklist

Emergency Response Checklist Engineering Staff		
Step	**Completion**	**Activity**
1		Facilitate effective communications with Water Division Manager and Water Division Supervisors
2		Perform emergency water quality sampling as directed by Supervisor
3		Assist Water Division Manager with preparation of press releases, consumer notices, response to public inquiries, etc.
4		Assist Water Division Manager with notification of customers, agencies, etc.
5		Assist with documentation of event, completion of Emergency Notification Report, Threat Identification Report, Chain of Custody Records, etc.

Support Staff Emergency Checklist

Emergency Response Checklist Supporting Staff		
Step	**Completion**	**Activity**
1		Respond to customer / public inquiries as directed by Water Division Manager or Supervisor
2		Assist with notifications as directed by Water Division Manager
3		Refer all media inquiries to Water Division Manager

Site-specific Discovery Emergency Checklist

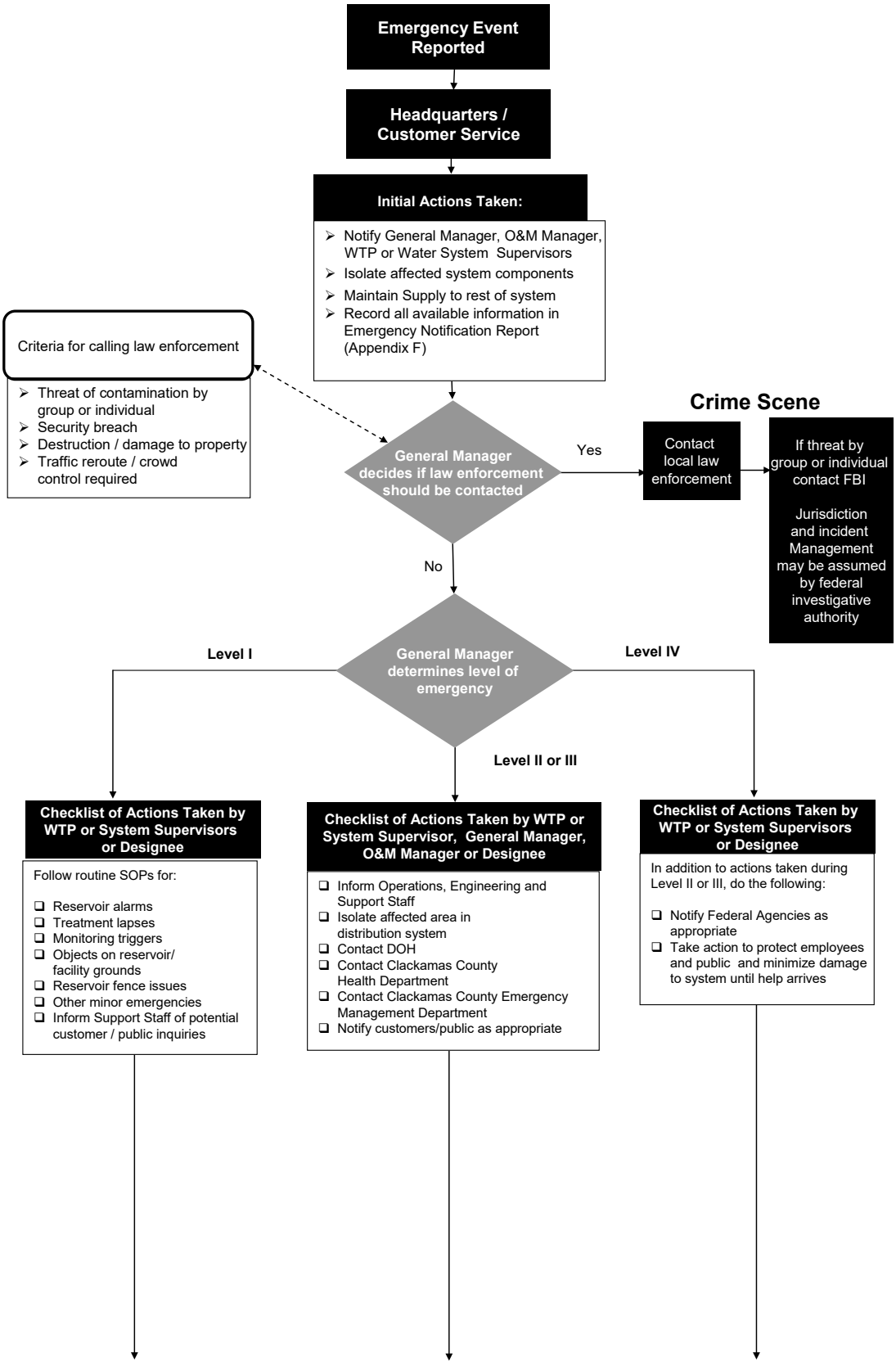
Site-specific Discovery Checklist

Step	Completion	Activity
1		Call 9-1-1 if employees or others are in imminent danger
2		Inform your Supervisor or the On-call Supervisor
3		If a Supervisor is not immediately available, contact Water Division Supervisor, or Water Division Manager directly
4		Proceed with event response as directed
5		Complete the Threat Identification Report if a threat is received
6		Complete the Emergency Notification Report as directed

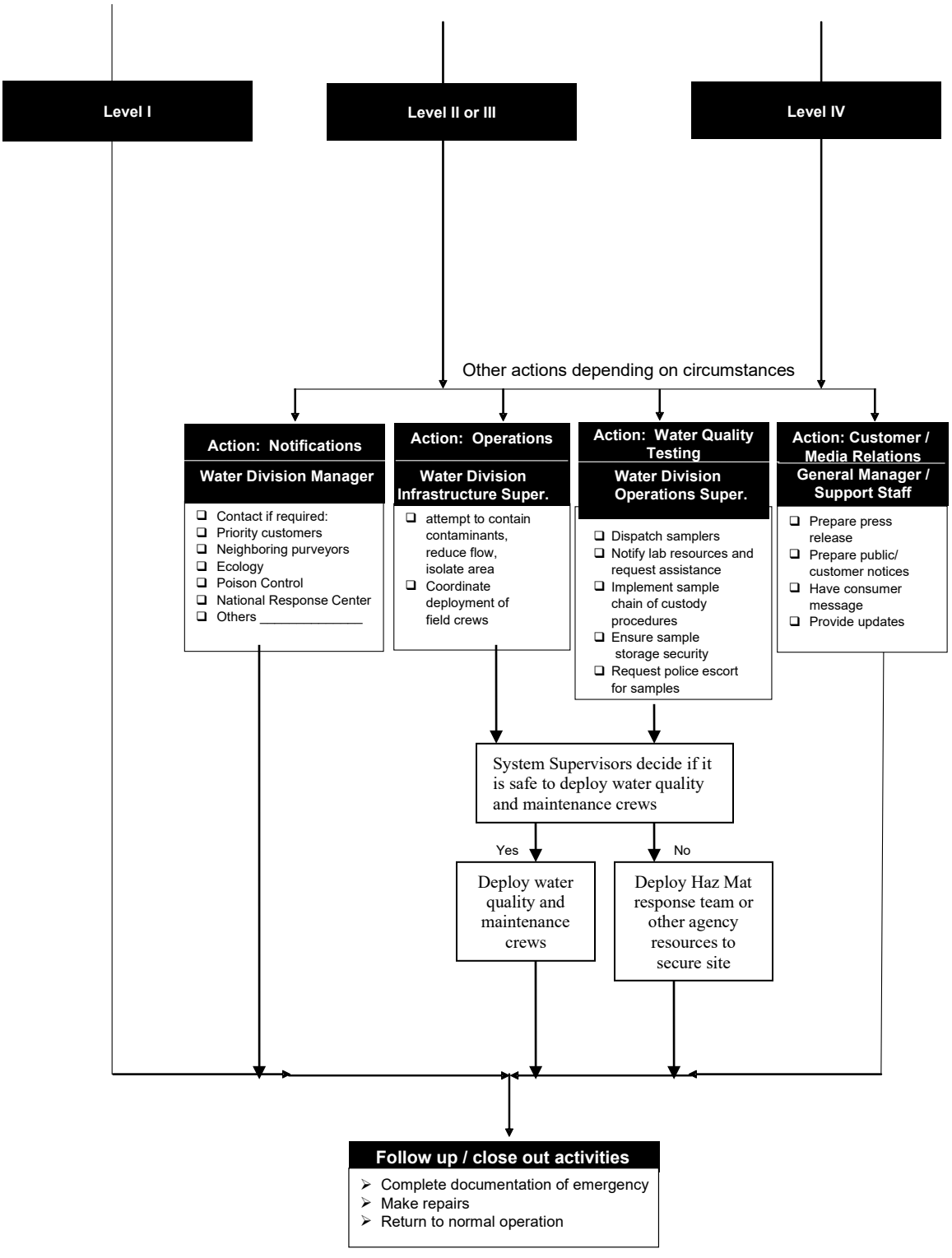
System-Wide Emergency Checklist

System-wide Emergency Checklist		
Step	**Completion**	**Activity**
1		Call 9-1-1 if employees or others are in imminent danger
2		Verify the safety of your self and your surroundings, your family and loved ones
3		Contact Utility Headquarters/Customer Service to verify your safety and advise your availability for emergency response
4		Proceed with event response as directed by Supervisor

Emergency Response Decision Tree



Emergency Response Decision Tree (cont.)



Appendix G

Notification Call-Up List

Table G-1
City of Klamath Falls
Water Section Call-up List

Seq[1]	Name	Home	Work	Cell
1	After Hours On-call Service	541-883-5392		541-810-2262
2	After Hours On-call Cell	541-891-9018	541-891-9018	541-891-9018
3	Larry Helms	541-810-1959	541-810-1959	541-810-1959
4	Andy Foster	541-891-3414	541-891-3414	541-891-3414
5	Alan Harris	541-891-7047	541-891-7047	541-891-7047
6	Byron Collman	541-892-2689		541-892-2689
7	Chris Barington	541-891-1192		541-891-1192
8	Jose Luna	541-880-8684		541-880-8684
9	Eric Thornton	541-331-6455		541-331-6455
10	Vicki Swafford	541-892-8148	541-883-5388	541-892-8148
11	Rod Denson	541-331-4964	541-883-4951	541-331-4964
12	Randy Travis	541-892-4805	541-883-4952	541-892-4805
13	Kody Fritz	541-591-5224		

Table G-2
City of Klamath Falls
Public Works Employees with Knowledge of Water System or Communications

Seq[1]	Name	Home	Cell
1	Ken Driessen	541-891-6116	541-891-6116
2	Kelly Brennan	541-884-7339	541-331-6770
3	Kurt Phillips	541-891-7395	541-891-7395
4	Bruce Sorlein	541-539-9397	541-539-9397
5	Ray Miller	541-281-4235	541-281-4235

Table G-3
City of Klamath Falls
Night Shift/ After Hours Call-up List

Name and Position	Contact Number
After Hours On-call service	541-883-5392
	541-810-2262

Table G-4 City of Klamath Falls Regulatory Contacts	
Agency	**Contact Number**
Klamath Falls Fire District 1	911
Oregon Health Authority - Drinking Water Program	971-673-0405
OHA/DWP Regional	541-726-2587 (26)
Klamath County Health Department	541-883-1122
Oregon State Department of Ecology 24-Hour Spill Response	541-753-2353
Oregon Emergency Response Commission	541-438-7572
National Response Center	1-800-424-8802

Table G-5 City of Klamath Falls Other Contacts		
Company/Agency	**Contact Number**	**Cell Number**
Chuck Cox – Street Division Manager	541-883-5385	541-891-8196
Joe David - Street Division Supervisor	541-883-5385	541-891-9016
Dale Kessler	541-880-4092	541-880-4092
Klamath County Road Department	541-883-4585	541-891-0618
Klamath County Public Works	541-883-4696	
ODOT	541-883-5662	541-858-3103
Oregon Utility Notification Center	811	1-800-332-2344
Ferguson Northwest (Bob Sheldon)	541-281-0879	541-281-0879
Power Pac Rental and Service	541-884-0114	
Jefferson State Redi-Mix	541-882-2286	541-892-1413 541-892-2450

Appendix H

Public Notification Fact Sheets

Drinking Water Warning

City of Klamath Falls water is contaminated with [fecal coliform] or [*E. coli*]

BOIL YOUR WATER BEFORE USING

Fecal coliform [or *E. coli*] bacteria were found in the water supply on _____. These bacteria can
Date
make you sick, and are a particular concern for people with weakened immune systems.

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

- *Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.*

- The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care providers.

What happened? What is being done?

Bacterial contamination can occur when increased run-off enters the drinking water source (for example, following heavy rains). It can also happen due to a break in the distribution system (pipes) or a failure in the water treatment process.

_____

_____

_____

[Describe corrective action.] We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem within _____
Estimated time frame

For more information, please contact _____at _____ or _____.
Name of Contact Phone Number Mailing Address
General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Klamath Falls. State Water System ID#: _____

Since exceeding the fecal coliform or *E. coli* maximum contaminant level is a Tier 1 violation, you must provide public notice to persons served as soon as practical but within 24 hours after you learn of the violation (141.202(b)). During this time, you must also contact your primacy agency. You should also coordinate with your local health department. You may also have to modify the template if you also have high nitrate levels or other coliform MCL violations. You must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

- Radio
- Television
- Hand or direct delivery
- Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served.

The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio or TV notice. If you do, you must still include all required elements and leave the health effects language in italics unchanged. This language is mandatory (141.205(d)). See Chapter 8 for a notice designed for posting. If you post or hand deliver, print your notice on letterhead, if you have it.

Population Served

Make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe corrective actions you are taking. Listed below are some steps commonly taken by water systems with fecal coliform or *E. coli* violations. Use one or more of the following actions, if appropriate, or develop your own:

- We are chlorinating and flushing the water system.
- We are switching to an alternate drinking water source.
- We are increasing sampling for coliform bacteria to determine the source of the contamination.
- We are repairing the wellhead seal.
- We are repairing the storage tank.
- We are restricting water intake from the river/lake/reservoir to prevent additional bacteria from entering the water system and restricting water use to emergencies.

After Issuing the Notice

Send a copy of each type of notice and a certification that you have met all the public notice requirements to your primacy agency within ten days from the time you issue the notice (141.31(d)). It is recommended that you notify health professionals in the area of the violation. People may call their doctors with questions about how the violation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water

during their procedures and need to know of contamination so they can use bottled water. It is a good idea to issue a ‘problem corrected’ notice when the violation is resolved.

DRINKING WATER WARNING

BOIL YOUR WATER BEFORE USING

Disease-causing organisms have entered City of Klamath Falls water system.

These organisms are causing illness in people served by City of Klamath Falls Board. We learned of a waterborne disease outbreak from _____ on _____.
Agency Date

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice. Boiling kills bacteria and other organisms in the water.
- Symptoms:

  _____
  _____
  _____

- [Describe symptoms of the waterborne disease.] If you experience one or more of these symptoms and they persist, contact your doctor. People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers.

What happened? What is being done?

_____
_____
_____

[Describe the outbreak, corrective action, and when the outbreak might end.]

We will inform you when you no longer need to boil your water.

For more information, please contact _____ at _____or _____.
Name of Contact Phone Number Mailing Address

General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Klamath Falls State Water System ID#: _____

Date distributed: _____

Since a waterborne disease outbreak is a Tier 1 situation, you must provide public notice to persons served as soon as practical but within 24 hours after you learn of the situation (141.202(b)). You must also contact your primacy agency during this time. You should coordinate with your local health department as well. **You must issue a public notice if you are experiencing a waterborne emergency other than a waterborne disease outbreak, such as one caused by flooding or treatment failure. In such cases, you may be able to modify this template to apply to your situation.** Check with your primacy agency for more direction. More information on waterborne disease outbreaks and emergencies is available from the Centers for Disease Control and Prevention (www.cdc.gov/health/diseases.htm, 1 (800) 311-3435). For a waterborne disease outbreak or other emergency, you must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

- Radio
- Television
- Hand or direct delivery
- Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served. If you post or hand deliver, print your notice on letterhead, if available. The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio, TV notice, or posting.

Describing the Outbreak

If known, list any organisms detected, the number of affected people, any water treatment problems contributing to the waterborne disease outbreak, and any sources of contamination, such as flooding.

Potential Health Effects

No mandatory health effects language exists for waterborne disease outbreaks. You may wish to use the sentence below, if appropriate, or contact your primacy agency or health department. These symptoms are common to many diseases caused by microscopic organisms:

- Symptoms may include nausea, cramps, diarrhea, jaundice, and associated headaches and fatigue.

Population at Risk

Some people who contract waterborne diseases can be affected more severely than others, as described on the reverse page. The specific language on the reverse is not mandatory, but you must provide information on the population at risk. In addition, make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe the corrective actions you are taking. Listed below are some steps commonly taken by water systems with waterborne disease outbreaks. Use one or more of the following actions, if appropriate, or develop your own:

- We are repairing our filtration system.
- We are increasing sampling for disease-causing organisms.

Make sure to send a copy of each type of notice and a statement certifying that you've met all public notification requirements to your primacy agency within ten days after issuing the notice (141.31(d)). It is a good idea to issue a 'problem corrected' notice when the waterborne disease outbreak is under control.

It is recommended that you notify health professionals in the area of the outbreak. People may call their doctors with questions about how the situation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of contamination so they can use bottled water.

DRINKING WATER WARNING

City of Klamath Falls Water System
has high turbidity levels
BOIL YOUR WATER BEFORE USING

We routinely monitor your water for turbidity (cloudiness). This tells us whether we are effectively filtering the water supply. A water sample taken [date] showed turbidity levels of [number] turbidity units. This is above the standard of [standard] turbidity units. Because of these high levels of turbidity, there is an increased chance that the water may contain disease-causing organisms.

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, washing dishes, brushing teeth, and food preparation until further notice.

- *Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease causing organisms. These organisms include bacteria, viruses, and parasites, which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.* People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers.

- The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice.

What happened? What is being done?

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

[Describe reason for the high turbidity, corrective action, and when the system expects to return to compliance.]

We will inform you when turbidity returns to appropriate levels and when you no longer need to boil your water.

For more information, please contact _____ at _____ or _____.
Name of Contact Phone Number Mailing Address

General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Klamath Falls State Water System ID#: _____

Date distributed: _____

If your primacy agency has designated this turbidity single exceedance as a Tier 1 violation (141.202(a)), you must provide public notice to persons served within 24 hours after it has been designated Tier 1 (141.202(b)). Turbidity violations are Tier 2 by default, but may frequently be elevated to Tier 1 by your primacy agency. In addition, violations are automatically elevated if you are unable to consult with your primacy agency within 24 hours. **In such cases, you must issue a notice within the next 24 hours.** You may elevate the violation to Tier 1 yourself as well. You should also coordinate with your local health department. One or both agencies should tell you whether to instruct consumers to boil water. You must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

- Radio
- Television
- Hand or direct delivery
- Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served. If you post or hand deliver, print your notice on letterhead, if you have it.

The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio or TV notice or posting. If you modify the notice, you must leave the health effects language in italics unchanged. This language is mandatory (141.205(d)).

Population Served

Make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe corrective actions you are taking. Listed below are some steps commonly taken by water systems with turbidity single exceedance. Use one or more of the following actions, if appropriate, or develop your own:

- We are adding chemicals that reduce turbidity.
- We are sampling both untreated and treated water for the presence of coliform bacteria.
- We are monitoring chlorine levels and will adjust them as needed to compensate for filtration problems.
- We are inspecting and cleaning the filters.

Source of the Problem

If you know why the turbidity is high, explain it in your notice. For instance, unusual conditions, such as heavy rains and flooding, can overburden the water plant, and treated water may therefore not meet the standards. In addition, run-off from parts of the watershed could contain increased concentrations of sediment and animal waste.

After Issuing the Notice

Send a copy of each type of notice and a certification that you have met public notice requirements to your primacy agency within ten days after you issue the notice (141.31(d)). It is a good idea to issue a "problem corrected" notice when the violation is resolved. It recommended that you notify health professionals in the area of the violation. People may call their doctors with questions about how the violation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of potential microbiological contamination so they can use bottled water.

Appendix I

Portable Power Generator Suppliers and Potable Water Haulers

Oregon Health Services - Drinking Water Program
Drinking Water Hauling Guidelines
April 2003

INTRODUCTION

Hauling water for drinking purposes is not regulated in the State of Oregon. The mission of the Drinking Water Program is to *assure all Oregonians safe drinking water*. The Program is solely responsible for administering both state and federal drinking water regulations, with the philosophy *to emphasize prevention activities*, which promote voluntary compliance with drinking water standards over the use of formal enforcement. These guidelines have been developed by the Drinking Water Program to help provide the "hauler" an effective means to ensure the delivery of safe drinking water.

SOURCE OF WATER

The Drinking Water Program recommends utilizing a public water system for the water supply source. The hauler should complete the following steps before utilizing the public water system:

1 **Contact the Drinking Water Program** at (503) 731-4381, or through their website at www.ohd.state.or.us/dwp/index.cfm and request a Compliance Status Report for the water system be sent to you. This report will indicate if the water system is current with drinking water monitoring requirements. This report will also help demonstrate to the customer that the water you're hauling is "safe" and comes from a reliable source.

2. **Contact the public water system** that is going to serve as your source of supply for the following reasons:

   A. Generally, they already have a location in their distribution system set-up for supplying tanks with water.
   B. They may require payment for the water to off-set their operating costs.
   C. They may operate a wastewater treatment facility. If you use their wastewater collection system to dispose of an emulsifying detergent used to clean your tank, or high levels of chlorinated water used for disinfection, you may affect their treatment process.

EQUIPMENT PREPARATION

Tanks used for hauling drinking water should be of an acceptable type. The Drinking Water Program recommends using tanks previously used for ONLY hauling water or food grade materials.

The Drinking Water Program STRONGLY recommends NOT using tanks that have previously hauled ANY FUELS because lead and other materials in the fuels can be "absorbed" into the tank over time and leach back out into the water during transport. To

use fuel tanks, they would need to be steam cleaned for a minimum of 90 minutes. Also, lead and volatile organic chemical (VOC) analysis of water that has been "standing" inside the fuel tank for a period of 24 hours would need to be completed. The results from the analysis would need to be below maximum contaminant levels (MCLs) established in the Drinking Water Program regulations. All tanks should be visually inspected, scrubbed, flushed, and disinfected before hauling water to customers as follows:

1. All equipment should be visually inspected to ensure its integrity.

2a. TANKS PREVIOUSLY USED FOR HAULING WATER should be scrubbed, flushed, and disinfected with chlorine as follows:

A. To ensure that water hauling equipment is adequately disinfected, all rust and sediment from the tank should be scrubbed with water containing 200 parts per million (ppm) chlorine. Chlorine bleach can be used for the scrubbing solution as follows:

200 ppm chlorine = 2.5 ounces (1/3 cup) of chlorine bleach for every 5 gallons of water used in the solution.

All hoses, pumps, and other equipment which will be in contact with the water should be disinfected in the same manner. After the tank and equipment has been scrubbed, everything should be rinsed.

B. After scrubbing and rinsing the tank, fill it with water containing 50 ppm chlorine for disinfection purposes. The chlorinated water should stand in the tank until you're ready to begin hauling (minimum period of 30 minutes). Chlorine bleach can be used as follows:

50 ppm chlorine = 2 quarts of chlorine bleach for every 500 gallons of water used to fill the tank.

All hoses, pumps, and other equipment which will be in contact with the water should be disinfected in the same manner.

C. When you are ready to begin hauling water, the chlorinated water should be drained and rinsed from the tank.

2b. TANKS USED PREVIOUSLY FOR HAULING FOOD GRADE MATERIALS should be scrubbed, flushed, and disinfected with an emulsifying detergent and chlorine as follows:

A. Scrub and flush the tank and equipment with warm water.
B. Clean with the injection of an approved (written on the manufacturer's label) emulsifying detergent until the tank and equipment are clean:
   a. Use the amount specified on the manufacturer's label.

b. Maintain a minimum temperature of 140 degrees.
c. Change the location of the nozzle to continuously keep the interior wet from top to bottom until the tank is clean.

C. Rinse the tank thoroughly using warm water.
D. Fill the tank for disinfection purposes with water containing 50 ppm chlorine (described in part 2aB) until ready for hauling (minimum period of 30 minutes). All hoses, pumps, and other equipment which will be in contact with the water should be disinfected in the same manner.
E. When you are ready to begin hauling water, the chlorinated water should be drained and rinsed from the tank.

Note: The food industry has facilities for cleaning and disinfecting tanks used in hauling food grade materials. You may want to contact these facilities to make arrangements for cleaning and disinfecting your tank and equipment.

Note: Aluminum tanks, and tanks having plastic or other types of organic coatings, may be affected by heat or alkaline materials. When these types of tanks are to be cleaned using emulsifying detergents, the manufacturer of these tanks should be contacted and their recommendations followed.

TRANSPORTION

After everything has been inspected, scrubbed, flushed, and disinfected, your equipment should be adequately prepared for hauling water. To ensure the water being transporting is safe for drinking purposes, it should carry a "free" chlorine residual of 1 ppm before transporting. The chlorine serves to disinfect organisms which may be present in the water and can cause illness. These organisms may be introduced into the water through the handling of equipment. The following steps should be followed to make sure the water is adequately disinfected:

1. You should have a chlorine test kit available that is able to measure "free" chlorine residuals. These test kits are available at swimming pool and spa supply stores. The Drinking Water Program recommends using a "DPD" test kit that can measure a free chlorine residual between 0.2 milligrams per liter (mg/L) and 3.0 mg/L.

   Note: One milligram per liter (mg/L) is equal to one part per million (ppm).

2. A majority of public water systems chlorinate their water for disinfection purposes; therefore, you should measure their water for a free chlorine residual before filling your tank. If the measured residual is between 0.5 ppm and 1.0 ppm, you have adequate disinfection for hauling. Be sure to record the date, time, and measured free chlorine residual.

3. If the source of water does not have a chlorine residual measured between 0.5 ppm and 1.0 ppm, disinfect the water at 1 ppm by adding chlorine bleach while filling the tank as follows:

1 ppm chlorine = 2.5 ounces (1/3 cup) of chlorine bleach for every 1000 gallons of water used to fill the tank.

Once the tank is filled, check the free chlorine residual. Be sure to record the date, time, and measured free chlorine residual.

4. Your tank should be filled through an air gap to prevent possible backflow conditions from occurring. Once the tank is filled, it should be covered and "tightly" sealed.

5. All hoses utilized in the operation should be stored off the ground at all times. The hoses should be capped at both ends when they are not being used.

6. Haul the drinking water to the customer's location. The following steps should be followed after arriving:

   A. Measure the free chlorine residual upon arrival. Be sure to record the date, time, and measured free chlorine residual.

   B. Inspect the customer's receiving tank(s) with the customer before filling. The customer should have cleaned, disinfected, etc., the receiving tank(s) before your arrival. Comments regarding the condition of the receiving tank(s) should be documented in your records.

   C. The customer's receiving tank(s) should be filled through an air gap to prevent possible backflow conditions from occurring.

REPEAT HAULING

If you haul drinking water on a day-to-day basis, you do not need to scrub, flush, and disinfect your tank and equipment between each haul. For each trip, you should repeat the guidelines described in the TRANSPORTATION section.

If you have stopped hauling drinking water for a period of several days, and have not hauled anything else, you should disinfect your tank and equipment with water containing 50 ppm chlorine before hauling again. Disinfecting with 50 ppm chlorine is described in Part 2aB of the EQUIPMENT PREPARATION section. After disinfecting the tank and equipment, you should repeat the guidlelines described in the TRANSPORTATION section for day-to-day operation.

If you have stopped hauling drinking water, and have since hauled food grade materials in your tank, you should repeat everything described in the guidelines.

RECORD KEEPING

Record keeping should be done at all times. By keeping records, liability issues surrounding "disease" outbreaks at your customer's location are greatly reduced. You will

also be able to provide the customer with pertinent information regarding the "safety" of the water being hauled. Records should include the following information:

1. Public water system utilized for the source of water. The Program's Compliance Status Report has this information and is suitable for record keeping.

2. Name and address (location) of customer.
3. Date, time, and free chlorine residual after filling the tank with water for hauling.
4. Date, time, and free chlorine residual after arriving at the destination.
5. Notes regarding the receiving tank and any other significant items.

Attached to the guidelines is a form that can be used for keeping records. Make additional copies of this form for your use.

For information on local haulers, contact the Health Services Drinking Water Program for the following counties at:

Gilliam, Grant, Harney, Lake, Morrow, Multnomah, Umatilla, Union, Wallowa, Wheeler:	(541) 276-8006 (Pendleton Office)
Lane:	(541) 731-4317 (Springfield Office)

or contact the following county water program staff at:

Benton:	(541) 766-6841
Clackamas:	(503) 557-2836
Columbia:	(503) 366-3828
Crook:	(541) 447-8155
Curry:	(541) 247-3254
Douglas:	(541) 440-3571
Hood River:	(541) 386-1115
Jackson:	(541) 774-8206
Jefferson:	(541) 475-4456
Klamath:	(541) 883-1122
Lincoln:	(541) 265-4179
Linn:	(541) 967-3821
Malheur/Baker	(541) 473-5186
Marion:	(503) 588-5346
Polk:	(503) 623-9237
Tillamook:	(503) 842-3902
Wasco/Sherman:	(541) 296-4636
Washington:	(503) 846-8722
Yamhill:	(503) 434-7423

City of Klamath Falls 2020 Water Master Plan

Appendix Q. Cross Connection Control Program

CITY OF KLAMATH FALLS

CROSS CONNECTION CONTROL PROGARM

In order to assure safe water is supplied to the consumers that we serve The City of Klamath Falls Water Division maintains an active Cross Connection Control Program as authorized by Oregon Administrative Rules.

The purpose of this program is to protect the public water system from possible contamination and help provide for the delivery of the best possible water quality.

A cross connection, is defined as “Any actual or potential physical connection between a potable water line and any pipe, vessel, or machine containing a non-potable fluid or has to possibility of containing a non-potable fluid, solid or gas , such that it is possible for the non-potable fluid, solid or gas to enter the potable water system by backflow.

The City of Klamath Falls Water Division monitors and controls over 2500 backflow prevention devices that protect the potable water system. Each device is required to be tested annually by an Oregon State certified backflow prevention device tester.

Three Types of Backflow Prevention Assemblies

Each assembly has different features and purposes. Choose an assembly that meets your needs.

Pressure Vacuum Breaker Assembly (PVBA)

A PVBA is a mechanical backflow preventer that consists of and independently acting, spring loaded check valve and an independently acting, spring-loaded air inlet valve on the discharge side of the check valve. It includes shutoff valves at each end of the assembly and is equipped with test cocks. A PVBA is effective against back-siphonage only.

- Used for irrigation systems supplied by City water only
- Installed above ground 12” above highest piping point
- State requires annual testing by State certified tester

Double Check Valve Assembly (DCVA)

A DCVA is a mechanical backflow preventer that consists of two independently acting, spring-loaded check valves. It includes shutoff valves at each end of the assembly and is equipped with test cocks. A DCVA is effective against backpressure backflow and back-siphonage but should be used to isolate only non-health hazards.

- Highly versatile
- Install above or below ground in a vault
- State requires annual testing by State-certified tester

Reduced Pressure Backflow Assembly (RPBA)

An RPBA is a mechanical backflow preventer that consists of two independently acting, spring-loaded check valves with a hydraulically operating**,** mechanically independent, spring-loaded pressure differential relief valve between the check valves and below the first check valve. It includes shutoff valves at each end of the assembly and is equipped with test cocks. An RPBA is effective against backpressure backflow and back-siphonage and may be used to isolate health or non-health hazards.

- Usually most expensive and complex
- Installed above ground
- Used at high-hazard sites such as hospitals, chemical plants, mortuaries
- Only device that allows for applying fertilizer or other chemicals into irrigation systems
- State requires annual testing by State-certified tester

If you have any questions please call 541-883-4956 to speak with our Cross Connection Control Specialist.

CITY OF KLAMATH FALLS

WATER DIVISION

STANDARD GUIDELINES

FOR

CROSS CONNECTION CONTROL

AND

BACKFLOW PREVENTION ASSEMBLIES

GENERAL STATEMENT

The purpose of these rules is to protect the public potable water supply served by the City of Klamath Falls Water Division from the possibility of contamination or pollution by isolation, within its customer internal distribution system, such contaminants or pollutants which could backflow or back-siphon into the public water system.

To promote the elimination or control of existing cross-connections, actual or potential, between its customers in-plant potable water system, and non-potable systems.

To provide for the maintenance of a continuing program of cross-connection control which will effectively prevent the contamination or pollution of all potable water systems by cross-connection.

WATER SYSTEM

The water system shall be considered as made up of two parts: The public system and the customer system.

A) The public system shall consist of the source facilities and the distribution system and shall include all those facilities of the water system under the complete control of the water division, up to the point where the customer system begins, generally at the downstream end of the meter connection, or in the case of unmetered fire services, at the utility control valve or backflow prevention assembly.
B) The customer system shall consist of those facilities, which convey domestic water to points of use beyond the termination of the public system.

CONDITIONS OF SERVICE

It shall be the responsibility of the customer to install, maintain and operate their piping and/or plumbing systems in accordance with the Oregon State Plumbing Code, The Oregon Health Division Rules Chapter 333, and the Klamath Falls City code Chapter 4.

DEFINITONS – The meanings of terms used in this Chapter are as follows:

A) "AIR GAP SEPARATION" shall mean a physical separation between the discharge end of a potable water supply line and an open or non-pressure receiving vessel. An approved " Air Gap Separation" shall be at least two times the diameter of the supply pipe measured vertically above the overflow rim of the receiving vessel, but in no case shall be less than one inch.

B) "APPOVED" as herein used in reference to backflow prevention assemblies, shall mean meeting approval by the Oregon Health Division.

C) "ATMOSPHERIC VACUUM BREAKER" shall mean a backflow prevention assembly consisting of a valve body containing a check seat, and an air inlet port.

D) "AUXILIARY WATER SYSTEM" shall mean any water supply on or available to a customer's system other than the approved public water system.

E) "BACKFLOW" shall mean the reversal of the flow of water or any mixture of water and other liquids, gas, or other substance into the distribution pipes of the public water system from any source.

F) "BACKFLOW PREVENTION ASSEMBLY" shall mean a backflow prevention device such as a pressure type vacuum breaker, a double check valve or a reduce pressure principle assembly and the attached shut off valves on the inlet and outlet ends of the device assembled as a complete unit.

G) "CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTER" shall mean a person who has been certified by the Oregon Health Division as having the necessary training and competence to test backflow prevention assemblies.

H) "CROSS CONNECTION" shall mean any actual or potential connection or structural arrangement between any part of the water system used or intended to supply water for human consumption, and any source or system containing used water, industrial fluid, gas or other substance that is not or cannot be approved as safe for human consumption.

I) "CUSTOMER" shall mean the owner or operator of an on-site water system having potable water service form the City of Klamath Falls Water Division.

J) "DOUBLE CHECK VALVE ASSEMBLY (DCVA)" shall mean a backflow prevention assembly incorporating two independently acting check valves, a shout-off valve at each end of the device, and necessary appurtenances for testing as required.

K) "DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)" shall mean a double check valve assembly consisting of a mainline double check valve assembly with a smaller factory installed double check valve assembly and meter in a bypass configuration.

L) "PRESSURE VACUUM BREAKER ASSEMBLY (PVBA)" shall mean a backflow prevention assembly incorporating one internally loaded check valve, an independently operating loaded air inlet valve, a shut-off valve at each end of the device and necessary appurtenances for testing as required.

M) "RUDUCED PRESSURE PRINCIPLE ASSEMBLY (RPPA)" shall mean a backflow prevention assembly incorporating two independently acting check valves, a hydraulically operating, mechanically independent pressure relief valve, a shut-off valve at each end of the device, and necessary appurtenance for testing as required.

N) "REDUCED PRESSURE PRINCIPLE DETECTOR ACCEMBLY (RPPDA)" shall mean a reduced pressure principle assembly consisting of a mainline reduced pressure principle assembly with a small factory reduced pressure principle assembly and meter in a bypass configuration.

O) "SERVICE CONNECTION" shall mean the point at which the public water system piping ends and the water system piping of the customer begins, generally at the downstream end of the meter connection, or in a case of unmetered fire services, at the utility control valve or detector check.

P) "SPILL RESISTANT VACUUMBREAKER (SRVB)" shall mean a pressure type vacuum breaker assembly.

CUSTOMER RESPONSIBILITY

The customer's premises shall be available for inspection at all reasonable times to authorized representatives of the City of Klamath Falls Water Division to determine whether cross-connections or other structural or sanitary hazards, including violations of these regulations exist. When such a condition becomes known, the utility may deny or immediately discontinue the water supply at the premises by a physical break in the service connection until condition has been corrected, provided that opportunity by the customer to be heard upon request shall be allowed thereafter as soon as practicable.

The customer is to furnish, install and maintain in a manner approved by the City of Klamath Falls Water Division any and all backflow prevention assemblies. Upon customers request The City of Klamath Falls Water Division will perform the initial tests on newly installed devices. The customer is to provide that any and all backflow prevention assemblies are tested by a certified backflow prevention assembly tester, immediately upon repair, upon relocation of the assembly and at least once annually thereafter as determined by the City of Klamath Falls Water Division. All tests of backflow prevention assemblies shall be performed at the customer's expense. Backflow prevention assembly test reports shall be filed with the City of Klamath Falls Water Division within ten (10) days after said report is conducted. The division shall accept reports only from those persons who possess a valid certificate as issued by the Oregon Department of Human Services.

In the event of a backflow incident, the customer shall immediately notify the City Water Division of the incident and take immediate action to confine the contamination or pollution.

It is the responsibility of the property owner to eliminate the possibility of thermal expansion, if a closed system has been created by the installation of a backflow assembly at the point of service.

CITY OF KLAMATH FALLS WATER DIVISION RESPONSIBILITY

The City of Klamath Falls Water Division shall maintain an inspection and enforcement program to provide backflow protection between the customer's system and the public system as required by Oregon Health Division Administrative Rules Chapter 333.

"The Manual of Cross Connection Control," current edition, published by the Foundation for Cross Connection and Hydraulic Research, University of Southern California and the "Accepted Procedure and Practice in Cross Connection Control," current edition published by the Cross Connection Control Committee, Pacific Northwest Section, American Water Works Association, shall be used as guidelines for inspection and enforcement of the backflow prevention program.

It is the responsibility of The City Water Division representatives to see that the required tests are completed. At the discretion of the water division, certified testers may be required to notify the water division in advance when the test is to be undertaken so that a water division representative may be present to witness the test. The City of Klamath Falls Water Division shall maintain records of all tests and repairs. The water division shall notify the owners of any and all backflow prevention assemblies located within the City of Klamath Falls water system of required tests due dates.

REQUIRED BACKFLOW PREVENTION ROTECTION

Backflow prevention assemblies for protecting the public water system shall be installed at the service connection to premises where and approved air-gap does not exist.

Service connections requiring premises isolation are listed in Table 1

Premises not listed in Table 1 shall be evaluated on an individual basis. The City of Klamath Falls Water Division shall require the installation of an approved assembly or air-gap commensurate with the degree of hazard as defined in Table 2.

In lieu of premise isolation, the City Water Division may accept an in-premise approved backflow assembly when the approved assembly is installed, maintained and tested as required by these guidelines.

Backflow prevention assemblies which are installed to isolate premises from the public potable water system must be installed on the downstream side of the meter at or near the property line or immediately inside the building being served, but in any case must be installed before the first branch line. In no case shall there be a drain or means for draining a backflow prevention assembly installed on the upstream side of the assembly.

TYPE OF PROTECTION

The type of protection required shall be commensurate with the degree of hazard. In determining the degree of hazard and the type of protection required, the following criteria shall be used.

A) An approved air-gap or an approved reduced pressure principle assembly (RPPA) shall be installed where the substance which could backflow is hazardous to health, such as but not limited to; Those facilities listed in Table 1 of this document and OAR 333-061-0020, 0070 through 0074. RPBAs shall be installed to isolate irrigation systems with means for chemical injection. RBPAs shall also be installed to isolate boilers and other pressure producing vessels, and at premises with an auxiliary water supply.

B) An approved double check valve assembly (DCVA) shall be installed where the substance that could backflow is objectionable but does not pose an unreasonable risk to health. An approved double check detector assembly (DCDA) shall be minimum protection for fire sprinkler systems using piping material that is not approved for potable water use and/or which does not provide for a periodic flow through during each 24-hour period. The detector meter shall be a Sensus model SR II with a cubic foot TRPL register. An approved RPBA shall be installed on all fire sprinkler systems, which include an antifreeze loop. Fire sprinkler systems which include antifreeze loops must be tested annually and maintained in accordance with the 1994 Uniform Building Code Standard 9-1 (NFPA 13,1991 edition) using food grade antifreeze and be maintained by professional, qualified personnel. The antifreeze loop piping must be clearly labeled "Food Grade Antifreeze Only." DCVAs shall be installed to isolate irrigation systems without means of chemical injection.

C) An approved pressure type vacuum breaker (PVBA), spill resistant vacuum breaker (SRVB) or an atmospheric type vacuum breaker (AVB) shall be installed where the substance which could backflow is objectionable but does not pose an unreasonable risk to health and where there is no possibility of backpressure in the downstream piping.

Any backflow prevention assembly required herein shall be a model approved by the Oregon Department of Human Services Health Services and the water division.

Backflow prevention assemblies installed before the effective date of these rules which were approved at the time they were installed but are not on the current list of approved assemblies maintained by the Oregon Dept. of Human Services shall be permitted to remain in service provided they are properly maintained, are commensurate with the degree of hazard, and are tested at least annually. When assemblies of this type are moved, changed in size or remodeled, they shall be replaced with assemblies which are on the current Oregon Health Division list of approved assemblies.

All backflow prevention devices installed shall comply with the installation guidelines defined in Oregon Health Division Administrative Rules Chapter 333 and City of Klamath Falls Backflow Prevention Assembly Installation Guidelines. Access to such devices shall remain unrestricted at all times. All backflow prevention assemblies installed in below

ground vaults shall have brass or plastic plugs installed in the test cocks and the vault shall be provided with a sump pump when in potential groundwater.

All backflow prevention assemblies are subject to annual inspection and testing. The cost of annual performance testing and any required maintenance is the responsibility of the owner. Backflow prevention assemblies, vaults and lids are owned by the property owner and they incur all responsibility and liability of these items. The property owner shall maintain these items.

The City of Klamath Falls Water Division Cross Connection Control policies and requirements for customers with private wells are as follows:

A) No backflow protection is required if the auxiliary source is verified to be permanently inactivated by removing the well pump and associated plumbing and welding the well casing closed. In such cases, formal abandonment in accordance with requirement of the County Watermaster should be pursued by the property owner.
B) If the well remains active a DCVA shall be the minimum protection and shall be installed at the service connection. The device shall drain to daylight and be protected from freezing. On site plumbing is the responsibility of the local plumbing authority.

In accordance with Oregon Administrative Rules 333 water service connections shall be disconnected until compliance is verified by The City of Klamath Falls Water Division. Visual inspection of a weld sealed well casing is required to avoid installing a backflow prevention assembly.

Plumbing permits are required by Klamath County. Please contact that agency for information about plumbing permits.

The City of Klamath Falls Water Division may refuse water service to any premise with more than one service connection except that multiple service connections may be used for service to a premise under one ownership or management wherein each service connection serves a separate building, and there is no physical connection between separate plumbing systems which would permit circulating flow and there is reasonable assurance that no future interconnection will be established. In large industrial and commercial customer piping systems requiring multiple service connections for adequate supply and fire protection, the water division may permit such multiple connections with interconnection of the customer's premises provide that there shall be an approved backflow prevention assembly installed immediately downstream from each service connection to prevent circulating flow.

In all cases, the system is considered potable to the backflow prevention assembly.

SECTION II

INSTALLATION STANDARDS

AIR GAP SEPARATION

A) Definition: A physical separation between a potable water supply pipeline and a receiving vessel.
B) Air gap separations provide maximum protection from backflow hazards and are required at premises where the substance that could backflow would be hazardous to health if introduced into the potable water system.
C) An approved air gap separation shall be at least two times the diameter of the supply pipeline measured vertically above the top rim of the receiving vessel – in no case less than one (1) inch.
D) Air gap separations shall not be altered in any way without prior approval from the City of Klamath Falls Water Division. If splashing is a problem, tubular screens may be attached or the supply line may be cut at a 45-degree angle. The air gap separation is measured at the point closet to the receiving vessel.

PRESSURE VACUUM BREAKER ASSEMBLY (PVBA)

A) Definition: A device containing one independently operating loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check. Assemblies must be equipped with properly located all brass test cocks and tightly closing shut off valves located at each end of the assembly.
B) PVBAs are required at premises where the substance that could backflow would be objectionable, but not pose an unreasonable risk to health if introduced into the potable water system. The device must be a model approved by the Oregon Health Division.
C) PVBAs protect against backsiphonage only and shall not be installed where there is potential for backpressure. Underground irrigation systems with a PVBA installed shall not be winterized using compressed air as this creates a backpressure condition.
D) PVBAs shall not be installed in an area subject to flooding and should be located where water damage would not occur when device discharges water. The device must be protected from freezing.
E) PVBAs shall be installed a minimum of 12 inched above any downstream piping. In no case shall a PVBA be installed with a drain upstream of the device.
F) The device shall be readily accessible for testing and maintenance, with a minimum clearance of 12 inches all around the device.
G) All PVBAs must be tested upon installation and at least once per year thereafter by an Oregon State certified tester. Tests are the responsibility of the owner. The owner must notify The City Water Division upon installation of any backflow prevention device.
H) Although, all approved assemblies are repairable in-line, the installation of union fittings on both ends of the device is recommended for easy repairs and maintenance.

I) Lines should be thoroughly flushed prior to installation. A strainer is recommended ahead of the assembly.
J) Standard drawings are shown in Appendix.

ATMOSPHERIC VACUUM BREAKER (AVB) (NON-PRESSURE TYPE VACUUM BREAKER)

A) Definition: A device containing a shut-off valve followed by a valve body containing a float check, a check seat and an air inlet port. When the shut-off valve is closed, the float falls and forms a check valve against backsiphonage and at the same time opens the air inlet port.
B) AVBs are approved for extremely low hazard conditions only. These devices cannot be routinely tested, and their use is discouraged for most cross-connection control applications.
C) AVBs are designed to protect against backsiphonage only and shall not be installed where a backpressure may occur.
D) The device must be installed a minimum of 6 inches above the highest downstream piping from the device. In no case shall an AVB be installed with a drain upstream of the device.
E) Shut-off valves downstream from the device are not permitted.
F) AVBs are permitted for only those applications where there is less than 12 hours per day continuous use.

DOUBLE CHECK VALVE ASSEMBLY (DCVA)

A) Definition: An assembly composed of two independently acting check valves, including tightly closing shut-off valves located at each end of the assembly and fitted with four properly located all brass test cocks.
B) DCVAs are required at premises where the substance, which could backflow, would be objectionable, but not pose an unreasonable risk to health if introduced into the potable water system. The assembly installed must be a model approved for use by the Oregon Health Division.
C) DCVAs must be sized to provide an adequate supply of water and pressure for the premises being served. Flow characteristics are not standard. Consult manufacturer's specifications for specific performance data.
D) Premises where interruption of water supply is critical should be provided with two assemblies installed in parallel. They should be sized in such a manner that either assembly will provide the minimum water requirements while the two together will provide the maximum flow required.
E) Bypass lines are not permitted. Pipe fittings which could be used for connecting a bypass line must not be installed.

F) DCVAs which are installed to isolate premises from the public potable water system must be installed on the downstream side of the meter at or near the property line or immediately inside the building being served, but in any case, must be installed before the first branch line and within 100 feet of the connection to the public supply water main.

G) Installation Inside Building

The assembly shall be readily accessible with adequate room for testing and maintenance. Minimum clearances shall be as follows:

1. Assemblies 2-inch and smaller shall have at least 6 inches clearance below and 6 inches clearance on both sides of the assembly
2. Assemblies larger than 2-inch shall have a minimum clearance of 12 inches below and on the backside and 24 inches on the test cock side of the assembly.
3. Maximum height shall not exceed 5 feet unless there is a permanently installed platform meeting Occupational Safety and Health (OSHA) standards to facilitate servicing the assembly.

H) Installation in Vaults

DCVAs may be installed below grade in a vault, provided watertight brass or plastic plugs are installed in all test cocks. The assembly shall not be subject to continuous immersion. All vaults shall meet City of Klamath Falls vault standards, be sized to make the assembly readily accessible for testing and maintenance and allow for the minimum clearances established below. Vault sides and bottom shall be solid to prevent collapse or rodent intrusions. All vaults shall be well drained or a sump pump shall be installed to prevent immersion.

Minimum clearances shall be as follows:

1. Assemblies 2 inch and smaller:

    a. Minimum of 6 inches clearance on all sides of the assembly
    b. For reach in type vaults, all test cocks shall be maximum of 12 inches from opening of vault.

2. Devices larger than 2-inch:

    a. Minimum of 12 inches clearance all around assembly
    And a minimum of 24 inches on test cock side.

I) The device must be protected from freezing and other severe weather conditions.

J) DCVAs may be installed vertically provided that the assembly is internally spring loaded, is 4 inches or smaller, is listed in the Oregon Health Division's approved

backflow prevention assembly lists, is specifically approved for vertical installation by the manufacturer and is installed with a normal upward flow.

K) The property owner assumes all responsibility for foundation or basement wall penetration, leaks and damage, the owner shall also see that the vault is kept reasonably free of silt and debris.

L) All DCVAs must be tested upon installation, immediately upon repair, upon relocation and at least once per year thereafter by an Oregon State certified tester. Tests are the responsibility of the owner. The owner must notify the City Water Division upon installation of any backflow prevention device.

M) Although all approved assemblies are repairable in-line, the installation of union fittings on both ends of the assembly is recommended for vault installation due to the lack of space required for easy repairs and maintenance.

N) Lines should be thoroughly flushed prior to installation. A strainer is recommended ahead of the assembly.

O) Standard drawings are shown in Appendix.

DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

DCDAs may be utilized in all installations requiring a double check valve assembly and detector metering. DCDAs shall comply with the installation requirements applicable for double check valve assemblies.

Bypass detector meters shall be a SENSUS model SRII with a gallon TRPL register. The property owner or property owner's agent shall be responsible for installing remote reading touch pad compatible with The City of Klamath Falls meter reading equipment. The property owner shall provide a location where the remote touch pad can be mounted on the outside of the building or vault for meter reading access. The City of Klamath Falls upon request shall provide meter and touch pad assembly.

REDUCED PRESSURE PRINCIPLE ASSEMBYL (RPBA)

A) Definition: An assembly containing two independently acting check valves together with a hydraulically operation mechanically independent pressure relief valve located between the check valves. The unit shall include four properly located all brass test cocks and tightly closing shut-off valves at each end of the assembly.

B) RPBA assemblies are required in the main water line at premises where the substance, which could backflow, would be hazardous to health if introduced into the potable water system.

C) RPBA assemblies must be sized to provide an adequate supply of water and pressure for the premises being served. Flow characteristics are not standard. Consult manufacturer's specifications for performance data.

D) Premises where interruption of water supply is critical should be provided with two assemblies in parallel. They should be sized in such a manner that either assembly will provide the minimum water requirements while the two together will provide the maximum flow required.

E) Bypass lines are not permitted. Pipe fittings which could be used for connecting a bypass line must not be installed.

F) Backflow prevention assemblies which are installed to isolate premises from the public potable water system must be installed on the downstream side of the meter at or near the property line or immediately inside the building being served, but in any case, must be installed before the first branch line and within 100 feet of the connection to the public system water main.

G) The assembly must be readily accessible for testing and maintenance and must be located in an area where water damage to buildings or furnishings would not occur when the relief valve is flowing. If the relief valve is piped to discharge water outside the building, an approved air gap is required at both ends of the drain line. The drain line must be sized to accommodate full relief valve discharge and must be installed level or down slope.

   Installation without drains must be located in well-drained areas where the highest possible level of standing water is below the bottom of the assembly.

   Minimum clearances for devices larger than 2 inches shall be as follows:

   1. At least 12 inches on the backside of the assembly and 24 inches on the test cock side of the assembly.
   2. Maximum height of installation must not exceed 5 feet unless there is a permanently installed platform meeting Occupational Safety and Health (OSHA) standards to facilitate servicing the assembly.
   3. Relief valve opening must be at least 12 inches plus nominal size of device from floor or highest possible floor level.

H) RPBA assemblies are typically installed above grade in well-drained areas but may be installed below grade if an adequate drain to daylight is provided. The vault or enclosure must be sized to make the assembly readily accessible for testing and maintenance and allow for minimum clearances established above.

Sides and bottom of the enclosure must be solid to prevent collapse or rodent intrusion. All vaults must meet City of Klamath Falls vault standards and drain to daylight with drain ports sized to accommodate full pressure discharge from the assembly.

I) The assembly must be protected from freezing and other severe weather conditions.

J) Vertical installation is not permitted.

K) The property owner assumes all responsibility for foundation or basement wall penetration, leaks and damage. The owner shall also see that the vault is kept reasonably free of silt and debris.

L) All RP assemblies must be tested upon installation, immediately after repair, upon relocation of the assembly and at least once a year thereafter by an Oregon State certified tester. The owner must notify the City Water Division upon installation of any backflow prevention device.

M) Although all approved assemblies are repairable in-line, the installation of union fittings on both ends of the assembly is recommended for vault installations due to the lack of space required for easy repairs and maintenance.

N) Lines should be thoroughly flushed prior to installation. A strainer is recommended ahead of the assembly.

O) Standard drawings are shown in Appendix.

REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY (RPPDA)

RPPDAs may be utilized in all installations requiring a reduced pressure backflow prevention assembly and detector metering. RPPDAs hall comply with the installation requirements applicable for reduced pressure backflow assemblies.

Bypass detector meters shall be a SENSUS model SRII with a cubic foot TRPL register. The City of Klamath Falls Water Division shall be responsible for installing remote reading touch pad compatible with the city meter reading equipment. The property owner shall provide a location where the remote touch pad can be mounted on the outside of the building or vault.

Staff

The Cross-Connection Program has a staff of three employees.

Andy Foster-Program Coordinator, Cross-Connection Specialist, Certified Tester #3954

Chris Barrington Certified Tester #5030

Terry Sellars Certified Tester #2760

Inspections

The Cross-Connections Control Specials perform on site inspections of commercial and residential accounts. Evaluation is also coordinated with the City Engineering Division inspectors and Klamath County Plumbing Inspector as to the need for backflow prevention devices and degree of hazard on new installations. It is the policy of the Water Division to perform the initial tests on all new backflow prevention devices.

Upon inspection of an existing facility the inspector shall determine the health hazards and the degree of protection required. The inspector shall inform the facility owner of his findings and the requirements for compliance. A follow up letter will be mailed to the owner explaining the required backflow protection and a time limit of installation.

Compliance

Corrective actions for failure to comply are covered in Klamath Falls City codes 4.264 section 2 paragraph B.

The City shall not knowingly permit any cross connection and shall discontinue service to any premises where a cross connection exists. Service shall not be restored until the cross connection is eliminated.

A series of three letters are sent to each owner of backflow prevention devices the third and “Final Notice” states that the Water Division will have a state certified tester test the device(s) and the cost of the test will be added to the customers water bill. Refusal to allow this testing to be completed will result in the immediate disconnection of water service until the required testing is completed.

Records

All records of installed assemblies, inspections, test results, and tester certification are stored in cross-connection software. In addition, test reports received from state certified testers are kept on file. The Cross Connection Program also maintains a master list of facilities that are subject to inspections and re-inspection and a schedule for conducting cross connection inspections.

Public education

As part of our public education program The City of Klamath Falls annually sends brochures to all customers explaining cross connections and the need for backflow prevention devices. Also included are contact phone numbers for further information

BACKFLOW ASSEMBLY TESTER

REQUIREMENTS & PERFORMANCE

STANDARDS

OBJECTIVES:

The purpose of these requirements and performance standards is to create a consistent method for monitoring compliance with the Oregon Health Division backflow assembly testing requirements; protecting public health and insuring safe drinking water.

The Oregon Health Division Administrative Rules 333-71-070 outline cross connection control responsibilities for public water systems. These rules require water purveyors to conduct an active program for systematically identifying and controlling cross connections.

Backflow prevention assemblies installed pursuant to these rules are required to be tested by certified testers in conformance with procedures established by the Foundation for Cross Connection Control 9th Edition, December 1993. Enforcement authority for these requirements is placed with the local water purveyor.

REQUIREMENTS

The City of Klamath Falls Water Division shall require each State Certified Backflow Tester working within our jurisdiction to provide verification of current Backflow Assembly Tester certification and gauge recalibration information.

TEST REPORTS

Test reports are public documents. They also serve as legal records. Complete and accurate test reports are essential to the Water Divisions effort to protect public health and the Tester's professional responsibility. As an agent of the owner, the tester assumes the owner's responsibility for compliance with the State regulations. A complete and accurate test report is proof that a test was performed and the assembly will prevent backflow.

Test reports that are not complete or accurate, may be returned to the tester, or the owner, not counting as having been turned in.

Test reports for passing test on assemblies tested commercially must be turned in within ten (10) working days of the test date or before the ten (10) day limit.

Failure to meet this requirement will result in the tester's removal from the local list of certified testers.

FAILED DEVICES

When a device fails the initial test and you are not prepared to repair it the same day, a temporary repair should, if possible, be affected until repairs parts can be obtained.

Failed devices cannot be left in service and must be reported to the Water Division within 24 hours, unless they are repaired and retested (with a passing result) or unless they are temporarily repaired. Once a temporary repair is affected, the device may be left in service for 10 working days. This allows the tester to repair, retest, and have the test report turned in within the 10 working day limit described in "Test Reports: timeliness."

Device assemblies that are altered, missing or damaged must be reported to the Water Division within 24 hours of the initial test.

Notice for devices that fail and are not repaired should be made when possible, however, by 24 hours after the initial test. Once notice is given, the Water Division can take action to help timely repair of the assembly or stop service to the customer, where appropriate.

Notice for devices not repaired, shall include; your name, certification number, name of firm authorizing test, address of installation, device or devices not repaired and a description of repairs needed.

UNETHICAL PRACTICES

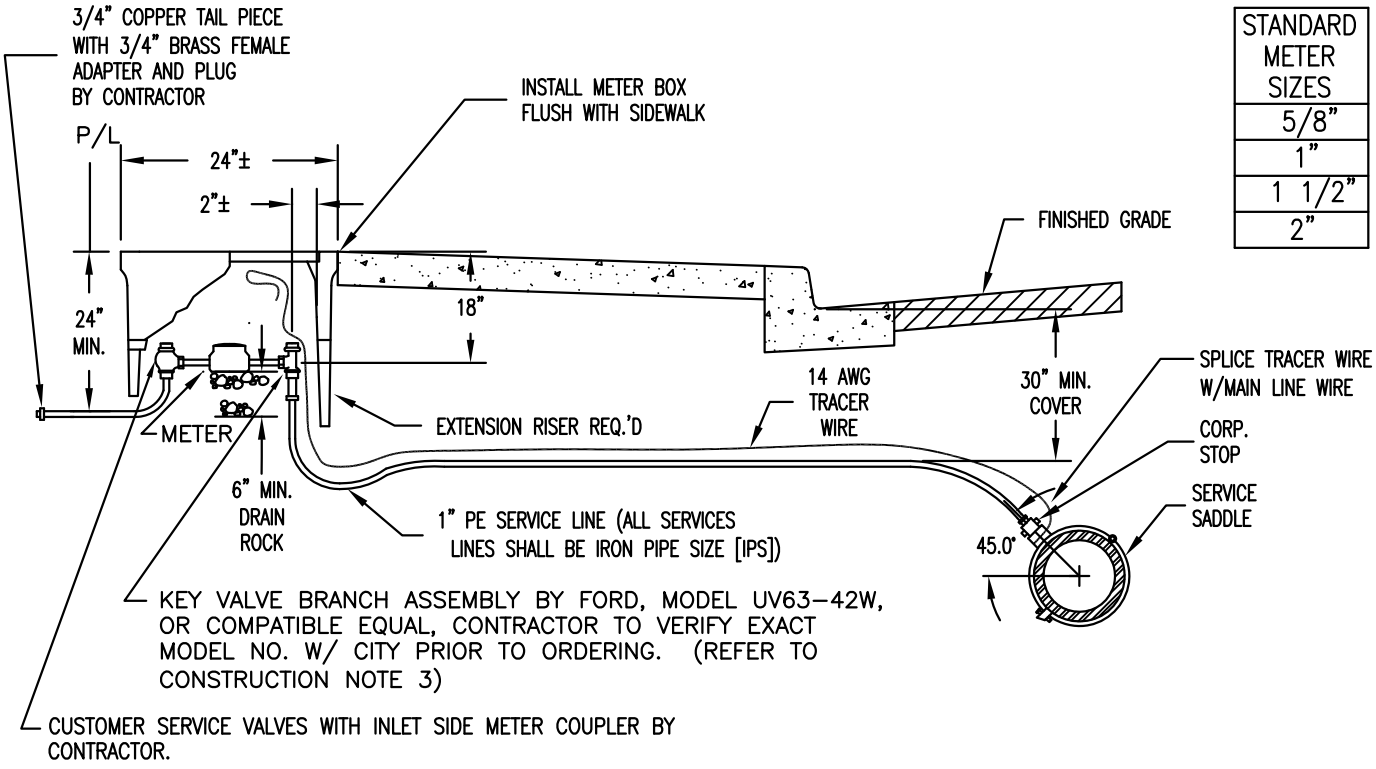
The Oregon Administrative Rules state, "the division may refuse or revoke certification if it finds, after the opportunity for a hearing, under ORS 183, That the device tester:

A) Is incompetent in performing device testing
B) Has falsified a test report or
C) Has allowed any other person to use their certificate number

To be competent in device testing, a tester must complete and submit accurate test reports for each assembly tested and shall be responsible for such reports. Evidence that a test report has been altered, falsified or forged, will be investigated and forwarded to the Health Division.

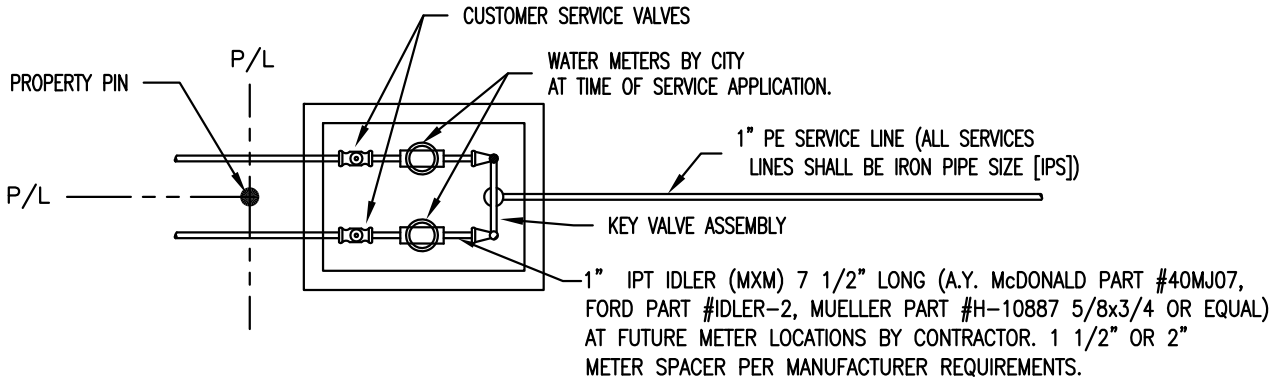
Proof of such activity, shall be cause for immediate action.

Appendix R. Standard Details for Water System Design



STANDARD METER SIZES
5/8"
1"
1 1/2"
2"

PROFILE



PLAN

CONSTRUCTION NOTES

1. ALL POLYETHYLENE (PE) PIPE SHALL CONTAIN STAINLESS STEEL INSERT STIFFENERS INSIDE BOTH ENDS OF PIPE.
2. METER BOXES SHALL BE SET IN THE SIDEWALK AT THE BACK OF SIDEWALK OR DIRECTLY BEHIND THE BACK OF SIDEWALK.
3. REFER TO STANDARD DRAWINGS 7-100a – 7-100c FOR PARTS LIST.
4. TRACER WIRE SHALL BE EXTENDED 24" ABOVE FINISHED SURFACE AND LEFT COILED UNDER METER BOX LID.

CITY OF KLAMATH FALLS

	Date	Revision:
3	3/10	5th EDITION
2	6/06	4th EDITION
1	6/04	2nd EDITION

WATER SERVICE CONNECTION RESIDENTIAL

Approved By: *Don Wilcox*

Drwn. By: GDG

Date: 1/2002

Drwg. No.: **7-100**

TYPICAL 1" TAP

#	1"MAIN TAP – FITTING	QTY	FORD	A.Y. McDONALD	MUELLER
1	Saddle Main size OD" x 1"IP tap Romac 101S (12"Main + 202S)	1			
2	Corp Stop 1"IP x 1"PE/PJ	1	F1101-4	4704-33 1"	H-15029
3	PE Pipe 1" IPS 200#PSI Thick Wall				
4	Stiffener 1" IPS PE Pipe	1	Insert 72	6136 1"	505142
5	2" Water Detectortape				
6	14 gauge x 1 Blue UF Irr Cont Wire				
	Dual $\frac{5}{8}$" x $\frac{3}{4}$" SERVICE SETTING				
7	U Branch Assembly 1" PE/PJx $\frac{3}{4}$" mip/AMV $\frac{3}{4}$"MSN/LW (or)	1	UV63-42W-7.5	09U3AW 1"X$\frac{3}{4}$"X7.5	N/A
8	U Branch 1" PE/PJx $\frac{3}{4}$" mip	1	U68-43-7.5	08U3M 1"X$\frac{3}{4}$"X7.5	N/A
9	Angle meter valve $\frac{3}{4}$" fip x $\frac{3}{4}$" swivel nut/lock wing	2	BA13-332W	460B-3/4	B 24265
10	Spacer PVC or Idler	2	Idler-2	40MJ07	H-10887$\frac{3}{4}$X$\frac{3}{4}$
11	Angle meter valve $\frac{3}{4}$" swivel nut/lock wing x $\frac{3}{4}$" Cu	2	BA43-332W-Q, BA43-332W4602BQ-3/4, 4602B-22-3/4	4602BQ-3/4, 4602B-22-3/4	B24258, P24258
12	Copper tubing $\frac{3}{4}$" type K soft	3'			
13	Coupling $\frac{3}{4}$" Cu flare x $\frac{3}{4}$" Fip	2	C14-33-Q, C14-33	4754Q-3/4, 4754-22-3/4	H15451, P15451
14	Plug $\frac{3}{4}$" PVC	2			
	METER BOXES		ARMORCAST		
15	Dual Box Body	2	P6001534X28		
16	Dual Box S-Cover	1			
17	Dual Box St-Lid	1			
18	Dual Box Traffic Cover	1	A6001947T-H7		
	$\frac{5}{8}$" x $\frac{3}{4}$" SINGLE SERVICE SETTING				
19	Angle meter valve 1" PE/PJx $\frac{3}{4}$" swivel nut/lock wing	1	KV63-342W	4602B-33 1" X $\frac{3}{4}$"	H-14259
20	Spacer/Idler PVC	1		40MJ07	
21	Angle meter cplg $\frac{3}{4}$" meter swivel nut x $\frac{3}{4}$" Cu	1	BA43-332W-Q, BA43-332W	4602BQ-3/4, 4602B-22-3/4	B24258, P24258
22	Copper tubing $\frac{3}{4}$" type K soft	1.5'			
23	Coupling $\frac{3}{4}$" Cu flare x $\frac{3}{4}$" Fip	1	C21-33	4754$\frac{3}{4}$"	H-15450
24	Plug $\frac{3}{4}$" PVC	1			
	METER BOXES		ARMORCAST		
25	Box Body	1			
26	Box Bottom	1			
27	Box Body	2	P6000485X24		
28	Box S-Cover	1			
29	Box St-Lid	1			
30	Box Traffic Cover	1	A6000484T-H7		

CITY OF KLAMATH FALLS

WATER SERVICE CONNECTION
RESIDENTIAL FITTINGS & BOXES

MK	Date	Revision:
4	2/11	5th EDITION
3	6/06	4th EDITION
2	6/05	3rd EDITION
1	6/04	2nd EDITION

Approved By: *Don Wilcox*

Drwn. By: GDG
Date: 1/2002
Drwg. No.: **7-100a**

TYPICAL 1" TAP (CONCLUDED)

1" MAIN TAP					
#	FITTING	QTY			
1	Saddle Main size OD" x 1"IP tap Romac 101S (12"Main + 202S)	1			
			FORD	A.Y. McDONALD	MUELLER
2	Corp Stop 1"IPx1"PE/PJ	1	F1101-4	4704-33 1"	H-15029
3	PE Pipe 1"IPS 200#PSI Thick Wall				
4	Stiffener 1"IPS PE Pipe	1	Insert 72	6136 1"	505142
5	2" Water Detectotape				
6	14 gauge x 1 Blue UF Irr Cont Wire				
1" SINGLE SERVICE SETTING					
7	Angle meter valve 1"PE/PJx1"swivel nut/lock wing	1	KV63-444W	4642B-33 1"	H-14259
	or				
8	Straight meter valve 1"Fip x 1"swivel nut/lock wing	1	B13-444W		
9	Spacer PVC or Idler	1	Idler-4	Not Available	H-10887 1"
10	Angle meter valve 1" swivel nut/lock wing x 1" Cu	1	KV23-444W	4642B	MH41255
11	Copper tubing 1" type K soft	1.5'			
12	Coupling 1"CU flare x 1 Fip	1	C21-44	4754 1"	H-15450
13	Plug 1"PVC	1			
	METER BOXES		ARMORCAST		
14	Box Body	1			
15	Box Bottom	1			
	or				
16	Box Body	2	P6000485X24		
17	Box S-Cover	1			
18	Box St-Lid	1			
	or				
19	Box Traffic Cover	1	A6000484T-H7		

MK	Date	Revision:
3	2/11	5TH EDITION
2	6/06	4TH EDITION
1	6/04	2nd EDITION

CITY OF KLAMATH FALLS

WATER SERVICE CONNECTION
RESIDENTIAL FITTINGS & BOXES

Approved By: *Don Wilcox*

Drwn. By: GDG
Date: 1/2002
Drwg. No.: **7-100b**

TYPICAL 2" TAP

2" MAIN TAP

#	FITTING	QTY			
1	Saddle Main size OD" x 2" IP Tap Romac 202S	1			
			FORD	A.Y. McDONALD	MUELLER
2	Corp Stop 2" IP x 2" IP	1	FB500-7 MIPT	3131B 2" MIPT	B-2969 2"MIPT
3	Pipe 2" PVC Sch80 with Sch 80 fittings or 2" IPS PE or 2" Cu tubing type K soft				
4	2" Brass Adapter/Bushing/Coupling for connection/reduction				
	or				
5	2" IPS PE or Cu tubing for connection.reduction		C86-77-IDR-7	4753-33 2"	E-15429
6	2" Water Detectotape				
7	14 gauge x 1 Blue UF Irr Cont Wire				
	2" SERVICE SETTING				
8	Angle Meter Valve 2" Fip x Flg	1	BFA13-777W	4604B 2"	B-24286
9	Spacer PVC 2" or Idler	1	Idler-7	N/A	N/A
10	Angle Meter Coupling 2" Fip x Flg	1	LF31-77	4783FF 2"	2" H-14204
11	Pipe 2" PVC Sch80 with Sch80 fittings	1.5			
12	PVC 2" Sch80 Adapter/Bushing/Coupling for connection/reduction				
	or				
13	2" IPS PE or Cu tubing type K soft	1.5			
14	Brass 2" IPS PE or Cu tubing size FOrd/McDonald/Mueller fittings for connection/reduction				
15	Plug 2" Brass	1			
	METER BOXES				
			ARMORCAST		
16	2" & 3" Box Body	2	P6001534X28		
17	2" & 3" Box S-Cover	1			
18	2" & 3" Box St-Lid	1			
	or				
19	2" & 3" Traffic Cover	1	A6001947T-H7		

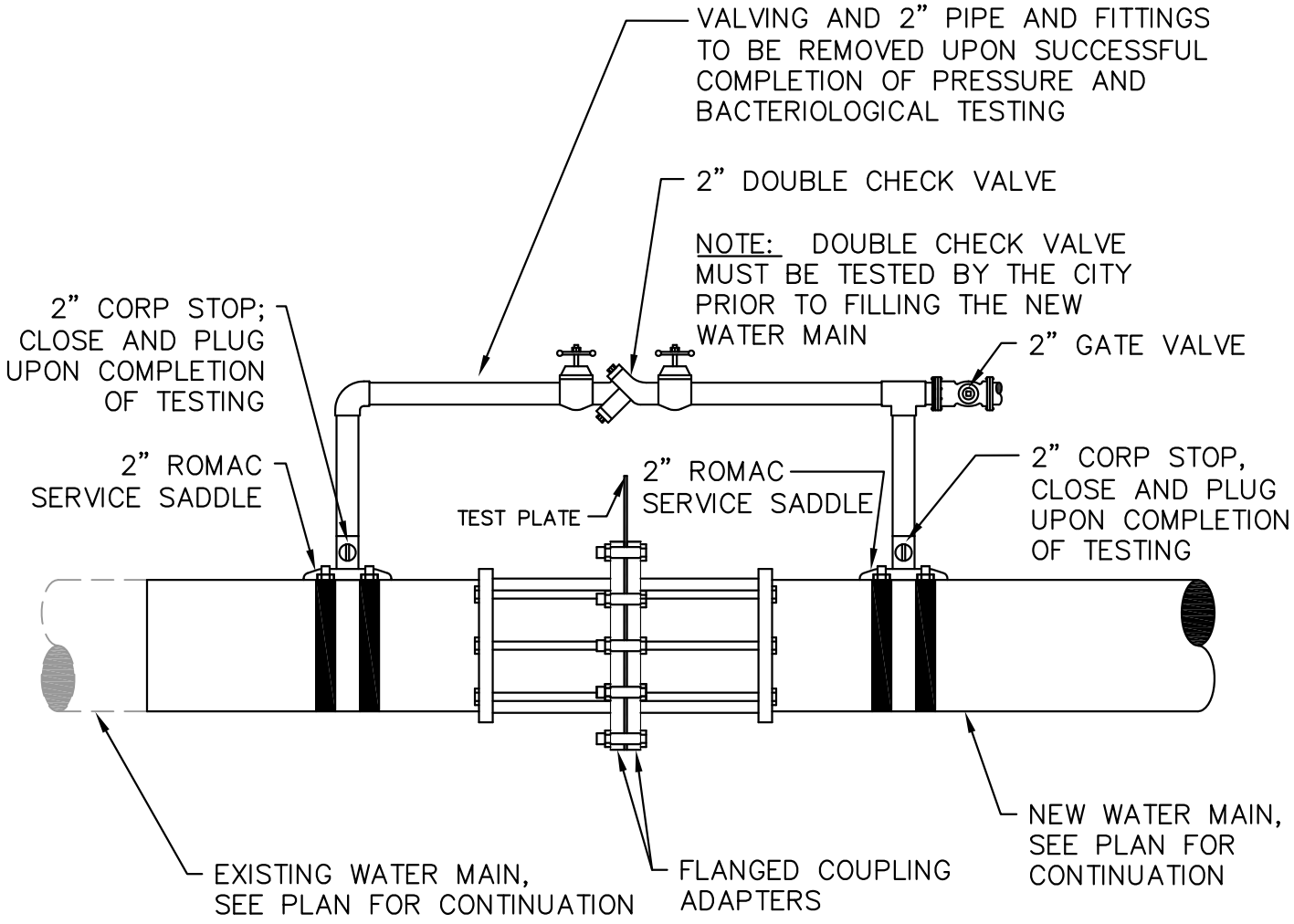
CITY OF KLAMATH FALLS

WATER SERVICE CONNECTION
RESIDENTIAL FITTINGS & BOXES

Approved By: *Don Wilcox*

MK	Date	Revision:
2	2/11	5th EDITION
1	6/06	4th EDITION

Drwn. By: GDG
Date: 1/2002
Drwg. No.: **7-100c**



CITY OF KLAMATH FALLS

	Date	Revision:
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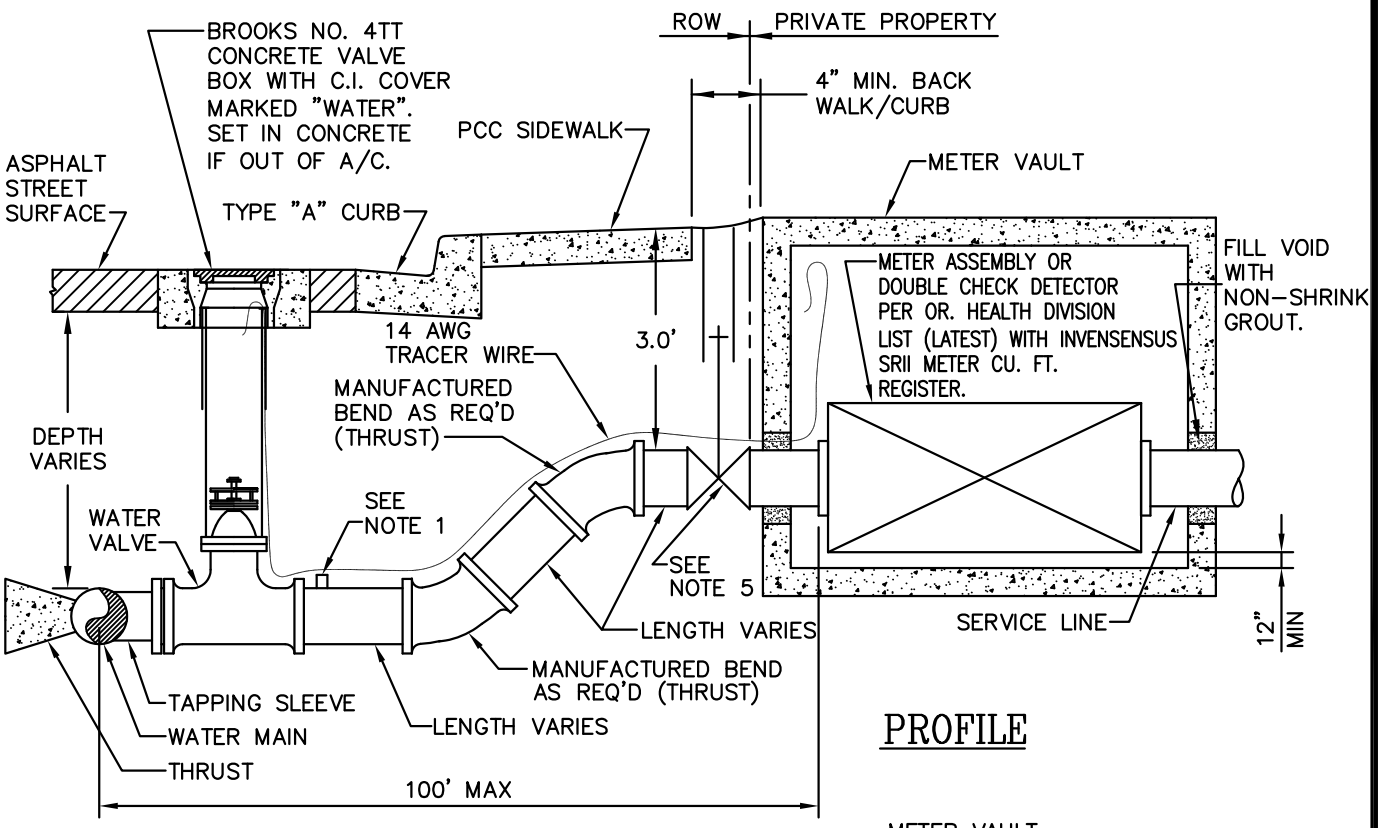
TESTING PLATE

Approved By: *Don Wilcox*

Drwn. By: JDH

Date: 12/2009

Drwg. No.: **7-102**



NOTES:

1. 1" TESTING AND CHLORINATION TAP, TEMPORARY PIPE TO FINISH SURFACE (LOCATED AWAY FROM TRAFFIC AREAS) IPT OUTLET CORPORATION STOP AT SURFACE, TO BE REMOVED AND CAPPED (PLUGGED) AT THE MAIN AS SOON AS THE TESTING AND CHLORINATION IS COMPLETED.
2. ALL FIRE SERVICES TO BE CLASS 50 DUCTILE IRON PIPE WITH APPROPRIATE FITTINGS.
3. TRACER WIRE SHALL BE EXTENDED 24" ABOVE FINISHED SURFACE ON BOTH ENDS AND LEFT COILED UNDER VALVE CASE LID AND METER VAULT LID.
4. CITY PERSONNEL MUST BE PRESENT ANY TIME A TAP IS MADE ON AN EXISTING CITY WATER LINE.
5. WHEN INSTALLING FIRE SERVICE, INSTALL RESILIENT WEDGE GATE VALVE AT PROPERTY LINE.
6. FOR BACKFLOW PREVENTOR INSTALLATIONS, SEE STD DWGS 7-130 THRU 7-226.
7. REQUIRES BYPASS VALVE, SEE STD DWG 7-106.

CITY OF KLAMATH FALLS

	Date	Revision:
4	3/11	5th EDITION
3	6/06	4th EDITION
2	6/05	3rd EDITION
1	6/04	2nd EDITION

WATER SERVICE CONNECTION GREATER THAN 2" & FIRE SERVICE

Approved By: *Don Wilcox*

Drwn. By: GDG

Date: 1/2002

Drwg. No.: **7-105**

CONSTRUCTION NOTES

FOR THE INSTALLATION OF FIRE SERVICES, OR SERVICE LINE GREATER THAN 2"

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE MOST CURRENT EDITION OF APWA "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" AND THE CITY OF KLAMATH FALLS STANDARD DRAWINGS AND SPECIFICATIONS UNLESS OTHERWISE NOTED OR AMENDED.

2. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO DIGGING BY CONTACTING THE KLAMATH UTILITIES COORDINATING COUNCIL @ 811, 48 HOURS BEFORE DIGGING.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL IMPROVEMENTS AND UTILITIES DAMAGED DURING CONSTRUCTION. ALL REPAIR WORK SHALL MEET OR EXCEED EXISTING CONDITIONS AND BE AT CONTRACTOR'S EXPENSE.

4. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL UTILITIES WITH THE UTILITY OWNERS TO PREVENT DELAYS DURING CONSTRUCTION.

5. ALL UTILITIES SHALL BE MARKED WITH AN APPROVED LOCATOR TAPE PLACED 12" BELOW THE GROUND SURFACE. TAPE SHALL BE COLOR CODED FOR THE UTILITY BEING MARKED. TRACER WIRE (14 AWG SINGLE STRAND WITH BLUE INSULATION) TO BE PLACED ON TOP OF PIPE ZONE. LOCATOR TAPE AND WIRE SHALL BE PLACED PER THE CITY OF KLAMATH FALLS STANDARD DRAWING NO. 2-105 UNLESS OTHERWISE NOTED.

6. ALL VALVES SHALL BE RESILIENT WEDGED EPOXY LINED AND COATED GATE VALVES. VALVES SHALL OPEN WHEN ROTATED COUNTER-CLOCKWISE.

7. ALL WATERLINE FITTINGS SHALL BE DUCTILE IRON AND SHALL BE INSTALLED WITH THRUST BLOCKS PER THE CITY OF KLAMATH FALLS STANDARD DRAWING NO. 2-120, UNLESS OTHERWISE NOTED.

8. GENERAL CONTRACTOR SHALL PERFORM DISINFECTION OF FACILITIES BY CHLORINATION ACCORDING TO OREGON ADMINISTRATIVE RULES 333-061-0050 (10) AND AWWA STANDARDS C651 THROUGH C654. CITY PERSONNEL SHALL PERFORM CHLORINE RESIDUAL TESTS IMMEDIATELY AFTER DISINFECTION AND IMMEDIATELY AFTER FLUSHING. CITY PERSONNEL SHALL PERFORM MICROBIOLOGICAL TEST PER CURRENT STANDARDS. SHOULD ANY TEST FAIL, THE CONTRACTOR IS RESPONSIBLE TO PAY THE CITY'S CURRENT HOURLY RATE AT NO LESS THAN 1/2 HOUR INCREMENTS FOR ADDITIONAL TESTS. CALL 883-5368 FOR CURRENT RATE. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR DE-CHLORINATION AS REQUIRED BY FEDERAL, STATE AND LOCAL REGULATIONS.

9. THE CONTRACTOR SHALL MECHANICALLY CLEAN THE CONSTRUCTED WATER MAINS BEFORE WATER IS ALLOWED TO ENTER THE NEW MAIN. CLEANING WILL BE ACCOMPLISHED BY PROPELLING OR PULLING AN APPROPRIATELY SIZED BULLET SHAPED FOAM PLUG (PIG) THROUGH THE ENTIRE LENGTH OF THE WATER MAIN. REFER TO THE WATER DISTRIBUTION OPERATION TRAINING HANDBOOK FOR INSTRUCTIONS. A COPY OF THIS SECTION CAN BE OBTAINED FROM CITY ENGINEERING.

10. THE CONTRACTOR SHALL PRESSURE TEST THE WATERLINE AND THE SERVICE BY HYDROSTATIC METHOD PER CURRENT AWWA STANDARDS SECTION C600. TEST PRESSURE SHALL BE A MINIMUM OF 150 PSI FOR A TWO HOUR PERIOD DURATION. CITY PERSONNEL SHALL APPROVE ALL EQUIPMENT USED AND WITNESS FILLING OF THE LINE AND PRESSURE TESTING PROCESS. SHOULD THE TEST FAIL, THE CONTRACTOR IS RESPONSIBLE TO PAY THE CITY'S CURRENT RATE AT NOT LESS THAN 1/2 HOUR INCREMENTS FOR ADDITIONAL TESTS. CALL 883-5368 FOR CURRENT RATE.

11. CONNECTION TO THE EXISTING WATERLINES SHALL BE MADE BY THE CONTRACTOR (CONTRACTOR TO FURNISH AND INSTALL ALL FITTINGS) WITH THE CITY PERSONNEL OBSERVING. THE CONTRACTOR SHALL COORDINATE WITH THE CITY ON THE TIMING OF WORK.

12. MECHANICAL JOINT ADAPTERS SHALL BE FOSTER ADAPTERS, OR A COMPATIBLE EQUAL.

13. ALL WORK AND MATERIALS SHALL BE WARRANTED BY THE CONTRACTOR OR THE DEVELOPER FOR A PERIOD OF ONE YEAR AFTER THE DATE OF ACCEPTANCE BY THE CITY OF KLAMATH FALLS.

14. ALL TRENCH WORK SHALL CONFORM TO THE DETAILS ON STANDARD DRAWING NO. 2-105 OF THE CITY OF KLAMATH FALLS STANDARD DRAWINGS.

CITY OF KLAMATH FALLS

	Date	Revision:
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3	6/06	4th EDITION
2	6/05	3rd EDITION
1	6/04	2nd EDITION

CONSTRUCTION NOTES
FOR STANDARD DRAWING NO. 7-105

Approved By: *Don Wilcox*

Drwn. By: GDG
Date: 1/2002
Drwg. No.: **7-105a**

CONSTRUCTION NOTES

FOR THE INSTALLATION OF FIRE SERVICES, OR SERVICE LINE GREATER THAN 2" (CONTINUED)

15. ALL VAULTS SHALL BE MANUFACTURED BY UTILITY VAULT COMPANY OR A COMPATIBLE EQUAL. APPROVAL OF EQUALS REQUIRED.

16. WATER METERS SHALL BE MANUFACTURED BY SENSUS TECHNOLOGIES, INC. AND WILL MEET ALL CITY REQUIREMENTS FOR EACH APPLICATION. 1 1/2" AND LARGER SHALL BE SENSUS OMNI METER.

17. FIRE SERVICE METERS SHALL CONFORM WITH AWWA STANDARD C703.

18. FOR FIRE SERVICES INSIDE A BUILDING:
    - SENSUS SRII TRPL GALLON METER W/LENGTH OF WIRE PER EACH UNIT
    - PAD HEIGHT – REASONABLE
    - TOUCH PAD–2" HOLE THROUGH WALL, 1 1/2"± CONDUIT IN WALL FOR WIRE TO CONNECT PAD TO SENSOR. WIRE SHALL BE STRAPPED TO FITTINGS AND PIPE.

19. WHEN TAPPING EXISTING WATER MAIN LINES, THE CONTRACTOR SHALL MAKE PROVISIONS TO CONTINUOUSLY FLUSH AND PURGE WATER THROUGH THE NON–PRESSURIZED SIDE OF THE TAPPING VALVE (TOWARD THE BOTTOM), OR THROUGH THE TAPPING MACHINE. USING A CORPORATION STOP ON THE TESTING TAP ON THE TAPPING SLEEVE IS NOT ACCEPTABLE. AN ALTERNATE METHOD MAY BE APPROVED BY THE CITY INSPECTOR TWO WORKING DAYS PRIOR TO THE ACTUAL TAP. WHEN WORKING WITH ASBESTOS PIPE, REFER TO APPENDIX 7–A FOR PROPER HANDLING. THE CONTRACTOR IS RESPONSIBLE TO DISPOSE OF CONTAMINATED WATER AND ASBESTOS PIPE IN ACCORDANCE WITH DEQ REGULATIONS.

20. THE CONTRACTOR SHALL NOT ADJUST OR OPERATE WATER VALVES UNDER CITY JURISDICTION. IF IT IS DETERMINED BY THE CONTRACTOR THAT A CITY VALVE NEEDS TO BE OPERATED, THE CONTRACTOR SHALL NOTIFY THE CITY INSPECTOR A MINIMUM OF TWO WORKING DAYS BEFORE THE CONTRACTOR'S SCHEDULED DATE.

21. CONTRACTOR TO NOTIFY THE CITY INSPECTOR A MINIMUM OF THREE WORKING DAYS BEFORE THE PRESSURE TEST SO THE CITY INSPECTOR CAN NOTIFY THE WATER DIVISION TO SCHEDULE MICROBIOLOGICAL TESTING.

22. IF THE CONTRACTOR IS PLANNING A CITY WATER MAIN SHUT DOWN, THE CONTRACTOR SHALL GIVE ALL AFFECTED WATER USERS A MINIMUM OF TWO WORKING DAYS WRITTEN NOTICE (FLYERS INSERTED ON DOOR HANDLES ARE RECOMMENDED) PRIOR TO THE CITY SHUTTING DOWN THE MAIN LINE. THE CITY INSPECTOR WILL SUPPLY THE CONTRACTOR WITH THE ADDRESSES OF THE AFFECTED WATER USERS.

23. THE CONTRACTOR SHALL NOT MIX GALVANIZED AND BRASS FITTINGS.

24. A RESTRAINT SCHEDULE SHALL BE INCLUDED ON THE DESIGN PLANS OR SUBMITTED BY THE CONTRACTOR SEPARATELY FOR CITY ENGINEERING APPROVAL.

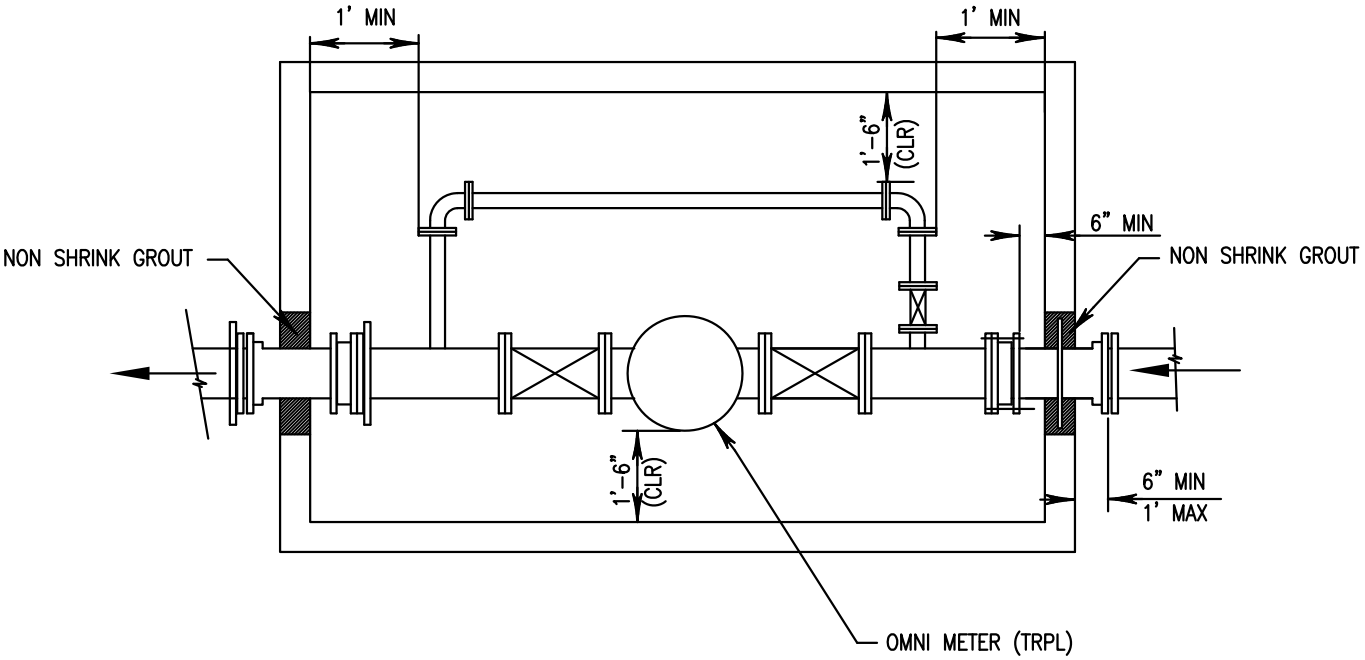
CITY OF KLAMATH FALLS

	Date	Revision:
4	3/10	5th EDITION
3	6/06	4th EDITION
2	6/05	3rd EDITION
1	6/04	2nd EDITION

CONSTRUCTION NOTES
FOR STANDARD DRAWING NO. 7–105

Approved By: *Don Wilcox*

Drwn. By: GDG
Date: 1/2002
Drwg. No.: **7-105b**



NOTES

1. ALL JOINTS MUST BE RESTRAINED.

CITY OF KLAMATH FALLS

Date	Revision:

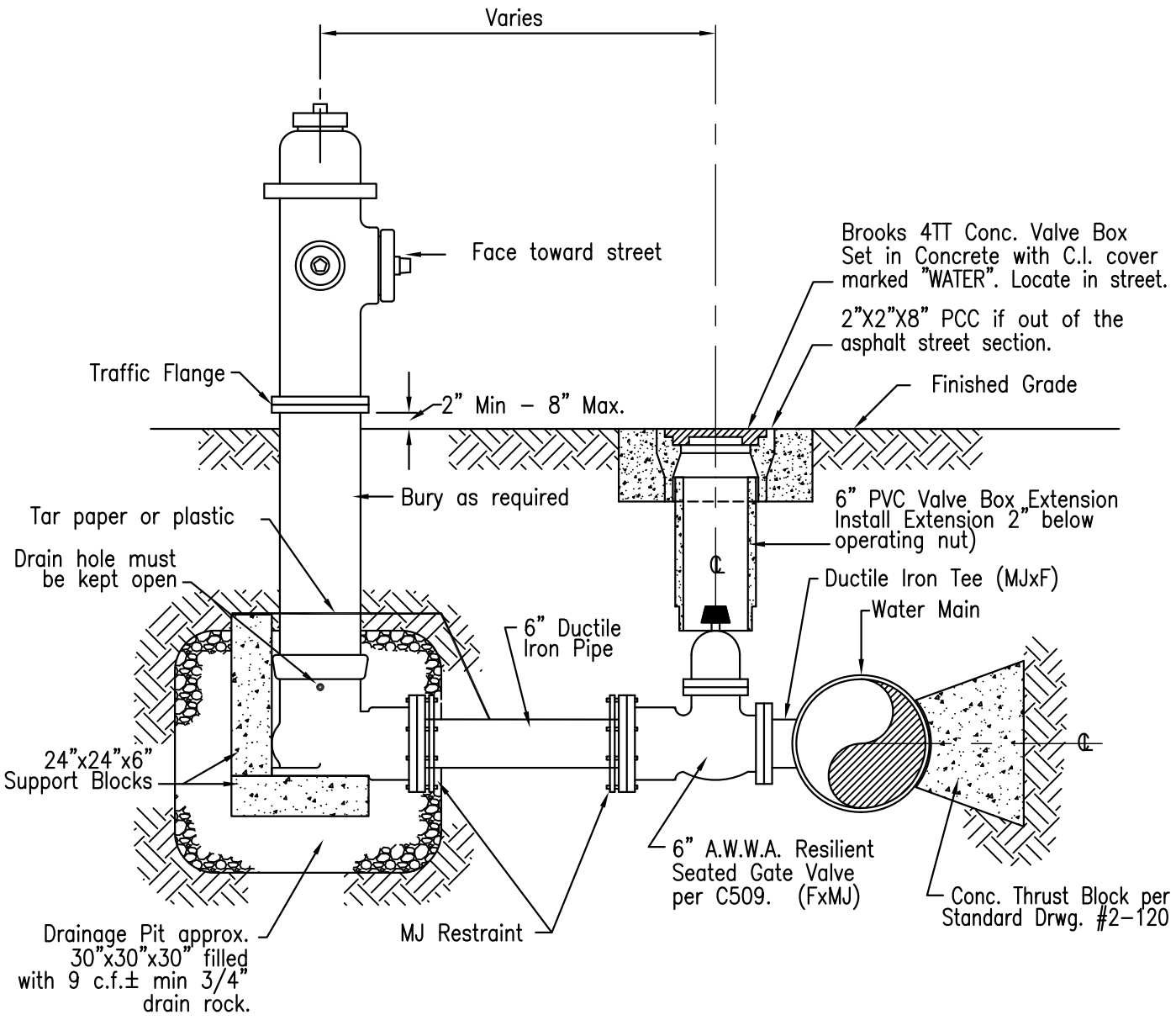
WATER SERVICE CONNECTION GREATER THAN 2"

Approved By: *Don Wilcox*

Drwn. By: JDH

Date: 3/2011

Drwg. No.: **7-106**



CONSTRUCTION NOTES:

1. MATERIALS: Fire Hydrant shall be KENNEDY, MODEL K81D. No substitutions will be permitted. Connection shall be Mechanical Joint unless otherwise noted.
2. All joints will be restrained from the valve to the hydrant.
3. Fire hydrant shall be installed on the same side of street as main line (short service only).
4. Maximum installation distance of 500' between hydrants.
5. Protective bollards required for fire hydrants in close proximity of vehicle travel. (See detail 7–110a)
6. Public Fire Hydrants and bollards shall be painted chrome yellow.

CITY OF KLAMATH FALLS

	Date	Revision:
4	3/10	5th EDITION
3	6/06	4th EDITION
2	6/05	3rd EDITION
1	6/04	2nd EDITION

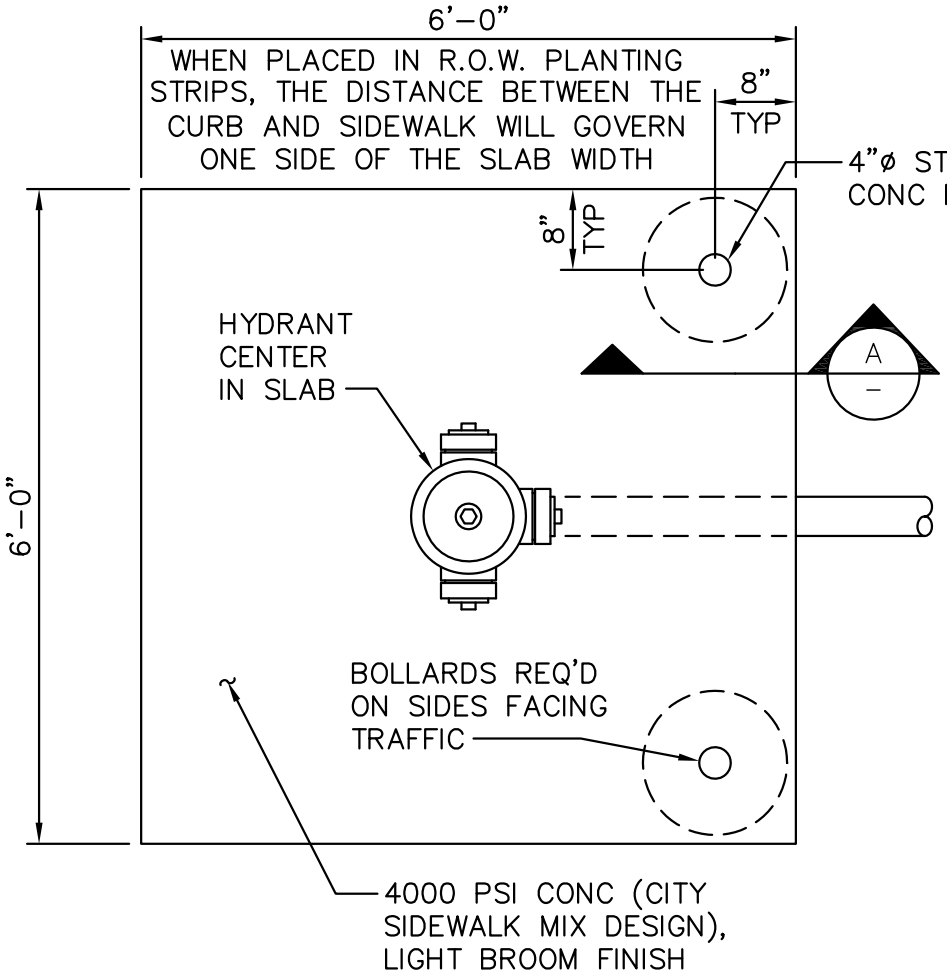
FIRE HYDRANT ASSEMBLY

Approved By: *Don Wilcox*

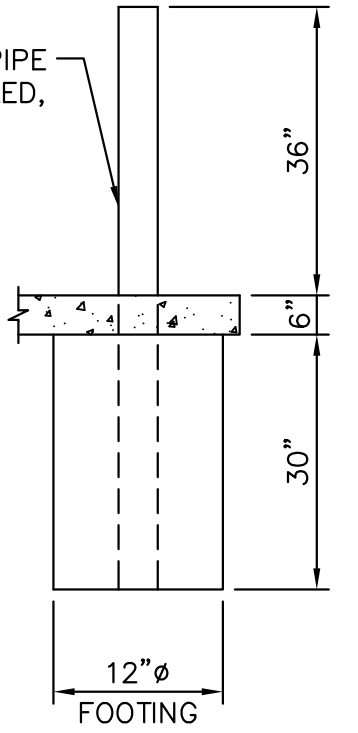
Drwn. By: GDG

Date: 1/2002

Drwg. No.: **7-110**



PCC SLAB DETAIL



BOLLARD DETAIL A

NOTES

1. CONSTRUCTED IN PLANTER OR PARKING AREAS.
7. PCC SLAB SHALL SLOPE TO THE STREET WITH A 2% GRADE.

SCALE: NONE

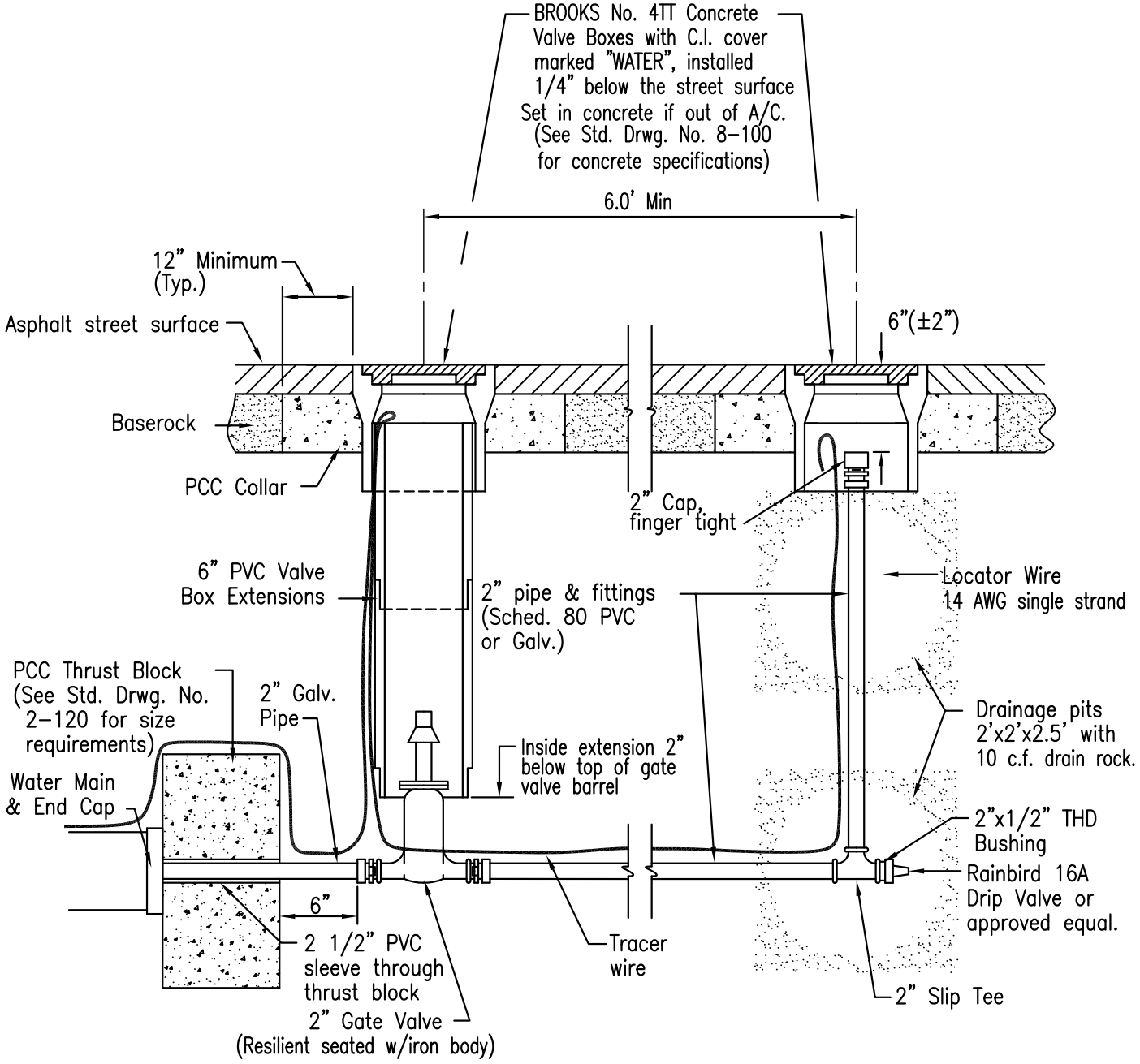
CITY OF KLAMATH FALLS

	Date	Revision:
1	3/10	5th EDITION

FIRE HYDRANT
BOLLARD LOCATION DETAIL

Approved By: *Don Wilcox*

Drwn. By: WM
Date: 10/04
Drwg. No.: **7-110a**



NOTES:

1. Blow-offs located outside of roadway shall have a raised pad around valve box, conforming to the gate valve box shown above.
2. Tracer wire shall be extended 24" above finished surface on both ends and left coiled under the valve box lids.

CITY OF KLAMATH FALLS

	Date	Revision:
3	3/10	5th EDITION
2	6/06	4th EDITION
1	6/04	2nd EDITION

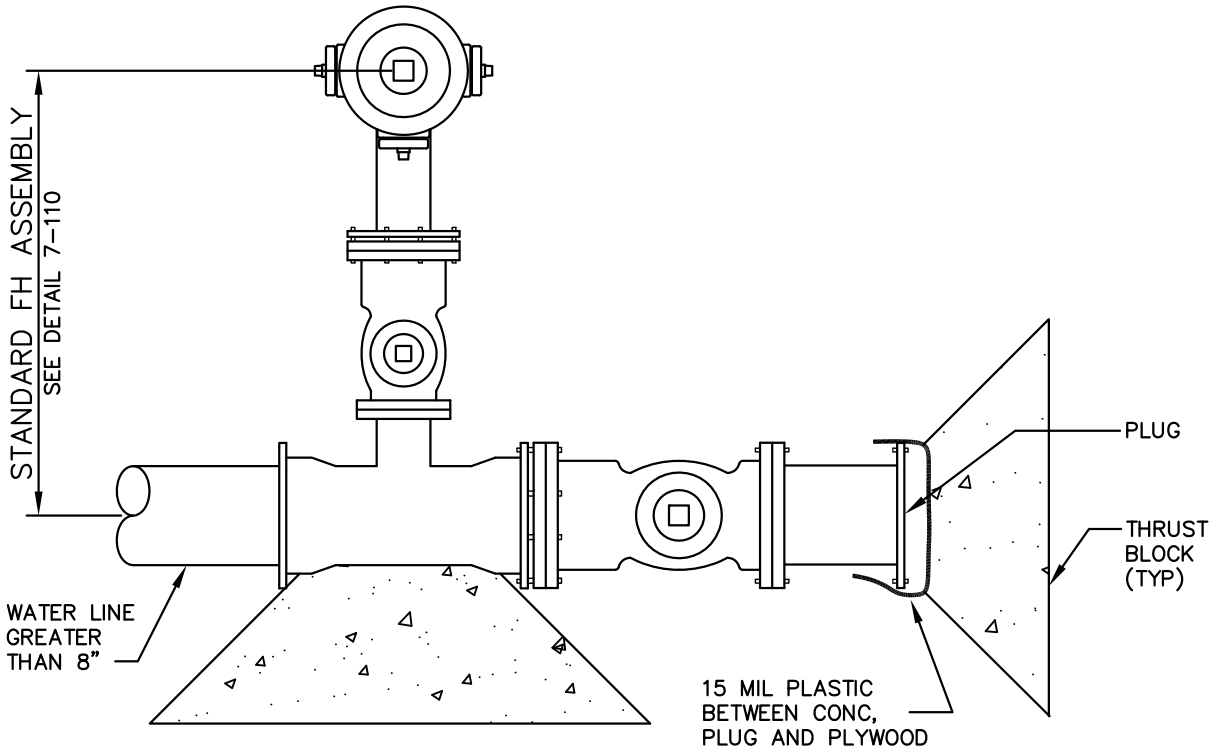
BLOW-OFF ASSEMBLY

Approved By: *Don Wilcox*

Drwn. By: GDG

Date: 1/2002

Drwg. No.: **7-115**



CITY OF KLAMATH FALLS

	Date	Revision:
2	3/10	5th EDITION
1	6/04	2nd EDITION

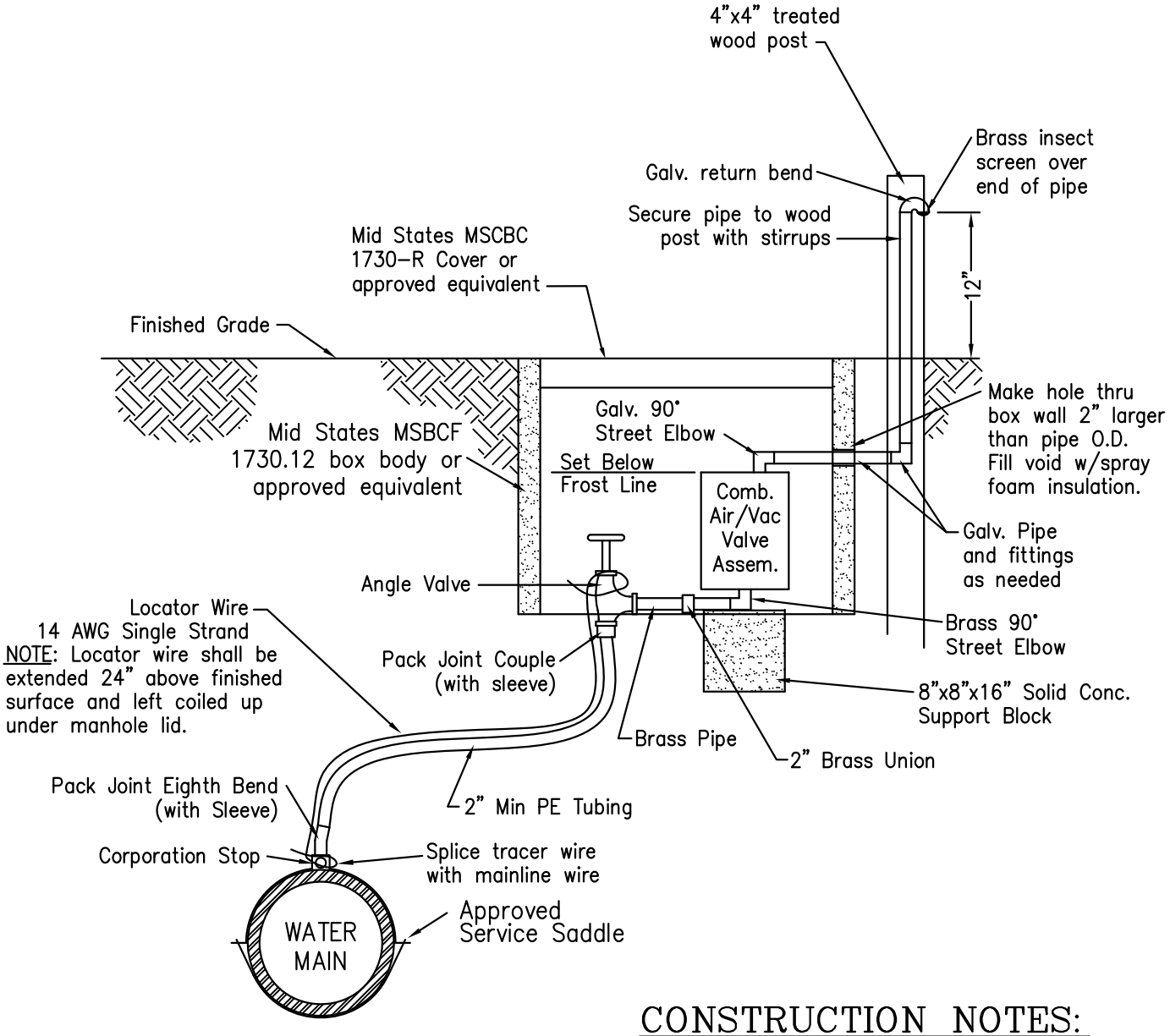
FUTURE CONNECTION FOR LINES GREATER THAN 8"

Approved By: *Don Wilcox*

Drwn. By: WEM

Date: 2/2004

Drwg. No.: **7-117**



CONSTRUCTION NOTES:

1. Locate assembly away from driveways.
2. Refer to 7-5.7

AIR/COMBINATION AIR-VACUUM VALVE ASSEMBLY

CITY OF KLAMATH FALLS

	Date	Revision:
3	3/10	5TH EDITION
2	6/06	4TH EDITION
1	6/04	2nd EDITION

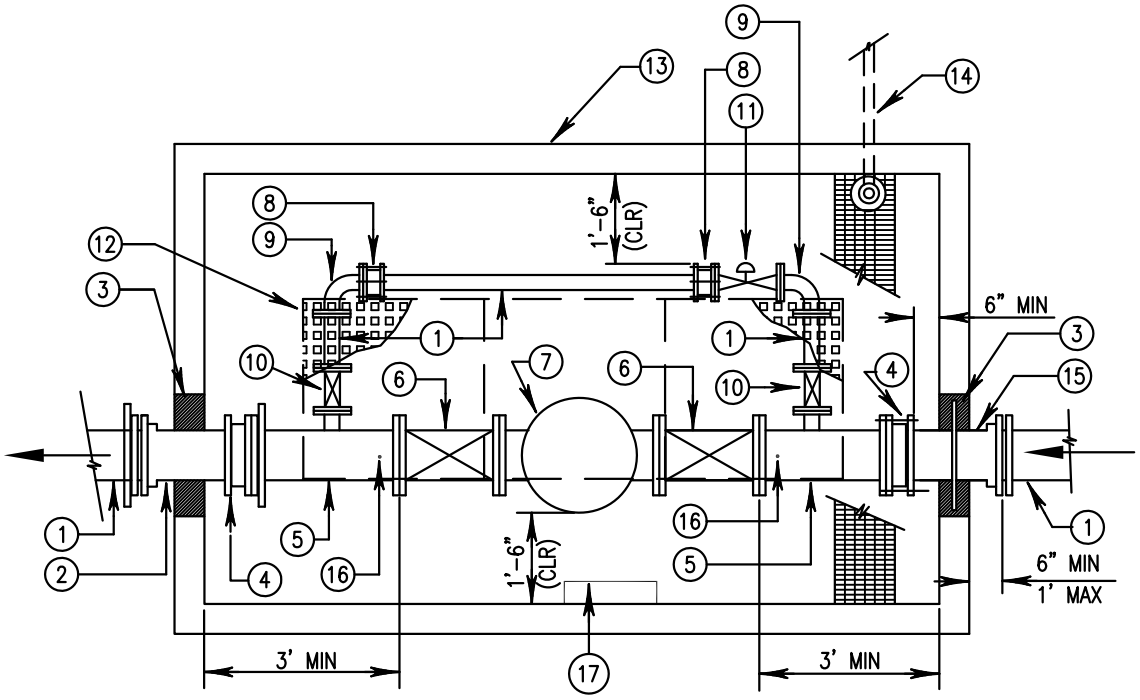
COMBINATION AIR/ VACUUM VALVE

Approved By: *Don Wilcox*

Drwn. By: GDG

Date: 1/2002

Drwg. No.: **7-120**



PARTS LIST

1. DUCTILE IRON PIPE
2. SPOOL (MJxPE) WITH MEGA-LUGS OR EQUAL TO BE USED IN PRECAST VAULTS
3. NON-SHRINK GROUT
4. FLANGED COUPLING ADAPTER (FLxMJ)
5. TEE (ALL FL)
6. GV CL 200 (FLxFL), OR BUTTERFLY VALVE IF LARGER THAN 12 INCH.
7. PRV (FLxFL) (CLA - VAL), HIGH FLOW
8. FLANGE COUPLING ADAPTER
9. FLG x FLG 90° ELL
10. GV (FLxFL)
11. LOW FLOW PRV (FLxFL) (CLA - VAL)
12. UTILITY VAULT CO., OR EQUAL, LID WITH TRAFFIC LOADED LOCKING STEEL COVERS..
13. UTILITY VAULT CO, OR EQUAL, PRECAST VAULT.
14. 2" GRAVITY SUMP DRAIN EXTEND TO DAY-LIGHT OR TO STORM DRAINAGE SYSTEM.
15. WALL SLEEVE (FLxPE) TO BE USED WITH CAST IN PLACE VAULTS.
16. 1/4" GAUGE TAPS WITH 1/4" BALL VALVES FOR ISOLATION.
17. GALVANIZED STEEL LADDER TO BE SECURED TO THE VAULT.

NOTES

1. MINIMUM CLEARANCE BETWEEN PRV VALVES AND FLOOR SHALL BE 12".
2. MINIMUM CLEARANCE BETWEEN HIGHEST PART OF ASSEMBLY AND TOP OF VAULT SHALL BE 24".
3. PROVIDE LIQUID FILLED 2 1/2" GAUGES AMETEK SERIES 550L OR EQUAL.
4. ALL EQUIPMENT MUST BE RATED FOR SOURCE PRESSURE.
5. PIPING AND VALVES SHALL BE SUPPORTED BY POURED-IN-PLACE CONCRETE OR STEEL STANDS. NUMBER AND PLACEMENT OF STANDS TO BE DETERMINED BY CITY ACCORDING TO VALVE SIZE.
6. BRAND, TYPE OF PRV, AND ACCESSORIES TO BE APPROVED BY CITY. PRESSURE SETTINGS TO BE DETERMINED BY CITY. SUBMITTAL REQUIRED.

CITY OF KLAMATH FALLS

	Date	Revision:
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1	6/04	2nd EDITION

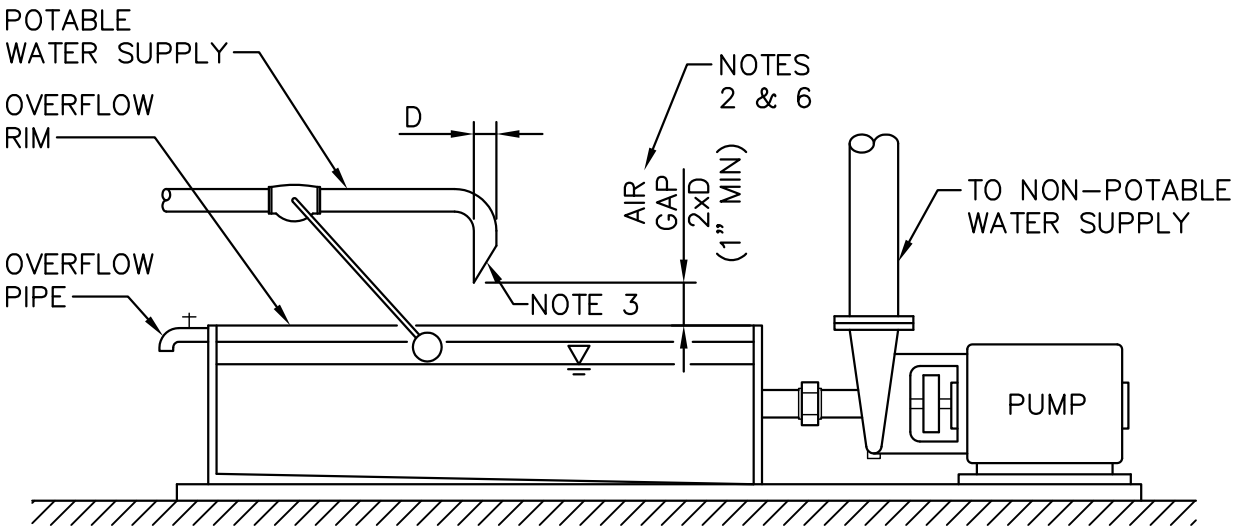
TYPICAL P.R.V. STATION

Approved By: *Don Wilcox*

Drwn. By: GDG

Date: 1/2002

Drwg. No.: **7-125**



MINIMUM AIRGAPS FOR WATER DISTRIBUTION

FIXTURES	WHEN NOT AFFECTED BY SIDE WALLS[1] INCH (MM)	WHEN AFFECTED BY SIDE WALLS[2] INCH (MM)
LAVATORIES AND OTHER FIXTURES WITH EFFECTIVE OPENINGS[3] NOT GREATER THAN ONE HALF (1/2) INCH IN DIAMETER	1" (25)	1 1/2" (38)
SINKS, LAUNDRY TRAYS, GOOSE-NECKS BATH FAUCETS AND OTHER FIXTURES WITH EFFECTIVE OPENINGS[3] NO GREATER THAN THREE QUARTERS (3/4) INCH IN DIAMETER	1 1/2" (38)	2 1/4" (57)
OVER RIM BATH FILLERS AND OTHER FIXTURE WITH EFFECTIVE OPENINGS[3] NO GREATER THAN ONE (1) INCH IN DIAMETER	2" (51)	3" (76)
EFFECTIVE OPENINGS[3] GREATER THAN ONE (1) INCH IN DIAMETER	TWO (2) TIMES DIAMETER OF EFFECTIVE OPENING	THREE (3) TIMES DIAMETER OF EFFECTIVE OPENING

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:

AIRGAP BACKFLOW PROTECTION

Approved By: _____

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-130**

[1] SIDE WALLS, RIBS OR SIMILAR OBSTRUCTIONS DO NOT AFFECT AIRGAPS WHEN SPACED FROM THE INSIDE EDGE OF THE SPOUT OPENING A DISTANCE GREATER THAN THREE TIMES THE DIAMETER OF THE EFFECTIVE OPENING FOR A SINGLE WALL, OR A DISTANCE GREATER THAN FOUR TIMES THE EFFECTIVE OPENING FOR TWO INTERSECTING WALLS.

[2] VERTICAL WALLS, RIBS, OR SIMILAR OBSTRUCTIONS EXTENDING FROM THE WATER SURFACE TO OR ABOVE THE HORIZONTAL PLANE OF THE SPOUT OPENING OTHER THAN SPECIFIED IN NOTE 1 ABOVE. THE EFFECT OF THREE OR MORE SUCH VERTICAL WALLS OR RIBS HAS NOT BEEN DETERMINED. IN SUCH CASES, THE AIRGAP SHALL BE MEASURED FROM THE TOP OF THE WALL.

[3] THE EFFECTIVE OPENING SHALL BE THE MINIMUM CROSS–SECTIONAL AREA AT THE SEAT OF THE CONTROL VALVE OR THE SUPPLY PIPE OR TUBING WHICH FEEDS THE DEVICE OUTLET. IF TWO OR MORE LINES SUPPLY ONE OUTLET, THE EFFECTIVE OPENING SHALL BE THE SUM OF THE CROSS–SECTIONAL AREAS OF THE INDIVIDUAL SUPPLY LINES OR THE AREA OF THE SINGLE OUTLET, WHICHEVER IS SMALLER.

[4] AIRGAPS LESS THAN ONE (1) INCH (25 MM) SHALL BE APPROVED AS A PERMANENT PART OF A LISTED ASSEMBLY THAT HAS BEEN TESTED UNDER ACTUAL BACKFLOW CONDITIONS WITH VACUUMS OF FROM 0 TO 25 INCHES OF MERCURY.

NOTES

1. AIRGAP PROTECTION MAY BE USED IN LIEU OF MECHANICAL BACKFLOW PROTECTION, WITH CITY OF KLAMATH FALLS APPROVAL IN THEIR RESPECTIVE SERVICE AREA.
2. ALL AIRGAPS ARE MEASURED FROM THE BOTTOM OF THE SUPPLY LINE TO THE TOP OF THE OVERFLOW RIM OF THE SINK OR BASIN THAT IS BEING FILLED. THE AIRGAP SHALL BE TWICE THE DIAMETER (2xD) OF THE SUPPLY LINE, BUT IN NO CASE LESS THAN 1". IF THE SUPPLY LINE IF ADJACENT TO THE WALL, THE AIRGAP SHALL BE INCREASED TO THREE TIMES THE DIAMETER (3xD) OF THE SUPPLY PIPING.
3. IF THE SUPPLY LINE IS CUT AT AN ANGLE, THE POINT CLOSEST TO THE BASIN IS USED FOR MEASUREMENT.
4. IF THE SUPPLY LINE IF REDUCED AT THE OPENING, THE DIAMETER USED FOR AIRGAP IS TAKEN AT THE LARGEST PORTION OF THE SUPPLY PIPING.
5. THERE SHALL BE NO EXTENSIONS OR ATTACHMENTS ON THE OPEN END OF THE SUPPLY PIPING. ANY SUCH EXTENSIONS OR ATTACHMENTS WILL VOID THE AIRGAP PROTECTION.
6. REFERENCE DOCUMENT–UNIFORM PLUMBING CODE, CHAPTER 10, SECTION 2003, AND MINIMUM AIRGAPS FOR WATER DISTRIBUTION.

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:

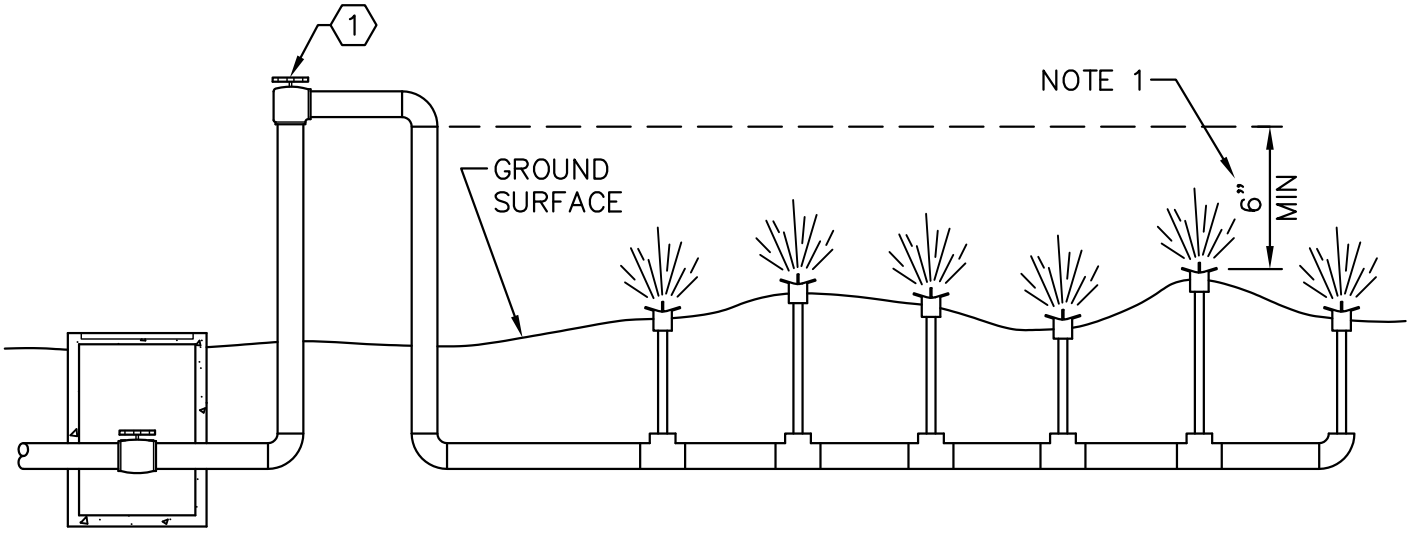
AIRGAP BACKFLOW PROTECTION NOTES

Approved By: _____

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-131**



NOTES

1. ATMOSPHERIC VACUUM BREAKERS SHALL BE INSTALLED A MINIMUM OF 6" ABOVE THE HIGHEST PIPING OR OUTLET THAT IT SERVES.
2. FOR TESTING AND MAINTENANCE PURPOSES, ATMOSPHERIC VACUUM BREAKER (AVB) SHALL NOT BE INSTALLED MORE THAN 6" ABOVE THE GROUND OR FLOOR LEVEL, UNLESS ACCOMPANIED BY A PERMANENT OSHA APPROVED PLATFORM,
3. ALL CLEARANCES APPLY TO OUTSIDE OR IN-BUILDING INSTALLATIONS.
4. AVB'S SHALL NOT BE INSTALLED IN AN AREA WHERE FLOODING IS A POSSIBILITY.
5. AVB'S SHALL NOT BE INSTALLED WHERE DUSTY, CORROSIVE, OR TOXIC ATMOSPHERES ARE PRESENT. NO CHEMICAL OR FERTILIZER MAY BE INTRODUCED THROUGH AN IRRIGATION SYSTEM EQUIPPED WITH AVB'S.
6. THERE SHALL BE NO SHUT-OFF VALVES DOWNSTREAM (ON THE DISCHARGE SIDE) OF THE DEVICE.
7. DEVICE CANNOT BE UNDER CONSTANT PRESSURE MORE THAN 12 HOURS IN ANY 24 HOUR PERIOD.

⟨1⟩ – APPROVED ATMOSPHERIC VACUUM BREAKER (DEVICES WITH IAPMO AND ASSE APPROVAL ARE APPROVED BY ODHS).

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

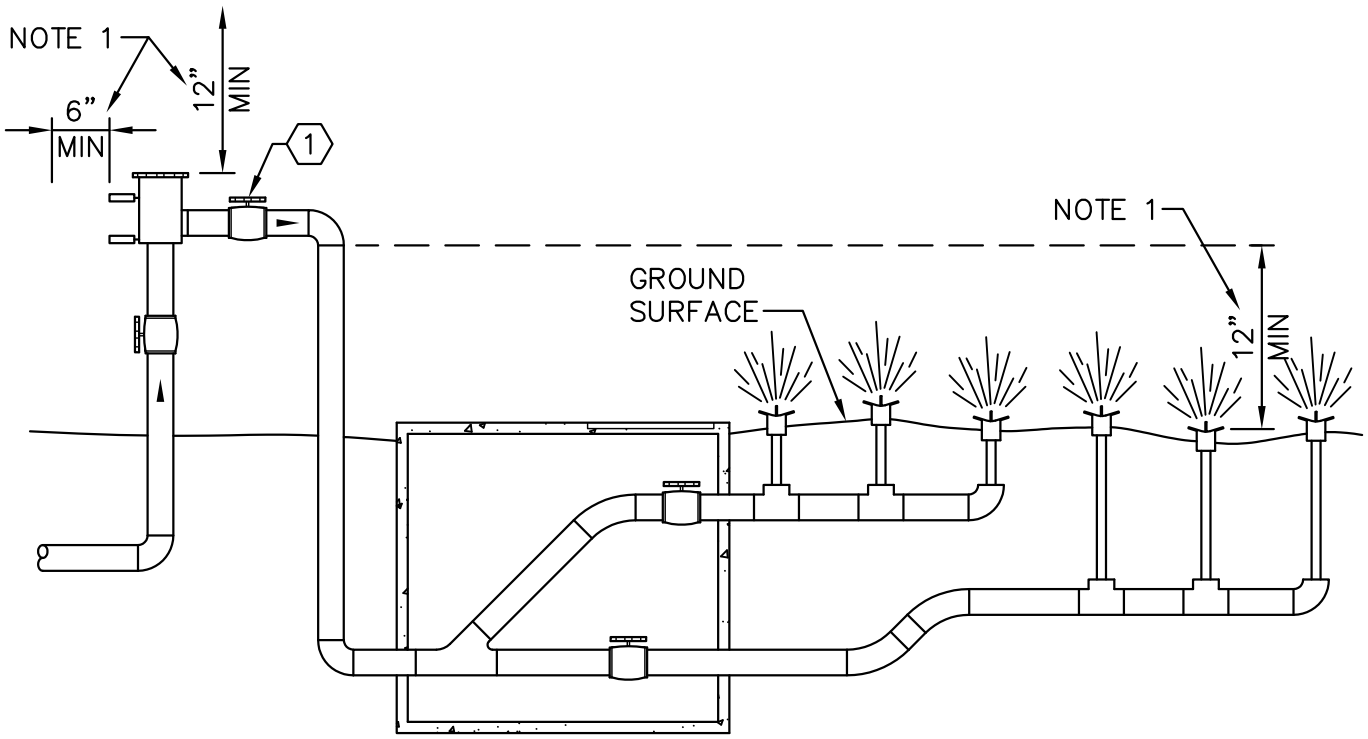
ATMOSPHERIC VACUUM BREAKER

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-135**



NOTES

1. PRESSURE VACUUM BREAKER ASSEMBLY (PVB) SHALL BE INSTALLED A MINIMUM OF 12" ABOVE THE HIGHEST PIPING THAT IT SERVES, 12" CLEARANCE ABOVE THE DEVICE FOR MAINTENANCE AND 6" CLEARANCE ON THE TEST-COCK SIDE FOR TESTING.
2. FOR TESTING AND MAINTENANCE PURPOSES, PVB ASSEMBLY SHALL NOT BE INSTALLED MORE THAN 5' ABOVE GROUND OR FLOOR LEVEL, UNLESS ACCOMPANIED BY A PERMANENT OSHA APPROVED PLATFORM.
3. ALL CLEARANCES APPLY TO OUTSIDE OR IN-BUILDING INSTALLATIONS. WHEN INSTALLED INSIDE A BUILDING, THERE MUST BE A DRAINAGE SYSTEM CAPABLE OF HANDLING THE VOLUME OF WATER, WHICH COULD DISCHARGE FROM THE ASSEMBLY.
4. PVB ASSEMBLY SHALL NOT BE INSTALLED IN AN AREA WHERE IT IS POSSIBLE TO FLOOD THE ASSEMBLY.
5. PVB'S SHALL NOT BE INSTALLED WHERE DUSTY, CORROSIVE, OR TOXIC ATMOSPHERES ARE PRESENT. NO CHEMICAL OR FERTILIZER MAY BE INTRODUCED THROUGH AN IRRIGATION SYSTEM EQUIPPED WITH PVB'S.

(1) – APPROVED PRESSURE VACUUM BREAKER ASSEMBLY

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

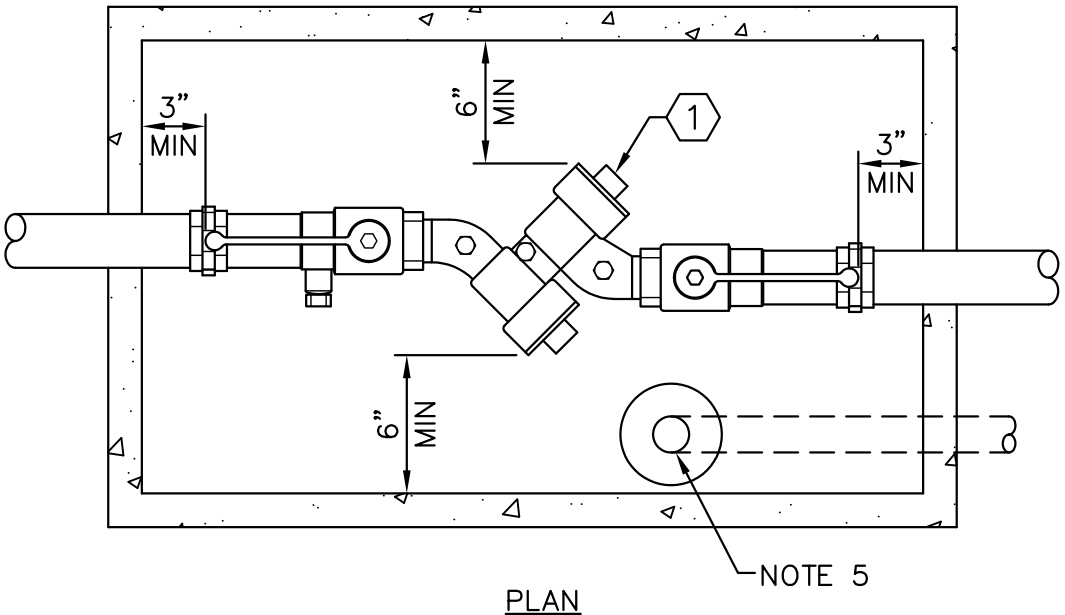
PRESSURE VACUUM BREAKER ASSEMBLY

Approved By: *Mark Willrett*

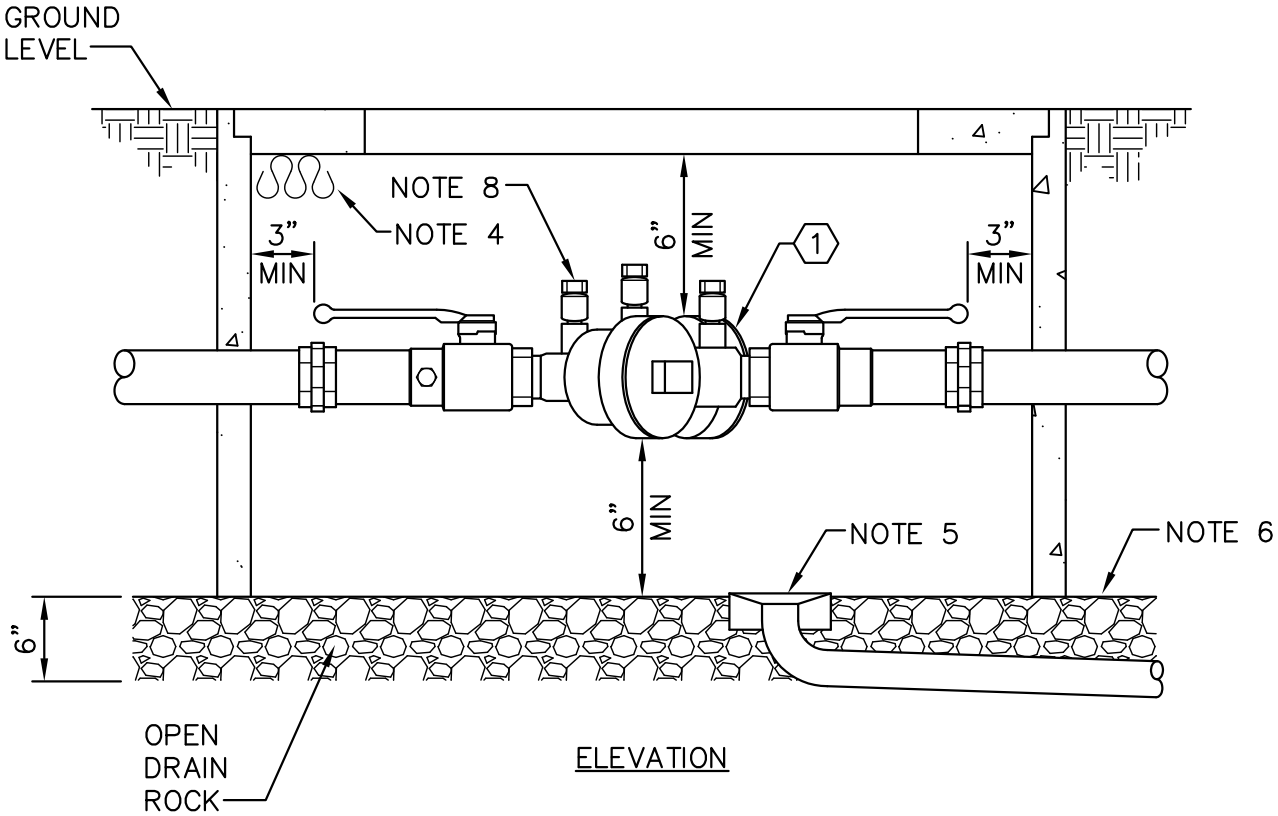
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-140**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DOUBLE CHECK VALVE 1/2"–2" BELOW GROUND

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-145**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. CITY OF KLAMATH FALLS DEVICES IN ITS SERVICE AREA MAY APPROVE ALTERNATE METHODS. ALLOWABLE ALTERNATIVES TO DAYLIGHT MAY INCLUDE:
   A. DRY WELL
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
8. ASSEMBLIES INSTALLED BELOW GROUND LEVEL SHALL HAVE WATERTIGHT PLUGS OR CAPS INSTALLED ON THE TEST COCKS.

FOR FIRE SERVICES

9. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
10. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
11. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

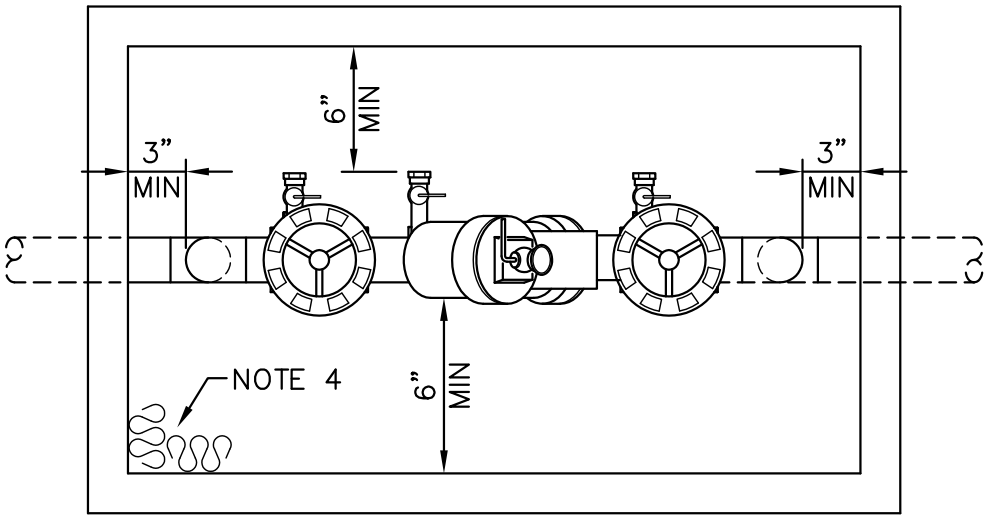
CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

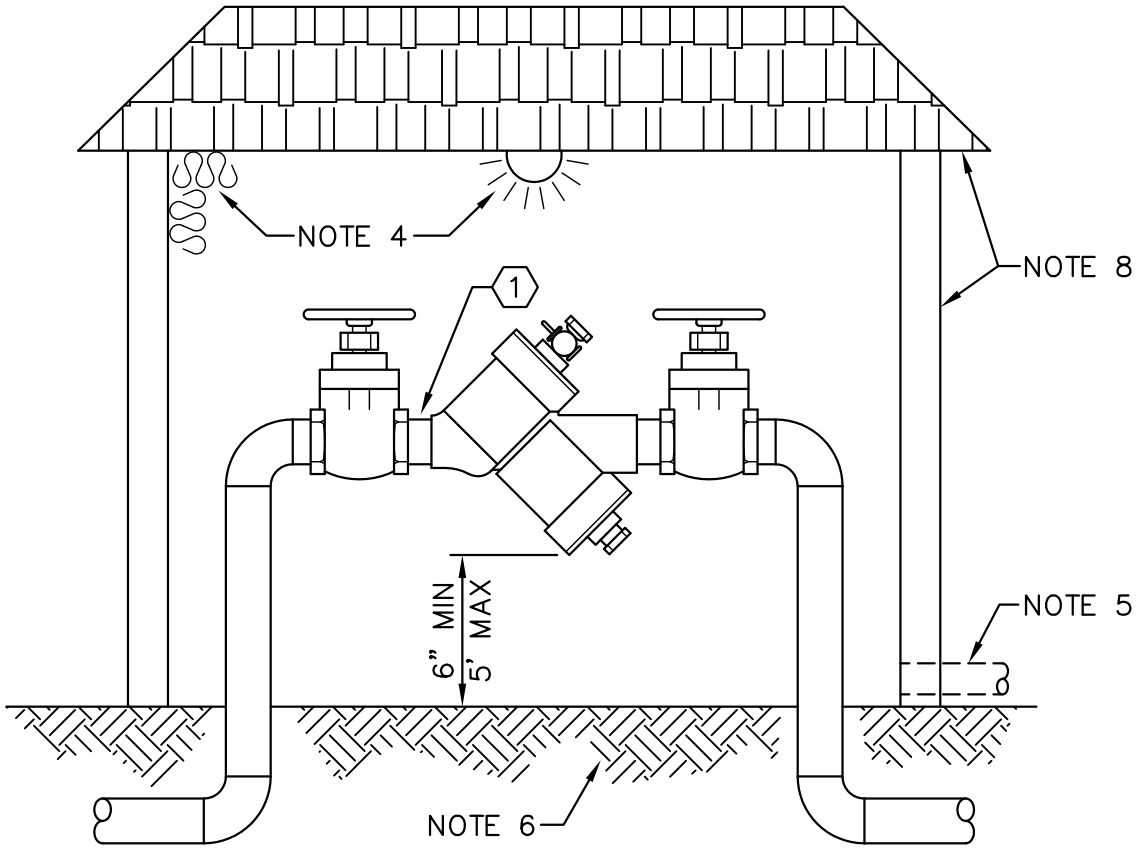
DOUBLE CHECK VALVE 1/2"-2" BELOW GROUND NOTES

Approved By: *Mark Willrett*

Drwn. By:	WEM
Date:	5/06
Drwg. No.:	**7-146**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DOUBLE CHECK VALVE ASSY 1/2"–2" ABOVE GROUND

Approved By: *Mark Willrett*

Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-150**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. CITY OF KLAMATH FALLS DEVICES IN ITS SERVICE AREA MAY APPROVE ALTERNATE METHODS. ALLOWABLE ALTERNATIVES TO DAYLIGHT MAY INCLUDE:
   A. DRY WELL
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
8. ALL STRUCTURES TO COMPLY WITH LOCAL CODES.

FOR FIRE SERVICES

9. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
10. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
11. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

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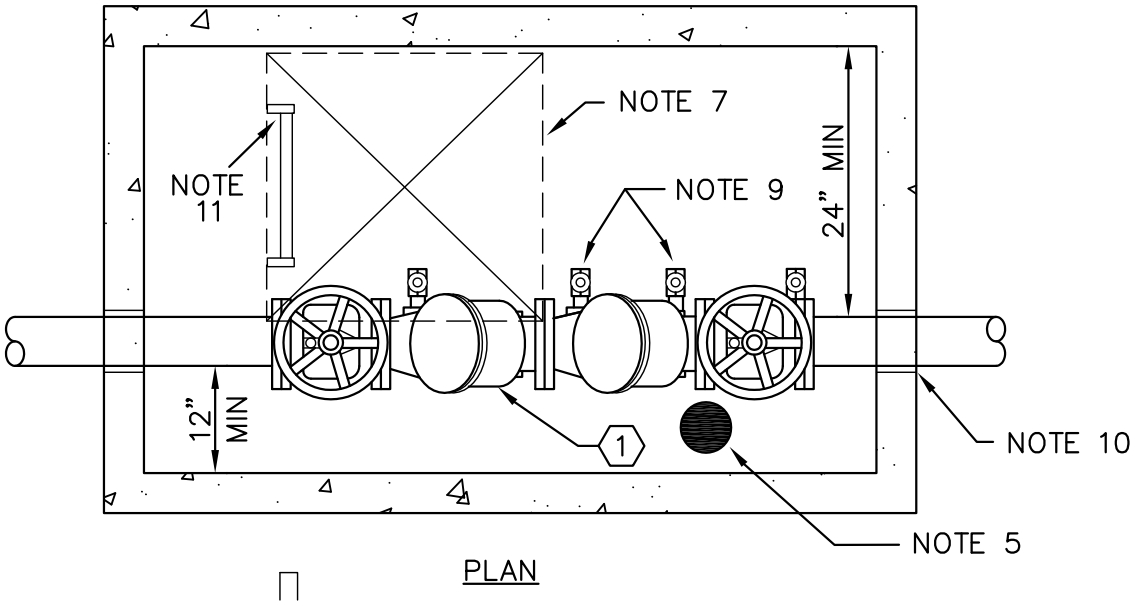
DOUBLE CHECK VALVE 1/2"-2" ABOVE GROUND NOTES

Approved By: *Mark Willrett*

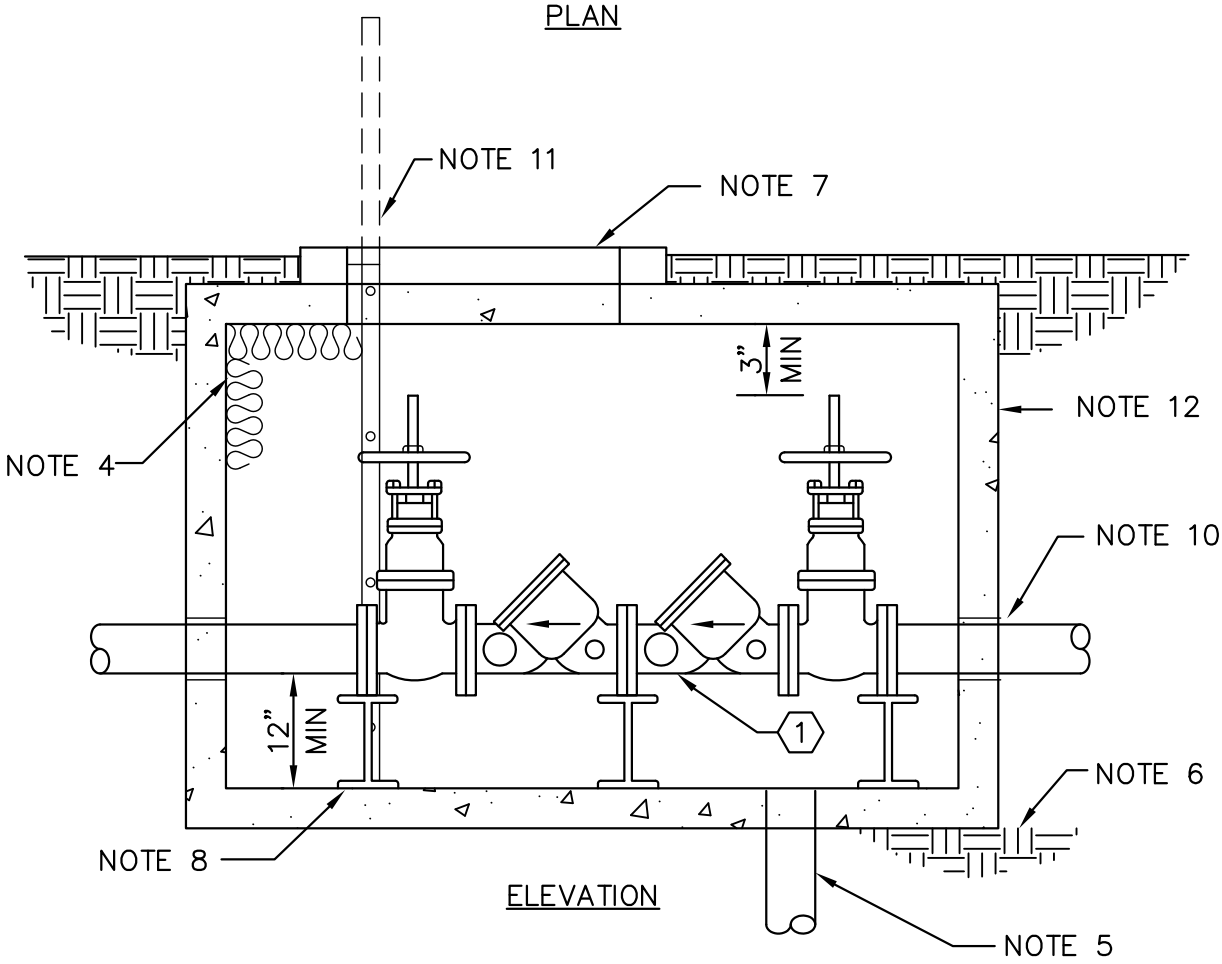
Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-151**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DOUBLE CHECK VALVE ASSY 2½"–10" BELOW GROUND

Approved By: *Mark Willrett*

Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-155**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. CITY OF KLAMATH FALLS DEVICES IN ITS SERVICE AREA MAY APPROVE ALTERNATE METHODS. ALLOWABLE ALTERNATIVES MAY INCLUDE:
   A. DRY WELL (2 CUBIC YARD MINIMUM)
   B. SUMP PUMP
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. HATCH, MINIMUM 3' X 3', SPRING ASSISTED, GALVANIZED OR ALUMINUM DIAMOND PLATE.
8. ALL ASSEMBLIES 2½" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. ASSEMBLIES INSTALLED BELOW GROUND LEVEL SHALL HAVE WATERTIGHT PLUGS OR CAPS INSTALLED ON TEST COCKS.
10. WATERTIGHT GROUT SHALL BE USED TO SEAL OPENINGS.
11. IF VAULT DEPTH EXCEEDS 4', USE OSHA APPROVED FIXED LADDER (OAR CH 437, DIVISION 2, 1910.27). PROVIDE LOCKABLE EXTENSION W/LADDER.
12. REINFORCED CONCRETE VAULT (ASTM C-875).

FOR FIRE SERVICES

13. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
14. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
15. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

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1	6/06	4th EDITION

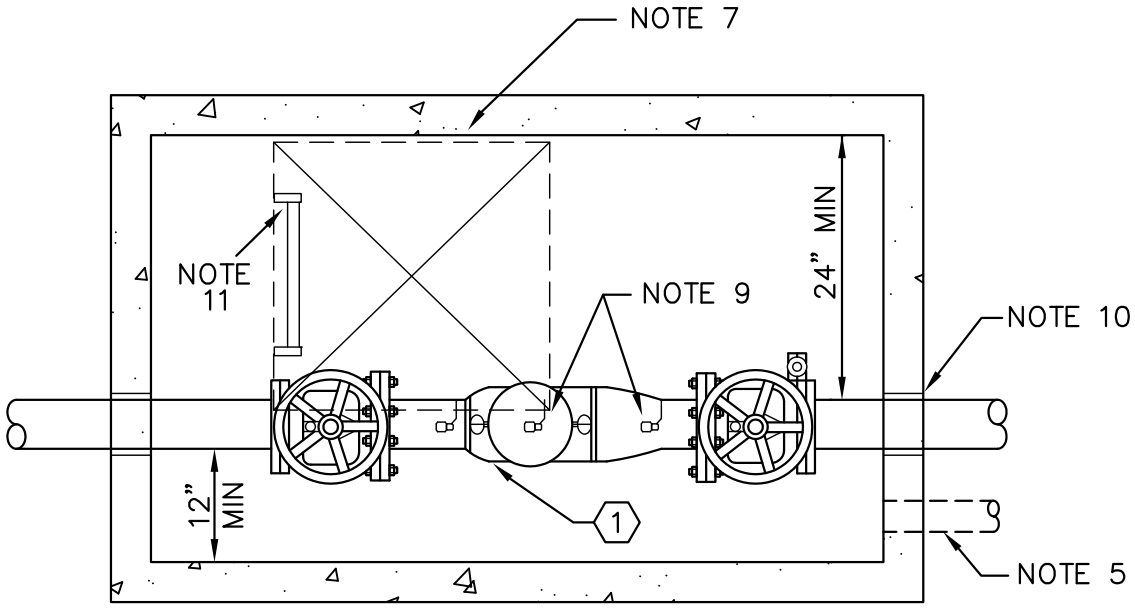
DOUBLE CHECK VALVE ASSY 2½"-10" BELOW GROUND

Approved By: *Mark Willrett*

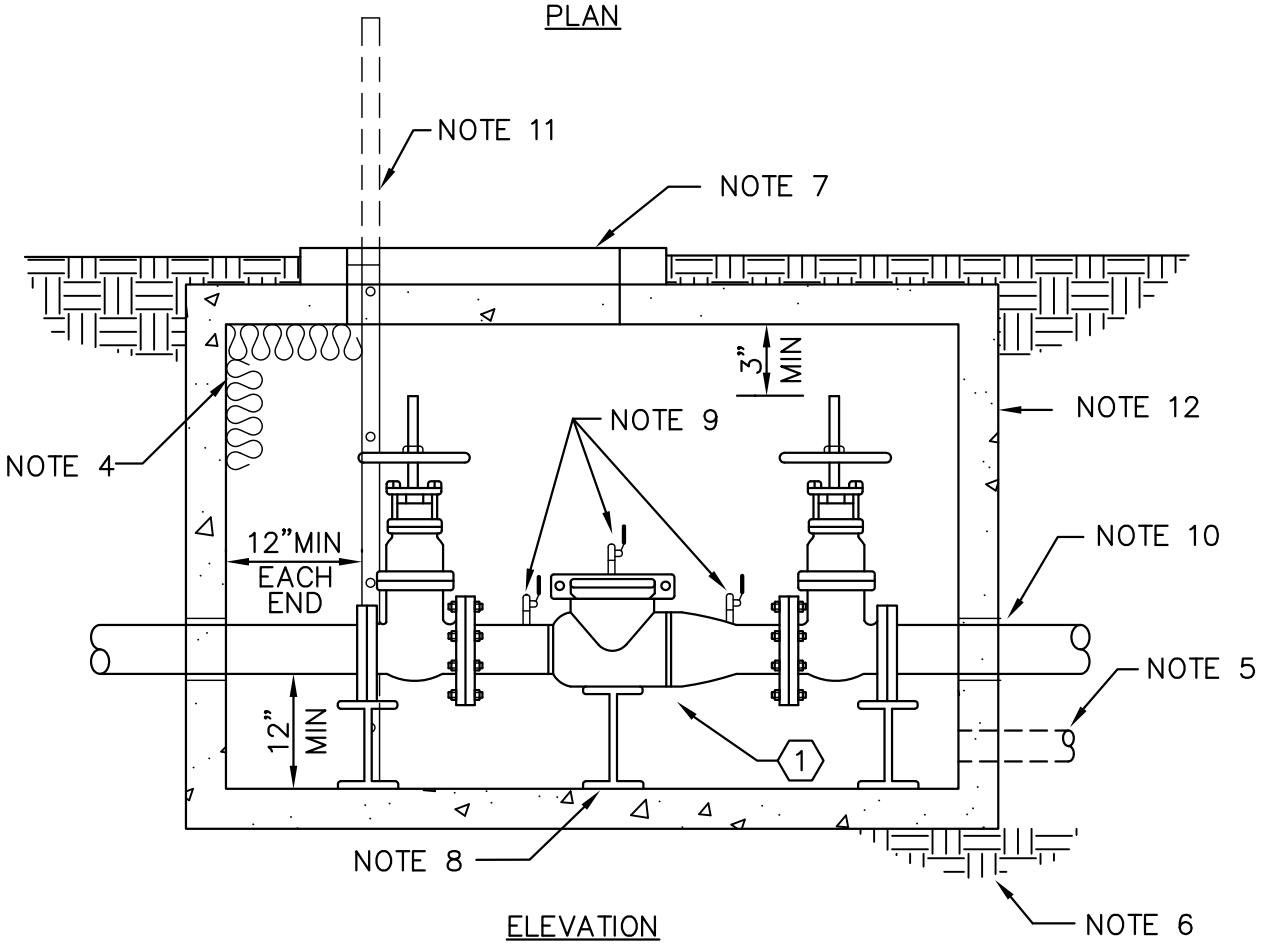
Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-156**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DOUBLE CHECK VALVE ASSEMBLY 2½" – 10" BELOW GROUND AMES SS/SE PATTERN

Approved By: *Mark Willrett*

Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-160**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. CITY OF KLAMATH FALLS DEVICES IN ITS SERVICE AREA MAY APPROVE ALTERNATE METHODS. ALLOWABLE ALTERNATIVES MAY INCLUDE:
   A. DRY WELL (2 CUBIC YARD MINIMUM)
   B. SUMP PUMP
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. HATCH, MINIMUM 3' X 3', SPRING ASSISTED, GALVANIZED OR ALUMINUM DIAMOND PLATE.
8. ALL ASSEMBLIES 2½" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. ASSEMBLIES INSTALLED BELOW GROUND LEVEL SHALL HAVE WATERTIGHT PLUGS OR CAPS INSTALLED ON TEST COCKS.
10. WATERTIGHT GROUT SHALL BE USED TO SEAL OPENINGS.
11. IF VAULT DEPTH EXCEEDS 4', USE OSHA APPROVED FIXED LADDER (OAR CH 437, DIVISION 2, 1910.27). PROVIDE LOCKABLE EXTENSION W/LADDER.
12. REINFORCED CONCRETE VAULT (ASTM C-875).

FOR FIRE SERVICES

13. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
14. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
15. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

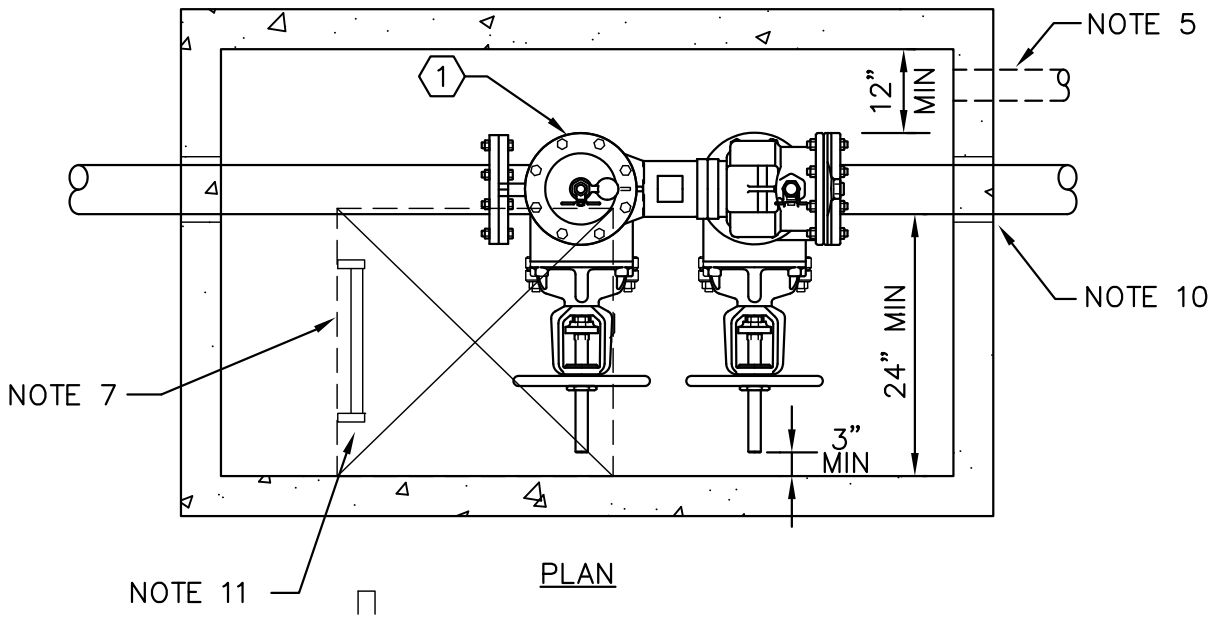
CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

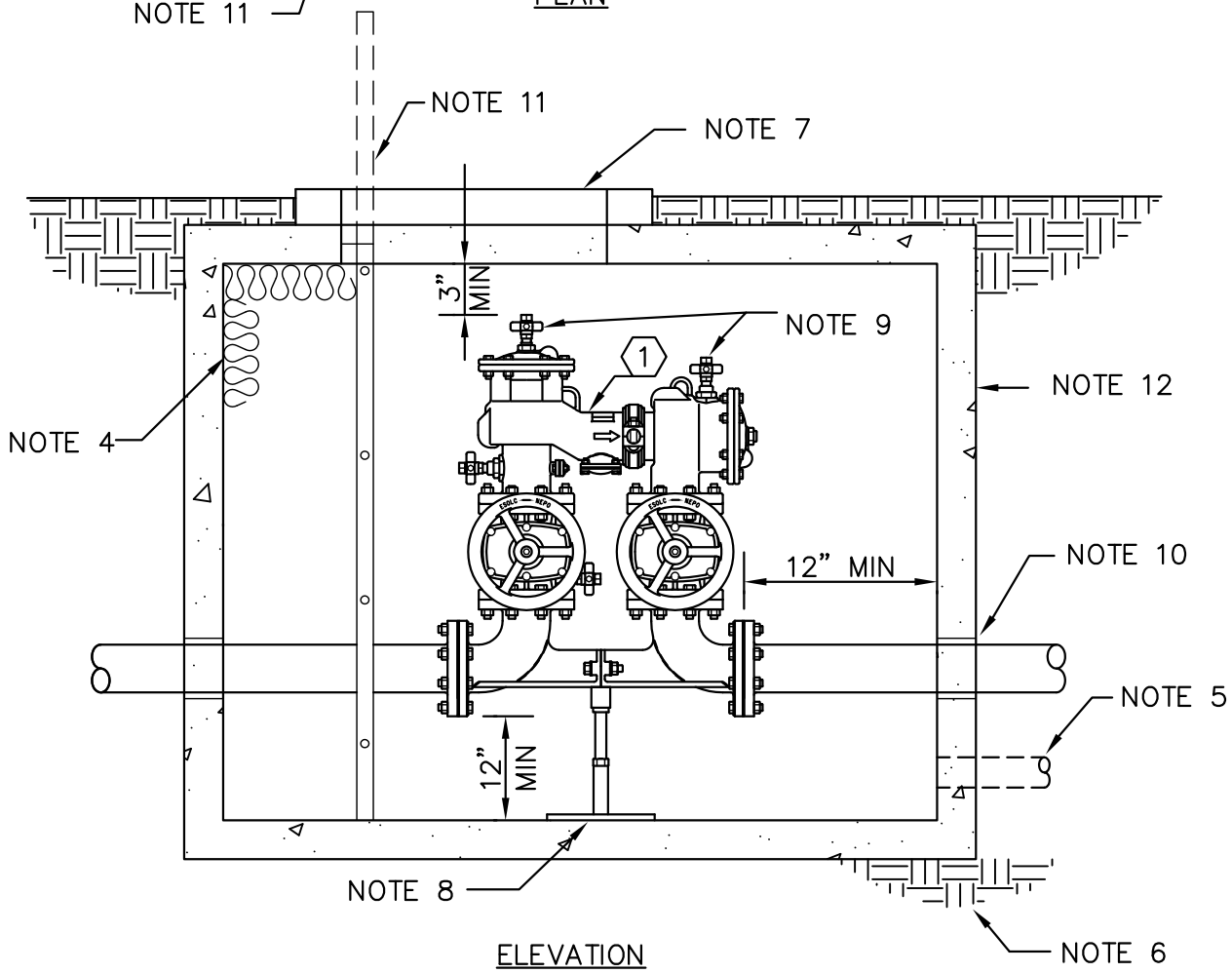
DOUBLE CHECK VALVE ASSEMBLY
2½" – 10" BELOW GROUND
AMES SS/SE PATTERN

Approved By: *Mark Willrett*

Drwn. By: KBW
Date: 5/06
Drwg. No.: **7-161**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DOUBLE CHECK VALVE ASSEMBLY 2½" – 10" BELOW GROUND FEBCO N PATTERN

Approved By: *Mark Willrett*

Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-165**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. CITY OF KLAMATH FALLS DEVICES IN ITS SERVICE AREA MAY APPROVE ALTERNATE METHODS. ALLOWABLE ALTERNATIVES MAY INCLUDE:
   A. DRY WELL (2 CUBIC YARD MINIMUM)
   B. SUMP PUMP
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. HATCH, MINIMUM 3' X 3', SPRING ASSISTED, GALVANIZED OR ALUMINUM DIAMOND PLATE.
8. ALL ASSEMBLIES 2½" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. ASSEMBLIES INSTALLED BELOW GROUND LEVEL SHALL HAVE WATERTIGHT PLUGS OR CAPS INSTALLED ON TEST COCKS.
10. WATERTIGHT GROUT SHALL BE USED TO SEAL OPENINGS.
11. IF VAULT DEPTH EXCEEDS 4', USE OSHA APPROVED FIXED LADDER (OAR CH 437, DIVISION 2, 1910.27). PROVIDE LOCKABLE EXTENSION W/LADDER.
12. REINFORCED CONCRETE VAULT (ASTM C-875).

FOR FIRE SERVICES

13. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
14. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
15. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

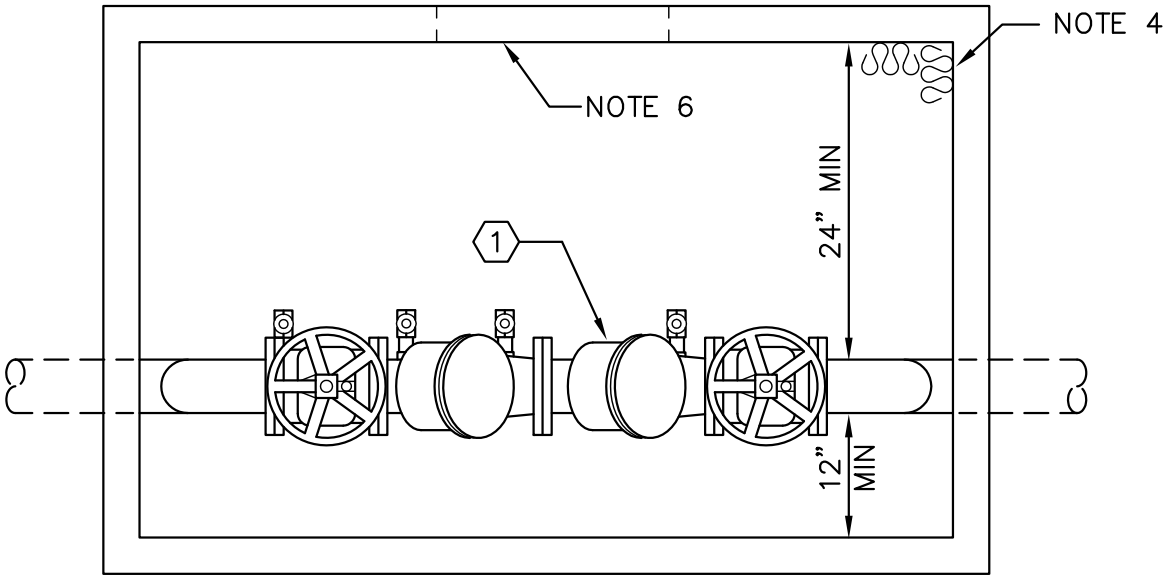
DOUBLE CHECK VALVE ASSEMBLY
2½" – 10" BELOW GROUND
FEBCO N PATTERN

Approved By: *Mark Willrett*

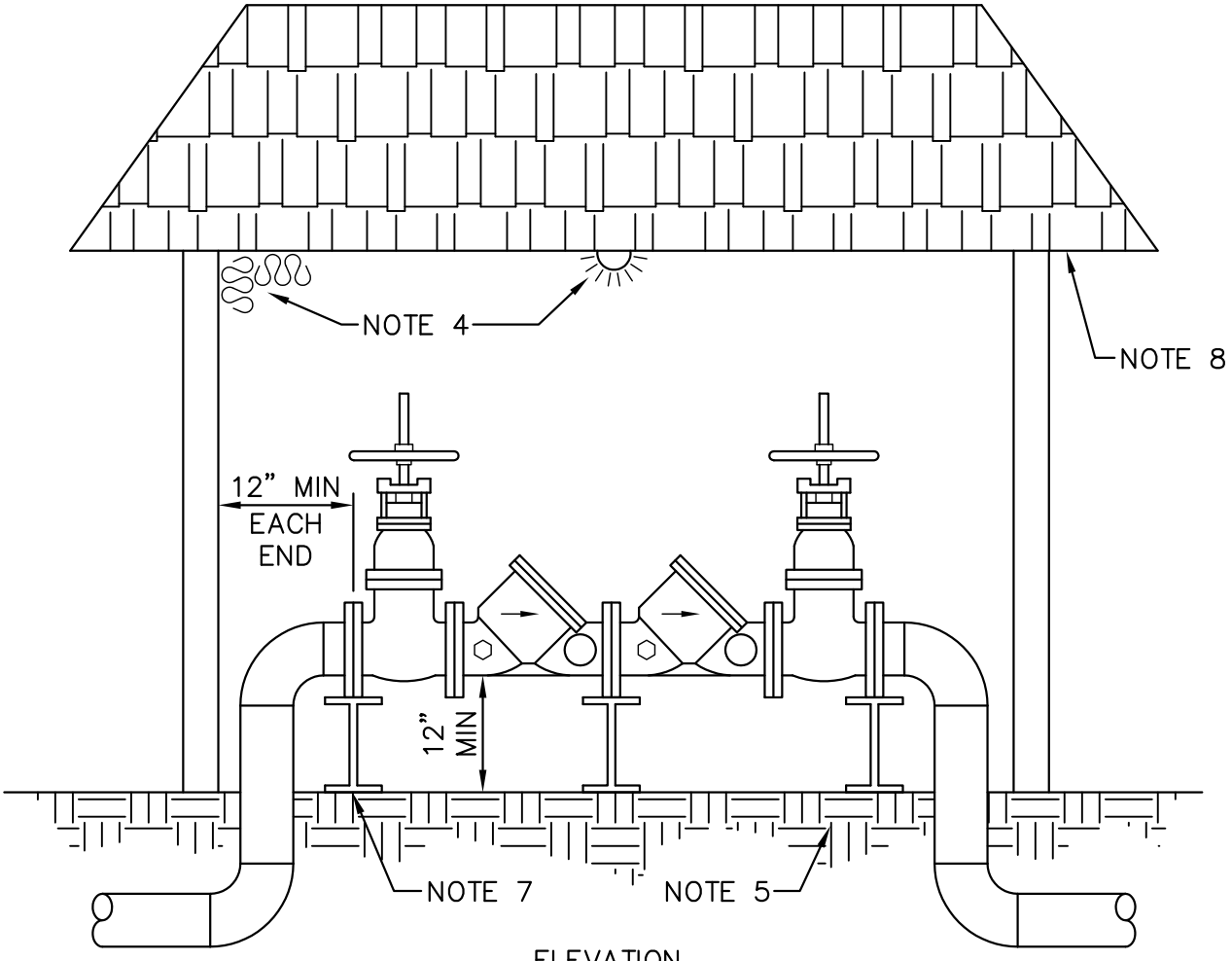
Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-166**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DOUBLE CHECK VALVE ASSY
2½ – 10" ABOVE GROUND

Approved By: *Mark Willrett*

Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-170**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503–731–4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN–BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION–FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13–4–5.4.1.1).
5. COMPACTED GRAVEL OR UNDISTURBED BASE.
6. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
7. ALL ASSEMBLIES 2½" AND LARGER SHALL HAVE FLANGE SUPPORTS.
8. ALL STRUCTURES TO COMPLY WITH LOCAL CODES.

FOR FIRE SERVICES

9. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
10. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
11. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT–OFF VALVES

AS REQUIRED BY OAR 333–061–0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
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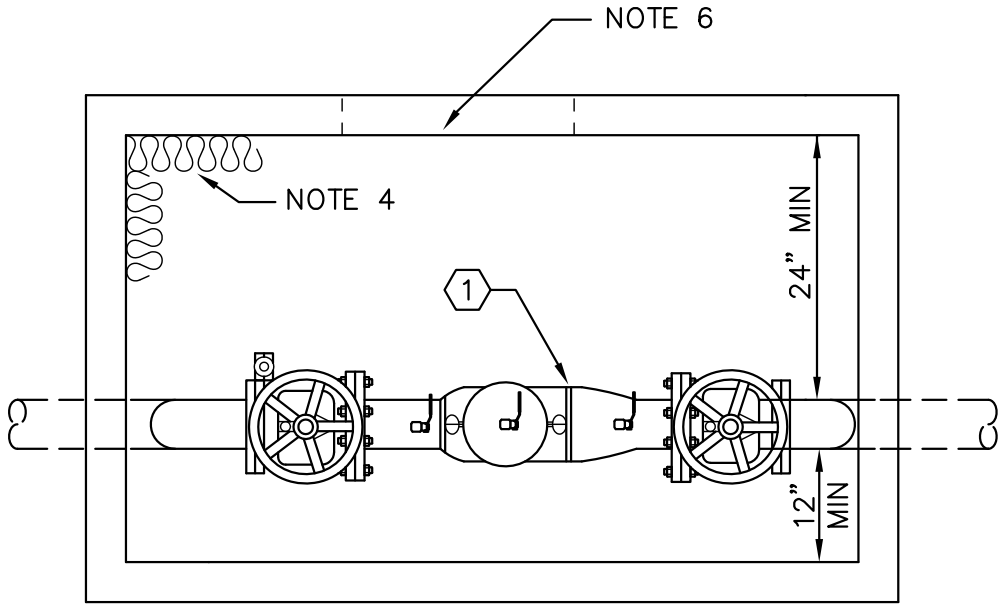
DOUBLE CHECK VALVE ASSY 2½ – 10" ABOVE GROUND

Approved By: *Mark Willrett*

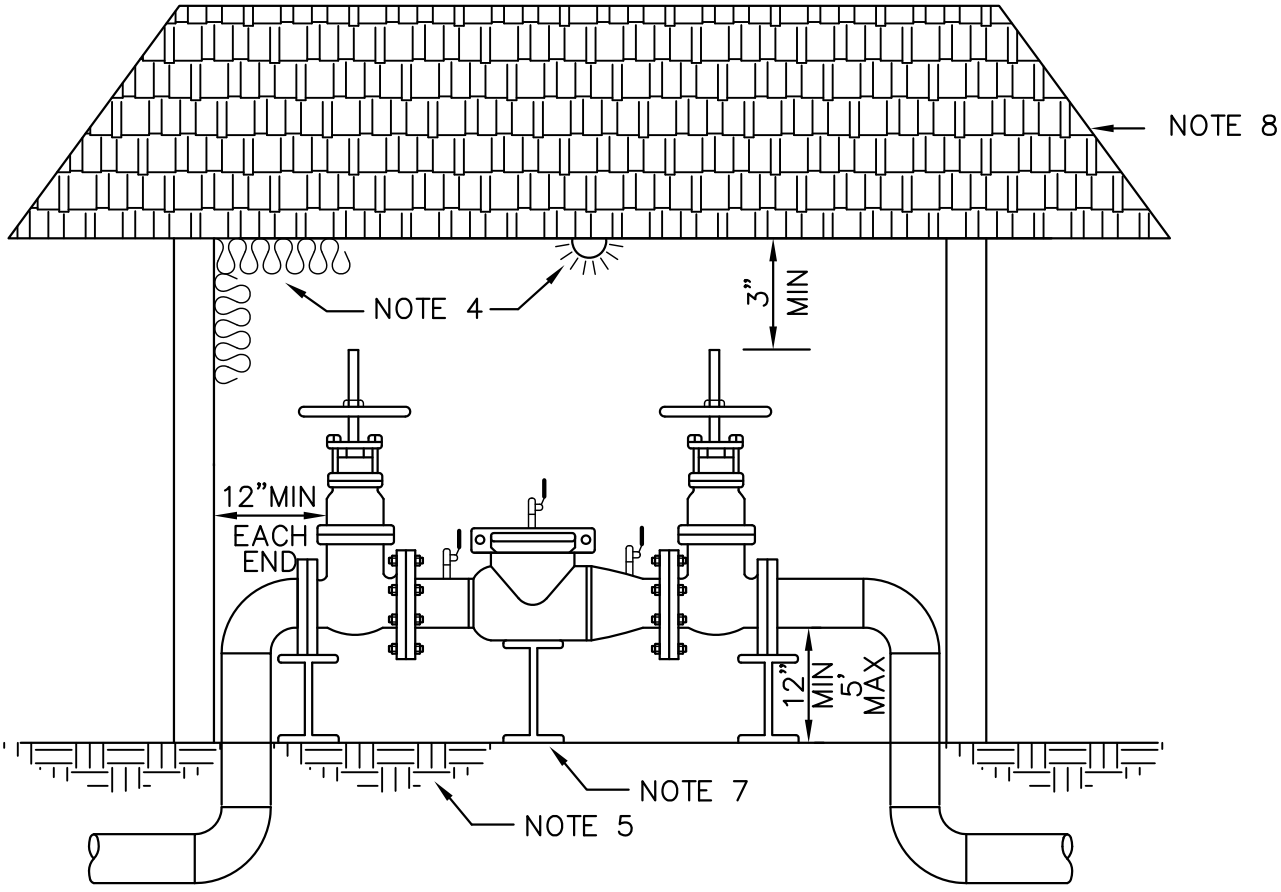
Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-171**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

	Date	Revision:
2	3/10	5th EDITION
1	6/06	4th EDITION

DOUBLE CHECK VALVE ASSEMBLY 2½" – 10" ABOVE GROUND AMES SS/SE PATTERN

Approved By: *Don Wilcox*

Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-175**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. COMPACTED GRAVEL OR UNDISTURBED BASE.
6. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
7. ALL ASSEMBLIES 2½" AND LARGER SHALL HAVE FLANGE SUPPORTS.
8. ALL STRUCTURES TO COMPLY WITH LOCAL CODES.

FOR FIRE SERVICES

9. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
10. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
11. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

	Date	Revision:
2	3/10	5th EDITION
1	6/06	4th EDITION

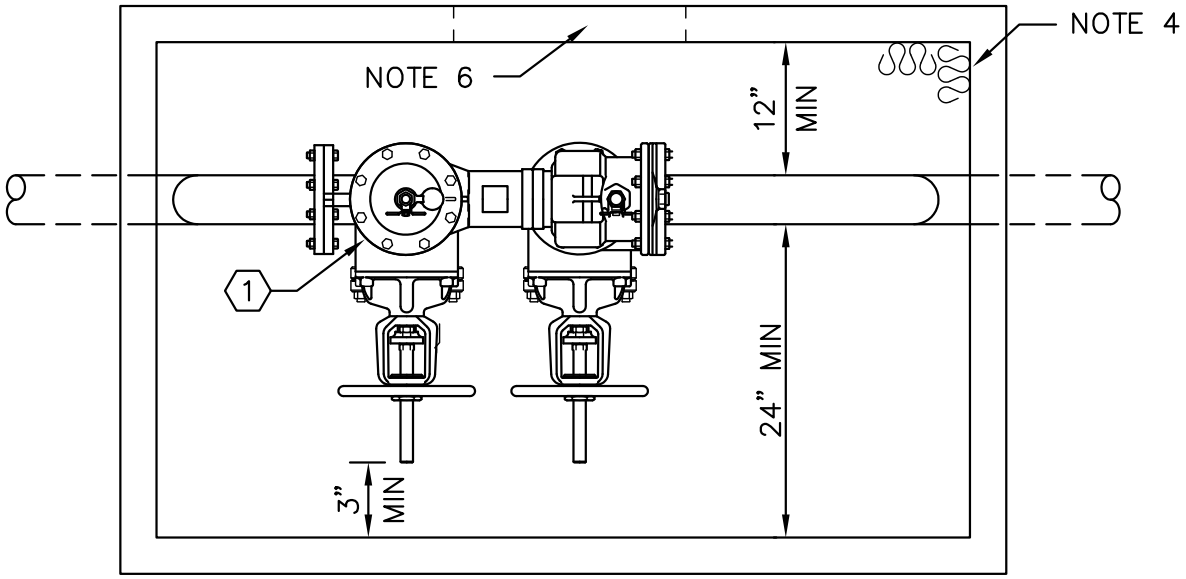
DOUBLE CHECK VALVE ASSEMBLY
2½" – 10" ABOVE GROUND
AMES SS/SE PATTERN

Approved By: *Mark Willrett*

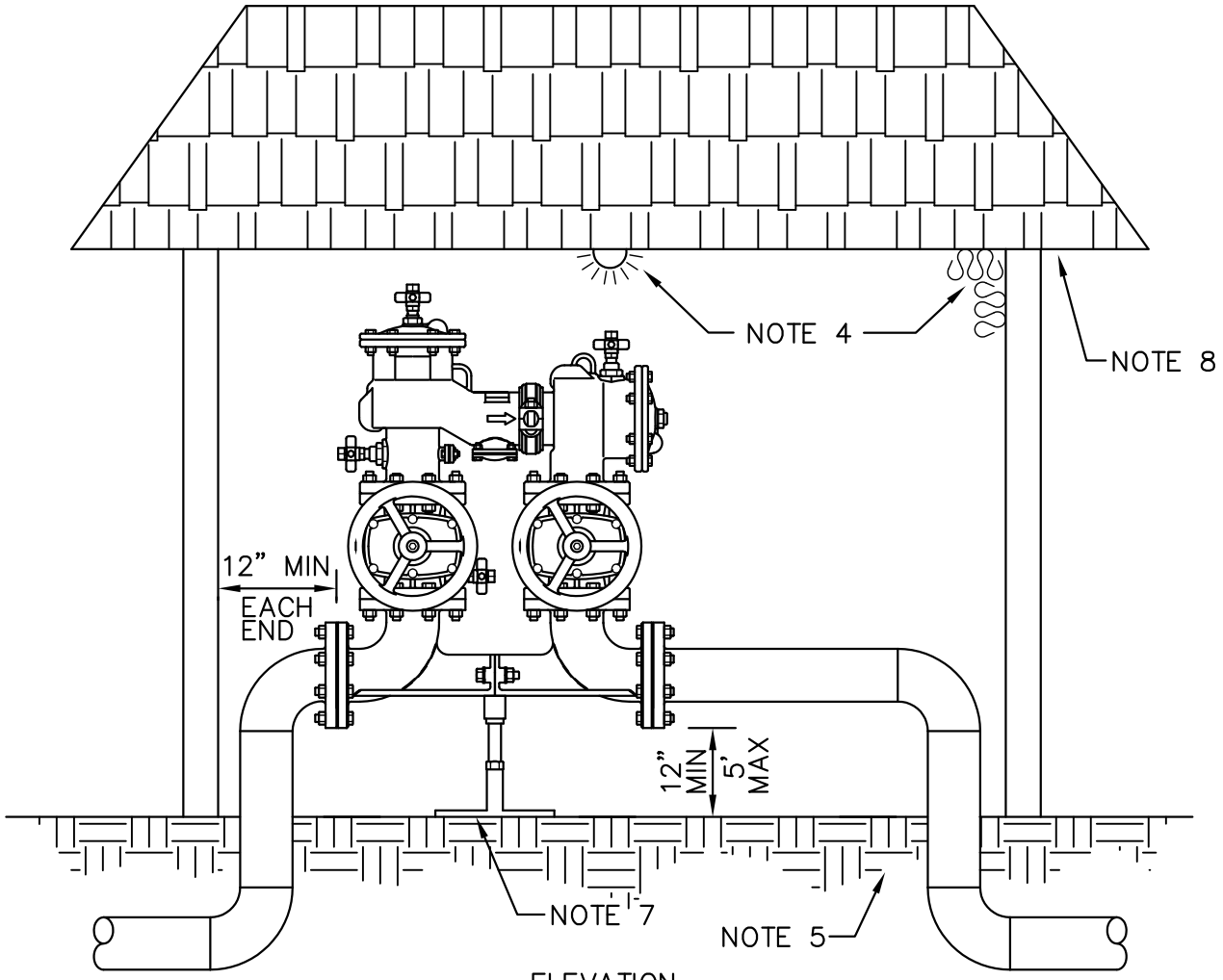
Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-176**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DOUBLE CHECK VALVE ASSEMBLY
2½" – 10" ABOVE GROUND
FEBCO N PATTERN

Approved By: *Mark Willrett*

Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-180**

NOTES

1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
2. DOUBLE CHECK VALVE ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN SERVICES, 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VERTICAL INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. COMPACTED GRAVEL OR UNDISTURBED BASE.
6. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
7. ALL ASSEMBLIES 2½" AND LARGER SHALL HAVE FLANGE SUPPORTS.
8. ALL STRUCTURES TO COMPLY WITH LOCAL CODES.

FOR FIRE SERVICES

9. FIRE ASSEMBLIES SHALL BE INSTALLED WITHIN 100 FT OF THE CONNECTION TO THE PUBLIC SUPPLY WATER MAIN.
10. ALL PIPING PRECEDING THE DOUBLE CHECK VALVE SHALL BE CONSTRUCTED OF POTABLE APPROVED MATERIAL, (E.G., PVC, LINED CAST IRON, OR DUCTILE IRON).
11. NO OUTLETS OR CONNECTIONS (INCLUDING HYDRANTS) WILL BE PERMITTED ON FIRE SERVICE LIES PRIOR TO THE DOUBLE CHECK VALVE.

⟨1⟩ – APPROVED DOUBLE CHECK VALVE ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
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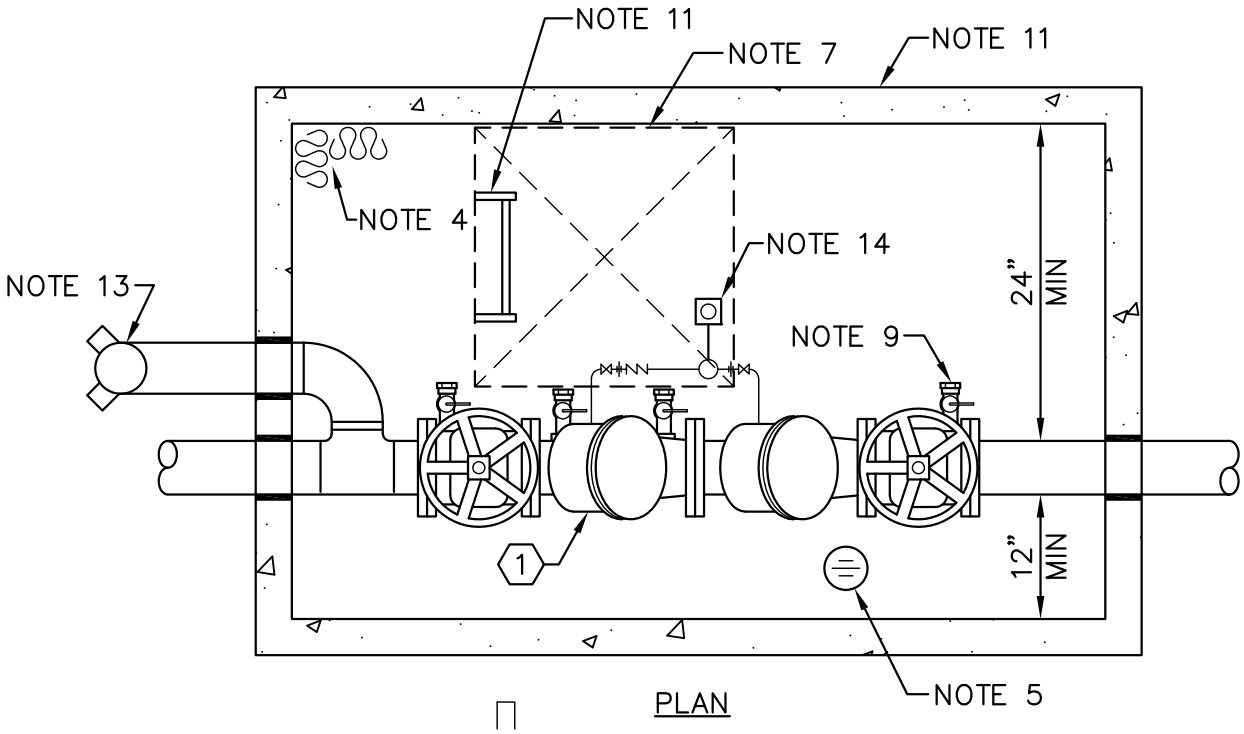
DOUBLE CHECK VALVE ASSEMBLY
2½" – 10" ABOVE GROUND
FEBCO N PATTERN

Approved By: *Mark Willrett*

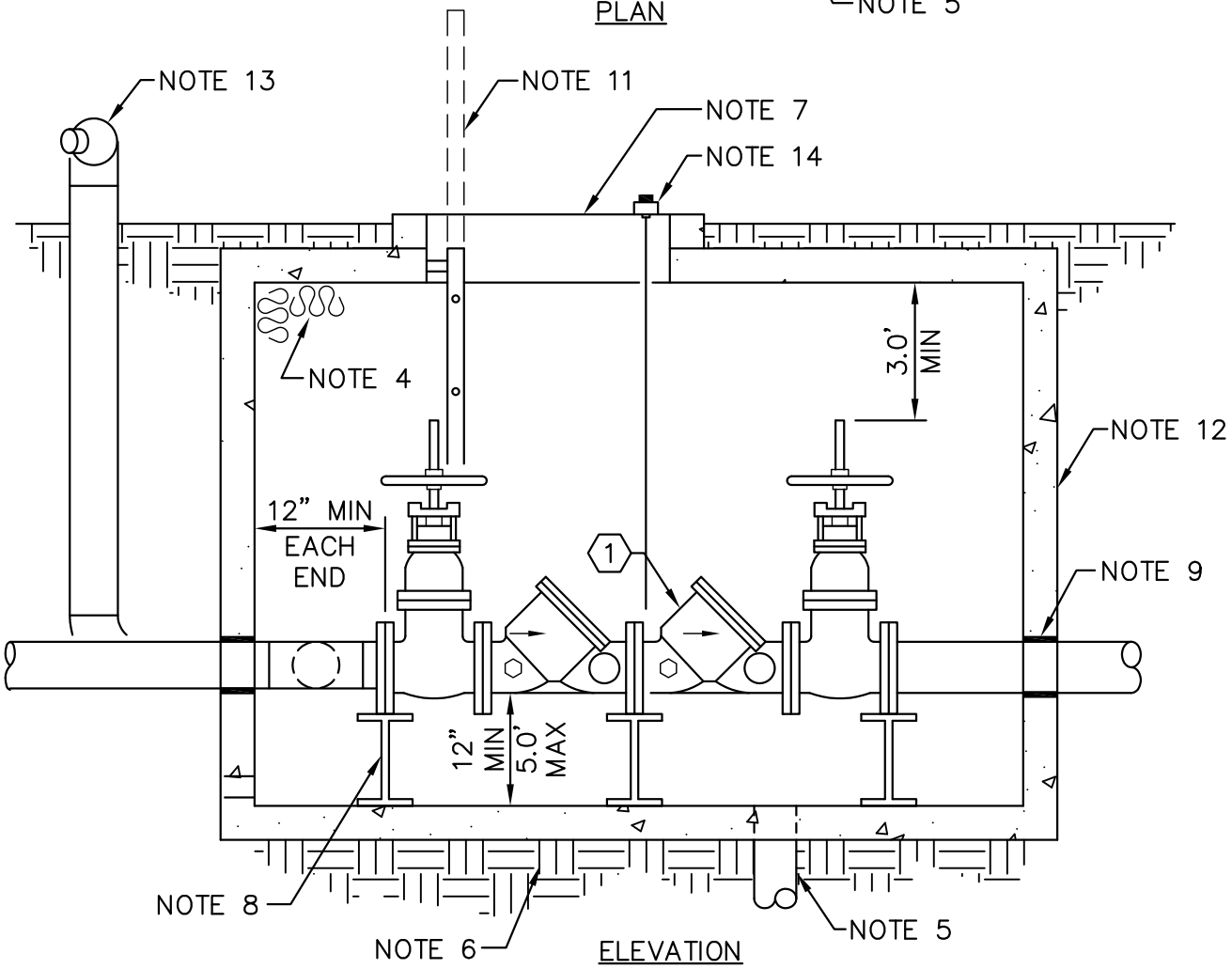
Drwn. By: KBW

Date: 5/06

Drwg. No.: **7-181**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"–10" BELOW GROUND

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-185**

NOTES

1. DETECTOR DOUBLE CHECK VAULT OR ENCLOSURE SHALL BE INSTALLED AT POINT OF SERVICE OR AN ALTERNATIVE LOCATION APPROVED BY THE CITY FOR THEIR RESPECTIVE SERVICE ARE, BUT NO LESS THAN 10 FEET FROM POINT OF SERVICE.
2. DETECTOR DOUBLE CHECK ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
    A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
    B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW PREVENTION ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN RESOURCES, HEALTH SERVICES 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE AND IN-BUILDING INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. BORE-SIGHTED DRAIN TO DAYLIGHT IS REQUIRED. ALLOWABLE ALTERNATIVES MAY INCLUDE:
    A. DRY WELL
    B. SUMP PUMP
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. HATCH MINIMUM 3'x3', SPRING ASSISTED, GALVANIZED OR ALUMINUM DIAMOND PLATE.
8. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. ASSEMBLIES INSTALLED BELOW GROUND LEVEL SHALL HAVE WATERTIGHT PLUGS OR CAPS INSTALLED ON ALL TEST COCKS.
10. WATERTIGHT GROUT SHALL BE USED TO SEAL OPENINGS.
11. IF VAULT DEPTH EXCEEDS 4', USE OSHA APPROVED FIXED LADDER (OAR Ch 437, DIVISION 2, 1910.27). PROVIDE LOCKABLE EXTENSION W/LADDER.
12. REINFORCED CONCRETE VAULT (ASTM C-875).
13. FIRE DEPARTMENT PUMPER CONNECTION PER LOCAL FIRE CODE.
14. INSTALL REMOTE READER, METER AND TOUCH PAD SUPPLIED BY CITY.

⟨1⟩ – APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

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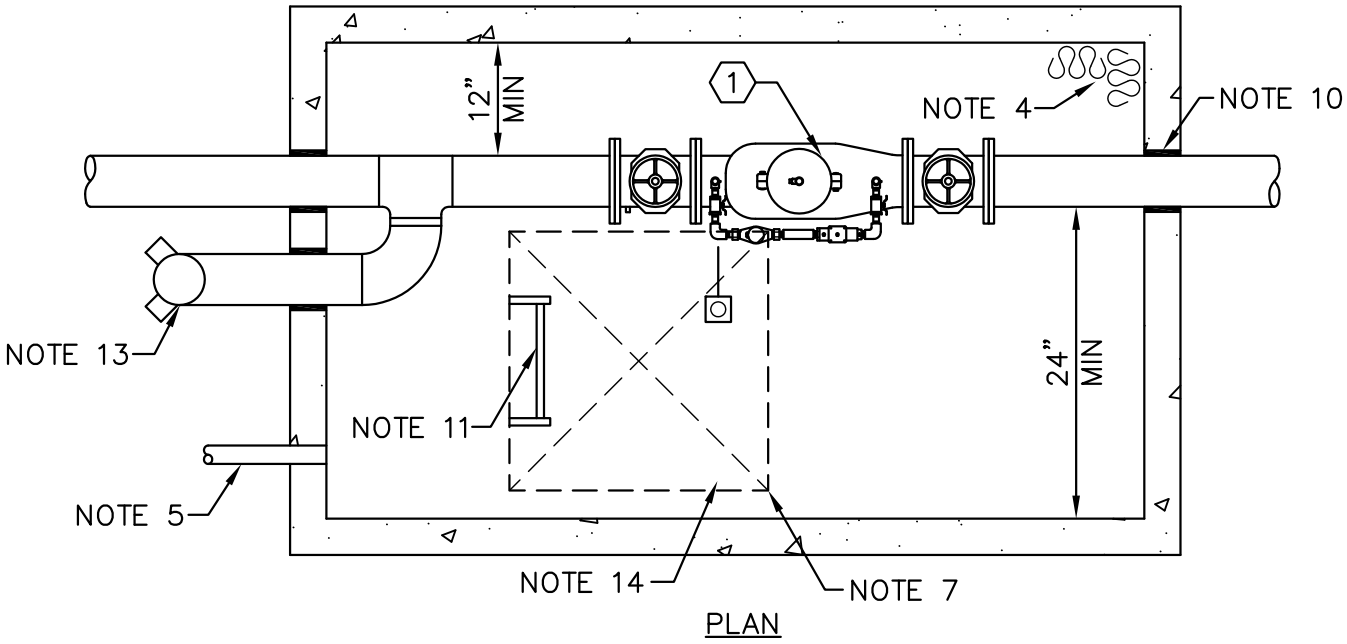
DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"-10" BELOW GROUND NOTES

Approved By: *Mark Willrett*

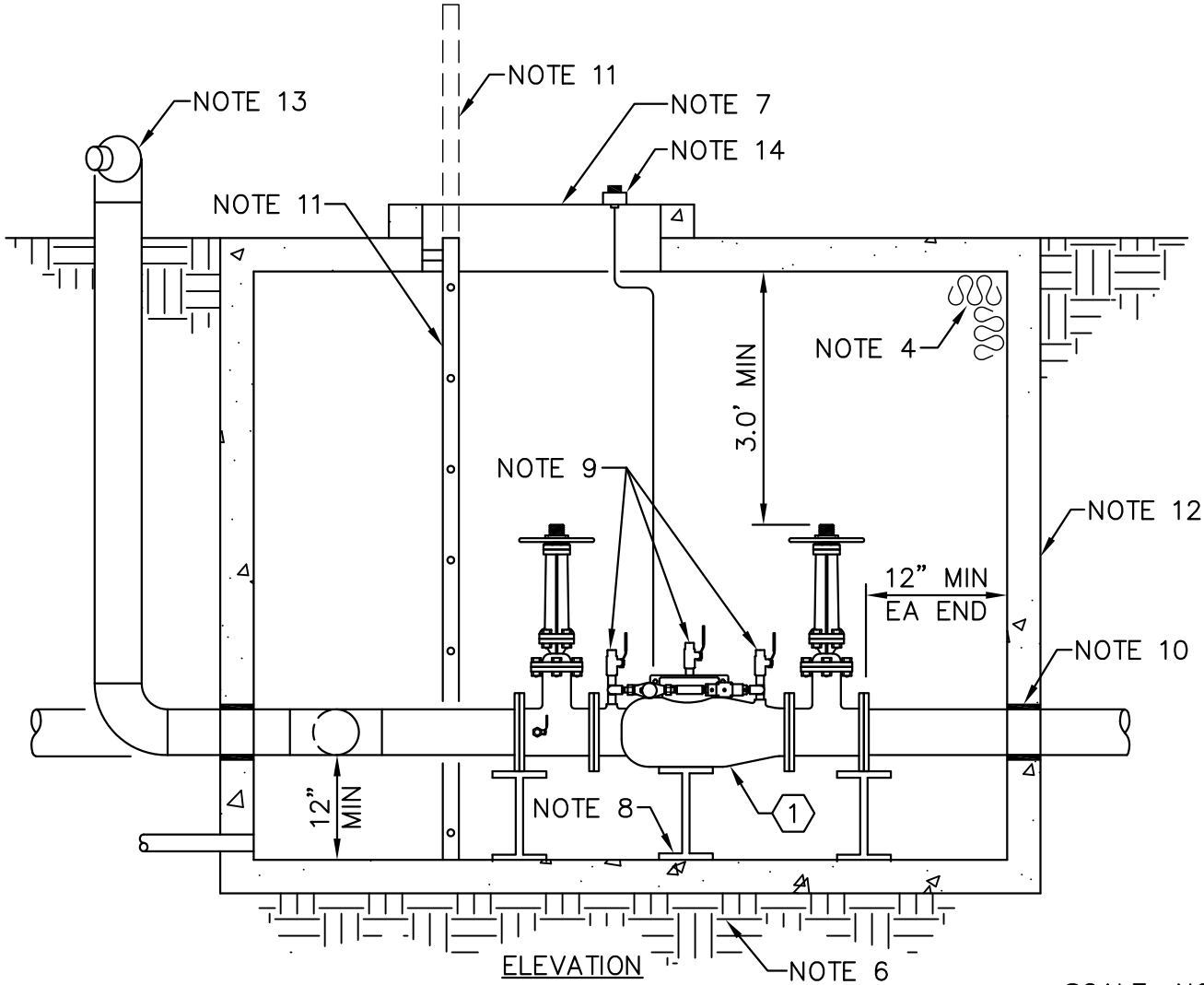
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-186**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"–10" BELOW GROUND AMES SS/SE PATTERN

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-190**

NOTES

1. DETECTOR DOUBLE CHECK VAULT OR ENCLOSURE SHALL BE INSTALLED AT POINT OF SERVICE, OR IN AN ALTERNATE LOCATION APPROVED BY THE CITY FOR ITS SERVICE AREA, BUT NO MORE THAN 10 FEET FROM POINT OF SERVICE.
2. DETECTOR DOUBLE CHECK ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
   A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW PREVENTION ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN RESOURCES, HEALTH SERVICES 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE AND IN-BUILDING INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. BORE-SIGHTED DRAIN TO DAYLIGHT IS REQUIRED FOR ALL INSTALLATIONS. ALLOWABLE ALTERNATIVES MAY INCLUDE:
   A. DRY WELL
   B: SUMP PUMP
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. HATCH, MINIMUM 3'x3', SPRING ASSISTED, GALVANIZED OR ALUMINUM DIAMOND PLATE.
8. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. ASSEMBLIES INSTALLED BELOW GROUND LEVEL SHALL HAVE WATERTIGHT PLUGS OR OR CAPS ON THE TEST COCKS.
10. WATERTIGHT GROUT SHALL BE USED TO SEAL OPENINGS.
11. IF VAULT DEPTH EXCEEDS 4', USE OSHA APPROVED FIXED LADDER (OAR CH 437, DIVISION 2, 1910.27). PROVIDE LOCKABLE EXTENSION W/LADDER.
12. REINFORCED CONCRETE VAULT (ASTM C-875).
13. FIRE DEPARTMENT PUMPER CONNECTION PER LOCAL FIRE CODE.
14. INSTALL REMOTE READER, METER AND TOUCH PAD AS PROVIDED BY CITY.

⟨1⟩ – APPROVED DETECTOR DOUBLE CHECK ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

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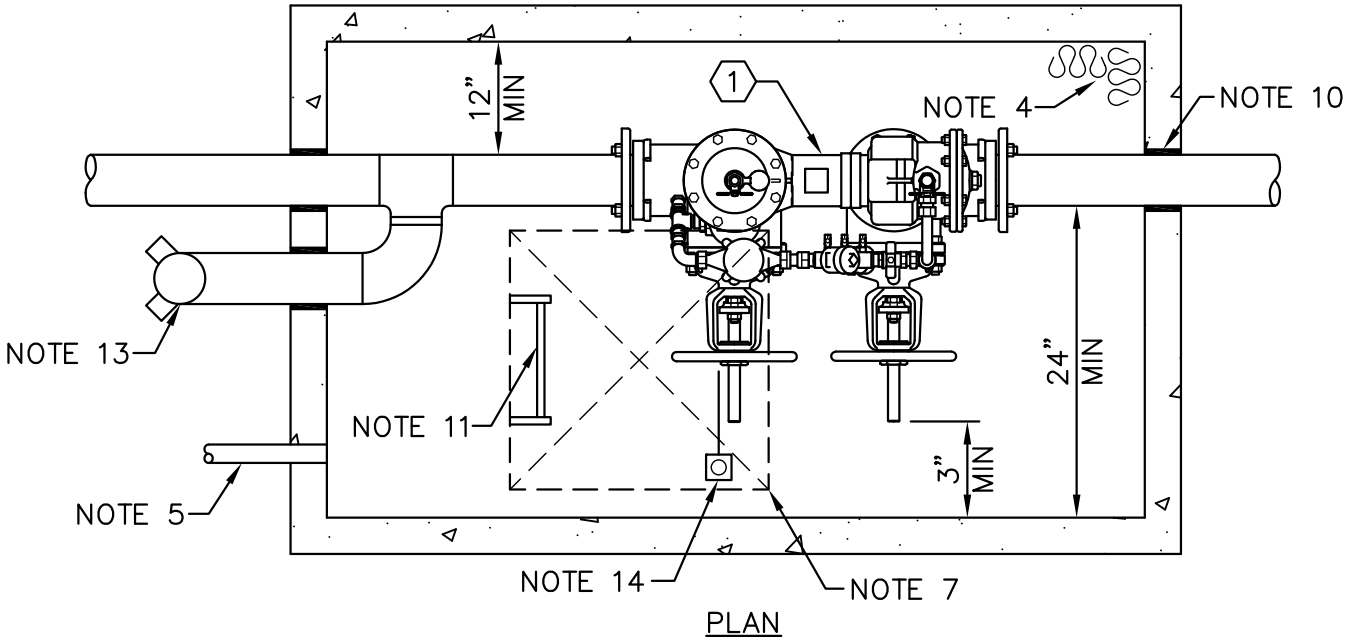
DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"-10" BELOW GROUND AMES SS/SE PATTERN NOTES

Approved By: *Mark Willrett*

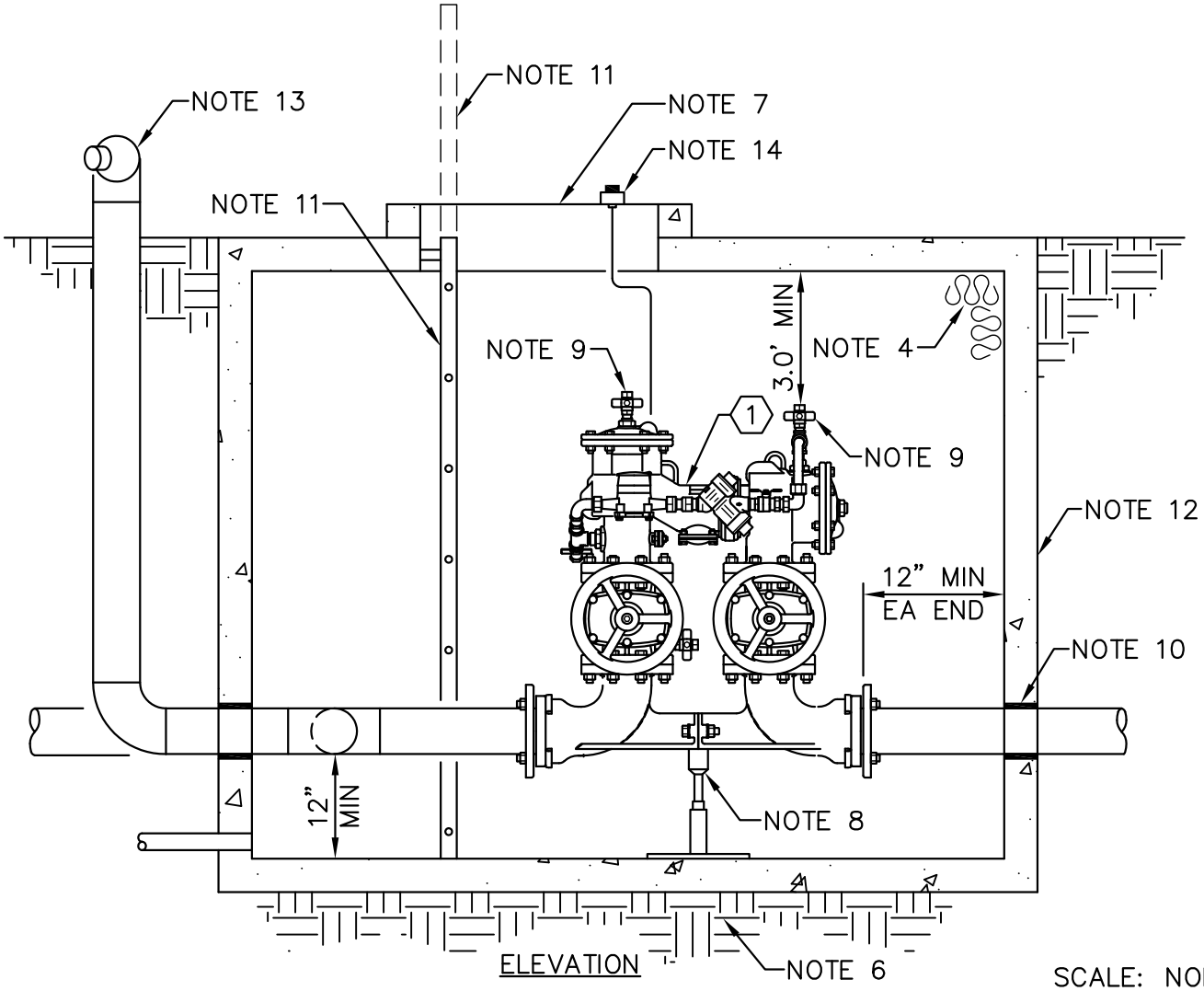
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-191**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"–10" BELOW GROUND FEBCO N PATTERN

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-195**

NOTES

1. DETECTOR DOUBLE CHECK VAULT OR ENCLOSURE SHALL BE INSTALLED AT POINT OF SERVICE, OR IN AN ALTERNATE LOCATION APPROVED BY THE CITY FOR ITS SERVICE AREA, BUT NO MORE THAN 10 FEET FROM POINT OF SERVICE.
2. DETECTOR DOUBLE CHECK ASSEMBLY MAY BE INSTALLED VERTICALLY, PROVIDED THAT THE ASSEMBLY:
    A. IS RECOMMENDED BY THE MANUFACTURER FOR VERTICAL INSTALLATION
    B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW PREVENTION ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN RESOURCES, HEALTH SERVICES 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE AND IN-BUILDING INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. BORE-SIGHTED DRAIN TO DAYLIGHT IS REQUIRED FOR ALL INSTALLATIONS. ALLOWABLE ALTERNATIVES MAY INCLUDE:
    A. DRY WELL
    B: SUMP PUMP
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. HATCH, MINIMUM 3'x3', SPRING ASSISTED, GALVANIZED OR ALUMINUM DUAMOND PLATE.
8. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. ASSEMBLIES INSTALLED BELOW GROUND LEVEL SHALL HAVE WATERTIGHT PLUGS OR OR CAPS ON THE TEST COCKS.
10. WATERTIGHT GROUT SHALL BE USED TO SEAL OPENINGS.
11. IF VAULT DEPTH EXCEEDS 4', USE OSHA APPROVED FIXED LADDER (OAR CH 437, DIVISION 2, 1910.27). PROVIDE LOCKABLE EXTENSION W/LADDER.
12. REINFORCED CONCRETE VAULT (ASTM C-875).
13. FIRE DEPARTMENT PUMPER CONNECTION PER LOCAL FIRE CODE.
14. INSTALL REMOTE READER, METER AND TOUCH PAD AS PROVIDED BY CITY.

⟨1⟩ – APPROVED DETECTOR DOUBLE CHECK ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

AS REQUIRED BY OAR 333-061-0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

1. THE OWNER
2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

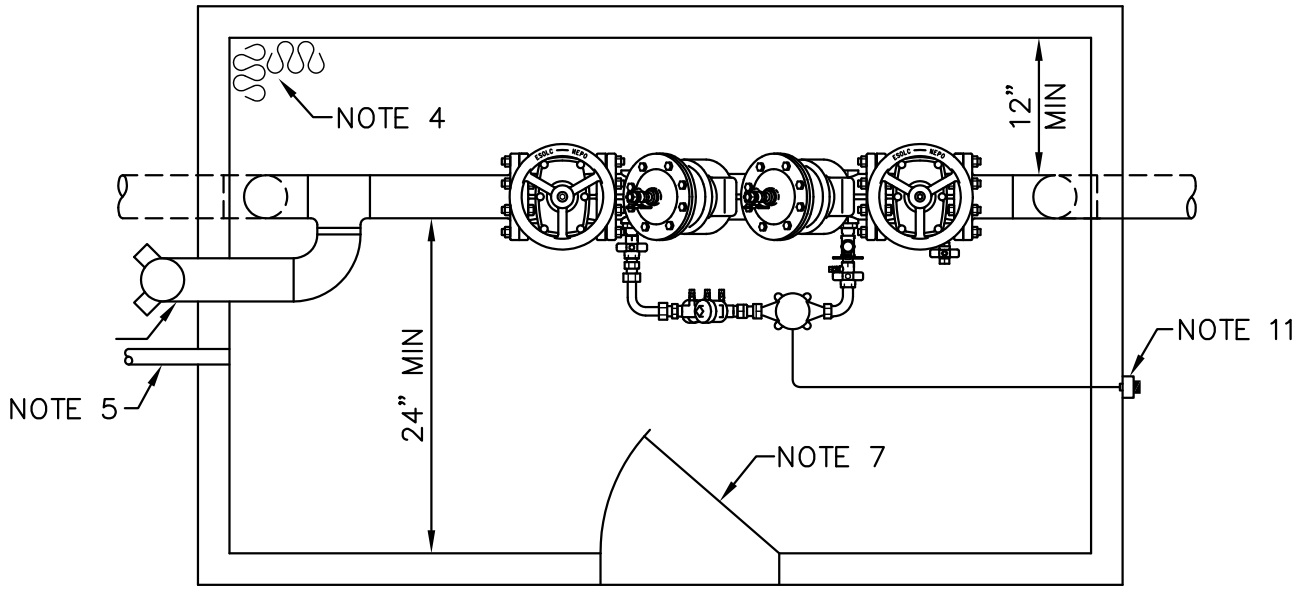
DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"-10" BELOW GROUND FEBCO N PATTERN NOTES

Approved By: *Mark Willrett*

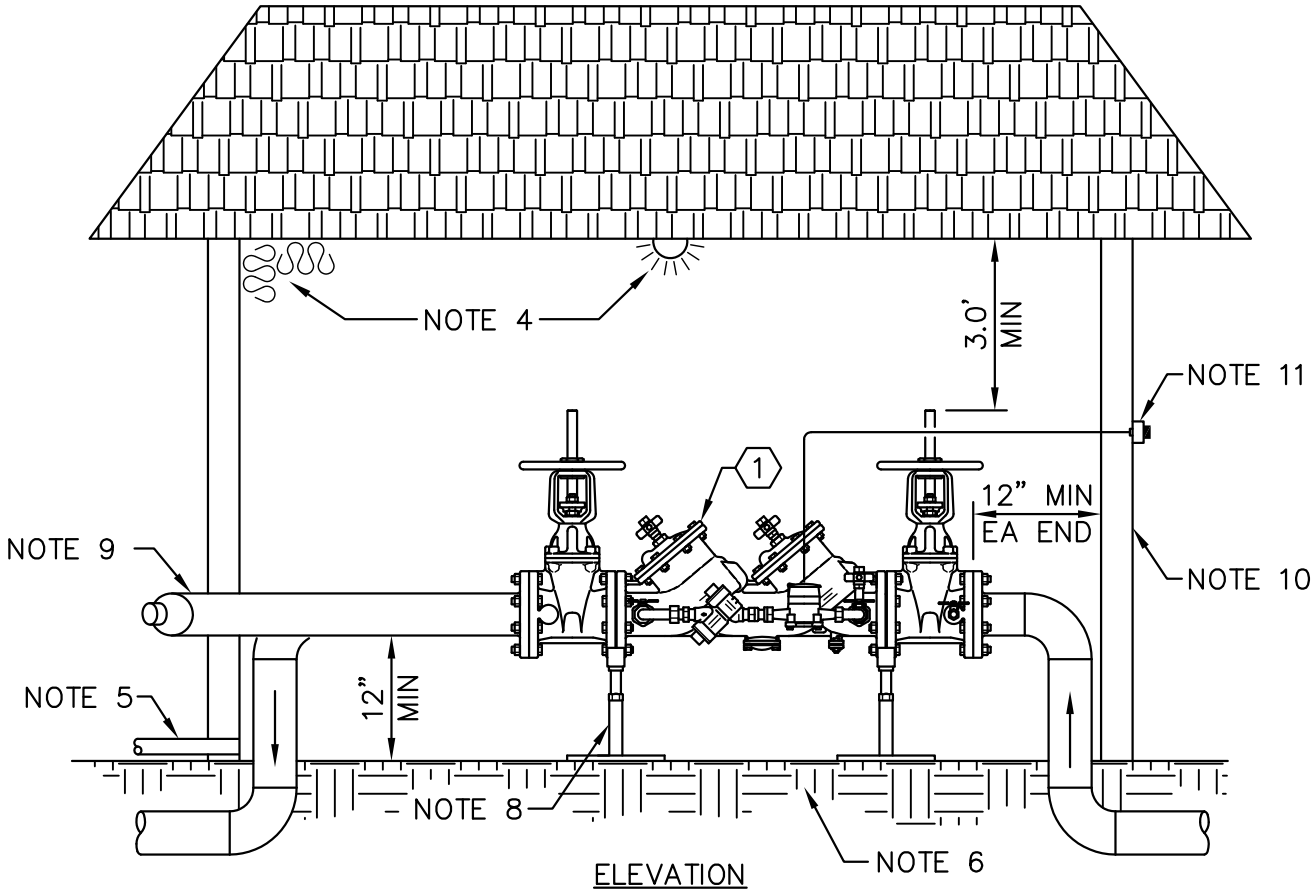
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-196**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"–10" ABOVE GROUND

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-200**

NOTES

1. DETECTOR DOUBLE CHECK VAULT OR ENCLOSURE SHALL BE INSTALLED AT POINT OF SERVICE, OR IN AN ALTERNATE LOCATION APPROVED BY THE CITY FOR ITS SERVICE AREA, BUT NO MORE THAN 10 FEET FROM POINT OF SERVICE.
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   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW PREVENTION ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN RESOURCES, HEALTH SERVICES 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE AND IN-BUILDING INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. BORE-SIGHTED DRAIN TO DAYLIGHT IS REQUIRED.
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
8. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. FIRE DEPARTMENT PUMPER CONNECTION PER LOCAL FIRE CODES.
10. ALL STRUCTURES TO COMPLY WITH LOCAL BUILDING CODES.
11. INSTALL REMOTE READER, METER AND TOUCH PAD AS PROVIDED BY CITY.

⟨1⟩ – APPROVED DETECTOR DOUBLE CHECK ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

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2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

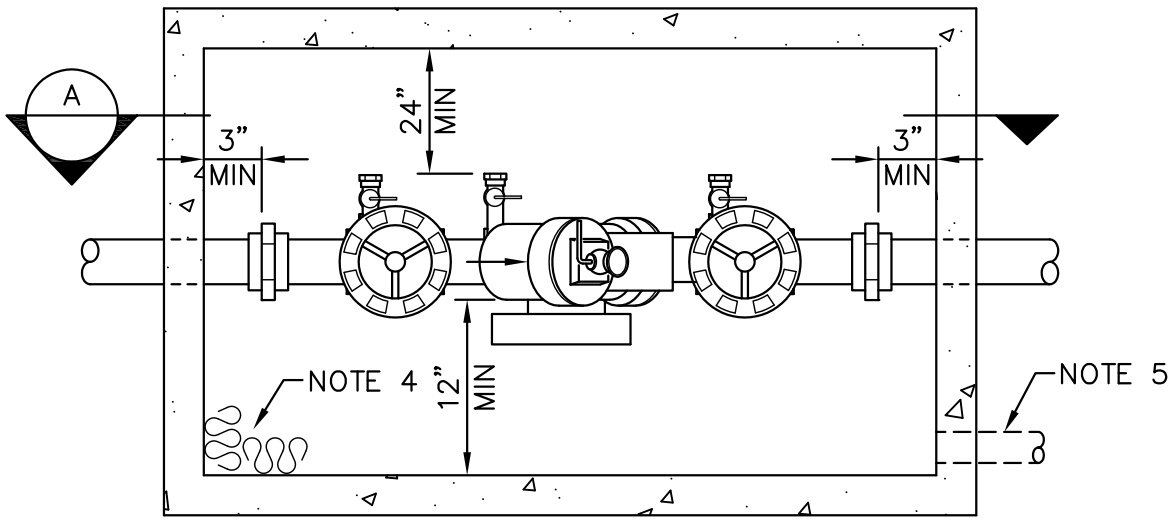
DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/12"-10" ABOVE GROUND NOTES

Approved By: *Mark Willrett*

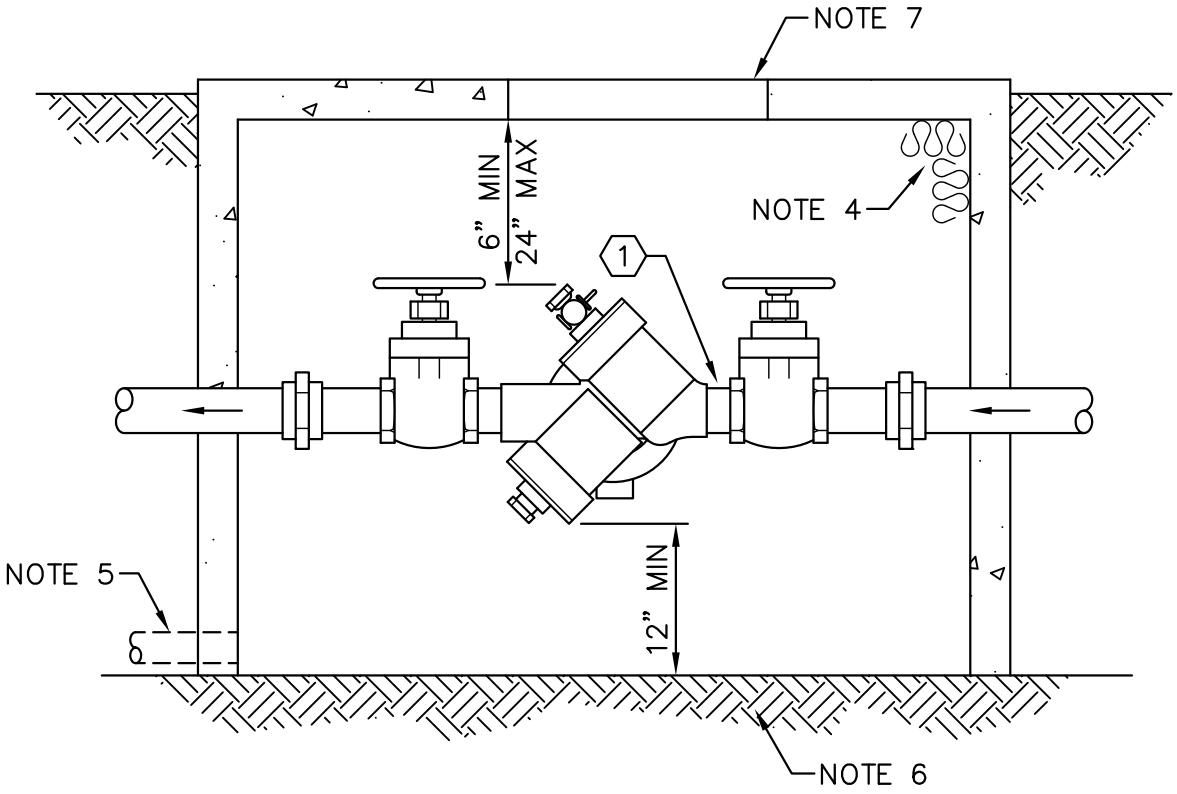
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-201**



PLAN



SECTION A

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

REDUCED PRESSURE BACKFLOW ASSEMBLY, 1 1/2"–2" BELOW GROUND

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 2/03

Drwg. No.: **7-205**

NOTES

1. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA, AND SHALL BE ABOVE THE 100–YEAR FLOOD PLAIN.
2. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED HORIZONTAL AND PLUMB.
3. ALL CLEARANCES APPLY TO OUTSIDE, IN–BUILDING, AND VAULT INSTALLATIONS. MINIMUM CLEARANCES FOR DEVICE ASSEMBLIES 2 INCHES OR SMALLER MAY BE REDUCED PROVIDED THAT THEY ARE ACCESSIBLE FOR TESTING AND REPAIRING AND THE CITY OF KLAMATH FALLS APPROVES THE VARIANCE FOR THEIR RESPECTIVE SERVICE AREA.
4. INSULATION–FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13–4–5.4.1.1).
5. ASSEMBLY ENCLOSURE SHALL INCLUDE A BORE SIGHTED DRAIN TO DAYLIGHT CAPABLE OF DRAINING A FULL RELIEF VALVE DISCHARGE (LENGTH OF DRAIN TO BE APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. DEVICE ENCLOSURE – (E.G., METER BOX, IRRIGATION CONTROL VAULT, OR FABRICATED PERMANENT ENCLOSURE).

⟨1⟩ – APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT–OFF VALVES

AS REQUIRED BY OAR 333–061–0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

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2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

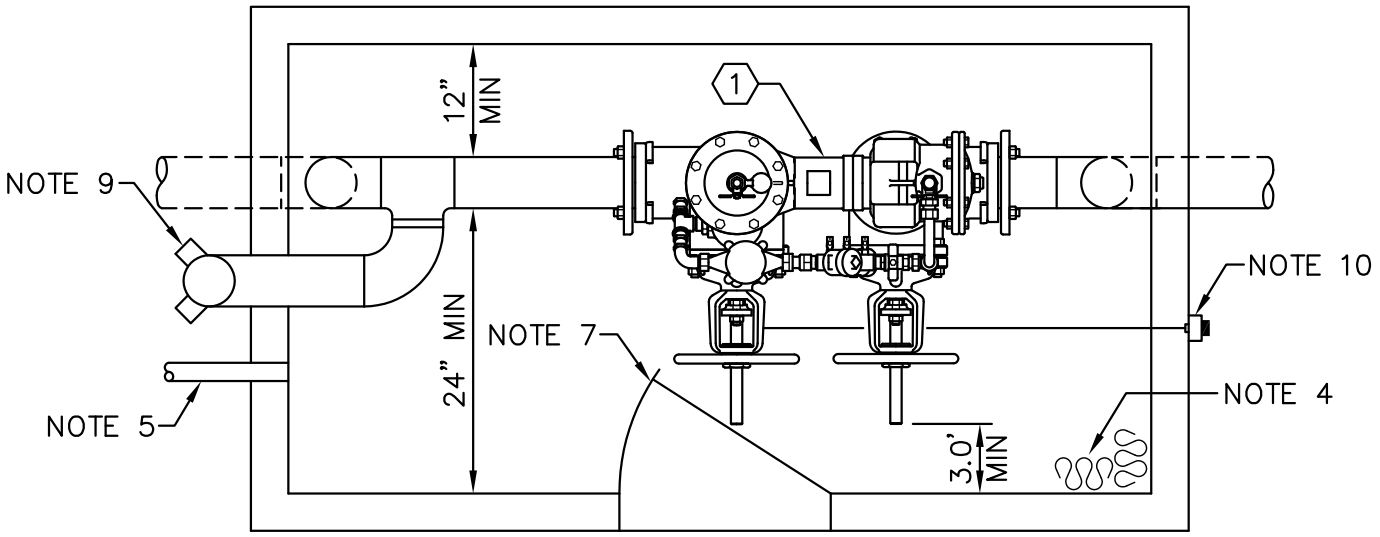
REDUCED PRESSURE BACKFLOW ASSEMBLY, 1 1/2"–2" BELOW GROUND NOTES

Approved By: *Mark Willrett*

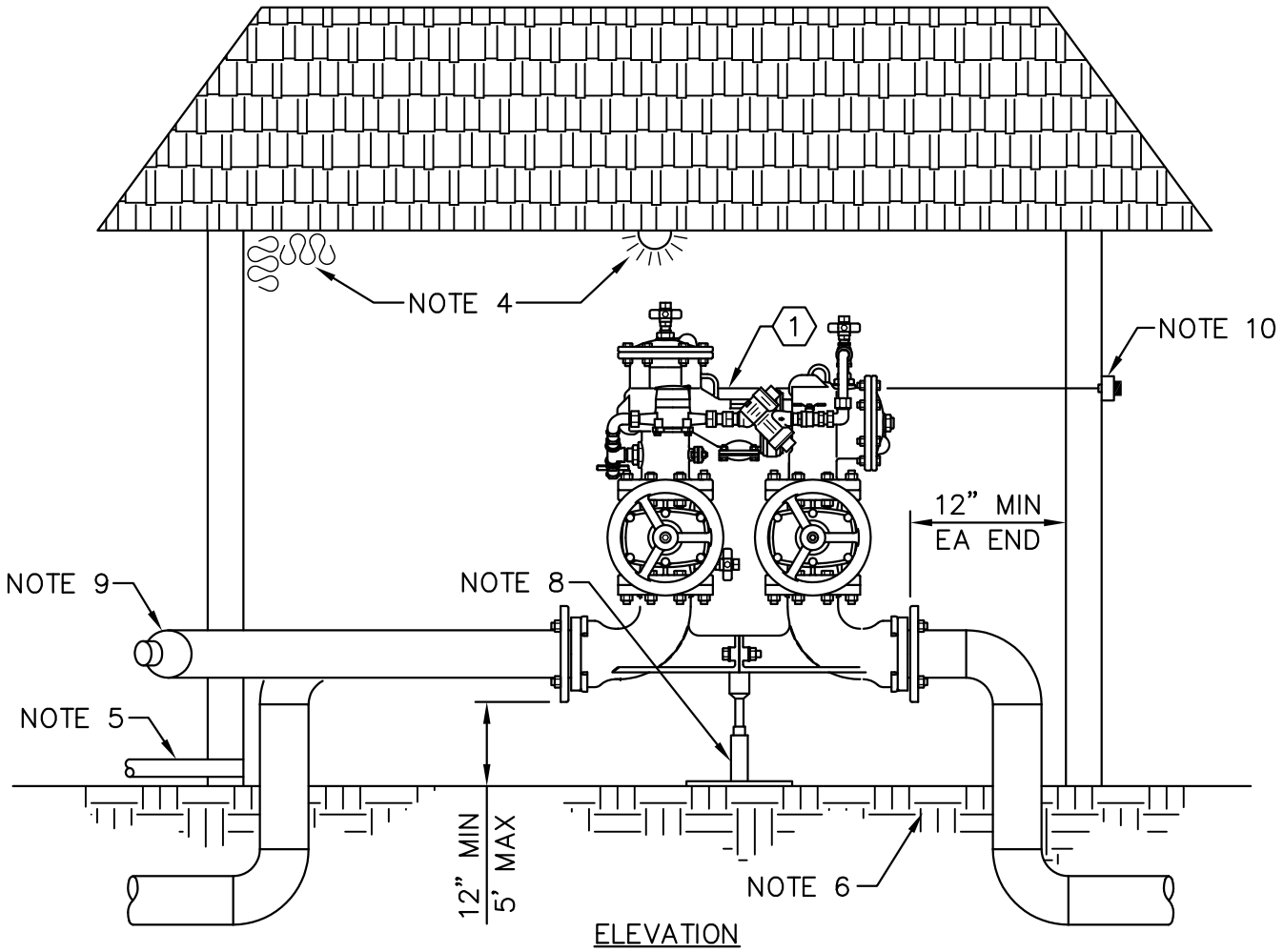
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-206**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/2"–10" ABOVE GROUND FEBCO N PATTERN

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-210**

NOTES

1. DETECTOR DOUBLE CHECK VAULT OR ENCLOSURE SHALL BE INSTALLED AT POINT OF SERVICE, OR IN AN ALTERNATE LOCATION APPROVED BY THE CITY FOR ITS SERVICE AREA, BUT NO MORE THAN 10 FEET FROM POINT OF SERVICE.
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   B. IS INSTALLED IN AN ORIENTATION AS LISTED IN THE CURRENT "APPROVED BACKFLOW PREVENTION ASSEMBLY LIST" (OREGON DEPARTMENT OF HUMAN RESOURCES, HEALTH SERVICES 503-731-4007).
3. ALL CLEARANCES APPLY TO OUTSIDE AND IN-BUILDING INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. BORE-SIGHTED DRAIN TO DAYLIGHT IS REQUIRED.
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
8. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. FIRE DEPARTMENT PUMPER CONNECTION PER LOCAL FIRE CODES.
10. INSTALL REMOTE READER, METER AND TOUCH PAD AS PROVIDED BY CITY.

⟨1⟩ – APPROVED DETECTOR DOUBLE CHECK ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

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3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
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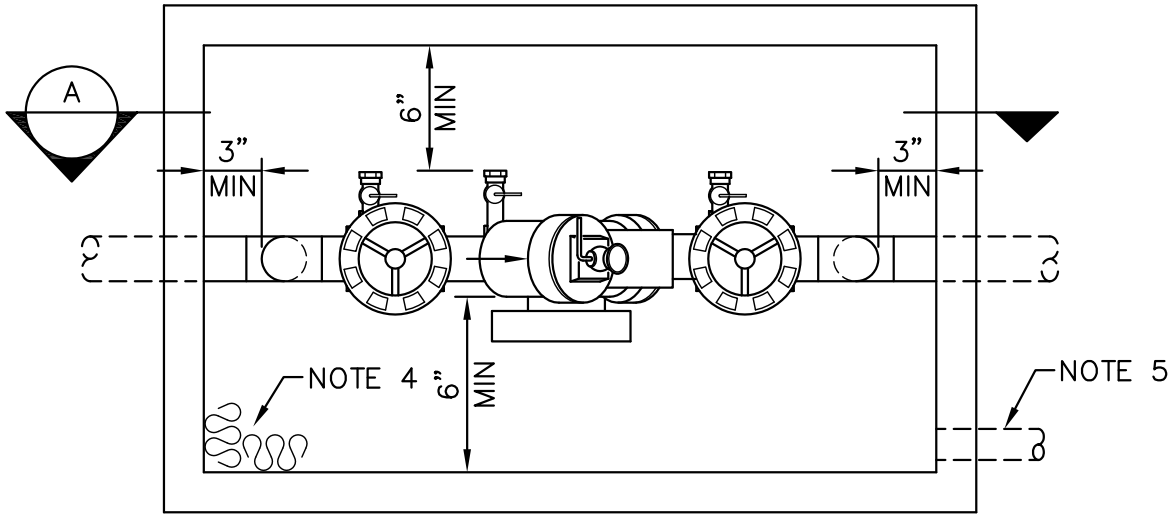
DETECTOR DOUBLE CHECK ASSEMBLY, 2 1/2"-10" ABOVE GROUND FEBCO N PATTERN NOTES

Approved By: *Mark Willrett*

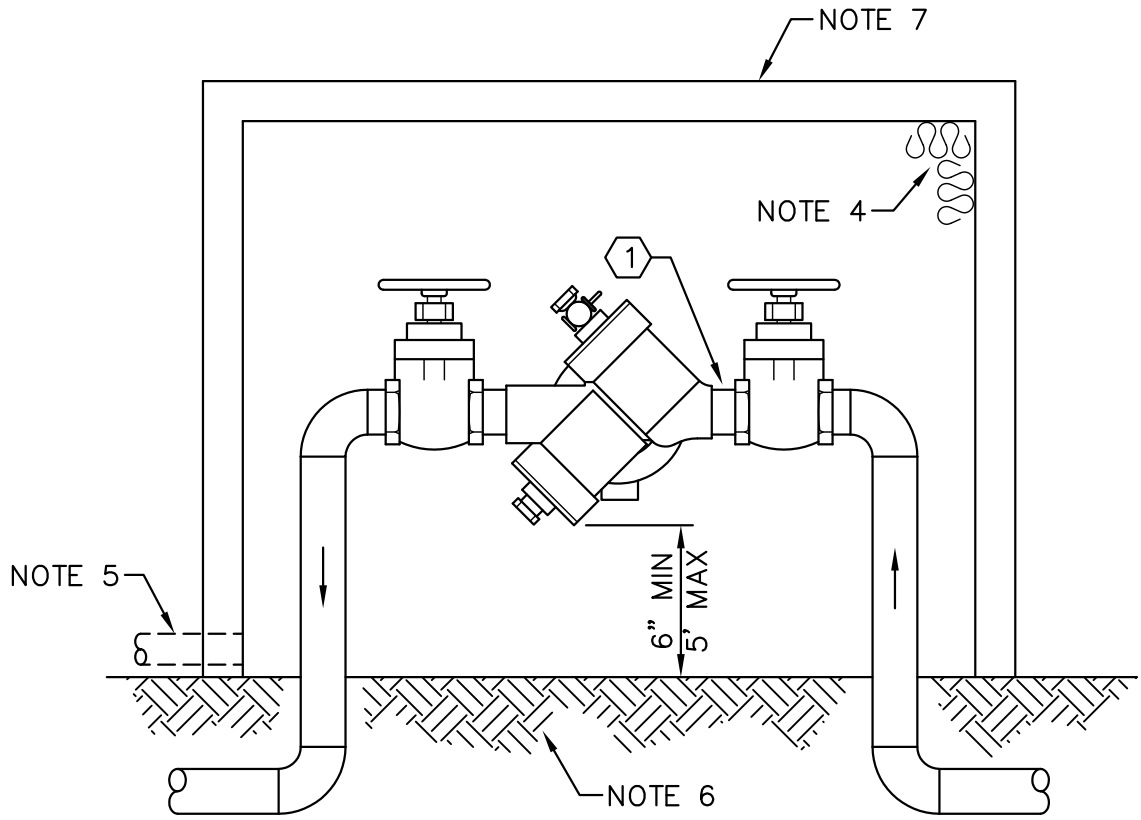
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-211**



PLAN



SECTION A

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

REDUCED PRESSURE BACKFLOW ASSEMBLY, 1 1/2"–2" ABOVE GROUND

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 2/03

Drwg. No.: **7-215**

NOTES

1. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA, AND SHALL BE ABOVE THE 100–YEAR FLOOD PLAIN.
2. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED HORIZONTAL AND PLUMB.
3. ALL CLEARANCES APPLY TO OUTSIDE, IN–BUILDING, AND VAULT INSTALLATIONS. MINIMUM CLEARANCES FOR DEVICE ASSEMBLIES 2 INCHES OR SMALLER MAY BE REDUCED PROVIDED THAT THEY ARE ACCESSIBLE FOR TESTING AND REPAIRING AND THE CITY OF KLAMATH FALLS APPROVES THE VARIANCE FOR THEIR RESPECTIVE SERVICE AREA.
4. INSULATION–FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13–4–5.4.1.1).
5. ASSEMBLY ENCLOSURE SHALL INCLUDE A BORE SIGHTED DRAIN TO DAYLIGHT CAPABLE OF DRAINING A FULL RELIEF VALVE DISCHARGE (LENGTH OF DRAIN TO BE APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. DEVICE ENCLOSURE – (E.G., METER BOX, IRRIGATION CONTROL VAULT, OR FABRICATED PERMANENT ENCLOSURE).

⟨1⟩ – APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT–OFF VALVES

AS REQUIRED BY OAR 333–061–0070 AND THE OREGON PLUMBING SPECIALTY CODE, AN INITIAL TEST PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER IS REQUIRED AT THE TIME IF INSTALLATION, WITH COPIES FURNISHED TO:

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2. THE WATER SUPPLIER
3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

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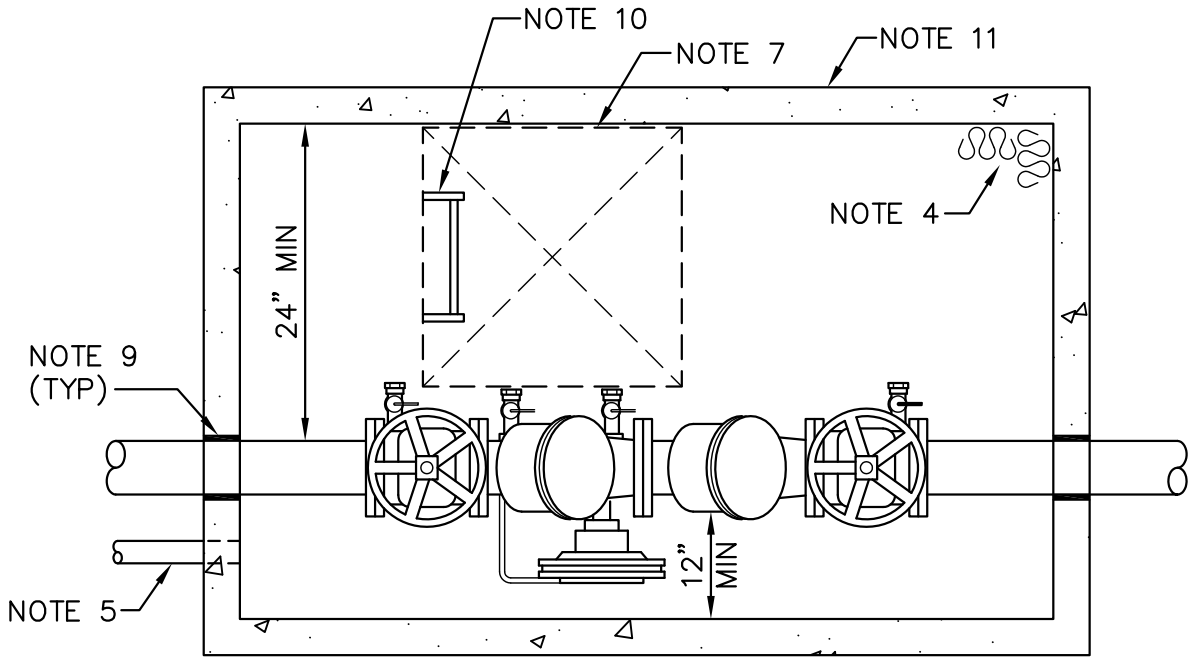
REDUCED PRESSURE BACKFLOW ASSEMBLY, 1 1/2"–2" ABOVE GROUND NOTES

Approved By: *Mark Willrett*

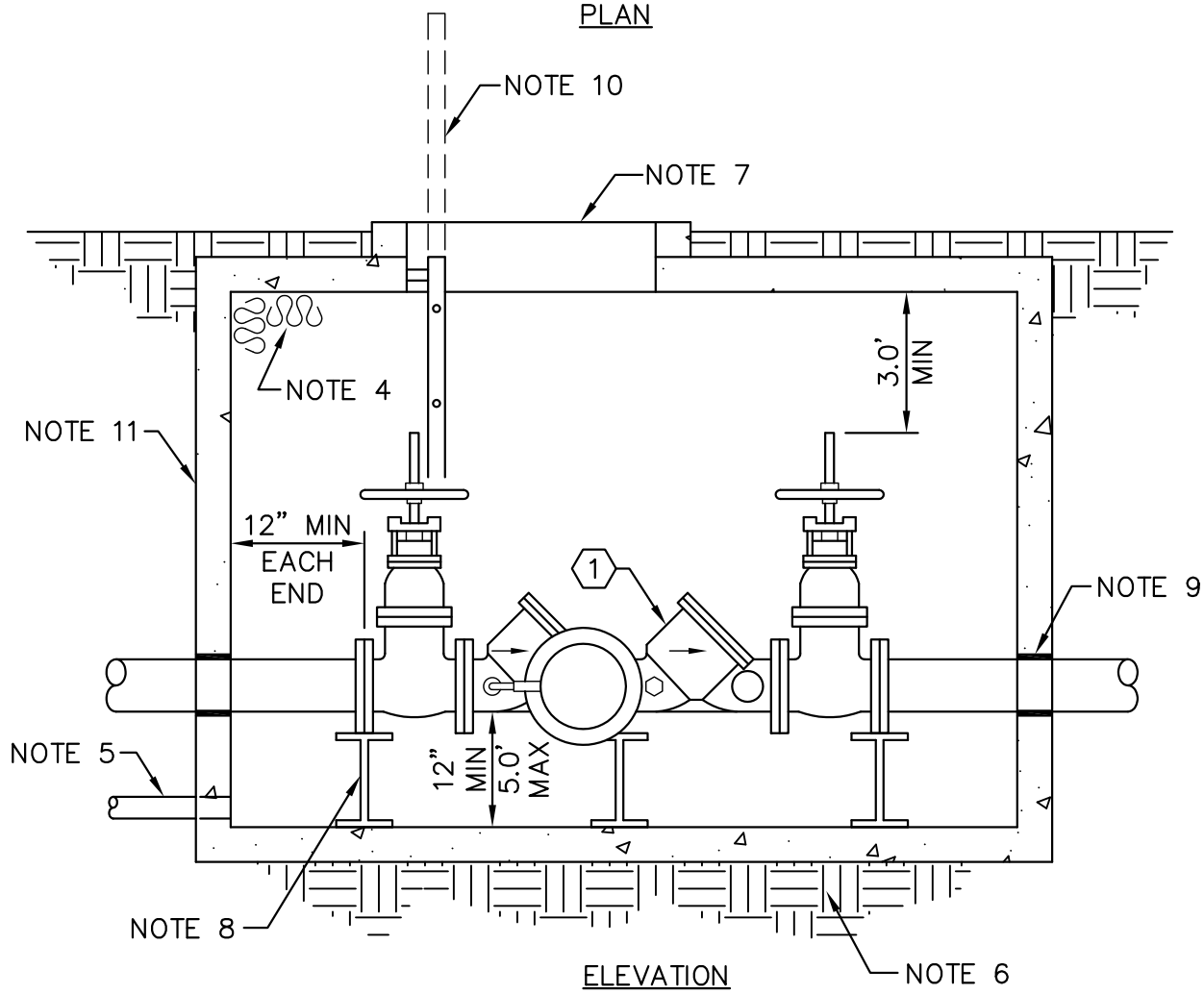
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-216**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

REDUCED PRESSURE BACKFLOW ASSEMBLY, 2 1/2"–10" BELOW GROUND

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-220**

NOTES

1. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA, AND SHALL BE ABOVE THE 100-YEAR FLOOD PLAIN.
2. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED HORIZONTAL AND PLUMB.
3. ALL CLEARANCES APPLY TO OUTSIDE, IN-BUILDING, AND VAULT INSTALLATIONS.
4. INSULATION-FREEZE PROTECTION TO BE INSULATION AND/OR HEAT SOURCE TO KEEP ENCLOSURES AT A MINIMUM TEMPERATURE OF 40°F (NFPA 13-4-5.4.1.1).
5. ASSEMBLY ENCLOSURE SHALL INCLUDE A BORE SIGHTED DRAIN TO DAYLIGHT CAPABLE OF DRAINING A FULL RELIEF VALVE DISCHARGE (LENGTH OF DRAIN TO BE APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA.
6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. HATCH MINIMUM 3'x3', SPRING ASSISTED, GALVANIZED OR ALUMINUM DIAMOND PLATE.
8. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. WATERTIGHT GROUT SHALL BE USED TO SEAL OPENINGS.
10. IF VAULT DEPTH EXCEEDS 4', USE OSHA APPROVED FIXED LADDER (OAR Ch 437, DIVISION 2, 1910.27). PROVIDE LOCKABLE EXTENSION W/LADDER.
11. REINFORCED CONCRETE VAULT (ASTM C-875).

⟨1⟩ – APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT-OFF VALVES

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SCALE: NONE

CITY OF KLAMATH FALLS

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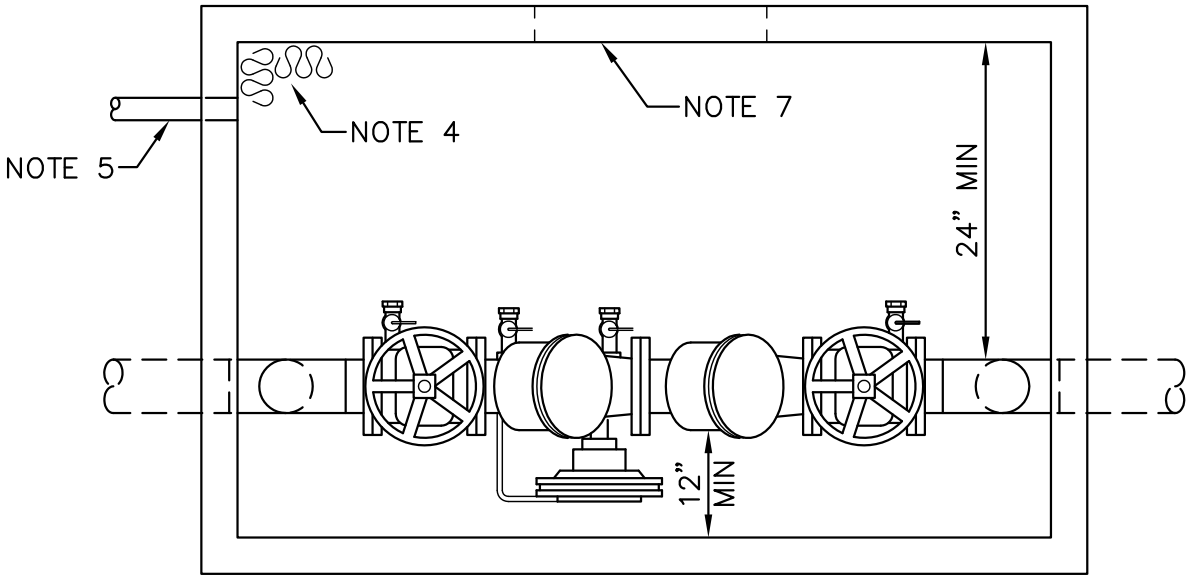
REDUCED PRESSURE BACKFLOW ASSEMBLY, 2 1/2"-10" BELOW GROUND NOTES

Approved By: *Mark Willrett*

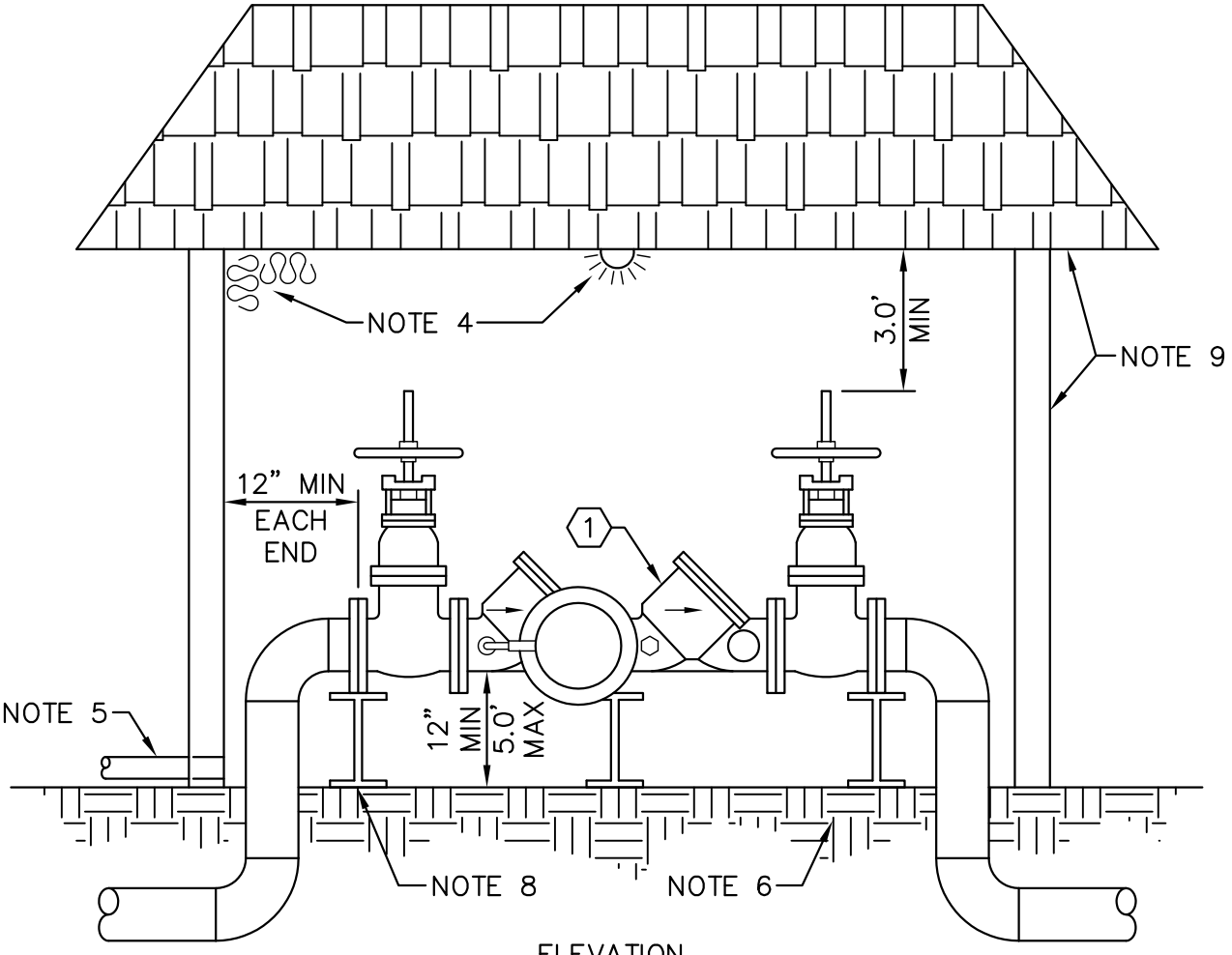
Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-221**



PLAN



ELEVATION

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
1	6/06	4th EDITION

REDUCED PRESSURE BACKFLOW ASSEMBLY, 2 1/2"–10" ABOVE GROUND

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-225**

NOTES

1. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED IN A LOCATION APPROVED BY CITY OF KLAMATH FALLS FOR THEIR RESPECTIVE SERVICE AREA, AND SHALL BE ABOVE THE 100–YEAR FLOOD PLAIN.
2. REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED HORIZONTAL AND PLUMB.
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6. COMPACTED GRAVEL OR UNDISTURBED BASE.
7. A DOOR OR OTHER ACCESS SHALL BE PROVIDED.
8. ALL ASSEMBLIES 2 1/2" AND LARGER SHALL HAVE FLANGE SUPPORTS.
9. ALL STRUCTURES TO COMPLY WITH LOCAL CODES.

⟨1⟩ – APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY INCLUDING FACTORY SUPPLIED SHUT–OFF VALVES

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3. THE BUILDING OFFICIAL

SCALE: NONE

CITY OF KLAMATH FALLS

MK	Date	Revision:
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REDUCED PRESSURE BACKFLOW ASSEMBLY, 2 1/2"–10" ABOVE GROUND NOTES

Approved By: *Mark Willrett*

Drwn. By: WEM

Date: 5/06

Drwg. No.: **7-226**

Appendix S. Water System Engineering Standards

SECTION 7 WATER FACILITIES

7-1 Purpose

The City owns and operates its water system as a public utility. As such, the City is responsible for ensuring the safe and reliable production and distribution of potable water to its customers.

The standards provided herein are intended to protect the integrity of the existing system and ensure that the future system operates efficiently. The City reserves the right to approve or reject any materials and devices proposed to be incorporated into the water system. The City also reserves the right to require that any proposed addition(s) to the water system comply with reliability, redundancy, construction and capacity requirements as outlined in these standards.

7-2 Summary

These standards represent the minimum requirements for the design and construction of water production and distribution facilities within the City's water system.

All improvements and additions to the potable water system will comply with the current and applicable requirements of the following standards:

1) Only new, unused pipe, fittings, meters and all other appurtenances will be accepted by the City for dedicated infrastructure within the City's water system. Refurbished, reconditioned, etc. materials or equipment of any kind are not acceptable for use in the City's water system.

2) The current Oregon Revised Statutes.

3) The Oregon Department of Human Services (DHS), Drinking Water Section, of the Oregon Administrative Rules.

4) The current American Water Works Association (AWWA) Standards for the design and construction of public water systems.

5) The current City of Klamath Falls "Standard Guidelines for Back Flow Prevention Assemblies" manual.

6) The current American Public Works Association – Oregon Chapter Standard Specifications.

7) The current City of Klamath Falls Water System Master Plan

In case of a conflict between standards, the design criteria of the City as presented herein shall govern.

7-2.1 Definitions

The terms used in this Design Standard and on construction plans and details shall have the following meanings:

7-2.1.1 Air Vacuum Control Valve (AVC):

An air vacuum control valve (AVC) is a control device that allows air to vent from a water main or allows air to enter the main to prevent a vacuum from forming in the main.

7-2.1.2 Appurtenances

Appurtenances are the fittings, connections pieces, control devices and any other miscellaneous equipment that make up a functioning water system.

7-2.1.3 Average Day Demand (ADD)

The average daily usage of water over a given one year period.

7-2.1.4 Back Flow Prevention Assembly:

A “back flow prevention assembly” is a system of gate valves and check valves used to prevent the reversal of the flow of water from an individual consumer, back into the City water system.

7-2.1.5 City Water System

The City water system is a collection of elements that produce, store, distribute and deliver potable water to the public for a number of consumptive uses.

7-2.1.6 Engineered Plan

An engineered plan will be required for all water system improvements to be constructed for any given private development or public improvement project. This plan will be drawn to scale, showing the layout and details of all water system improvements to be constructed. Please note SECTION 10 of these Standards.

7-2.1.7 Equivalent Residential Unit (ERU)

An equivalent residential unit (ERU) is the amount of water required to support the domestic consumption for one family unit, residing in a typical single family home. Refer to the values in the Connection Request Report available from City Engineering.

7-2.1.8 Flush Out

A flush out is a combination of piping, valves and fittings that will allow water to be drained from the City water main.

7-2.1.9 Point of Service (POS)

The “point of service” (POS) is defined as the location, on any water service, where the City’s maintenance responsibility ends. The POS for service sizes two-inch and smaller is the outlet connection of the water meter, including the meter box and lid. The POS for service sizes three-inch and larger is the outlet connection of the water meter, excluding the meter vault and lid. The POS for fire services is the point at which the fire service line leaves the right of way (ROW) or easement. In case of a fire service double check valve assembly, with a usage detector check (DDC) in a vault in the ROW or water main easement, the POS is the location at which the fire service line enters the vault.

If any water service line extends out of the ROW or easement (i.e.: the meter or DDC is inside the facility’s “mechanical room”) the service owner will install a valve at the property line. In these cases the property owner will be responsible for maintenance and repair of all underground water infrastructure “downstream” from the valve.

7-2.1.10 Pressure Zone

A pressure zone is a portion of the distribution system in which all customers receive water within a defined pressure range. Due to the extreme elevation changes within the City system, pressure zone boundaries may fall within developmental areas. A pressure-reducing valve (PRV) is a control device that maintains system pressure at the intersection of two different pressure zones.

7-2.1.11 Tie-ins

A tie-in is the point of connection of a new water main to the existing water system. Tie-ins made to the existing main, while the main remains in service are tap connections. Tie-ins made by removing a piece of the existing main and inserting a connection fitting are cut-in connections. Tie-ins made at the end of an existing water main are dead end connections. All tie-ins will be connected using mechanical joint type "cut in sleeves", with restrainer fittings at each end. No "flex type" couplings will be allowed.

7-2.1.12 Water Mains

Water mains are pipes placed in street rights-of-way and utility easements for distributing potable water to City customers.

7-2.1.13 Water Utility Maps

The water system utility maps are working drawings, compiled over the life of the utility. These maps represent the most accurate information available regarding the location, size and construction material of all City facilities.

7-2.1.14 Water Services

Water services are short runs of pipe connected to water mains to supply water to individual lots or parcels. A water service pipe installed to supply an on-site fire suppression system is a fire service. Fire services require a (DDC) approved by the Oregon State Health Division with a usage detector meter. A water service installed for the sole purpose of supplying water to a landscape irrigation system is an irrigation service. All irrigation services require a water meter and the installation of an Oregon State Health Division approved back flow assembly.

7-2.1.15 Water System Model

A water system model is a mathematical representation of the characteristics of a water system (pipes, storage, production, pumps, and controls) used to predict the pressure, flow, velocity, and energy losses expected under a given system demand scenario (e.g. peak day demand or peak day plus fire flow).

7-2.2 Development Permit

A water system concept (preliminary utility plan) will be submitted to the City with the Development Permit Application for all proposed development that will result in water supply demands exceeding two hundred and fifty (250) ERUs at its saturation build-out. The planning level concept shall include preliminary demand calculations and/or modeling reports that estimate initial, phased, and ultimate domestic and fire demand required by the development. The concept shall include general locations of any proposed connection to the existing water system, identification of proposed pressure zones, and preliminary locations of any booster station(s)

and/or reservoir(s) required to ensure adequate domestic and fire service pressures to the development.

This information will assist the City in confirming that adequate water capacity is available at the proposed connection point(s). In addition, the information will be used to determine whether the proposed development shall assume responsibility for the cost of any capacity improvements necessary to accommodate the proposed development. The City reserves the right to require a comprehensive system capacity analysis if, in its opinion, the proposed development may have the potential of operational, supply or hydraulic impact on the current water production or distribution system.

7-2.3 Site Construction Permit

Prior to the City's issuance of the Site Construction permit, design calculations and construction documents shall be submitted to the City for review and approval for any proposed connection or water system improvements regardless of development size. The submittal shall include a design stamped by an Engineer licensed by the State of Oregon and include all information necessary for the City to verify that the proposed facilities meet all design criteria defined in these standards. The plan will include detailed notes describing all pertinent construction phases, areas of responsibility, standard references and specific instructions that will affect the successful completion of the project. The plan shall meet the City's design and drafting standards.

The Site Construction Permit will not be granted until the City has been satisfied that all requested design modifications have been addressed by the applicant and that all required easements have been granted to the City. The design submittal shall include all drawings, specifications and supporting calculations needed to verify that the proposed water system improvements and/or connections align with the water system concept (utility plan) approved during the City's Development Permit process and that the design meets the City's standards as specified herein. All proposed agreements between the applicant and the City regarding cost sharing, advance financing, utilization of SDC credits, etc. shall be signed by all parties prior to the issuance of the Site Construction Permit. The City will not accept water system improvements that an applicant intends to dedicate to the public unless the improvements are reviewed and approved by the City prior to the start of construction.

7-3 Production Facilities

In general, the City assumes the lead in the design, construction and funding of water production system improvements. However, developers may be required to construct and dedicate new public facilities or provide the water system with the funding necessary to offset the cost of increased capacity required to serve a proposed development. Typically, this is the case with large "Planned Unit Developments", commercial/industrial users, and/or other users that will potentially place a significant demand on the current water system. Some capacity related dedications may be eligible, in part, for financing or expense recapture through various City programs. It is the City's intent to identify these requirements and/or options during the Development Permit process.

7-3.1 Wells

The City obtains all of its potable water from groundwater wells drilled into the water bearing strata beneath the Klamath Basin. Proper well placement, design, construction and development are critical to the economical and sanitary production of water supplies. Any proposed public dedication of new well facilities will be identified during the City's Development Permit process and identified on the required water system concept submittal. The proposed dedication will include a planning level concept outlining the preliminary demand and engineering production calculations that verify that the proposed well and the connecting water system will meet City's

capacity requirements and will be consistent with the hydraulic operation of the surrounding City system. The planning level concept must be approved by the City before well construction (or geological testing) begins.

The City will not consider or accept any production well dedications under 420 gpm of capacity. All new production wells over 420 gpm that the applicant intends to dedicate to the City will be designed and constructed to provide 140 percent of the maximum peak day demand at saturation build-out of the proposed development. Applicants must apply for and receive the appropriate "Water Rights" certification from the Oregon State Water Resources Department. These rights must be assigned to the City prior to the public dedication.

A testing and development plan must be approved by the City, for any proposed dedicated well, prior to construction of the production well.

7-3.2 Well Pumping Plants and Facilities

Well pumps are specific to individual wells and distribution system requirements. All pump designs will be submitted to the City for approval and shall include all engineering calculations necessary to verify the pump will meet City hydraulic and capacity requirements.

In order to maintain water supplies during emergency situations, the City will require generator "back-up" power at each well pump location. Generators will be sized to fully power the well pump and associated facilities. Generators shall be diesel powered and capable of operating at least 48 consecutive hours without re-fueling. The fuel tank shall be mounted within the unit (no free standing tanks).

7-3.3 Water Storage Reservoirs

Reservoirs are located throughout the current distribution system and are placed at locations and elevations that support the City's operational, hydraulic and system management plan. Any proposed development that will require demand capacity greater than 450 ERUs (or fire suppression requirements greater than the existing system will support) will be required to provide reservoir storage. New reservoirs will be designed to maintain water storage capacity equal to 150 percent of the development's peak day demand at saturation build-out. They will also be designed to meet applicable fire storage requirements. Fire storage for residential services will be equal to 1500 gpm for two hours. Developments that include commercial or industrial designations will provide fire storage at 2500 gpm for three hours. In areas served by more than one storage or pumping facility, "fire flow" storage requirements may be reduced with concurrence of the Fire Department. New reservoirs shall also be designed to complement their surrounding environment and meet any specific aesthetic requirements established as a condition of Development Permit. This storage capacity requirement does not exempt or offset the required SDC charges.

7-3.4 System Control

Control and remote operations of any proposed water system pumping, storage or production infrastructure that will be dedicated to the City shall include a computerized radio telemetry system. All facilities will be equipped with components that are compatible with the City's control and telemetry system. Please see SECTION 9 of these Standards.

7-4 Design Criteria

The following criteria will be used as minimums when planning and designing water facilities that will be dedicated to the City water system. Situations not specifically covered in this section (or

these Standards) should be discussed with Public Works Department staff before the Development Permit Application is submitted.

7-4.1.1 City Wells

Wells dedicated to the City will provide at least 115 percent of the maximum PDD for the development served.

7-4.1.2 Fire Flow Requirements

The amount of flow (gpm) and duration (hours) required at a site for fire protection are as per City Standards and the requirements set by the Oregon State Fire Marshall (OSFM) in the Oregon Fire Code. City minimum Fire flow requirements are 1500 gallons per minute for 2 hours in residential (only) areas and 2500 gallons per minute for 3 hours in commercial / industrial areas. OSFM requirements are based on the International Fire Code (IFC) with amendments as authorized by the Oregon Revised Statute (ORS) 476.030 and in accordance with OAR Chapter 837, Division 40. Flow Capacity Requirements

Flow capacity requirements for domestic and commercial services are as follows:

1. Peak Day Demand equals 960 gallons per day for one ERU. (.67 GPM)

2. Average Day Demand equals 750 gallons per day for one ERU. (.52 GPM)

3. Peak Hour Demand equals 64 gallons per hour for one ERU. (1.07 GPM)

7-4.1.3 Storage Requirements

Storage requirements are 100 percent of the Peak Day Demand plus the applicable fire flow for any development larger than 450 ERUs or a development that will impose capacity requirements greater than the existing water system will support.

7-4.1.4 System Pressure

System pressure within new development service areas (and in the existing service area affected by the development) will be maintained at a minimum of 42 pounds per square inch and at a maximum of 105 pounds per square inch. Please see 7-5.2.

7-4.1.5 Water Velocity

Water velocity in any City water main will not be permitted to exceed limits discussed in 7-5.1

7-5 Distribution Systems

7-5.1 Water Mains

All new water mains will be either Class 50 Ductile Iron Pipe, according to AWWA Standards section C100, or DR 18 Polyvinyl Chloride Pipe, according to AWWA Standards section C900. All water mains larger than twelve-inches shall be constructed of ductile iron pipe. C900 PVC mains will be colored blue, throughout the entire composition of the pipe. The City may entertain or direct changes to these material standards where pressure considerations or ground conditions warrant modification.

The City has standardized on five nominal pipe sizes for mains 24-inch and smaller. These include 8,12,16, 20, and 24 inch diameter pipe. Pipe selection shall be based on this standardization and these velocity limitations.

Water mains will be sized to meet the following flow criteria:

1) In residential areas, velocity shall be less than four and one-half (4.5) feet per second, during the peak usage hour, calculated using the saturation build-out ERUs.

2) In commercial / industrial areas, velocity shall be less than seven and one-half (7.5) feet per second, during fire flow on the peak usage day (at saturation build-out ERUs).

3) Water mains in residential areas will be a minimum of eight-inch (8") nominal diameter.

4) Water mains in areas serving commercial/industrial zonings will be a minimum of twelve-inch (12") nominal diameter.

5) Pipe size selection will not decrease the residual pressure within the existing distribution system below 20 pounds per square inch, during a fire situation or 42 pounds per square inch during normal usage periods.

Water main extensions that will be dedicated to the City will be installed so that the main extends a minimum of twenty lineal feet past the development to be served.

Mains will be placed and constructed as indicated on the approved engineered plan. Back filling, compaction and surface restoration will be as required by the Agency having jurisdiction of the right-of-way.

7-5.1.1 Tapping Main Lines

When tapping existing water main lines, the contractor shall use a Romac SST Tapping Tee or approved equivalent. Ductile Iron tapping sleeves are not acceptable for use, except on Ductile Iron pipe.

When tapping existing water main lines, the contractor shall make provisions to continuously flush and purge water through the non-pressurized side of the tapping valve (toward the bottom), or through the tapping machine. Using a corporation stop on the testing tap on the tapping sleeve is not acceptable. When working with asbestos pipe, refer to Appendix 7-A for proper handling. The contractor is responsible to dispose of contaminated water and asbestos pipe in accordance with DEQ regulations.

The purpose of this procedure is to prevent the fouling of valves, regulators, meters and other equipment with chips and to prevent the unnecessary addition of asbestos and other debris to drinking water.

City personnel must be present any time a tap is made on the City's existing water main lines.

7-5.1.2 Working with Asbestos Pipe

See Appendix 7-A.

7-5.2 Distribution Pumping Plants (Booster Stations)

Specific service areas or pressure zones may require the installation of a pumping plant to provide flow capacity or adequate water pressure. Design and installation of booster stations, when required, will be the responsibility of the developer. The City will accept booster stations as part of the dedicated infrastructure if the proposed station serves a development of 25 ERUs or more. In developments of less than 25 ERUs, water pumping and delivery will be operated as a private water-delivery system. Private systems will require a "master meter" at the City "point of service" upstream of the pumping station and appropriate cross-connection control devices. If water pressure can be maintained above 20 pounds per square inch at all "points of service" within a development, the City will consider allowing privately operated booster pumps (residential) at each service location.

Booster station design is specific to the distribution service area and the hydraulic conditions of the adjacent water system. Any development that proposes to dedicate a booster station to the City shall submit the detailed design for review and approval prior to the issuance of the Site Construction Permit. The design shall include demand and hydraulic calculations and all materials specifications necessary for the City to verify that the proposed facility meets the City's flow and technical requirements. The developer and its engineer are encouraged to contact Water Division staff early in the development process to discuss booster station design and construction alternatives.

Modeling will be required when a booster pumping station is necessary. Modeling will evaluate both existing system characteristics and system characteristics after the proposed booster station installation. If the additional flow volumes created by the booster station result in conditions that exceed the limits stated in Section 7-3.3 or 7-5.1 above, the developer will be required to provide water production, storage and distribution facilities sufficient to offset increased demand.

In order to maintain water supplies during emergency situations, the City will require generator "back-up" power at each booster pump location. Generators will be sized to fully power all pumps and associated facilities. Generators will be diesel powered and capable of operating at least 48 consecutive hours without re-fueling. The fuel tank will be mounted within the unit (no free standing tanks).

7-5.3 Valves

All water mains twelve-inch and smaller will be fitted with resilient wedge epoxy lined and coated gate valves, according to AWWA Standards section C500. Substitution of butterfly valves will only be permitted when field conditions require the main to be installed with "minimum cover." In these cases gate valves may not allow adequate "surface to operator nut" clearance.

Water mains larger than twelve-inch will be fitted with either gate or butterfly valves, with resilient valve seats and epoxy lining and coating, according to AWWA Standards section C500**.**

Isolation valves will be installed on all City mains at intervals no greater than 500 linear feet. At water main intersections, valves will be installed as detailed on the engineered plan.

Submittal data will be required for all valves installed in the City system.

See Standard Drawing 7-100 to 7-125 and the approved engineered plans for installation details and requirements.

7-5.4 Services

All water, fire and irrigation services will be installed by the developer at the time of original construction. See Standard Drawing 7-100, 7-100(a, b & c), 7-105 and the approved engineered plans for installation details and requirements. Where existing mains are in place, City personnel will install services sized two-inch and smaller in those area currently served by existing City water mains. The developer will install services larger than two-inch. Water services (other than fire services) larger than 2-inch will require a 2-inch lockable meter bypass for exclusive use by City Water Division staff during meter maintenance. Materials for services larger than two-inches shall correspond to requirements for mains and appurtenances.

7-5.5 Fire Hydrants

All fire hydrants will be installed by the developer at the time of original construction. All fire hydrants will be Kennedy K-81 D.

See Standard Drawing 7-110 and the approved engineered plans for installation details and requirements.

7-5.6 Pressure Zone Control

If a pressure reducing valve (PRV) is required within a development to provide appropriate residential pressure, the developer will design and install an approved PRV station as part of the water facilities provided. PRV station design and hydraulic capabilities are specific to the distribution area to be served. The PRV station design shall be submitted to the City for approval prior to the issuance of the Site Construction Permit. The submittal shall include all engineering calculations necessary for the City to verify that the station meets the City's hydraulic and material requirements. In addition, the submittal should address any anticipated hydraulic impacts on the existing water system.

Flow modeling may be required when a PRV station is necessary. The modeling effort will evaluate both existing system characteristics and system characteristics after the proposed PRV installation. If the additional flow volumes created by any proposed development result in velocities that exceed those stated in Section 7-5.1, the developer will be required to provide larger or additional water distribution facilities.

See Standard Drawing 7-125 and the approved Engineered Plans for installation details and requirements.

7-5.7 Air-Vacuum Control

An air-vacuum control (AVC) device is required on any City Water main where a "high spot" exists at any point between lower portions of the main. A "high spot" is any location at which the main rises more than one-half (.5) times the nominal pipe diameter, and then descends to the previous elevation.

See Standard Drawing 7-120 and the approved engineered plans for installation details and requirements.

7-5.8 Flush Outs

A flush out is required on all dead end portions of City mains. A fire hydrant may be installed instead of a flush out at the end of a cul-de-sac.

See Standard Drawing 7-115 and the approved engineered plans for installation details and requirements.

7-5.9 Backflow Control

All services that present a cross contamination risk to the public water supply must be equipped with a backflow prevention assembly approved by the Oregon Health Division. Designers are to refer to the current edition of the "City of Klamath Falls: Standard Guidelines for Backflow Prevention Assemblies" manual for information.

See the approved engineered plans for installation details and requirements.

7-5.10 Appurtenances

All fittings needed to provide a fully functional water distribution system, not specifically covered in these specifications are to be manufactured and installed according to the latest edition of the AWWA Standards.

7-5.11 Disinfection of Facilities

Following completion of new facilities, including wells, valves, pumps, water mains and service connections, which will be in contact with the water delivered to users, said facilities shall be disinfected before they are placed into service. Disinfection shall be by chlorination according to Oregon Administrative Rules 333-061-0050(10) and AWWA Standards C651 through C654. Disinfection shall include but not be limited to the introduction of a chlorine solution with a free residual of 25mg/l into the facility in a manner that will result in a thorough wetting of all surfaces. The solution shall remain in place for 24 hours. After the 24-hour period, the free chlorine residual must be checked and found to be 10 mg/l or greater. The chlorine solution shall be drained and the facility flushed with potable water. A minimum of one sample shall be collected from the facility for microbiological analysis. Should any test fail, the facility shall be flushed, rechlorinated and rechecked until a sample free of coliform organisms is obtained. Other disinfectants may be used if demonstrated that they can also achieve the same results.

7-6 Facilities, Infrastructure and Property

7-6.1 Site Enclosures

All City Water wells, reservoirs, pump stations and buildings will be contained within a limited access enclosure. Enclosures will be (minimum) six-foot tall, nine-gauge, chain link fencing with a heavy-duty top rail and 12.5-gauge stranded bottom tension wire. Enclosures will be equipped with at least one 16-foot "drive through" double gate and one 36-inch "walk through" gate. When appropriate, enclosures will include three-wire "anti-climb" top barrier. Fences (or other enclosures) will be positioned so that a service truck, with a standard 160-inch wheel base, can travel around all buildings or facilities without reversing direction.

Site enclosure requirements may be altered depending on the specific usage or location of the property or facility. Additional costs associated with requirements that are more stringent will be the responsibility of the developer.

7-6.2 Buildings

All City water buildings and structures that house mechanical, electrical, electronic or other temperature and humidity sensitive equipment shall contain central climatic control apparatus. Atmospheric conditions inside the structures shall be maintained according to the recommendations of the equipment manufacturers. No

climatic control equipment will be installed without approval of the City. Please see SECTION 9 of these Standards.

7-6.3 Access

All City Water properties and facilities shall be accessible by way of an improved roadway connecting to a public right-of-way. The minimum requirements for access driveways outside the City limits include: a minimum width of 20 feet; base course of at least eight inches of 1 ½ inch minus compacted to 95% of AASHTO T-99; surface course of at least 3 inches of "¾ inch minus" compacted 95% of AASHTO T-99 and drainage that meets the requirements of SECTION 4 of these Standards. The minimum requirements for access driveways within the City limits include a minimum width of 20 feet; base courts of at least 6 inches of 1 ½ inch minus, compacted to 95% of AASHTO T-99, asphalt paving 'B' mix (3 inch thickness, minimum), and drainage that meets the requirements of SECTION 4 of these Standards.

All access driveways shall be located in areas wholly controlled by the City through a dedicated easement. Shared usage will be permitted, but the access needs and requirements of City will have precedence over all others. All easements or private usage agreements will be recorded with the appropriate governmental authority and will be non-revocable.

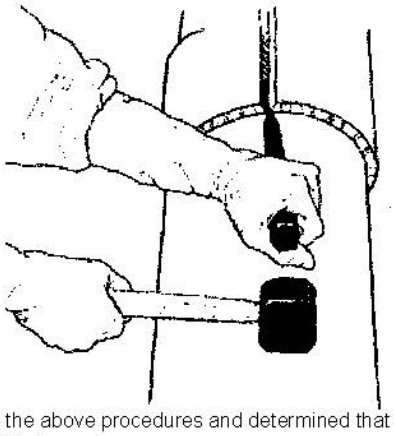
7-6.4 Property

All City Water buildings or other structures (not located in rights-of-way) will be located on property deeded to the City. Easements or private usage agreements will not be considered as viable alternatives to City ownership. Water system improvements required as a condition of public dedication of infrastructure will be constructed on property that is deeded to the City. Property will be free of encumbrances, as reported in a title search provided by the developer and approved by the City attorney.

EXHIBIT 7-A

8. USING HAMMER AND CHISEL TO REMOVE COUPLING FROM AC PIPE IN ALL SIZES.

Replacement of damaged pipe necessitates excavation, exposure and removal. AC coupling removal may be accomplished by gradually splitting the coupling lengthwise using a chisel and hammer. After the top of the coupling has been split, a crowbar or similar tool is used as a lever to split the bottom of the coupling.



KEEP MATERIAL WET AT ALL TIMES.

DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**

DEQ and Oregon OSHA have carefully evaluated the above procedures and determined that they can be used safely when handling and repairing AC pipe.

REMEMBER, DEQ regulations require that all asbestos-containing materials be kept wet during removal and disposal in accordance with the asbestos disposal regulations. Exceptions to these requirements must be approved prior to starting an asbestos removal project.

EXHIBIT 7-A

REMOVING NONFRIABLE ASBESTOS (AC) WATER PIPE

PART I GENERAL

1.01 SUMMARY

Exposure to asbestos can result in severe health impacts and the Department of Environmental Quality (DEQ) regulates the removal, handling and disposal of asbestos-containing materials (ACM) during construction, remodeling, and demolition. This section outlines handling procedures for working with water pipe that contains asbestos. For a complete list of Oregon DEQ regulations involving the removal of asbestos materials, visit the DEQ website at http://www.deq state.or.us/ag/asbestos/Contractors.htm.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 GENERAL

When handling AC pipe, make sure the material stays in a nonfriable condition. Friable asbestos material will easily release fibers when crushed. Nonfriable asbestos material holds the asbestos fibers within a solid matrix and will not allow asbestos fibers to release easily, unless mishandled, damaged, or in badly weathered condition. In most cases, AC pipe is considered nonfriable. Nonfriable asbestos materials in good condition are exempt from some DEQ rules. You do not need to be a DEQ licensed asbestos contractor or DEQ certified asbestos worker to do nonfriable removal. If you follow the procedures in this guide, the AC pipe should remain in nonfriable condition.

Nonfriable material must be handled, transported, and disposed of in a way that prevents it from becoming friable and releasing asbestos fibers. For more information about the asbestos rules or if you have questions contact the DEQ regional office:

Easter Region Bend at (541) 388-6146, ext. 226

The Oregon Occupational Safety and Health Division (OR-OSHA) has rules about worker training, building surveys, and the safe handling of nonfriable asbestos. (See OAR 437, Division 3, Construction.) Contact OR-OSHA at (503) 378-3272 for current rule and policy information.

3.02 OPERATION PROCEDURES

A. FOR AC WATER PIPE TO BE CONSIDERED NONFRIABLE, IT MUST BE REMOVED IN WHOLE SECTIONS.

You cannot cause the AC pipe to shatter, crumble, be pulverized, or release asbestos fibers. You cannot sand, saw, grind, chip, or use power tools on AC pipe. If you use this guide, licensing as a DEQ asbestos abatement contractor and DEQ worker certification are not needed.

1. File a DEQ nonfriable notification and pay the nonfriable fee as outlined in OAR 340-248-0260.

2. Keep the material wet while you remove it. You can use a water hose, garden sprayer, spray bottles, or any method that keeps the material wet. Wetting prevents fiber migration during removal.

3. Pull the pipe up out of the ground in easy to handle lengths (3 feet to 5 feet), using DEQ approved procedures.

4. Place the pipe in leak-tight containers with a warning statement "DANGER ASBESTOS-CONTAINING MATERIAL". The asbestos-containing waste material (ACWM) must remain wet until disposed of at a landfill authorized to handle asbestos waste. Fill out a DEQ ASN-4 waste shipment report for transport and give it to the landfill upon arrival. DEQ advises you to contact the landfill before you start your project so you can find out what that landfill's disposal needs are. Many landfills require asbestos to be specially packaged and labeled. Nonfriable asbestos waste may not be used as clean fill and DEQ rules do not allow on-site burial of AC pipe, unless the reason for this burial meets specific exception conditions!

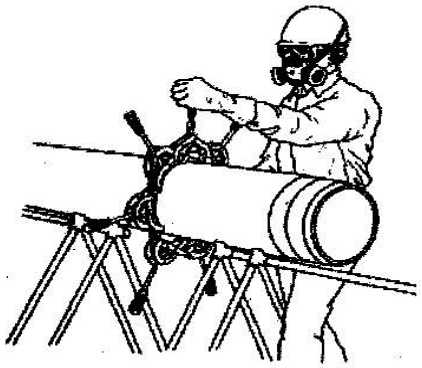
NOTE: *DEQ knows that some breakage and damage will occur during this process. However, that breakage will be minimized if you follow this guide.*

B. **USE THE FOLLOWING PROCEDURES WHEN THE REMOVAL RESULTS IN THE AC PIPE BECOMING FRIABLE.**

If AC PIPE is shattered, damaged, or badly weathered, it will become friable and release dust and asbestos fibers. A DEQ licensed asbestos abatement contractor using DEQ certified workers must remove all friable asbestos materials.

All asbestos abatement rules under OAR 340-248-0010 through 0290 must be followed, including the Following:

1. File a friable asbestos abatement notification And fee as outlined in OAR 340-248-0260
2. Hire a DEQ licensed asbestos abatement contractor to remove the asbestos for you.



The following information was excerpted from the American Water Works Association guideline for handling AC pipe. This information is modified to make it compatible with the DEQ asbestos removal regulations. There may be other removal and handling procedures employing non-power options that are equally effective and also meet DEQ asbestos requirements.

EXHIBIT 7-A

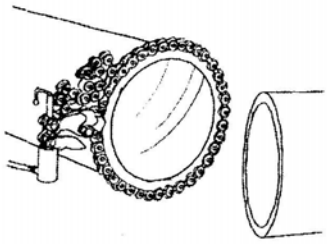
AMERICAN WATER WORKS ASSOCIATION RECOMMENDED WORK PRACTICES FOR CUTTING AND SPLICING CEMENT WATER PIPE

1. USING CARBIDE TIPPED BLADES TO CUT AC PIPE, IN SIZES FROM 3 INCH THROUGH 24 INCH.

Blade cutters are frame adjustable to the circumference of the pipe and have a number of selftracking rollers that align one or more carbide-tipped cutting blades. Because of the relatively low mechanical input and clean cutting action, hand operated blade cutters do not produce significant amounts of airborne asbestos dust.

KEEP MATERIAL WET AT ALL TIMES
DO NOT blow out with compressed air, dry sweep, or vacuum with a non-HEPA vacuum cleaner!

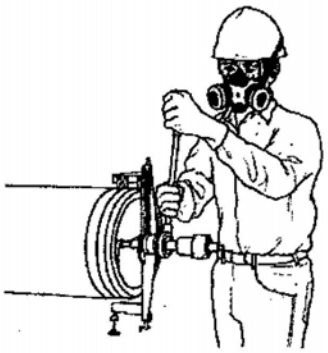
2. USING SNAP CUTTERS TO CUT AC PIPE IN SIZE RANGES 3 INCH THROUGH 24 INCH.



Snap cutters ("squeeze-and-pop" equipment) operate by means of cutting wheels mounted in a chain wrapper around the pipe barrel. Hydraulic pressure, applied by means of a remote, pneumatically, or manually operated pump, squeezes the cutting wheels into the pipe wall until the cute is made. This type of cutting minimizes the release of asbestos fibers.

KEEP MATERIAL WET AT ALL TIMES.
DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**

3. USING MANUAL FIELD LATHES TO MACHINE AC PIPE IN ALL SIZES



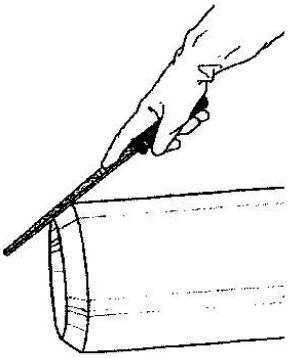
Manual field lathes are designed to end-trim and re-machine rough pipe barrels to factory-machined end profiles. The lathe consists of an adjustable, self-aligning arbor inserted into the pipe bore (which acts as a mandrel upon which the turning handle operates), a screw-fed turning frame, carbide machining blades, and manual (hand or ratchet) turning handles.

KEEP MATERIAL WET AT ALL TIMES.
DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**

EXHIBIT 7-A

4. USING A MANUAL RASP TO MACHINE AC PIPE IN ALL SIZES.

Short lengths of AC pipe, machined-end exclusively (MEE) and machined overall (MOA), can be cut to make closures and repairs and to locate fittings exactly. Field-cut ends may be rebeveled with a coarse wood rasp to form a taper approximating the profile of the factor-beveled end.



KEEP MATERIAL WET AT ALL TIMES.

DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**

5. WET TAPPING AC PRESSURE PIPE IN ALL SIZES.

Pressure or "wet" tapping for service connections is performed in the trench while the pipe is under pressure. The equipment (manual driven) is affixed to the pipe by means of a chain yoke. A combination boring-and- inserting bar drills and taps the pipe wall and inserts a corporation stop or pipe plug. The pressure chamber, which protects against water leakage, also catches the asbestos-cement chips, so this is essentially a dust-free operation. To minimize (1) the fouling of valves, regulators, meters, and other equipment with chips and (2) unnecessary addition of asbestos to drinking water, provisions shall be made for continuous flushing through the tapping equipment with positive purge or "blow-off" features.



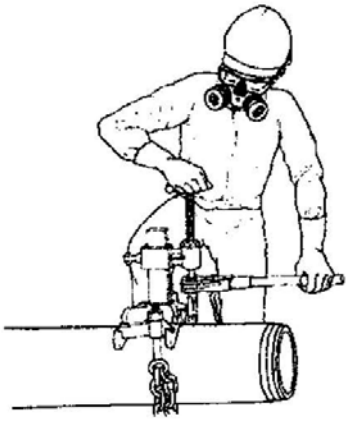
KEEP MATERIAL WET AT ALL TIMES.

DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**

EXHIBIT 7-A

6. DRY TAPPING AC PRESSURE PIPE IN ALLSIZES.

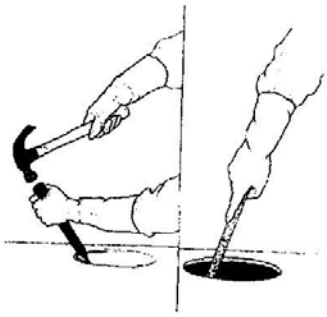
Non-pressure or "dry" tapping for service connections may be performed in or out of the trench. The equipment is affixed to the pipe by means of a chain yoke. Separate drills and taps or a combination tool is used to drill and tap the pipe wall. Remember, always keep the pipe wet during these processes. Corporation stops or other connections may then be affixed to the pipe. To minimize (1) the fouling of valves, regulators, meters, and other equipment with chips and (2) the unnecessary addition of asbestos to drinking water, all dust and cutting should be removed from the pipe's interior by flushing with water, wet mopping, or vacuuming with a HEPA rated vacuum cleaner.



KEEP MATERIAL WET AT ALL TIMES.
DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**

7. USING CHISEL AND RASP TO HOLE CUT AC PIPE IN ALL SIZES.

Holes may be cut into AC pipe with a hammer and chisel. The edge of a plumber's wood chisel is used to cut completely around the hole outline, about ¼ in. (7 mm) from the prescribed line. The operation is repeated and the cut deepened until through. The edges of the hole are then dressed with a coarse wood rasp. When cutting holes in AC pipe products, all dust and cuttings should be removed from the pipe or duct interior after the cutting operation. Removal may be accomplished by flushing with water, wet mopping or vacuuming with a HEPA rated vacuum cleaner.



KEEP MATERIAL WET AT ALL TIMES.

DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**

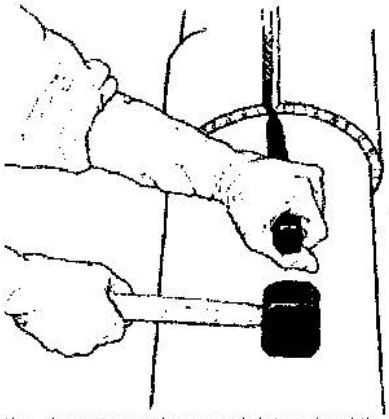
EXHIBIT 7-A

8. USING HAMMER AND CHISEL TO REMOVE COUPLING FROM AC PIPE IN ALL SIZES.

Replacement of damaged pipe necessitates excavation, exposure and removal. AC coupling removal may be accomplished by gradually splitting the coupling lengthwise using a chisel and hammer. After the top of the coupling has been split, a crowbar or similar tool is used as a lever to split the bottom of the coupling.

KEEP MATERIAL WET AT ALL TIMES.

DO NOT blow out with compressed air, dry sweep, or vacuum **with a non-HEPA rated vacuum cleaner!**



DEQ and Oregon OSHA have carefully evaluated the above procedures and determined that they can be used safely when handling and repairing AC pipe.

REMEMBER, DEQ regulations require that all asbestos-containing materials be kept wet during removal and disposal in accordance with the asbestos disposal regulations. Exceptions to these requirements must be approved prior to starting an asbestos removal project.

City of Klamath Falls 2020 Water Master Plan

Appendix T. Current SDC Rates

2018
SYSTEM DEVELOPMENT CHARGES
METER INSTALLATION FEES
Commercial - Multi-Family – Residential
Fees valid January 1 – December 31, 2018

PUBLIC WORKS ENGINEERING
226 S. 5th St., Klamath Falls, OR 97601, (541) 883-5368

PLEASE NOTE: Additional fees or charges not listed on this form may apply based on property location. City Review of property must be conducted prior to final verification of any fees and charges. The City cannot accept credit or debit cards for payment of System Development Charges.

WATER METER INSTALLATION FEES & SYSTEM DEVELOPMENT CHARGES

METER SIZE	METER INSTALLATION FEE	+	SYSTEM DEVELOPMENT CHG	=	TOTAL COST
5/8 "	$ 1,050.00		$ 2,875.00		**$ 3,925.00**
1 "	1,050.00		7,188.00		**8,238.00**
1 ½ "	1,500.00		14,375.00		**15,875.00**
2 "	1,850.00		23,000.00		**24,850.00**
3 "	Developer Install		46,000.00		**46,000.00**
4 "	Developer Install		71,875.00		**71,875.00**
6 " or larger	Developer Install		based on anticipated water use		**TBD**

Meter "Drop-in" charge: 5/8" & 1" = $ 225.00; 1 ½" = $375.00; 2" = $525.00 - City installed services do not qualify; Applies only to services pre-installed by developer during construction of a qualified subdivision or development

Fire Service Lines larger than 2": SDCs exempt per City Code Sec. 3.560; Developer installs in compliance with City Public Works Engineering Standards; Engineering Site Construction Permit with inspection fees required.

Fire hydrant installation: Developer installs in compliance with City Public Works Engineering Standards sec. 7-5.5, Standard Drawing 7-110 (assembly) and sec. 7-5.1.1 (tap); Engineering Site Construction Permit with inspection fees required.

- Meter installation cost is for City installed service line and meter box, which includes routine boring. Costs resulting from pavement or concrete replacement, or landscape reconstruction are in *addition* to the listed standard charges and will be billed to the applicant at cost, plus a 15% administrative fee [Klamath Falls City Code Resolution No. 02-37].
- Meters are placed in the public right-of-way; developer/property owner is responsible for determining meter size, constructing private water lines and for connection to meter. *Legal access from the water meter to building is property owner responsibility.*
- Please allow 3 weeks for meter installation after City's receipt of proper documents and fees.
- **Inside City applicants** [Commercial and Residential] contact City Planning for Residential Review or Development Permit before applying for City utility services. Residential applicants pay Parks System Development Charge; please see chart below.
- **Outside City applicants** need valid address as assigned by County Public Works. Building Permit or Conditional Use Permit is required prior to applying for City utility services. Applicants should check with County Public Works for any street cut restrictions.

SEWER SYSTEM DEVELOPMENT CHARGES

SINGLE FAMILY RESIDENTIAL	**$ 1,970.00 Per dwelling**
DUPLEX & MULTI-FAMILY RESIDENTIAL	**$ 1,281.00 Per dwelling unit**
COMMERCIAL	**$ 1,970.00 Per Equivalent Residential Unit ***

*** Commercial applicants:** *Equivalent Residential Unit* will be determined by the Wastewater Division based on plumbing and facility information provided during Development Permit process; this includes manufactured home parks, care facilities, churches, restaurants, etc. Contact City Planning Department to begin the Development Permit Process. Detailed information on determining ERUs is available in our Engineering Standards Manual, section 5 at *ci.klamath-falls.or.us*. Developer/property owner is responsible for constructing the sewer service lateral from the structure to either the service lateral at the property line or to the City main line as per City of Klamath Falls Public Works Engineering Standards.

PARKS SYSTEM DEVELOPMENT CHARGES

Applies to any new residential construction or expansion which creates additional residential units inside City limits

SINGLE FAMILY RESIDENTIAL	**$ 1,112.00 per dwelling**
DUPLEX & MULTI FAMILY RESIDENTIAL	**$ 809.00 per dwelling unit**
COMMERCIAL	**EXEMPT**

TRANSPORTATION SYSTEM DEVELOPMENT CHARGES & TRAFFIC MITIGATION FEES [RESIDENTIAL]

Applicant may be subject to additional fees not included on this form based on property location. Please consult City utility maps for information on affected properties. City review must be conducted prior to final verification of any fees and charges.