Thurston PUD

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Prairie Ridge 605
ODW ID# 02356W
Part B Water System Plan

Prepared By
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Part B Water System Plan Update
For The
Prairie Ridge – 605 Water System
WSID: 02356W

EXECUTIVE SUMMARY:

Thurston PUD is submitting a Water System Plan (WSP) Update to accomplish the consolidation of three water systems into a single system to be known as the Prairie Ridge 605 Water System (DOH ID 02356W):

- Prairie Ridge 605 (DOH ID 02356W)
- Hawk Acres 607 (DOH ID 31845T)
- Tolmie Park 239 (DOH ID 88667P)

The submitted document is the Part B Water System Plan; please refer to the Thurston PUD Part A (Umbrella) Plan for PUD standards, policies, asset management, and rate setting. Thurston PUD requests approval of the WSP for a 10-year planning period, along with approval to use the distribution submittal exemption per submittal documents and approval of the Part A Water System Plan, and an emergency intertie with the Lacey Water Department.

The service area of the consolidated system is the same as that of the existing service areas of the constituent water systems, with the exception of an addition of four parcels on the east of the existing Prairie Ridge service area, which were previously not serviced. Currently 303 connections are served by the consolidated system, all of which are full-time single-family residences. This WSP includes a full capacity analysis of the system and proposes approval of a total of 525 connections.

Current Population:	778
Sources:	5 permanent wells: Pumping to storage: 2 wells, combined capacity 137 gpm Pumping direct to distribution: 3 wells, combined capacity 203 gpm
Storage:	76,300 gallons
Pressurization:	One 3 hp booster pump, three 5 hp booster pumps Three wells pumping direct to distribution; combined distribution output 596 gpm.
Treatment	Secondary Disinfection using Sodium Hypochlorite.
Distribution	28,580 lineal feet total, of variable age and pipe material, primarily PVC installed in 1980's. Includes 13,350 feet of 6-inch, and the remainder in various smaller sizes.
Water Rights	G2-25286C: 80 gpm, 30.5 acre-feet per year G2-25478C: 125 gpm, 99.5 acre-feet per year G2-25621C: 50 gpm, 80.0 acre-feet per year

	G2-29250P: 125 gpm, 80.0 acre-feet per year (annual quantity non-additive to G2-25621) G2-27015P: 175 gpm, 50.0 acre-feet per year (125 gpm additive to G2-25621, 50 gpm and 50.0 acre-ft/yr non-additive to G2-25621)
ADD/ERU	180 gpd
MDD/ERU	672 gpd
Current PHD	335 gpm
20 Yr PHD	433 gpm
Fire Flow Requirements	N/A – Fire flow is not required for the existing platted areas. Further subdivision or commercial/high density development may require fire flow, to be addressed by developer improvement as necessary. New single family home connections to the water system may require installation of residential fire suppression system as directed by the Thurston County Fire Marshal.

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Prairie Ridge 605

Water System Plan

Acronyms

ADD	Average Daily Demand
C	Coefficient of Friction
DSL	Distribution System Leakage
ERU	Equivalent Residential Unit
GWI	Groundwater Under the Influence of Surface Water
HGL	Hydraulic Grade Line
MCL	Maximum Contaminant Level
MDD	Maximum Daily Demand
MPA	Microscopic Particulate Analysis
NTNC	Non-Transient Non-Community
PHD	Peak Hourly Demand
ppb	Parts per Billion
ppm	Parts per Million
RSA	Retail Service Area
SMA	Satellite Management Agency
SWL	Static Water Level
SWSMP	Small Water System Management Program
UTC	Utilities and Transportation Commission
WDM	Water Distribution Manager
WFI	Water Facilities Inventory (form)
WSDM	Water System Design Manual
WSDOH	Washington State Department of Health
WSP	Water System Plan
WUE	Water Use Efficiency

Chapter 1 System Description

1.1 Ownership and Management

The Prairie Ridge 605 water system is a consolidation of three existing systems, (Prairie Ridge 605, Hawk Acres 607, and Tolmie Park 239). The water system is owned and operated by Thurston PUD, a Public Utility District established by the vote of the people in 1938. Thurston PUD owns and manages multiple water systems and has approved umbrella Part A (Part A) and Satellite Management Agency (SMA) plans that cover information that is relevant to the management of multiple systems. These documents are referenced where applicable. See Thurston PUD's Part A for information on the Ownership and Management structure.

Pertinent information about the water system is summarized below:

Water System Name:	Prairie Ridge 605
System Type:	Group A Community Water System
WSDOH ID Number:	02356
Location:	Thurston County, Washington
Source:	Groundwater
Type of Ownership:	Special Purpose District
Service Connections:	303
Population Served:	778
Ownership	Thurston PUD (owner/operator)
Primary Contact:	Kim Gubbe, Director of Planning and Compliance
Owner Address:	1230 Ruddell Rd SE Lacey WA 98503
Owner Phone:	(360) 357-8783

1.2 System Background

1.2.1 History

The prior history of the three Group A water systems which are now consolidated and hereafter known as the Prairie Ridge water system are described below.

The Tolmie Park Estates Water System was originally approved to serve 47 single-family homes in 1979. The system was subsequently approved for 67 connections in May, 1996. The original owner was Wally Pratt who developed the water system along with the 47-lot subdivision of Tolmie Park Estates. Mr. Pratt sold the water system to Clearwater Utilities, who in turn sold it to Satellite Water Systems. American Water Resources purchased the water system from Satellite Water Systems in May 1996, and it was incorporated into Thurston PUD in April 2005.

The Hawk Acres Water System began service in 1963 with the drilling of well 1 and with an initial 2 connections. In 1969 the system expanded to 87 connections, and was approved for 116 connections in 1973. A second well was installed in 2005 in order to increase system capacity and allow additional services. The system was owned by John D Swift / Swift Asset Management Company, Inc. under the

Marvin Road Water Company (MRWC) from inception until May 2014, when the system was incorporated into Thurston PUD.

The Prairie Ridge water system was created in 1980 Robert Drohman to serve the Prairie Ridge subdivision, consisting of four divisions. The first division was platted in April 1981 (volume 21 of Plats, page 123), and was served with Well 1. Division 2 was platted in 1984 (volume 22 of Plats, page 56), at which time the water system added a small steel reservoir, Reservoir 1, and booster pumps at the wellsite. Division 3 was platted in 1992 (volume 25 of Plats, page 92), and included construction of an additional reinforced concrete reservoir, Reservoir 2 at the well site to augment the storage capacity of Reservoir 1. In 1996, a second well was drilled to increase supply and provide source redundancy. Division 4 was platted in 2000 (AFN 3309071) and included construction of a second concrete reservoir (reservoir 3) along with an additional booster pump and disconnection (and later removal) of the old steel reservoir (reservoir 1). The water system was owned and operated by Robert Drohman under the Prairie Ridge Water Company until Thurston Public Utility District assumed ownership and operation of the system in June 2010. The system currently serves 102 single family residential connections and is approved to serve 123 single family residential connections. The zoning is now "Rural Residential-Resource 1 unit per 5 acres. There are parcels in the service area which are owned by the North Thurston School District and may be developed as public schools.

1.2.2 Geography

The Prairie Ridge Water System service area is located in Hawks Prairie, a peninsular upland area in Northern Thurston County. Average annual rainfall in the service area is 49 inches. The highest area in the service area is at an approximate elevation 300 feet above MSL in the SW corner of the School District's parcel (TPN 11934100000). The highest elevation of existing water service is 294 feet, located near the intersection of 44th Avenue NE and Prairie Ridge Drive. The lowest elevation in the service area is at the southern most area of the service are on 32nd Ct NE, at 198 feet above MSL. Ground surface slopes in the service area is gently rolling, with a general loss in elevation from North to South. The service area comprises two pressure zones, the upper pressure zone 415-ft), serving the area north of Hawks Prairie Rd., and the lower pressure zone (370-ft), serving the area south of Hawks Prairie Rd. Services in the upper zone located at or below 240-ft elevation require individual pressure reducing valves.

The onsite soil is predominantly classified as Alderwood Gravelly Sandy Loam by the SCS Soil Survey for Thurston County. Alderwood soils generally include a weakly cemented hardpan about 30 inches below ground surface. A copy of the SCS Soil Description is included in Appendix 1. The annual rainfall for the Olympia WSO AP Station is 51.4 Inches. The site is located in the Henderson Watershed Protection area and includes category 1, 2, and 3 Critical Aquifer Recharge Areas as mapped by Thurston County. As a general rule, the area is not subject to high water table or flooding, with no areas of concern mapped by Thurston County near the existing groundwater wells.

Map Unit Legend

Thurston County Area, Washington (WA667)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Alderwood gravelly sandy loam, 8 to 15 percent slopes	502.0	58.8%
3	Alderwood gravelly sandy loam, 15 to 30 percent slopes	35.6	4.2%
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	94.0	11.0%
34	Everett very gravelly sandy loam, 15 to 30 percent slopes	5.4	0.6%
39	Giles silt loam, 3 to 15 percent slopes	1.4	0.2%
40	Giles silt loam, 15 to 30 percent slopes	1.6	0.2%
50	Kapowsin silt loam, 0 to 3 percent slopes	4.6	0.5%
51	Kapowsin silt loam, 3 to 15 percent slopes	182.9	21.4%
65	McKenna gravelly silt loam, 0 to 5 percent slopes	25.8	3.0%
69	Mukilteo muck	0.1	0.0%
Totals for Area of Interest		**853.3**	**100.0%**

Figure 1-1: NRCS Soil Map

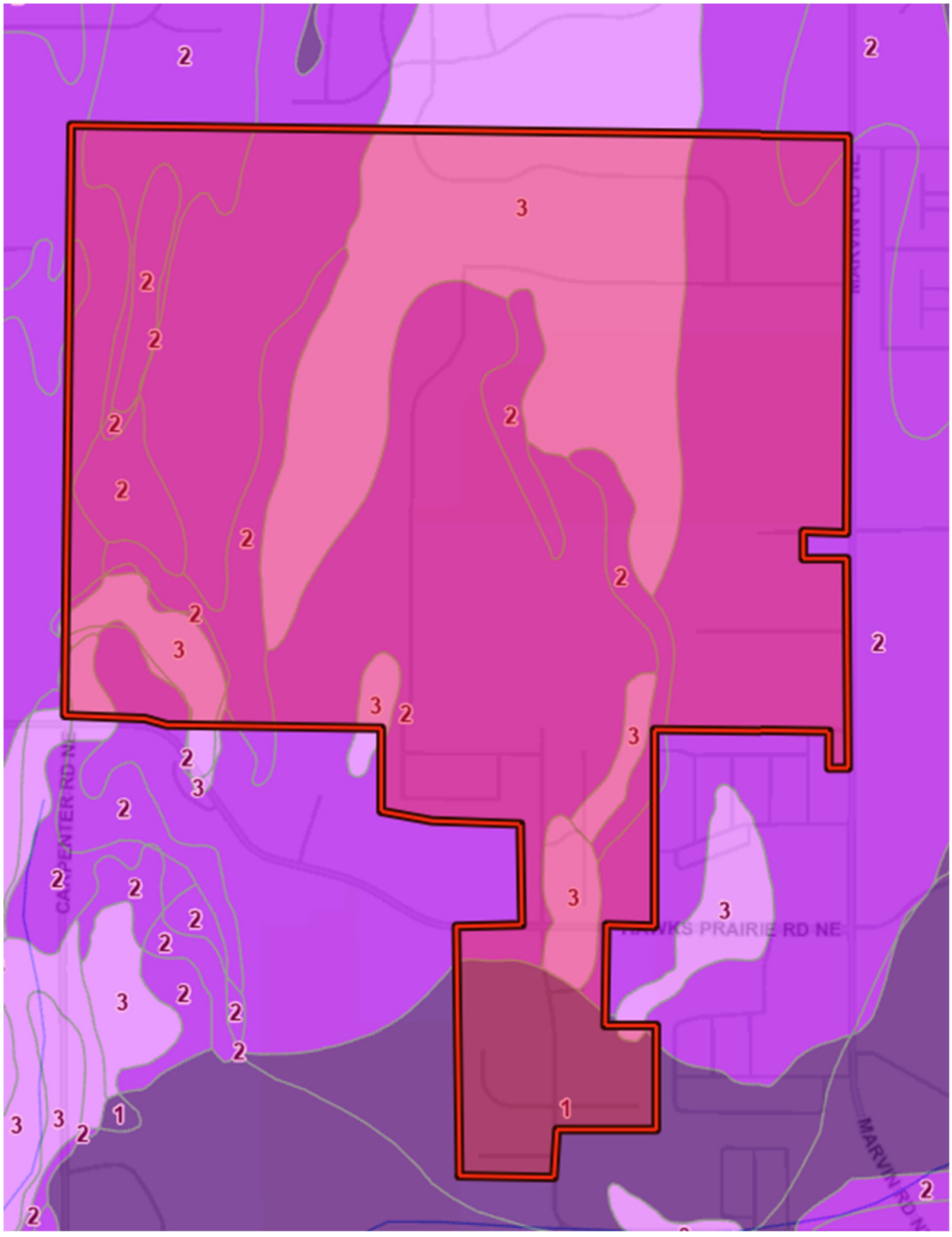

Figure 1-2: Map of Critical Aquifer Recharge Areas

1.2.3 Existing Facilities

The water system consists of two pressure zones and operates facilities at three separate sites, Tax Parcel Number (TPN) 80120100000, 11934430100, and 69330007101. The system is supplied by five permanent wells (S01, S02, S04, S05, S06). Three wells (S04, S05, S06) pump direct to distribution using variable speed drives to control output. Two wells (S01, S02) pump to two concrete reservoirs (combined volume of 76,300 gallons), with distribution via four booster pumps equipped with variable speed drives. The system is chlorinated and maintains a minimum 0.2 mg/L residual; no other water treatment is required. The well, reservoir, and booster/treatment building are all located on easement on the HOA owned tax parcel 0418321095. Distribution System consists of 28,000 lineal feet of primarily PVC pipe in a variety of pipe sizes; the most common sizes are 6-inch (13,350 feet), 4-inch (5,660 feet), and 2.5-inch (6,560 feet). The majority of existing pipe was installed around 1980, with smaller amounts of older and of recently installed pipe. Additional information can be found in Thurston PUD's Capital Asset Management Plan.

1.3 Related Plans

The following documents were consulted in the preparation of this Water System Plan:

- *Thurston PUD Water System Plan: Part A - Umbrella Plan, updated November 2023*
- *Thurston PUD Satellite Management Agency Plan, March 2021*
- *Thurston County Comprehensive Plan, updated November 2019*
- *Cit of Lacey Comprehensive Plan, 2016*
- *Deschutes Watershed Plan (WRIA 13), December 2024*
- *Sanitary Code for Thurston County; Article III, Public Water Supplies, January 2014*
- *North Thurston County Coordinated Water System Plan—Areawide Supplement, 1996*

Adjacent Group A public water systems are the City of Lacey water system to the south and east, and Hawley Hills and Forest Park to the North. To the west is unserved area. Nearby Group B water systems include the Mayse water system to the southwest.

1.4 Service Area, Maps, and Land Use

The Prairie Ridge Water System service area is located west of a county arterial, Marvin Road. It is bounded on the north by the Hawley Hills, a single-family residential subdivision and on the west by an equestrian area with barns and open fields. On the south the service area is bound by the City of Lacey. The service area comprises a significant portion of Section 34, Township 19 North, Range 1 West, as well as a portion of the NE ¼ of Section 03, Township 18 North, Range 1 West, W.M. See Figure 1-3 through Figure 1-6.

1.4.1 Retail Service Area

The retail service area is where a municipal water supplier has a duty to serve connections under the conditions described in Section 1.6. For the Prairie Ridge 605 Water System, the retail service area is as shown in Figure 1-6.

1.4.2 Service Area Agreements

There are no service area agreements with outside utilities. Thurston PUD and the City of Lacey have recently formalized an emergency intertie agreement, see appendix 10.9.

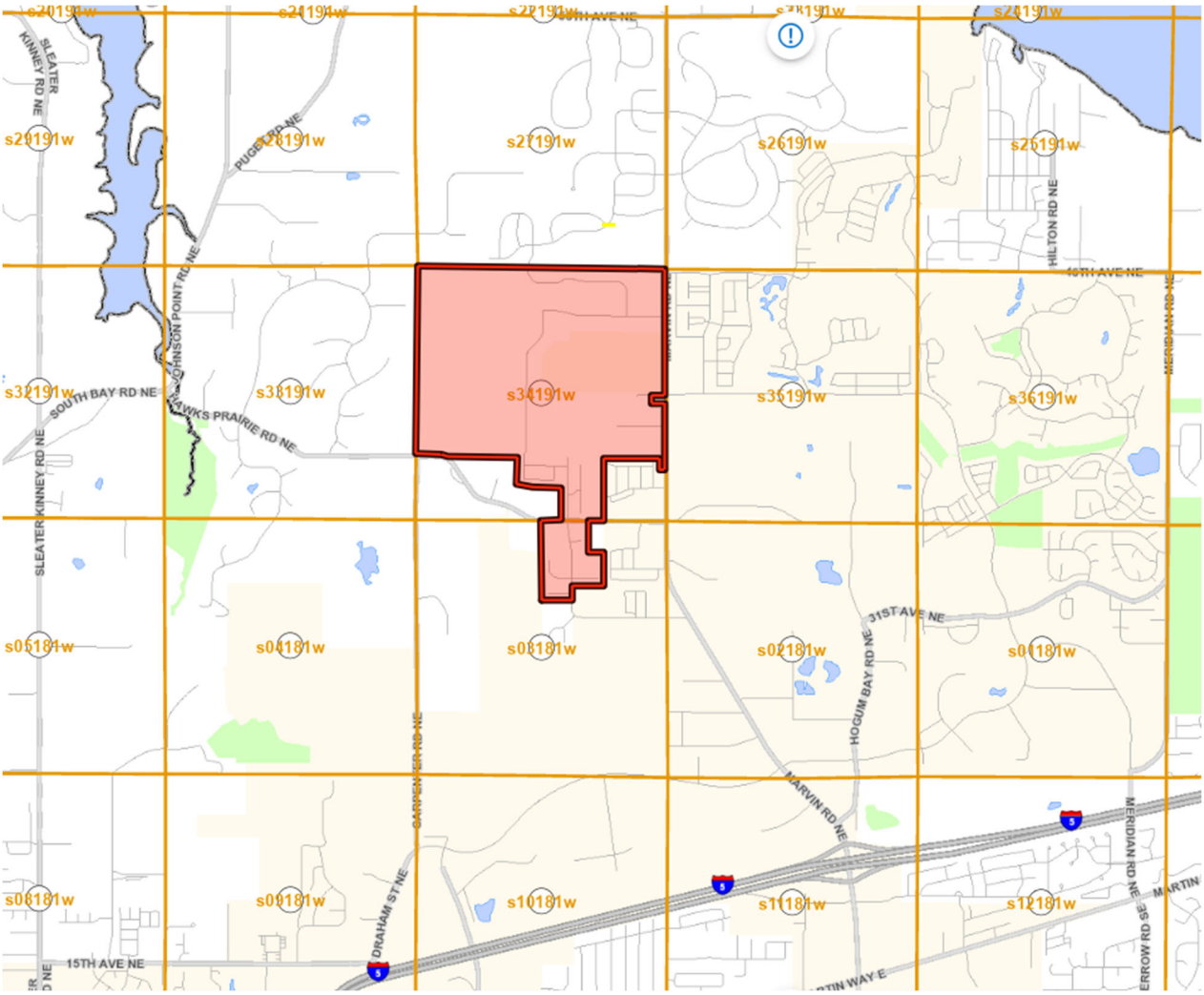

Figure 1-3: Prairie Ridge Water System Section Map.

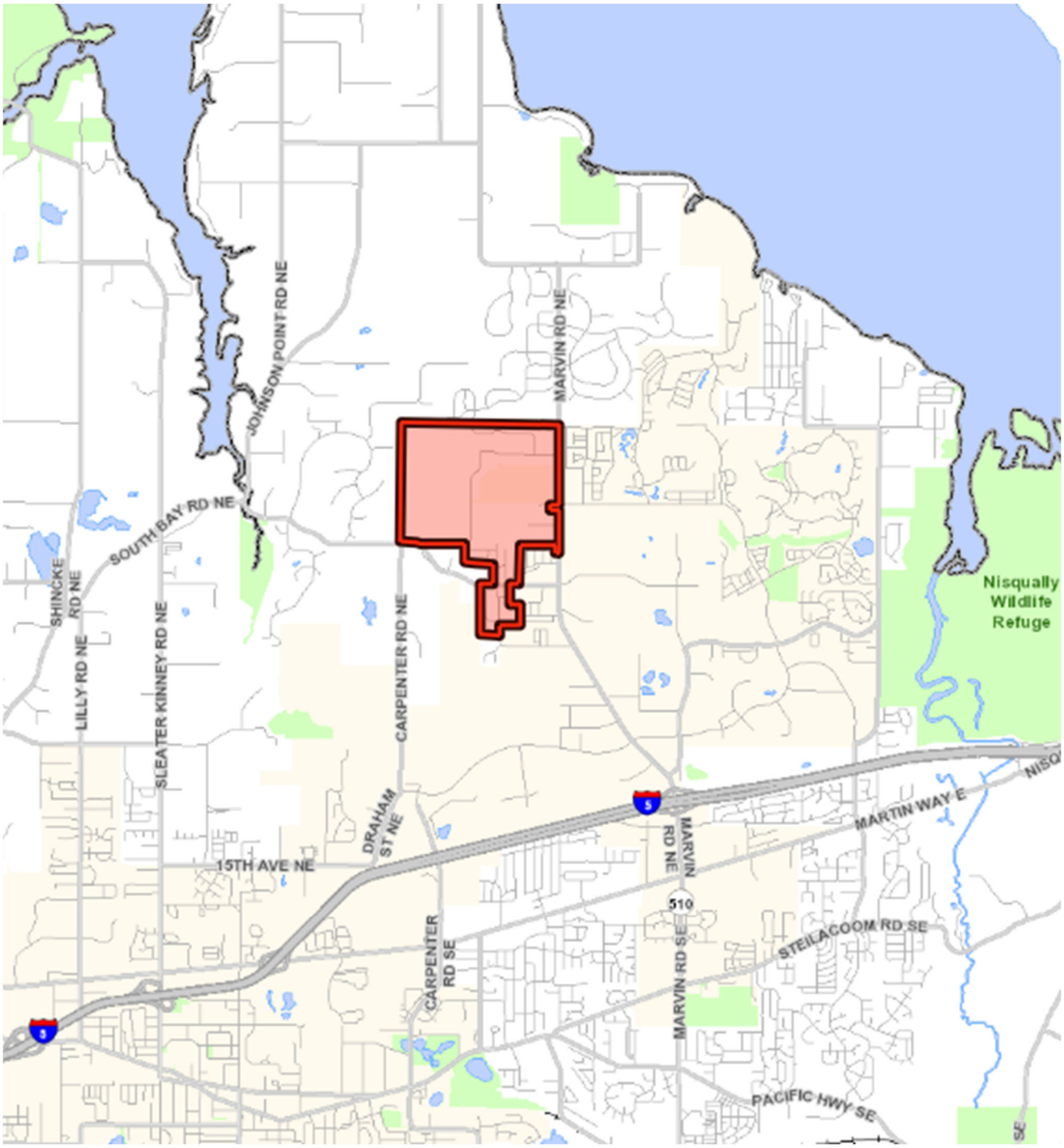

Figure 1-4: Prairie Ridge Water System vicinity map.

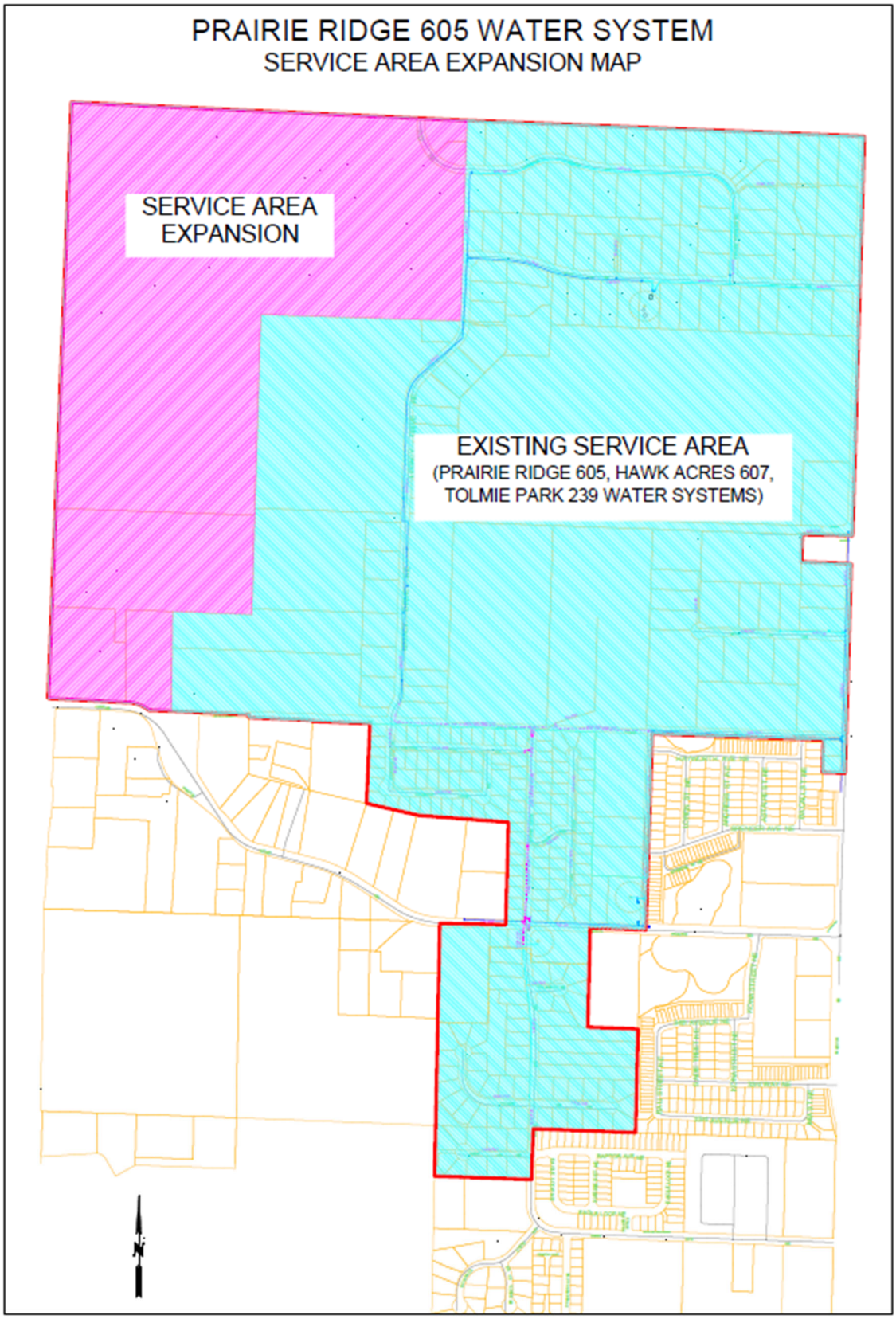

Figure 1-5: Service Area Expansion

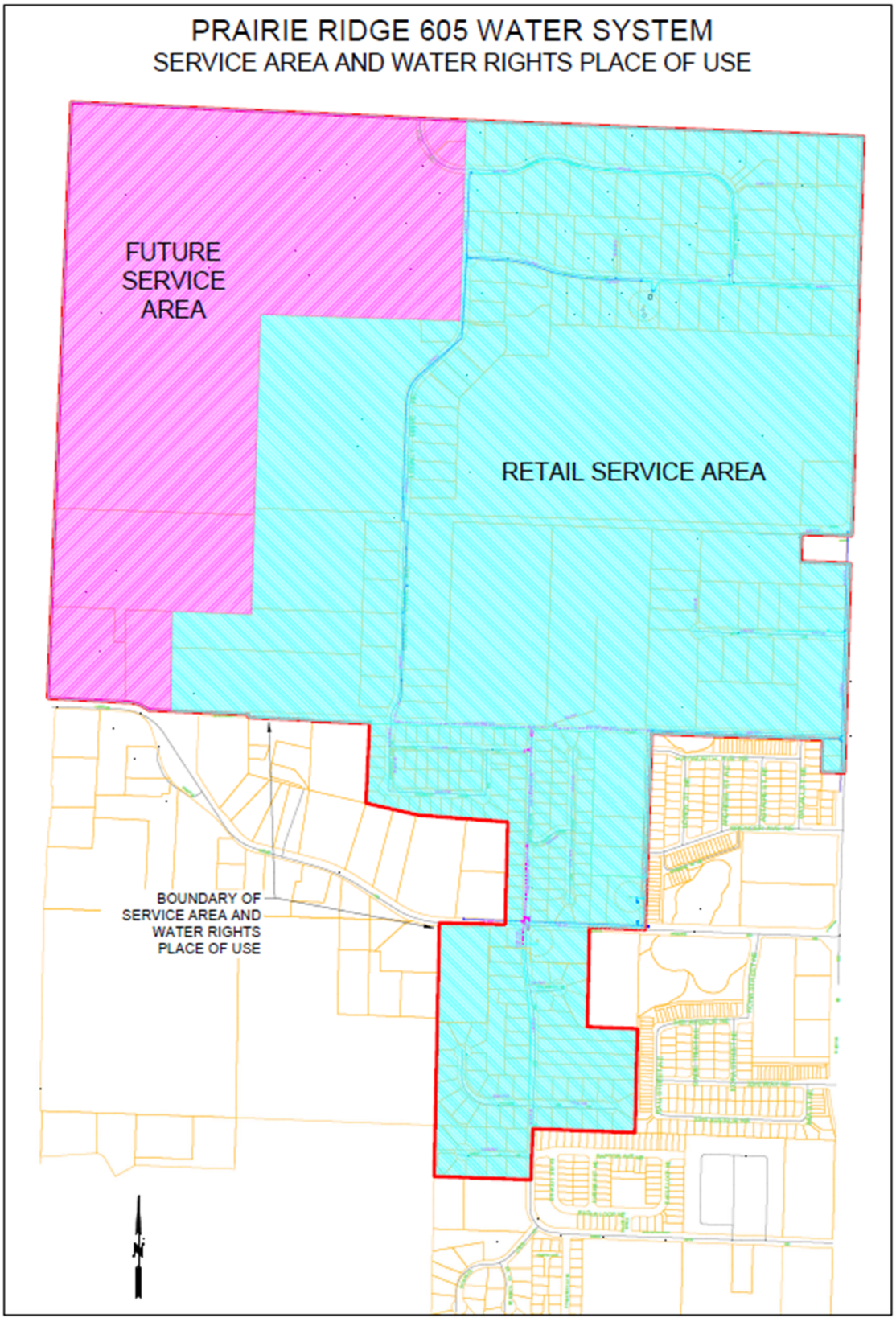

Figure 1-6: Service Area, Retail Service area, and Water Rights Place of Use

1.4.3 Land Use and Zoning

The Prairie Ridge Water System service area comprises approximately 560 acres, the majority of which has been subdivided and developed as single-family residences, with most lots generally ranging from ¼ acre to 1 acre, along with several dozen larger parcels. There are approximately 120 acres of undeveloped land within the service area, 70 acres of which are owned by Thurston County School District 3. An additional 230 acres consists of large lots which are currently developed as single-family homes and estates, but which may be rezoned and/or redeveloped in the future.

The area of the Prairie Ridge water system lying north of 38th Way NE is under the jurisdiction of Thurston County, with the exception of parcel 11934100000, which is in the City of Lacey Urban Growth Area (UGA) and zoned OSI-S (open space intended for future school). Existing zoning outside the UGA consists of RRR1/5 (rural residential, one residence per 5 acres), RL1/1 (residential lamird, one residence per acre). The area of the water system lying south of 38th Way NE is in the City of Lacey UGA, with existing zoning consisting of LD (Low density residential, 6 units per acre), and MD (moderate density residential, 8 – 16 units per acre).

Accessory Dwelling Units (ADU's) are permitted and do not count towards calculated maximum housing density. In the 20-year time horizon it is likely that there will be construction and subdivision of available vacant parcels, and likely some redevelopment and addition of ADU's to larger lots.

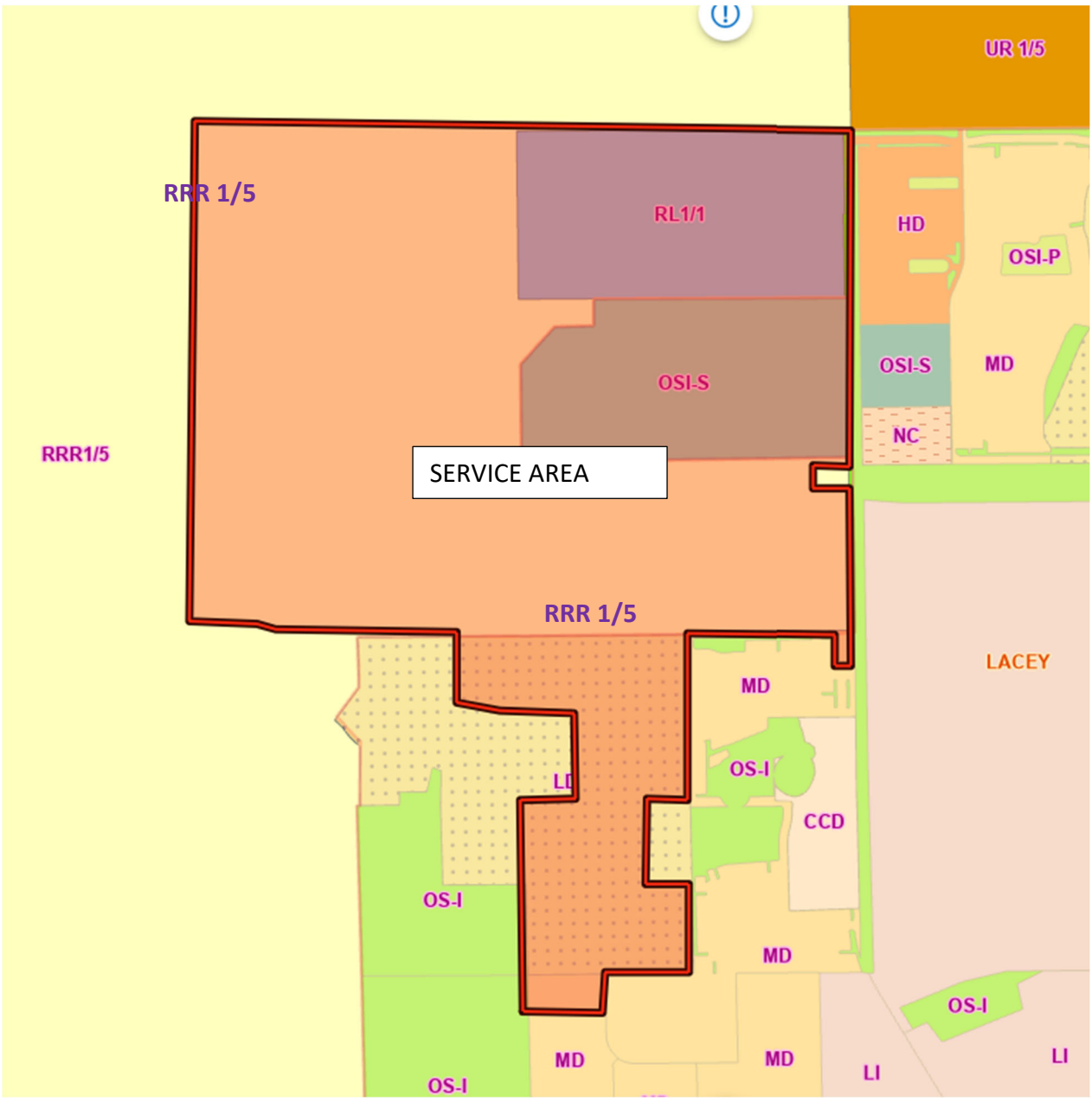

Figure 1-7: Area Zoning Map

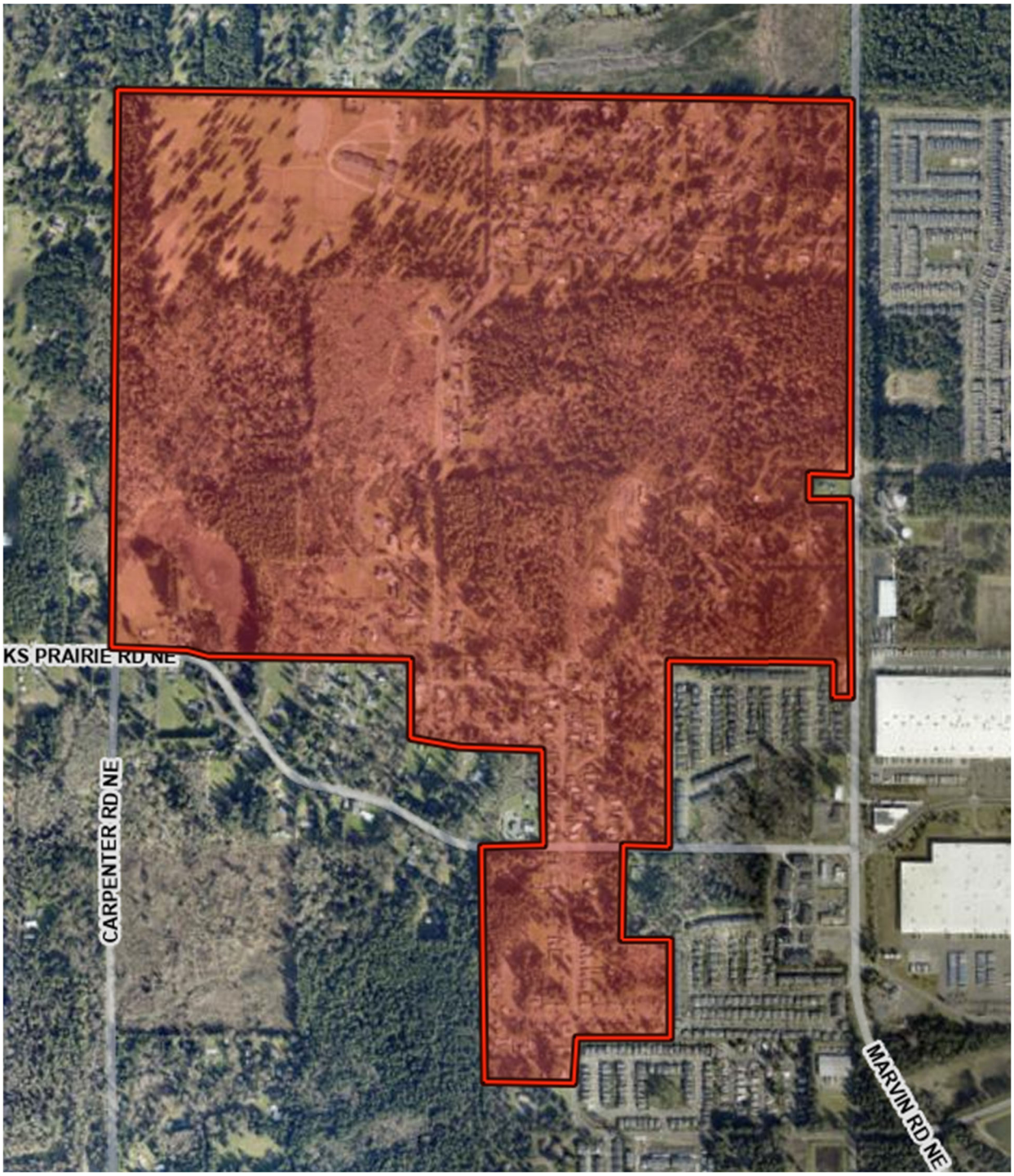

Figure 1-8: Aerial Photographs

1.5 System Policies

Thurston PUD, in its commitment to provide dependable water service in accordance with all applicable regulatory rules and regulations, observes the following general policies.

1.5.1 Direct Connection and Satellite/Remote Systems

Future direct connections to the Prairie Ridge water system will occur as a result of infill within the retail service area.

Satellite systems are noncontiguous or separate water systems that use separate facilities and infrastructure and may be served by a different source. See SMA plan Section 4 and Part A plan Section 2.3 for policies regarding satellite / remote systems.

1.5.2 Design and Performance Standards

All design and construction shall be completed under the direction of Thurston PUD per the standards of Thurston PUD and Thurston County. Design and construction specifications and standards can be found in Thurston PUD's Part A plan, Appendix A, Specifications and Standards for Design and Construction.

1.5.3 Urban Growth Area

Approximately 150 acres of the service area lies within the City of Lacey Urban Growth Area (UGA). Water service within the UGA and infill of existing platted lots is prioritized over new plats, redevelopment, and accessory dwelling units outside of the UGA. Thurston PUD pursues engagement with City of Lacey and Thurston County planning staff to facilitate water service availability to support proposed zoning changes and proposed development within the UGA.

1.5.4 Late-Comer Agreements

Late-comer agreements may be considered by Thurston PUD on a case-by-case basis upon request prior to approval of developer extensions.

1.5.5 Oversizing

Please see Part A plan, Appendix A Section 3 for policies regarding oversizing.

1.5.6 Accessory Dwelling Units

Accessory Dwelling Units (ADUs) require a separate water service and are typically considered equivalent to 0.5 ERU. Connections for ADU's may be approved by Thurston PUD, subject to availability of connections and District discretion. See ADU policy, section 2.3.8 of Thurston PUD's Policies and Procedures Manual, Appendix A of the Thurston PUD Part A Water System Plan.

1.5.7 Cross-Connection Control Program (CCCP)

Please see Part A plan Section 5.8 and Appendix R for Cross-Connection Control Program. A list of Cross-Connection Control devices and inspection dates can be found in Appendix 10.8 of this Part B water system plan.

1.5.8 Interties

An emergency intertie is planned with the Lacey Water Department. The intertie agreement requires prior notification by both parties prior to opening. Both systems are chlorinated.

1.5.9 Extension

In order to facilitate ongoing level of service and redundancy, extension of a 6-inch C-900 PVC main in the unopened portion of the right of way for 38th Way NE / NE Stillwell Rd between Legacy Drive NE and Hepburn St NE is planned. No further extensions are planned at this time, however minor future developer

extensions are anticipated. An extension submittal exemption is requested per WAC 246-290-125; all extension design and installation shall be completed per the Design and Construction Specifications and Standards, found in the Part A plan, Appendix A.

1.6 Duty to Serve

See Part A Plan Section 2.3 for policies related to Duty to Serve.

1.7 Local Government Consistency

In accordance with the Municipal Water Law, Thurston PUD is working on obtaining a signed consistency statement from Thurston County and the City of Lacey to document that this WSP is consistent with local area planning. A copy of local government consistency statements will be included in Section 10.8 of the WSP.

1.8 Watershed Plan Consistency

As discussed in Section 1.3, Prairie Ridge 605 Water System is within the Deschutes watershed (WRIA 13). No inconsonances have been identified with the Deschutes Watershed Management Plan.

Chapter 2 Basic Planning Data

2.1 Current Population, Service Connections, and Equivalent Residential Units (ERUs)

2.1.1 Population and Demographics

The Prairie Ridge 605 water system serves 303 full time residential connections. There are no Part-time Residential, Commercial, Industrial, Agricultural or Multi-Family service connections on the water system at this time. Population is estimated at 778 persons, which is nominally higher than the statewide average of 2.5 persons per household.

Per the 2019 Thurston County Comprehensive Plan, a county wide growth rate of 42% is projected over the period of 2017 to 2040 (an average compound annual growth rate of 1.54%). Projected growth rate for the same period is 66% for the Lacy UGA, and 20% for unincorporated areas outside of UGAs. Given that approximately half off the Prairie Ride 605 water system service area is in the City of Lacy UGA and half in unincorporated county area the county average is assumed. The median household income for Thurston County is approximately $63,286 and ranks 5th out of counties in Washington State.

2.1.2 ERU Analysis

For the purpose of this report, one ERU is defined as the equivalent usage of a single-family residence occupied full time. Since all services are full time residential connections all connections represent a single ERU.

2.2 Water Production and Usage

2.2.1 Meter Data

Source and Service meters are read on a monthly basis. Service Meter records for the five-year period of September 2020 through August 2025 were used in developing a model of residential water demand for the community. During this period the number of full time residential and total connections has remained relatively unchanged, increasing from 294 ERU in September 2020 to 303 ERU in 2025.

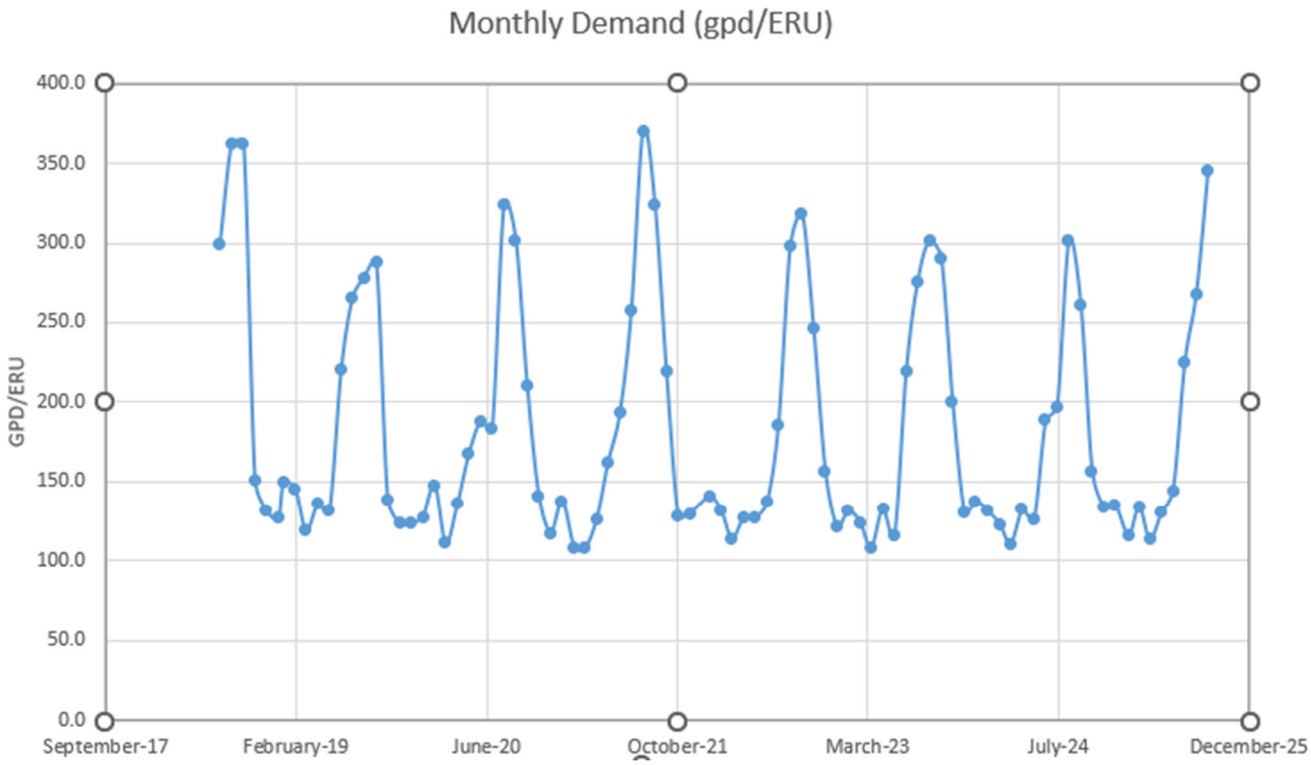

Figure 2-1: Monthly Average Consumption per ERU

2.2.2 System Parameters: ADD, MDD, and PHD

Average daily demand (ADD) is 180 gpd/ERU. The Maximum Month Daily Demand (MMDD) was 370 gpd/ERU and occurred in August of 2021. Maximum Daily Demand (MDD) was calculated based on multiplying MMDD by a scaling factor of 1.65 and a safety factor of 1.1, yielding an MDD of 672 gpd/ERU.

The peak hourly demand (PHD) was estimated based on MDD using Equation 3-1 and Table 3-1 of the WSDM. PHD is calculated both for the existing 308 ERU (303 ERU plus 5 ERU of DSL) and for a buildout projection of 551 ERU.

$$PHD_{exist} = \frac{MDD}{1440}\big((C)(N) + F\big) + 18 = \frac{672}{1440}\big((1.8)(308) + 125\big) + 18 = 335\ gpm$$

$$PHD_{551\ ERU} = \frac{MDD}{1440}\big((C)(N) + F\big) + 18 = \frac{672}{1440}\big((1.6)(551) + 225\big) + 18 = 534\ gpm$$

Table 2-1: Summary of Current Systems Design Parameters

Existing Connections	303 ERU
ADD/ERU	180 gpd
MDD/ERU	672 gpd
DSL	4.7 ERU
DSL	2.2 gpm
PHD	335 gpm
PHD w/551 ERU	534 gpm

2.2.3 Pressure Zones

The consolidated system is comprised of two pressure zones. The upper pressure zone comprises the largest area of the system and serves 128 existing connections. The upper pressure zone maintains a hydraulic grade line of approximately 415 feet. Elevations within the upper pressure zone range from 240 to 300 feet; any services below an elevation of 240 feet require individual Pressure Reducing Valves (PRVs). The reservoirs and booster station and all direct to distribution wells pump into the upper pressure zone. The emergency intertie with the City of Lacey Water Department is also located in the upper pressure zone and is connected to the City of Lacey 400-foot hydraulic grade line pressure zone.

The lower pressure zone comprises most of the area south of Hawks Prairie Road, servicing 175 existing connections. The lower pressure zone maintains a hydraulic grade line of 370 feet and provides water service over an area with elevations ranging from 198 to 265 feet; any services below an elevation of 190 feet require individual Pressure Reducing Valves (PRVs). Based on existing zoning there is no further growth or subdivision expected in the lower pressure zone, therefore the only additional connections anticipated are from new Accessory Dwelling Units. The lower pressure zone is supplied from the upper zone via a Pressure Reducing Station and has no other internal source of supply.

The reservoirs and 4 of the 5 wells pump into the upper pressure zone; the emergency intertie to City of Lacey water system is also in the upper pressure zone. The lower pressure zone is supplied by a single well, and by two pressure reducing valves supplied by the upper pressure zone. Hydraulic analyses for both pressure zones at PHD and static conditions are included in Appendix 10.3.

Four of five existing sources, all storage, and the booster pump station are all located in the upper zone; the lower zone is supplied by S06, which is supplemented by the upper zone via two pressure reducing stations. Capacity analysis calculates that the upper pressure zone is limited to supply of 464 ERU, and the lower pressure zone to 320 ERU. The upper zone has significant capacity for growth but given 175 existing connections in the lower zone the overall Prairie Ridge system capacity is more limiting. Given existing platting it is unlikely the lower zone will experience significant future growth and is unlikely to exceed 200 connections within the next 20 years.

2.3 Distribution System Leakage

Distribution System Leakage (DSL) averaged 2.2 gpm over the past 5 years, exhibiting increasing rates as leaks developed and became significant enough for detection, followed by decline following detection and repair. The overall trend has been a slight decrease in average leak rate over this period. Overall, DSL has averaged 5.5 percent.

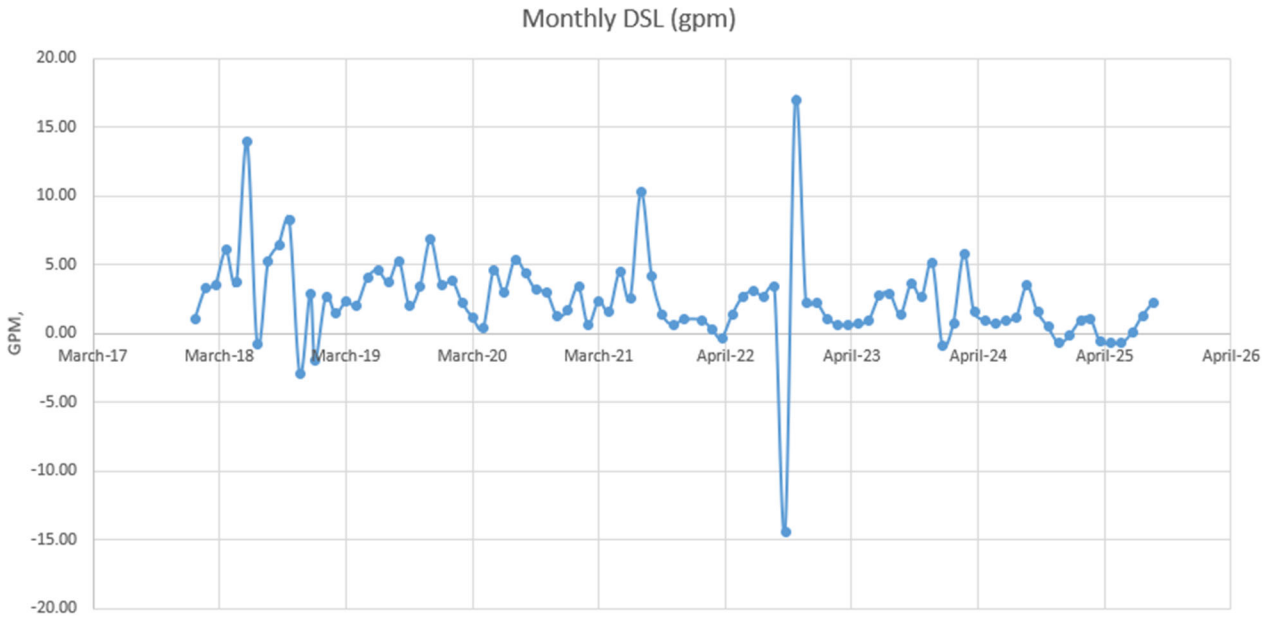

Figure 2-2: DSL Rate

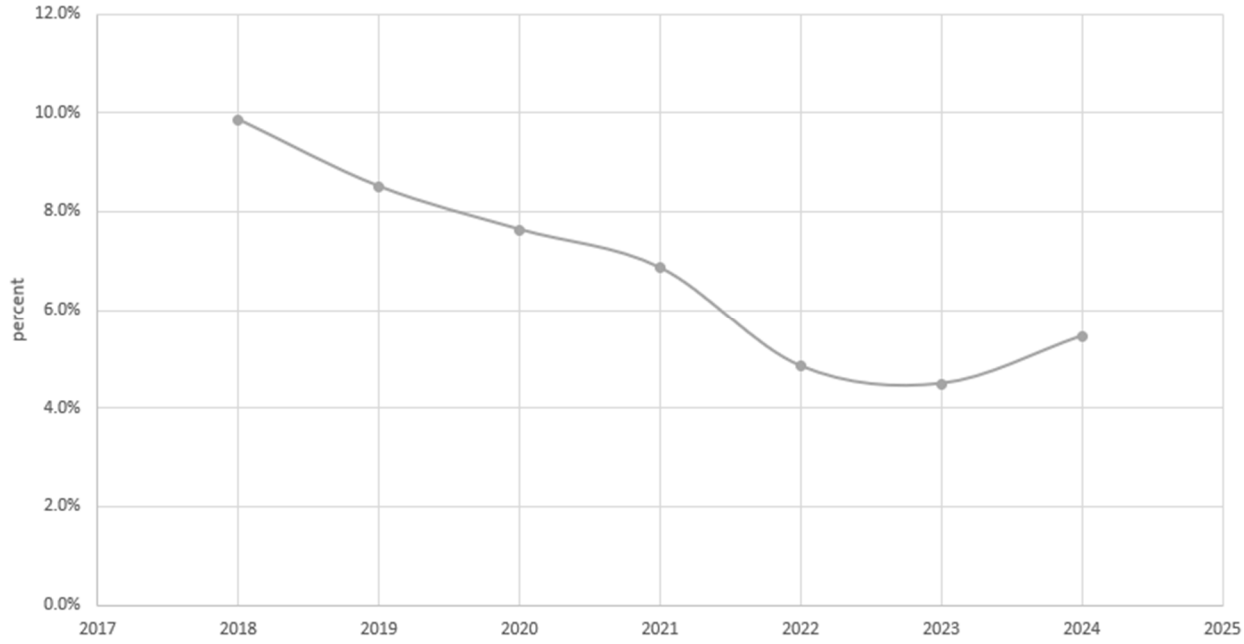

Figure 2-3: Annual Average DSL Percent

2.4 Water Supply Characteristics

The Prairie Ridge water system is supplied by five groundwater wells, S01,S02,S04,S05,S06, with S01 and S02 being part of a well field designated as S03. Depth to open interval ranges from 120 to 280 feet below local ground level; compensated for surface elevation, four of the five wells have open intervals beginning at about 120 feet above mean sea level, with the open interval for S05 beginning at 50 feet below mean sea level. None of the wells have primary or secondary mcl exceedances. There is also an emergency intertie with the Lacey Water Department.

2.5 Water Supply Reliability Evaluation

The Prairie Ridge 605 water system is supplied by five wells with a total capacity of 340 gpm, none of which have any history of or significant concern for future contamination. Three wells pump direct to distribution, and two wells pump to the two reservoirs, which supply the distribution system via booster pumps. The booster pumps (combined capacity of 358 gpm) and four wells (with a combined source capacity of 260 gpm) are equipped with emergency backup power generators. Additionally, there is a nominal 1000 gpm emergency intertie with the Lacey Water Department. Given the high level of redundancy standby storage is not needed. Though no standby storage is necessary, the requested approval of 546 connections (551 ERU) effectively provides 100 gallons per connection standby storage.

2.5.1 Interties

There is a 6-inch intertie with a nominal capacity of 1000 gpm to the Lacey Water Department. The intertie is located in the upper pressure zone of the Prairie Ridge 605 water system (which maintains a nominal 415-ft hydraulic grade line), and the 400-ft hydraulic grade line zone of the Lacey Water Department. Both water systems are chlorinated and maintain the required minimum distribution system residual of 0.20 mg/L free chlorine. An intertie agreement defines operation and notifications between the water purveyors.

There are no other interties currently planned, however other interties which may be further explored in the future include Hawley Hills and Forest Park.

2.6 Future Population Projections and Land Use

There are three sources of likely growth in the Prairie Ridge 605 service area: Development of existing undeveloped parcels, redevelopment of underdeveloped parcels, and addition of accessory dwelling units. There are approximately 120 acres of undeveloped land within the service area, 70 acres of which are owned by Thurston County School District 3. An additional 230 acres consists of large lots which are currently developed as single-family homes and estates, but which may be rezoned and/or redeveloped in the future. Given the potential for all three modes of growth as described above, it is likely that

residential growth within the Prairie Ridge 605 service area will continue in line with the projected area average annual growth rate of 1.54% per Section 2.1.1.

In addition to residential growth, it is likely that Thurston County will begin development of a new school within the next 10 to 20 years. Projected student and staff population and extent of irrigated play fields is not currently known.

2.7 Future Water Demand

Thurston PUD has a tiered rate structure in place which incentivizes conservation; given that this tiered rate has been in place for several years, it is unlikely that this will drive further reduction in water use and ADD per ERU is expected to remain relatively stable over time. DSL is also anticipated to remain relatively stable through a combination of main replacement and continued monitoring for and aggressively finding and fixing leaks. Should the new school be developed, there will be significant demand for both potable water and irrigation. As the timing, as well as the size and extent of the school and grounds is as yet unknown, a school is not included in the population and water use projections or in the water rights self-assessment or capacity planning. Currently however, Thurston PUD anticipates approximately 140 acre-feet per year to be available for a future school.

See water rights self-assessment in appendix 10.5 and capacity analysis of Section 3.3.

Table 2-2: Population and Water Use Projections

Year	No. Connections	DSL ERU	ERU ADD (gpd)	System ADD (gpd)	ERU MDD (gpd)	System MDD (gpd)	PHD (gpm)	System Annual Use (ac-ft/yr)
2025	303	4.9	180	57850	672	206926	335	64.80
2026	308	5.0	180	58741	672	210113	339	65.80
2027	312	5.1	180	59645	672	213348	343	66.81
2028	317	5.2	180	60564	672	216634	347	67.84
2029	322	5.2	180	61497	672	219970	351	68.89
2030	327	5.3	180	62444	672	223358	356	69.95
2031	332	5.4	180	63405	672	226797	360	71.02
2032	337	5.5	180	64382	672	230290	364	72.12
2033	342	5.6	180	65373	672	233837	369	73.23
2034	348	5.7	180	66380	672	237438	373	74.36
2035	353	5.7	180	67402	672	241094	378	75.50
2036	358	5.8	180	68440	672	244807	382	76.66
2037	364	5.9	180	69494	672	248577	387	77.84
2038	370	6.0	180	70565	672	252405	392	79.04
2039	375	6.1	180	71651	672	256292	397	80.26
2040	381	6.2	180	72755	672	260239	402	81.50
2041	387	6.3	180	73875	672	264247	407	82.75
2042	393	6.4	180	75013	672	268316	412	84.03
2043	399	6.5	180	76168	672	272448	417	85.32
2044	405	6.6	180	77341	672	276644	422	86.63
2045	411	6.7	180	78532	672	280904	427	87.97
2046	418	6.8	180	79741	672	285230	433	89.32
2047	424	6.9	180	80969	672	289623	438	90.70

2.7.1 Other Systems

Interties are emergency only; therefore, no water use by other systems is considered.

Chapter 3 System Inventory and Analysis

3.1 System Design Standards

All design and future construction shall be completed in accordance with the Washington State Department of Health Water System Design Manual (Design Manual) and Thurston PUD construction standards, which are found in Appendix A of the Umbrella Plan. The following is a brief summary of relevant standards set forth in the Design Manual:

Water Demand	Chapter	3
PHD	Equation	3-1
Capacity Analysis	Chapter	4
Distribution System	Chapter	6
Hydraulic Analysis	Section	6.1

3.2 System Inventory and Asset Condition Assessment

See Thurston PUD's comprehensive asset management plan (found in the Part A WSP) for detailed inventory and capital replacement projections. A synopsis of the major system components is detailed below:

3.2.1 Distribution System

The community's distribution system consists of an array of primarily 6" waterline, with smaller diameter pipe primarily serving cul-de-sacs. Waterlines are not looped but are equipped with blow-offs for flushing. A summary of pipe sizes and quantities in service are shown in Table 3-1.

Table 3-1: Pipe Inventory

Nominal Pipe Size	Installed Length
2"	1,150 feet
2.5"	6,070 feet
3"	2,350 feet
4"	5,660 feet
6"	13,350 feet
Total	**28,580 feet**

The community's sources and services are all metered. The service meters are read and billed monthly.

Table 3-2: Valve, Blow-off, and Appurtenance Inventory

Component	Number Installed
2-in valve	3
2.5-in valve	11
3-in valve	4
4-in valve	7
6-in valve	28
2-in Blow-Off	13
2" PRV	2
Single Service Assembly	45
Double Service Assembly	129

3.2.2 Sources

Prairie Ridge is supplied by 5 wells and an emergency intertie to the City of Lacey. Two wells (S01 and S02, forming well field S03) pump to the reservoir. The remaining three wells (S04, S05, and S06) pump directly to distribution. All wells are chlorinated to provide secondary disinfection, however no other treatment is necessary. Total non-emergency source capacity is 340 gpm. Well logs and available records are found in Appendix 10.2.

Table 3-3: Summary of Sources

	Well Name	Well Tag	Year Drilled	Well Depth	Static Water Level	Well Capacity (gpm)	Installed Well Pump (gpm)
S01	Prairie Ridge Well 1	AKY156	1980	174'	134'	55	55
S02	Prairie Ridge Well 2	AAE334	1995	183'	140'	82	82
S03	Prairie Ridge Well Field	-	-	183'	140'	137	137
S04	Hawk Acres Well 1	AGN780	1969	174'	112'	55*	55
S05	Hawk Acres Well 2	ALG212	2005	151'	112'	68*	68
S06	Tolmie Park Well 1	AHG013	1979	280'	210'	80	56
S07	Intertie #1-City of Lacey		-	-	-	1000	
	Total non-emergency					340	316

*S04 and S05 are highly productive and have been tested at 110 gpm with minimal drawdown.

Table 3-4: Summary of Submersible Well Pumps

Source	Pumps to:	Model	HP	Set Depth	Drop Pipe	Date installed
S01	Reservoirs	Franklin 60FH5S4-PE	5	147’	3” GIP	2025
S02	Reservoirs	Franklin 75FA5S6-PE	5	169’	2.5” GIP	2021
S03	Reservoirs	N/A (Well field, S01&S02)				
S04	Upper Pressure Zone	Franklin 60FA7S4-PE	7.5	136	2” GPP	2019
S05	Upper Pressure Zone	10 HP 125 GPM	10			2005
S06	Lower Pressure Zone	Goulds 45GS75	7.5	262’	2” GIP	2025
S07	Upper Pressure Zone	(emergency intertie)	-			-

3.2.3 Water Rights and Capacity

The system has a total primary water right quantity of 380 gpm and 210 acre-feet per year. A comprehensive list of water rights and demand projections is found in the Water Right Self-Assessment form; the Water Rights Self-Assessment form and the water right certificates can be found in Appendix 10.4. The system is within their water rights based on annual usage, and based on water use projections, it is expected that annual water right is sufficient throughout buildout.

3.2.4 Storage

Storage is provided by two concrete reservoirs with a combined gross volume of 76,370 gallons. The reservoirs both have internal heights of 10-feet; tank volume below 6 inches and above 9 feet is dead storage (DS), with operational storage (OS) utilizing the interval from 8.5 to 9 feet. The remainder of the volume is available as working storage to provide Equalizing (ES) and Standby (SST) storage. The reservoir structures are in relatively good condition and have an expected lifespan of 75 years, with anticipated replacement in 2055 and 2075 respectively.

Table 3-5: Summary of Submersible Well Pumps

Year Built	Size (ft)	Gross Volume (gal)	DS (gal)	OS (gal)	ES (gal)	SST (gal)
1980	20’D x 10’H	23,500	3,520	1,170	1,850	16,960
2000	30’D x 10’H	52,870	7,930	2,630	4,150	38,150
Total		76,370	11,460	3,800	6,000	55,110

3.2.5 Water Treatment

Secondary chlorination is provided via flow proportional injection of sodium hypochlorite at each well to achieve a minimum distribution system residual of 0.2 mg/L. Chlorination equipment consists of a small chemical tank, Stenner pump, and water meter.

3.2.6 Booster Pumps and Pressure Control

The system is pressurized by a 3 hp jockey pump and three 5 hp main pumps on variable speed drives, with an 80-gallon pressure tank for cycle control. Booster pump capacity is a combined 393 gpm at 50 psi.

Table 3-6: Summary of Booster Pumps

Model	HP	Operating pressure (psi)	Output (gpm)	Date installed
Flint & Walling C22233	3	50	60	2013
Flint & Walling C22253	5	50	111	2013
Flint & Walling C22253	5	50	111	2013
Flint & Walling C22253	5	50	111	2026

3.2.7 Buildings

Three existing buildings currently serve the water system and will continue to be in use. These buildings house pumps, electrical, and chlorination equipment. The Hawk Acres building has a planned addition to house chlorination equipment; the Tolmie Park building will be remodeled due to poor condition. See Table 3-7 for building summary.

Table 3-7: Summary of Buildings

Site	Building Size	Year Constructed	Notes
Booster Station	14' x 14'	1980	Electrical new in 2013
Hawk Acres Wells	4’ x 6’	2007	Electrical new in 2017
Tolmie Park Well	8’ x 20’	1991	Poor condition

3.2.8 Backup Power Generators

The Hawk Acres well site is equipped with a propane backup generator, automatic transfer switch, and 500-gallon propane tank that were installed in 2017. The backup power system maintains power to S04, S05, and chlorination during power outages. A new propane backup generator along with an automatic transfer switch and two 1,000-gallon propane tanks are being installed at the booster station site to run the booster pumps, SO1 and SO2, and chlorination and controls. There are no plans to install backup power at S06, as more than sufficient capacity is available during power outages to meet maximum day demand without S06.

3.3 Capacity Analysis

The system has the capacity to supply 530 ERU; see Worksheet 4-1 on following page.

Table 3-8: Limiting Factor Capacity Summary

Component	ERU Capacity
Source(s)	564
Treatment	564
Storage	530
Pumping	601
Water Rights	1,029
Other (Distribution)	687

Worksheet 4-1 --ERU Capacity Summary

6/1/2021

Specific Single Family Residential Connection Criteria (measured or estimated demands.)

Average Day Demand (ADD) 180 gpd/ERU

Maximum Day Demand (MDD) 672 gpd/ERU

Water System Connections Correlated to ERUs			
Service Classification	**Total MDD for the classification, gpd**	**Total # Connections in the classification**	**ERUs**
Residential			
Single-family	203,616	303	303
Multifamily			
Nonresidential			
Industrial			
Commercial			
Governmental			
Agricultural			
Recreational			
Other (specify)			
DSL	3,130		4.7
Other (identify)			
Total existing ERUS (Residential + Nonresidential + DSL + Other) =			308

Service Capacity as ERUs and Gallons Per Day			
Water System Component (Facility)	**ERU Capacity for Each Component**	**GPD Capacity for Each Component**	**Notes**
Source(s)	564	379,200	
Treatment	564	379,200	
Equalizing Storage	530	8,120	
Standby Storage	530	52,980	
Pumping	601	823,680	
Water Rights (Qa)	1,029	187,476	average annualized
Water Rights (Qi)	1,082	727,200	
Other (Distribution)	687	915,840	
Water System Service Capacity (ERUs) =			530
(Based on the limiting water system component shown above.)			

Note: For the purposes of capacity analysis and water system plans, this form needs to be accompanied by the calculations that were used to come up with the ERU capacity figures.

- Capacity determinations are only for existing facilities that are operational for the water system
- Not shown above are distribution system limitations (Section 4.5.4) on ERUs because these are location-specific within the distribution system. These limits are not expected to limit the ERU capacity of the entire water system.

Capacity Analysis Calculations

Average Day Demand (ADD)	180	gpd/ERU
Maximum Day Demand (MDD)	672	gpd/ERU
Current Peak Hourly Demand (PHD)	335.0	gpm

Table 3-1

Number of ERUs (N)	C	F
15-50	3.0	0
51-100	2.5	25
101-250	2.0	75
251-500	1.8	125
>500	1.6	225

Source Capacity

Source capacity pumping to reservoirs (WF 3 /Sources 1 and 2)	137	gpm
Source capacity pumping direct to distribution (Sources 4, 5, and 6)	179	gpm
Total Non-Emergency System Source Capacity	316	gpm
With Equalizing Storage (Must supply system MDD in 20 hours, Equ. 4-3)	564	ERU
Treatment (treatment capacity + non treated sources)	316	gpm
'-Proportional chlorine injection, same capacity as well capacity	564	ERU
Total Live Storage:	61100	gallons
Available Equalizing Storage (ES) volume:	8,120	gallons
ES Capacity per Equ. 4-5	530	ERU
Available Standby Storage (SB)	52,980	gallons
SB Capacity 100 gallons per ERU	530	ERU
Booster Pump Capacity (booster pumps + direct to distribution sources)	572	gpm
Distribution Capacity (Must supply system PHD per Equ. 3-1)	601	ERU
Distribution Capacity (limited by 8fps or 30 psi in distribution)	636	gpm
Distribution Capacity (Must supply system PHD per Equ. 3-1)	687	ERU
Annual water right	210	ac-ft/yr
Average Daily limit:	187476	gpd
Average Daily limit less average DSL:	184346	gpd
Annual water right capacity (adjusted for DSL)	1029	ERU
Instantaneous water right	505	gpm
Max daily limit	727200	gpd
Instantaneous water right capacity (with equalizing storage)	1082	ERU
Limiting number of ERUs	530	ERU
Existing number of calculated ERUs	308	ERU
Proposed increase in number of approved ERUs	222	ERU

Existing number of total connections	303	
Proposed increase in number of approved connections (assumes SFRs)	222	
Requested number of approved connections:	**525**	
Resulting PHD	518.4	gpm

Capacity Analysis Calculations Upper Zone		
Source Capacity (upper zone)		
Source capacity pumping to reservoirs (WF 3 /Sources 1 and 2)	137	gpm
Source capacity pumping direct to distribution (Sources 4, 5)	123	gpm
Total Non-Emergency System Source Capacity	260	gpm
With Equalizing Storage (Must supply system MDD in 20 hours, Equ. 4-3)	464	ERU
Treatment (treatment capacity + non treated sources)	260	gpm
'-Proportional chlorine injection, same capacity as well capacity	464	ERU
Total Live Storage:	61100	gallons
Operational Storage (OS)	28,900	gallons
Dead Storage (DS)	13,453	gallons
Fire Flow Storage (FFS) (Nested with Standby Storage)	45000	gallons
Total available storage for ES and SB:	18,747	
Available Equalizing Storage (ES) volume:	13,070	gallons
ES Capacity per Equ. 4-5	480	ERU
Available Standby Storage (SB)	48,030	gallons
SB Capacity 100 gallons per ERU	480	ERU
Booster Pump Capacity (booster pumps + direct to distribution sources)	516	gpm
Distribution Capacity (Must supply system PHD per Equ. 3-1)	526	ERU
Distribution Capacity (limited by 8fps or 30 psi in distribution)	636	gpm
Distribution Capacity (Must supply system PHD per Equ. 3-1)	687	ERU
Annual water right	179.5	ac-ft/yr
Average Daily limit:	160247	gpd
Average Daily limit less average DSL:	160247	gpd
Annual water right capacity (adjusted for DSL)	895	ERU
Instantaneous water right	425	gpm
Max daily limit	612000	gpd
Instantaneous water right capacity (with equalizing storage)	911	ERU
Limiting number of ERUs	464	ERU
Existing number of calculated ERUs	128	ERU

Resulting PHD	469.7	gpm

Capacity Analysis Calculations Lower Zone		
Source Capacity		
Source capacity (lower zone)	56	gpm
PRV capacity	420	gpm
Total Non-Emergency System Source Capacity	476	gpm
Capacity to meet PHD	473	ERU
Storage Capacity: provided by upper zone, same limitation as for entire water system		
Distribution Capacity (limited by 8fps or 30 psi in distribution)	362	gpm
Distribution Capacity (Must supply system PHD per Equ. 3-1)	320	ERU
Water right: same as system as a whole		
Limiting number of ERUs	320	ERU
Existing number of calculated ERUs	175	ERU
Resulting PHD	361.8	gpm

3.3.1 Water Rights Self-Assessment

See completed Water Rights Self-Assessment documents in Appendix 10.5 for existing status and 20-year forecast.

3.3.2 Source of Supply Analysis

The water system is served by a five groundwater sources with combined capacity exceeding MDD at buildout. Additionally, there is an emergency intertie to the City of Lacey water system, as well as a reservoir providing equalizing and standby storage. There is no history of seasonal well decline or known source vulnerabilities.

3.4 Distribution System Analysis

3.4.1 Model Description

Distribution System hydraulics were modeled using EPAnet 2.2. The system consists of two pressure zones, with the upper zone at an average hydraulic gradient of 415 ft, and the lower zone at an average hydraulic gradient of 370 ft. The upper zone is supplied from the booster station and the Hawk Acres wells (S04 and S05). The lower zone is supplied by the Tolmie Park well (S06) and two pressure reducing stations fed by the upper zone. A surface roughness of 150 was used for PVC pipes, with service connections modeled as nodes with variable demand scaled according to the scenario. Pumps were modeled based on the given pump's curve, with a PRV valve used to set output pressure, and a water supply via a reservoir. Reservoir surface elevation was set to the pumping water elevation for wells, or the applicable storage reservoir level for booster pumps. Pressure reducing stations were modeled as PRV valves with set point pressures analogous to design setpoints. Demand was assigned by multiplying the unit demand at the node by a scenario scaling factor.

3.4.2 Scenarios

The system does not provide fire flow; therefore, the following scenarios were analyzed:

- Static Conditions (at pump shutoff pressure)
- Peak hourly demand flow rates (buildout condition of 530 connections
- Average MDD flow at buildout with S04 and S05 offline
- Average MDD flow at buildout with S06 offline
- Average MDD flow at buildout with two booster pumps offline
- Average MDD flow at buildout with all pumps and wells offline and supply via the intertie to City of Lacey
- Distribution system limiting factor (max flow while maintaining pressure above 30 psi and velocity below 8 fps).

3.4.3 Model Results

Model results show that the distribution system is relatively efficient and exhibits minor friction losses under most conditions, with pressure differences largely driven by elevation. The distribution system is able to support up to 687 ERU distributed as infill and ADU's. The distribution system is also capable of supplying MDD flow rates at above 30 psi under emergency conditions (multiple pumps/wells offline).

At buildout PHD conditions of 520 gpm pressure at services ranges from 37.6 psi to 63.2 psi. The distribution system limiting factor was found to be pressure; the system is able to supply up to 636 gpm while maintaining pressure above 30 psi at all points in the distribution system.

All upper pressure zone services below 242-ft elevation and lower zone services below 190-ft elevation require individual pressure reducing valves in order to maintain pressures below 80 psi. There are no existing services at elevations requiring individual pressure reducing valves.

3.5 Summary of System Deficiencies

Following pump replacements and rebuilding of the Hawk Acres and Tolmie Park pump houses with the consolidation project, all know deficiencies have been addressed and the water system's infrastructure is in good working order. The system has no significant hydraulic capacity limitations, and DSL is well below the 10% target. Modeling suggests that the system will be able to provide adequate flow and pressure through any likely level of community build out and occupancy. The system is not currently capable of providing fire flow, but this is not considered a deficiency because it is not required due to the system being grandfathered in under prior regulations. Should fire flow be required for future development, it may be provided, though some system upgrades will be required.

Chapter 4 Water Use Efficiency Program

In 2003, the Washington State Legislature passed Engrossed Second Substitute House Bill 1338, known as the Municipal Water Law, to address increasing demand on the state's water resources. The law established that all municipal water suppliers must use water more efficiently in exchange for water right certainty and flexibility to help them meet future demand. The Legislature directed the Department of Health to oversee and enforce a WUE program to help support the collective goal of ensuring a safe and reliable drinking water supply. The WUE program seeks to support this goal in the following ways:

- Contribute to long-term water supply reliability and public health protection,
- Promote good stewardship of the state's water resources, and
- Ensure efficient operation and management of water systems.

This program became effective on January 22, 2007 and established certain responsibilities that water suppliers must fulfill. Fundamental elements include the following:

- Water use efficiency program,
- Distribution leakage standard,
- Goal setting and performance reporting, and
- Metering requirements

This chapter summarizes Webster Hill's compliance with conservation planning requirements including the actions taken to promote water use efficiency, and the conservation program that the system will implement. The applicable WUE program requirements and guidelines are contained in *Water Use Efficiency Guidebook*, Revised May 2025(DOH 331-375).

4.1 Source and Service Metering

4.1.1 Source Meters

All sources are metered. Any additional sources developed in the future will be metered when installed.

4.1.2 Service Meters

The system is fully metered. Meters are read and billed monthly. The system billing software provides month by month total usage reports which are used for calculating distribution system leakage. All new services will be metered upon activation.

4.2 Distribution System Leakage

If a system's distribution system leakage exceeds 10 percent, the conservation program must also provide an implementation program that includes leak detection and repair, and other measures to reduce water loss. Leak loss for the past five-year period has averaged 5.9%, and for the past three-year period has averaged 4.9%. It should be noted that for four months of the year 2021 and 10 months of the year 2022 the source meter for the Tolmie Park well was not functional, resulting in missing DSL data for the then Tolmie Park water system. To account for this lack of record the available source production data for the

previous and following 2 years was averaged to yield an estimated monthly source production volume for the missing months. Consumption (service) metering is available for the past 7 years, and the DSL calculated by using the actual consumption data and estimated production data for the months missing production data is in line with the system's long-term trend. Given the general trend of DSL at Tolmie Park has been downward over time and given that Tolmie Park comprises only about 20% of the total connections in the consolidated Prairie Ridge water system, this is considered an accurate approach. See Figure 2-2: DSL Rate for historical trend.

The Hawk acres water system has experienced a recent source meter accuracy issue, resulting in apparent negative DSL over the past year. Both Hawk Acres source meters are past typical lifespan and are being replaced January 2026. Meter inaccuracy appears to have begun developing in May or June of 2024; this has no impact on consumption demand; however, DSL calculations have been adjusted by applying the prior 3-year average DSL rate of 31,750 gallons per month (based on years 2021 through 2023) for the most recent period starting May 2024.

4.3 Water Use Efficiency Program

4.3.1 Current Program

The Thurston PUD Board of Commissioners recognizes that water is a valuable commodity, and the wise and efficient use of water is a goal that is in the best interests of its constituents. Staff have training and equipment to respond to leak reports from customers generally within a few hours of the report. Significant discrepancies between service meter and source meter records are investigated.

4.3.2 Goals

State regulation (WAC 246-290-830) requires the governing body of the municipal water system to develop the water use efficiency goals through a public process. The current WUE goal was considered in a public meeting held on October 19, 2020. The current goal for years 2021 through 2030 is to reduce and/or maintain the annual average demand per connection, for all Group A systems, to no more than 250 gallons per day. The Prairie Ridge water system is currently meeting this goal.

4.3.3 Measures

As part of a water system plan, DOH regulations also require the implementation of a specified number of water use efficiency measures. WAC 246-290-810 identifies the minimum number of water use efficiency measures that must be evaluated based on system size. Thurston PUD has less than 9,999 connections and therefore must evaluate or implement six supplementary water use efficiency measures in addition to the mandatory measures. Please see Part A WSP, chapter 3.4 for Water Use Efficiency Measures.

In addition to water efficiency measures identified in the Part A WSP, Thurston PUD currently offers customers the following efficiency related devices and incentives:

- Shower Timers -first come first serve basis
- Irrigation Timers -first come first serve basis
- Soil Moisture Meters -first come first serve basis

- High Efficiency toilet rebate ($50.00)

4.3.4 Reclaimed Water

Systems serving more than 1,000 connections are required to evaluate reclaimed water opportunities. Most of the Prairie Ridge system is comprised of properties that have private septic systems and therefore would not be able to implement a sewer treatment plant for reclaimed water use. With fewer than 1,000 connections, the system is not required to further evaluate reclaimed water opportunities.

4.3.5 Consumer Education Program

Thurston PUD sends out seasonal water conservation tips to customers at least bi-annually within our monthly newsletter. Conservation is also included in our annual consumer confidence reports. Newsletters can be found online at http://www.thurstonpud.org/pud-news-newsletters.htm

4.3.6 Annual Reports

The annual report provided to DOH by July 1 must include:

- Total system production and system wide consumption
- Distribution system leakage in percentage and volume
- Goal description, schedule, and progress toward meeting goals

Thurston PUD submits the annual WUE report on DOH's SENTRY database system, https://fortress.wa.gov/doh/eh/portal/odw/si/Disclaimer.aspx?Page=FindWaterSystem.aspx, before July 1 every year and adds a copy of the report to the website at http://www.thurstonpud.org/water-systems-ccr-2017_copy(1).htm. Additionally, the District reports this information to each customer on the annual Consumer Confidence Reports (CCR), example included in the Part A Water System Plan, Appendix J . The CCR provides each individual water system the current goal, total water produced and what the average household used for that water system.

4.3.7 Water Rates

Please see Water System Plan Part A, Section 6-6 and 6-7 for discussion and evaluation of current and future rates. Please see Thurston PUD website for current rates and fees http://thurstonpud.org/our-rates.htm.

4.4 Demand Forecast

See Sections 2.6 and 2.7 for population and demand forecasting.

4.5 Water Use Efficiency Savings

Thurston PUD has a significant successful history of improving water use efficiency at water systems owned and operated by the PUD. Over the past 7 years, Thurston PUD has consistently reduced leak loss, from approximately 10% in 2018 to under 6% in 2024. The 3-year running average DSL for the consolidated system is under 5%. See WSP Part A section 3.8 for additional history of WUE Program success at Thurston PUD water systems.

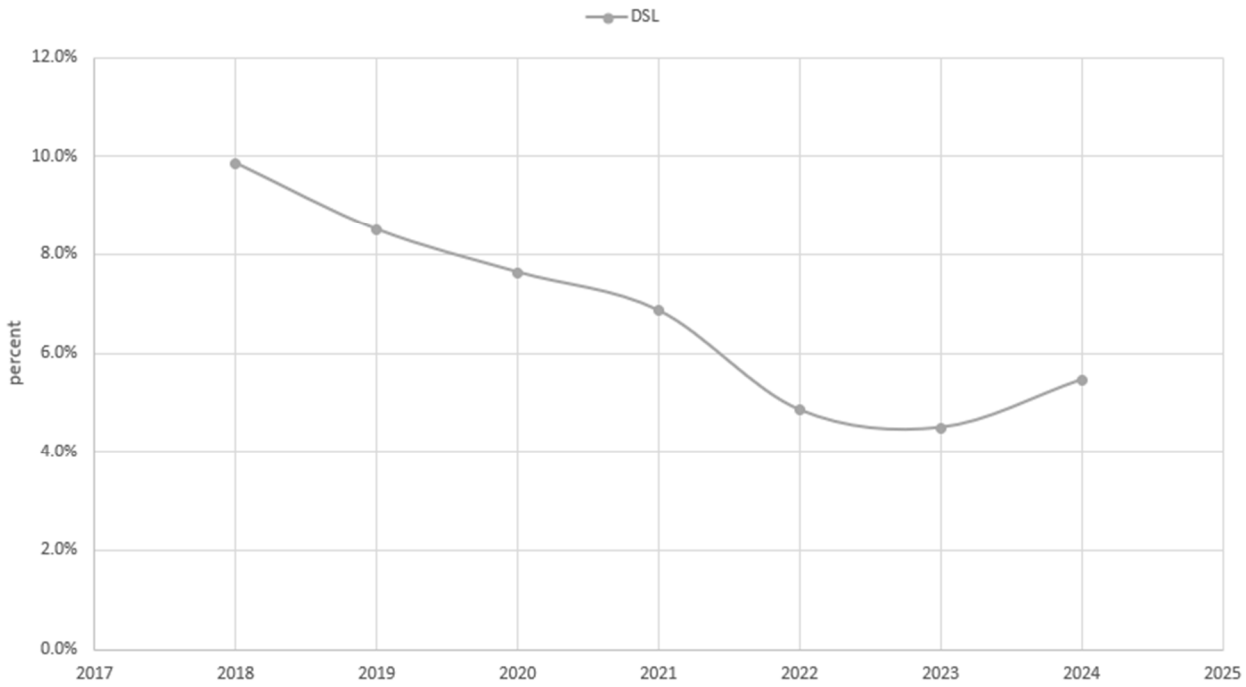

Figure 4-1: Annual Average DSL Percent

4.6 DSL Exemption for Water Systems under 500 Connections

The Prairie Ridge water system currently serves less than 500 connections; however the system maintains an average DSL below 10% and does not request the DSL exemption at this time.

Chapter 5 Source Water Protection

5.1 Wellhead Protection

The wellhead protection program has been developed in conjunction with the WSP. The following susceptibility assessment, protection area, and contamination source inventory will provide the necessary documentation to make educated management and land use decisions to prevent aquifer contamination.

5.1.1 Susceptibility Assessment

Ground Water Contamination Susceptibility Assessment forms for each source for the Prairie Ridge Water System are included in Appendix 10.6. The results of the assessment are summarized in this Chapter.

5.1.2 Wellhead Protection Area

A map showing the 100-foot protected radii and the 6-month, 1-year, 5-year, and 10-year ground water travel radii is given below. The well protection radii are calculated using the formula found in the susceptibility assessment as provided by the WSDOH.

5.1.3 Contamination Source Inventory

The following are potential sources of contamination within the 10-year travel time radii:

1. Residential Septic Systems
2. Minor Residential Chemical Applications (Pesticides, herbicides, etc.)
3. Stormwater detention ponds
4. Active and inactive land disturbance permits
5. Target Warehouse facility
6. Gas station
7. Private and County Roadways

5.1.4 Notification of Findings

The following agencies will be provided with a letter (see Appendix 10.6 for a copy of the notification letter) requesting information about any potential sources of contamination within the Wellhead Protection Radii:

Thurston County Health Department
Thurston County Community Planning and Economic Development
Emergency Services (911)
Washington State Department of Ecology

A letter to all the homeowners with lots within the 10-year radii will also be sent a notification letter. See Appendix 10.6 for copies of the notification letters.

Figure 5-1: Wellhead Protection Areas

5.1.5 Contingency Planning

The well is provided with continuous disinfection, therefore biological contamination is unlikely. In the event of contamination, the well would be taken offline. Thurston PUD has an emergency intertie with the City of Lacey, and the ability to provide residents with bottled water or to resupply the reservoir by tanker.

5.2 Water Quality Analysis

5.2.1 Bacteriological Testing

The system tests the distribution system for coliform bacteria each month per the coliform monitoring plan, Located in Appendix 10.7. There have been no exceedances in the past 10 years. All other parameters are tested based on the water quality monitoring schedule, located in Appendix 10.7. The water system has historically exceeded the secondary MCL for manganese and is in the process of installing treatment. There are no other known water quality exceedances.

Chapter 6 Operations and Maintenance

6.1 Water System Management, Personnel, and Certifications

See Thurston PUD WSP Part A, Sections 5.1 and 5.2.

6.2 Operations and Preventative Maintenance

The routine operation and preventative maintenance schedule for the system infrastructure is outlined in the WSP Part A in Chapter 5, Table 5-2, and further detailed in Appendix M. O & M procedures are fully detailed in Appendix N of the WSP Part A.

6.2.1 Normal Operating Conditions and Settings

Table 6-1 outlines the normal setpoints for the well pumps, reservoirs levels, and booster pumps.

Table 6-1: Normal Operating Conditions

Component	Pumps To	On Condition	Set Point	Off Condition
Well 1 & 2	Reservoir 1	8.5 ft	-	9.0 ft
Booster Pumps	Upper Zone	52 psi	56 psi	30 Hz
Well 4 & 5	Upper Zone	65 psi	69 psi	30 Hz
Well 6	Lower Zone	55 psi	59 psi	30 Hz
Chlorination	After all sources	Flow detected	0.6 mg/L Flow rate proportional	No flow
City of Lacey Intertie (Emergency Only)	Upper Zone	open PUD & Lacey isolation valves	400-ft	PUD & Lacey isolation valves both closed

6.3 Comprehensive Water Quality Monitoring

The system is sampled in accordance with its Water Quality Monitoring Schedule (WQMS), located in Appendix 10.7. If any water quality testing exceeds the standards set forth in WAC 246-290-310, the DOH will be notified immediately.

6.3.1 Coliform Monitoring Plan and Map

The coliform monitoring plan can be found in Appendix 10.7. The system takes one routine samples per month from distribution. If there are any failures, repeat distribution samples and a source sample are taken per this plan. See the Coliform Monitoring Plan for details. Response Plans can be found in the Emergency Response Plan in the WSP Part A, Appendix P.

6.3.2 Lead and Copper Monitoring

The Lead and Copper Monitoring plan can be found in Appendix 10.7.

6.3.3 Water Treatment Monitoring

Chlorine residual is measured downstream of the reservoir 5 days per week and reported to WSDOH on a monthly basis.

6.3.4 Disinfection Byproduct Monitoring

The Disinfection Byproduct Monitoring Plan can be found in Appendix 10.7.

6.4 Emergency Response Program

The Emergency Response Plan is found in the WSP Part A, Appendix P.

6.5 Cross Connection Control

The cross-connection control policy and program are located in the WSP Part A, Appendix R. A list of backflow devices can be found in this WSP Part B, Appendix 10.7.

6.6 Sanitary Survey Findings

The latest Sanitary Survey were performed in 2025 on the three individual systems. Finding for each system are:

- Prairie Ridge 605 - No significant deficiencies or findings were observed.
- Hawk Acres 607 – One significant deficiency of electrical conduits needing to be sealed was completed by the due date.
- Tolmie Park 239 – One significant deficiency of a portable toilet in the 100 ft SCA which was removed as soon as possible.

6.7 Summary of O&M Deficiencies

Overall, the system is well maintained with repairs and upgrades routinely made. All significant system deficiencies identified during the most recent Sanitary Survey have been addressed. Other O&M items to be addressed include:

6.7.1 Clean and Repair Pumphouse

The pumphouse should be cleaned and undergo minor repair, including ventilation improvement.

6.7.2 Continue to Find and Fix Leaks

Thurston PUD has found and fixed all significant leaks and reduced leak loss considerably, however as the distribution system ages it will continue to develop leaks. Leak loss should continue to be monitored, with leaks found and fixed in a timely manner.

6.8 Record Keeping, Reporting, and Customer Complaint Program

See WSP Part A, Section 5.9

6.9 Customer Complaint Response Procedures

See WSP Part A, Section 5.10

Chapter 7 Distribution Facilities Design and Construction Standards

Thurston PUD requests a distribution main extension submittal exemption for the Prairie Ridge 605 water system as allowed under WAC (246-290-125 (2)). The distribution design and construction standards are outlined in the Thurston PUD WSP Part A, Appendix A. Maps of the distribution system is available in Section 10.10 of this WSP Part B.

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Chapter 8 Capital Improvement Program

8.1 Prioritization Criteria

Improvements are prioritized according to the following criteria listed from highest to lowest in importance:

1. Public Health Risks
2. Adequate Supply
3. WSDOH Operation and Design Standards
4. Achieving Conservation Goals
5. Regularly Scheduled Improvements
6. Aesthetic and Optional Improvements

8.2 Prioritized List of Improvements

Improvements Planned for 2026 as part of the consolidation are:

1. Distribution upgrades (service meters in Hawk acres and Tolmie Park, PRV stations, new/replaced 6-in mains intertying Hawk Acres to Prairie Ridge and Tolmie Park)
2. Rebuild Tolmie Park well house (S06) and install of upsized well pump
3. Installation of 3rd main booster pump
4. Installation of upgraded pump controls and telemetry system wide, Installation of secondary chlorination at S04, S05, S06
5. Install Backup Generator at reservoir site to power S01, S02, and Booster Station

Future improvements include:

6. Rebuild Prairie Ridge booster station
7. 2035 mainline replacement
8. New well (S08)

8.3 Assessment of Improvements

8.3.1 Distribution Upgrades

Installation of approximately 1,800 linear feet of 6-in distribution main in an unopened ROW area of Stillwell Rd from Legacy Lane to Hepburn St, intertying the existing Prairie Ridge and Hawk Acres distribution systems. Installation of approximately 1400 linear feet of 4-in distribution main in Eagle Dr, intertying the existing Hawk Acres and Tolmie Park service areas. Two small PRV vaults, to be located at the corners of Stillwell Rd and Eagle Dr, and Eagle Dr and Hawks Prairie Rd for the regulation of pressure to the lower pressure zone. Replacement of meters in the existing Hawk Acres and Tolmie Park service areas.

8.3.2 Rebuild Tolmie Park well house (S06) and install of upsized well pump

An upsized well pump is required at S06 (Tolmie Park) to enable pumping direct to distribution. This requires replacement of the submersible pump, as well as upgraded power supply, electrical, and controls. The existing building is not fit for purpose and must be replaced prior to electrical upgrades.

8.3.3 Installation of 3rd main booster pump

An additional 5 hp booster pump at the Prairie Ridge booster station is needed to provide redundancy to the consolidated system.

8.3.4 Installation of upgraded pump controls and telemetry system wide, Installation of secondary chlorination

Consolidation requires upgrades to pump controls and telemetry for interoperability between the dispersed well/pump sites. The existing Prairie Ridge system has secondary chlorination, requiring secondary chlorination systems be installed at S04, S05, and S06 in order to ensure a minimum residual of 0.2 mg/L free chlorine is maintained throughout the entire distribution system.

8.3.5 Install Backup Generator

A backup generator to power the booster station during a utility power outage is necessary to ensure continuity of water service. There is an existing backup generator which is able to power S04 and S05; with backup power to the booster station and S04 and S05 the system has sufficient emergency capacity with redundancy so backup power is not necessary or planned for S06. The lower pressure zone will be supplied from the upper zone via the PRVs during utility power outage.

8.3.6 Rebuild Prairie Ridge Booster Station Building

The Prairie Ridge booster station building was built in 1980 and in declining condition. Reconstruction of walls and roof is planned for 2030.

8.3.7 2035 mainline replacement

Approximately 5,000 feet of mainline and 42 service laterals (76 total services, consisting of 8 singles and 34 doubles) were installed in 1970; replacement is planned for these areas in approximately 2035. Existing mains consist of approximately 1200 feet of 6-inch AC, 650 feet of 3-inch PVC, and 3,200 feet of 2.5-inch PVC.

8.3.8 New Well (S08)

Ground water permit G2-29250P approves the drilling of an additional well in S34, T34N, R01W, with a production capacity of up to 125 gpm. The permit anticipates an 8-inch diameter well drilled to approximately 175-ft deep and tied into the same conveyance system as S01 and S02. The need for S08 is based on development by the school district and is tentatively planned for 2035.

8.4 Improvement Program Summary and Schedule

Table 8-1 provides an overview of the likely schedule for capital improvements projects. See Umbrella Plan Appendix U for details of the financial program.

Table 8-1: Improvement Schedule

Project	Estimated Cost	Estimated Year to be Completed	Funding Source
Distribution upgrades	$615,000	2026	DWSRF Loan, Capital Budget
Rebuild Tolmie Park well house (S06) and install of upsized well pump	$90,000	2026	DWSRF Loan
3rd main booster pump	$25,000	2026	DWSRF Loan
Upgraded pump controls and telemetry system wide, Installation of secondary chlorination at S04, S05, S06.	$100,000	2026	DWSRF Loan
Backup Generator at reservoir site	$120,000	2026	DWSRF Loan
Rebuild Prairie Ridge Booster Station Building	$130,000	2030	Capital Budget
2035 Mainline Replacement	$1,600,000	2035	Capital Budget
New Well (S08)	$500,000	2035	Capital Budget

Chapter 9 Financial Program

See WSP Part A, Section 6. Thurston PUD's current Asset Management Program incorporates planning for all 273 Thurston PUD systems can be downloaded from the Thurston PUD website or made available upon request.

Chapter 10 Appendices and Supporting Documents

10.1 Hydraulic Analysis
10.2 Well Logs, Pump Curves, and Equipment
10.3 Meter Data
10.4 WFI and Operating Permit
10.5 Water Rights
10.6 Wellhead Contamination Susceptibility Assessments
10.7 Water Quality Monitoring Programs, Cross Connection Control
10.8 Consistency Statements, WSP Adoption, and Correspondence
10.9 Easements, Covenants, Legal Instruments
10.10 Maps and Drawings