THURSTON PUD

PRAIRIE RIDGE WATER SYSTEM
COMPREHENSIVE WATER PLAN
PART B (INDIVIDUAL SYSTEM PLAN)

W.D.O.H. I.D. NO. 02356 W

Thurston PUD

December 2019

JWM&A Civil • Municipal • Geotechnical Engineering and Planning

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Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Water System Plan Submittal Form

This form must be completed and submitted along with the Water System Plan (WSP). It will expedite review and approval of your WSP. **All water systems should contact their regional planner before developing any planning document for submittal.**

Prairie Ridge #605	02356 W	Thurston PUD No. 1
1. Water System Name	PWS ID# or Owner ID#	Water Systems Owner's Name
Kim Gubbe	(360)357-8783 x125	Director of Planning and Compliance
Contact Name for Utility	Phone Number	Title
1230 Ruddell Rd SE	Lacey	WA 98503
Contact Address	City	State Zip
Doug Eklund	(360) 352-9456	Senior Project Engineer
2. Project Engineer	Phone Number	Title
1700 Cooper Point Rd SW #B2	Olympia	WA 98502
Project Engineer Address	City	State Zip
3. Billing Contact Name (required if not the same as #1)	Billing Phone Number	Billing Fax Number
Billing Address	City	State Zip

4. How many services are presently connected to your system? 100
5. Is your system expanding (*circle what applies:* seeking to extend service area or increase number of approved connections)? ☒ Yes ☐ No
6. If the number of services is expected to increase, how many *new* connections are proposed in the next six years? 15
7. If your system is private-for-profit, is it regulated by the State Utilities and Transportation Commission? ☐ Yes ☒ No
8. Is the system located in a Critical Water Supply Service Area (i.e., have a Coordinated Water System Plan)? ☒ Yes ☐ No
9. Is your system a customer of a wholesale water system? ☐ Yes ☒ No
10. Will your system be pursuing additional water rights from the Department of Ecology in the next 20 years? ☐ Yes ☒ No
11. Is your system proposing a new intertie? ☐ Yes ☒ No
12. Do you have projects currently under review by us? ☐ Yes ☒ No
13. Are you requesting distribution main project report and construction document submittal exception and if so, does the WSP contain standard construction specifications for distribution mains? ☐ Yes ☒ No
14. The water system is responsible for sending a copy of the WSP to adjacent utilities for review or a letter notifying them that a copy of the WSP is available for their review and where the review copy is located. Has this been completed? ☐ Yes ☒ No
15. The purveyor is responsible for sending a copy of the WSP to all local governments within the service area (county and city planning departments, etc.). Has this been completed? ☒ Yes ☐ No
16. Are you proposing a change in the place of use of your water right? ☐ Yes ☒ No
17. What is the last year of the plan approval period (the year the shortest WSP projection is made)? 2029

If answer to questions 7,8, 11, 14 and/or 15 is "yes," list who you sent the WSP to: Thurston County CPED Dept.

Is this plan: ☒ an Initial Submittal ☐ a Revised Submittal

Please enclose the following number of copies of the WSP:

3 copies for Northwest and Southwest Regional Offices **OR 2** copies for Eastern Regional Office (We will send one copy to Ecology)
1 additional copy if you answered "yes" to question 7. 3 Total copies attached

Please return completed form to the Office of Drinking Water regional office checked below.

☐ **Northwest Drinking Water Operations**
Department of Health
20425 72nd Avenue South, Suite 310
Kent, WA 98032-2358
253-395-6750

☑ **Southwest Drinking Water Operations**
Department of Health
PO Box 47823
Olympia, WA 98504-7823
360-236-3030

☐ **Eastern Drinking Water Operations**
Department of Health
16201 East Indiana Avenue Suite 1500
Spokane Valley, WA 99216
509-329-2100

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).

PUBLIC UTILITY DISTRICT No. **1 of THURSTON COUNTY**

COMPREHENSIVE WATER SYSTEM PLAN

PART B (INDIVIDUAL SYSTEM PLANS)

PRAIRIE RIDGE WATER SYSTEM
(ID # 02356 W)

July 2019

Engineer's Certification:

I hereby certify that the Comprehensive Water System Plan for:

Part B for Prairie Ridge Water System for Public Utility District No. 1 of Thurston County

Was prepared by me or by someone under my direct supervision and meets or exceeds the minimum requirements for such plans as defined under WAC 246 290 100.

Douglas H. M. Eklund, P.E.

Prairie Ridge #605 Water System Plan
Part B Individual System Plan

TABLE OF CONTENTS

ENGINEER'S CERTIFICATION

CHAPTER 1 Description of Water System
1A. History of Water System 1-1
1B. Geography 1-1
1C. Adjacent/Neighboring Purveyors 1-2
1D. Inventory of Existing Water System Facilities 1-3
1E. Related Plans 1-4
1F. Retail Service Area and Characteristics 1-4
1G. Future Service Area, Retail Service Area and Characteristics 1-4
1H. Service Area Agreements 1-5
1I. Duty to Serve 1-5

CHAPTER 2 Basic Planning Data and Water Demand Forecasting
2A. Current Population, Number of Services, and Water Use 2-1
2B. Projected Land Use, Future Population, and Water Demand Forecasting 2-1
Demand Summary 2-3

CHAPTER 3 System Analysis
3A. Water System Design Standards 3-1
3B. Water Quality Analysis 3-1
3C. System Description and Analysis 3-1
3D. Limiting Factors 3-3
3E. Recommendations 3-5

CHAPTER 4. Water Use Efficiency Program and Water Rights
4A. Water Use Efficiency 4-1
4B. Water Rights 4-1
4C. Metering Program 4-1
4D. Water Use Efficiency Program 4-1

CHAPTER 5 System Monitoring Requirements
5A. System Monitoring Requirements 5-1
WDOH Water Quality Monitoring Schedule
Coliform Monitoring Plan
Coliform Monitoring Plan Map

CHAPTER 6 Wellhead Protection
6A. Potential Impact Areas 6-1
6B. Contingency Plan 6-1
6C. Notifications 6-1

Prairie Ridge #605 Water System Plan
Part B Individual System Plan

TABLE OF CONTENTS

CHAPTER 7 Improvement Program
7A. Selection/Justification of Proposed Improvement Projects 7-1

CHAPTER 8 Financial Program
8A. System Financing 8-1
8B. Costs of Improvements 8-1
8C. Financial Viability Worksheet 8-1
8D. Asset Management Plan 8-1

CHAPTER 9 Vulnerability Assessment

APPENDICES
Consistency Checklist
Zoning Map
Live Storage Reservoir Diagram
Capacity Related Storage Engineering Calculations
Booster Pump Station Analysis
Well Protective Covenants
Water Rights Self-Assessment and Water Rights
Wellhead Protection Plan
Asset Management Plan
EPANet Analysis
Fire District Response
Meter Records
Large Print Appendices
System Map
Service Area Map

Chapter 1 DESCRIPTION OF WATER SYSTEM

1A. History of Water System

This water system was created in 1980 by a land developer to serve multiple domestic supply and single family residences lots. The water system was owned and operated by the land developer for about 30 years, when Thurston Public Utility District assumed ownership and operation of the system. The water system was developed in several phases as the system expanded to serve additional connections. The first phase was served with Well 1. The second phase added a small steel reservoir, Reservoir 1, and booster pumps at the wellsite. The third phase added 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. In 2000, a third reservoir was constructed along with the additional booster pumps. The system currently operates with the two concrete storage reservoirs, Reservoirs 2 and 3 and the two wells constructed by the land developer. Reservoir 1 has been physically disconnected from the system. The system is currently serves 100 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.

1B. Geography

The Prairie Ridge Water System service area is located westerly of a county arterial, Marvin Road. It is bound 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 undeveloped parcels and by the Hawk Acres single family residential subdivision.

The majority of the service area has been developed in 1 acre lots (prior to the current zoning requirements). There are some 5 acre or larger parcels in the service area. The developed lots within the service area occupied by relatively large, rather upscale single family homes. Many of the developed lots are nicely landscaped with large lawns and flower gardens, vegetable gardens.

Average annual rainfall in the service area is 49 inches. The highest area in the service area is at approximate elevation 290 feet above MSL just north of the intersection of 44th Avenue NE and Prairie Ridge Drive. The lowest elevation is the service area is at the southerly end of Legacy Drive 242 feet above MSL. Ground surface slopes in the service areas gently rolling.

1C. Adjacent/Neighboring Purveyors

1. Lacey Water Department serves areas lying east of Marvin Road NE.
    a. ID # 43500 Y
    b. Group A Community, 29,599 connections, unspecified approved
    c. Contact: Peter Brooks, Water Manager
    City of Lacey
    420 College St SE
    Lacey, WA 98503-1238
    Phone: (360) 438-2675

2. Forest Park Water System serves areas lying westerly of Prairie Ridge.
    a. ID # 07167 Q
    b. Group A Community, 48 connections, 49 approved
    c. Contact:
    Washington Water Service
    6800 Meridian Rd SE
    Olympia, WA 98513
    Phone: (360) 491-3760

3. Hawk Acres serves areas lying southerly of the Prairie Ridge.
    a. ID # 31845 T
    b. Group A Community, 131 connections, 136 approved
    c. Contact: Kimberly S. Gubbe, Director of Planning and Compliance
    Thurston Public Utility District No. 1
    1230 Ruddell Rd SE
    Olympia, WA 98503
    Phone: (360) 357-8783

4. Hawley Hills Water System serves areas lying northerly of the Prairie Ridge.
    a. ID # AB037F
    b. Group A Community, 50 connections, 52 approved
    c. Contact: Kimberly S. Gubbe, Director of Planning and Compliance
    Thurston Public Utility District No. 1
    1230 Ruddell Rd SE
    Olympia, WA 98503
    Phone: (360) 357-8783

5. Mayse Water System serves areas southerly of Prairie Ridge and west of Hawk Acres.
    a. ID # 02534 L
    b. Group B, Single Family Residential 6 connections, 6 approved.
    c. Contact: Andrew J. Noble, H2O Management Services

PO Box 2026
Shelton, WA, WA 9584-50346
Phone: (360) 463-6189

1D. Inventory of Existing Water System Facilities

- Facilities Inventory and Description

General
The wells pumps to the storage reservoirs and are controlled by float switches. The wells operate in lead and lag configuration with alternation. There are 2 storage reservoirs all operating at the same hydraulic grade line and with the same base elevation. A booster pump station pumps from the reservoirs to the distribution system. The booster pump station is equipped with 3 booster pumps with variable speed drives set to maintain 60 psi at the booster pump station. The distribution system consists of looped 4 inch and 6 inch PVC lines and with 1 – 6 inch dead end line, 1 – 4 inch dead end line, 1 – 2.5 inch dead end line and 1 – 2 inch dead end line. All water services are metered.

Wells
1. Well 1 (S01) - Well Tag # AKY 156, 55 gpm (1 Well Pump), metered, 174 ft to open interval, NW/4 of NE/4 Section 34, Township 19 North, Range 1 W
2. Well 2 (S02) - Well Tag # AAE 334, 82 gpm (1 - Well Pump), metered, 170 ft to open interval, NW/4 of NE/4 Section 34, Township 19 North, Range 1 W
3. Well Field (S03), S01 + S02

Reservoirs
1. Reservoir 2, reinforced concrete, 20 foot diameter x 10 foot wall height, nominal volume 22,230 gallons – well pump off elevation to bottom of reservoir. See Chapter 3 for the volume of the reservoir available for equalizing and standby storage.
2. Reservoir 3, reinforced concrete, 30 foot diameter x 10 foot wall height, nominal volume 49,7012 gallons – well pump off elevation to bottom of reservoir. See Chapter 3 for the volume of the reservoir available for equalizing and standby storage.

Booster Pump Station
1. 1 – 3 hp Flint and Walling C 22233 booster pump
2. 2 – 5 hp Flint and Walling C 22253 booster pump
3. 1 – 79 gallon bladder tank
4. Equipped for operation by a portable generator.

Distribution System
1. 5,100 LF 6 inch PVC watermain, 3,130 LF in 1 dead-end line
2. 3,700 LF 4 inch PVC watermain, 750 LF in 1 dead-end line
3. 600 LF 2 ½ inch PVC dead-end watermain

4. 330 LF 2 inch PVC dead-end water main.
5. 100 service meters.

- Map of Facilities - A map of the existing facilities is included in the appendix titled "Water System Map".

1E. Related Plans

- Thurston County zoning allows development of single family residences within the service area.

1F. Retail Service Area and Characteristics

- Characteristics –
  - Location - The retail service area lies within the north ½ of Section 34, Township 19 North, Range 1 West and within the North ½ of the South ½ of Section 34. The service area lies west of Marvin Rd NE and north of Stillwell Rd NE.
  - Roads - All public roads, within service area, are owned and maintained by Thurston County.
  - Sewer Service - There are no public or private community sewer systems within the service area. Sewer service is provided by private on-site disposal systems.
  - Topography/Climate – Elevations in the service area range between 246 feet above MSL near the southwest corner of the service area and 292 feet above MSL near the northwest corner of the service area. The ground surface is undulating with slopes that range up to 10%. The climate for this area produces wet mild winters and dry summers. Annual rainfall amounts to approximately 48 to 52 inches with the majority of the rain occurring between October and March, outside of the growing season. Dry summer months can often average less than 1" of rainfall. Average annual air temperatures are about 50 degrees with the average frost-free period typically lasting from 165 to 200 days.
  - Development – The retail service area consists of single family residences and a limited number of undeveloped parcels. There is no multi-family or duplex dwelling within the service area, nor are there any commercial or institutional uses within the retail service area. When the undeveloped parcels are developed, they will be most likely be developed as single family residences, with the potential exception of the parcel owned the North Thurston School District which lie south of the well site

- Service Area Map - The retail service area for the Prairie Ridge Water System is shown on the service area map in the appendices.

1G. Service Area, Retail Service Area and Characteristics

- Characteristics –

- Location - The Service Area is depicted on the Service Area map and includes the the existing Retail Service Area. The Retail Service Area lies within the South ½ of the north ½ of Section 34, Township 19 North, Range 1 West and within the North ½ of the South ½ of Section 34. The Service Area lies west of Marvin Rd NE and north of Stillwell Rd NE as depicted on the Service Area map.
- Roads - All public roads, within the Service Area, are owned and maintained by Thurston County.
- Sewer Service - There are no public or private community sewer systems within the Service Area or the Retail Service Area.
- Topography/Climate – Elevations in the Service Area and the Retail Service Area range between 246 feet above MSL near the southwest corner of the Retail Service Area and 300 feet above MSL near the northeast corner of the Retail Service Area. The ground surface is undulating with slopes that range up to 10%. The climate for this area produces wet mild winters and dry summers. Annual rainfall amounts to approximately 48 to 52 inches with the majority of the rain occurring between October and March, outside of the growing season. Dry summer months can often average less than 1" of rainfall. Average annual air temperatures are about 50 degrees with the average frost-free period typically lasting from 165 to 200 days.
- Development – The Service Area is currently zoned Rural Residential/Resource 1 dwelling unit per 5 acres. Except for a large parcel owned by North Thurston Schools, it is most likely that when the undeveloped parcels are developed, the development will be single family residences. The largest single parcel in the Service Area (72 acres) is owned by North Thurston Public Schools. North Thurston Schools may construct a middle school and high school at the school district parcel. .

- Service Area Map - The Service area and the Retail Service Area for the Prairie Ridge Water System are shown on the Service Area Map.

1H. Service Area Agreements

There are no formal service area agreements for the Prairie Ridge Water System. The Prairie Ridge Water System will not provide service outside its service area, unless on a temporary basis and in agreement with the primary purveyor for that service area. The service area map shows the service areas of all the water systems that adjoin the Prairie Ridge Water Service area.

1I. Duty to Serve

A. The Prairie Ridge #605 Water System has sufficient physical capacity to serve water in a safe and reasonable manner.
B. Service requests for single family residential connections are consistent with adopted plans and development regulations.
C. The Prairie Ridge #605 Water System has sufficient water rights to provide service as noted in Chapter 2 of this water system plan.
D. The Prairie Ridge #605 Water System can provide service in the Retail Service Area upon receiving a service application for single family residential service and payment of fees. Where extensions of the distribution system are required to provide service,

the extensions of the distribution system will be designed and constructed by the project proponent. The Prairie Ridge #605 Water System can provide water service in the Service Area immediately upon approval, completion and acceptance of construction of distribution system extensions as noted in Chapter 3 of this water system plan and upon receipt of service applications and payment of fees.

Chapter 2 BASIC PLANNING DATA AND WATER DEMAND FORECASTING

Analysis of the most recent 3 years of source and service meter data for this water system indicate that the average demand day (ADD) is 261 gallons/day/equivalent residential unit, (ADD = 261 gpd/ERU) and estimates that maximum day demand (MDD) is 1,167 gpd/ERU.

2A. Current Population, Number of Services and Water Use

Residential Population- The residential population of the area serviced by the Prairie Ridge Water System is estimated at the rate of 2.5 capita per single family residence. For the 100 Single Family Residential connections the population served is estimated at 250 capita.

Un-accounted for water (DSL)- Checking the service meter data against the source meter data indicates that the current amount of un-accounted for water (distribution system loss, DSL) for this water system is currently 7% or 1.31 gpm or 7.2 ERU on Average Day Demand basis.

Total Service Connections – The total number of active service connections is 100.

Single Family Residential Connections	-	100
Multi-Family Residential Connections	-	0
Non-Residential, Other		
RV sites, motels, duplexes, institutional, commercial, business, etc.	-	0
Total Service Connections		100

2B. Projected Land Use, Future Population, and Water Demand Forecasting

Projected Land Use- Projected land use for this area is single family residences and a single parcel for public high school and a public middle school. There are several lots in the service area that are undeveloped or are capable of being further developed. Current zoning requires that new single family residential lots have minimum area of 5 acres. At full buildout in accordance with zoning requirements the system could serve 15 single family residential connections, a high school and a middle school in addition to the existing 100 single family residential connections. Demands for the middle school and the high school are based on information provided by the North Thurston School District. At this time the school district plans for development of the school district parcel are indeterminate. It is likely that when the parcel is developed, the development will be for facilities which would use less water than the existing large high schools and large middle schools. In addition the North Thurston School District timeline for development of the school district parcel is indeterminate. The school district parcel is currently undeveloped. Estimates of domestic and irrigation demands for high school and middle school are noted on the Demand Summary on page 2-3.

Chapter 2 BASIC PLANNING DATA AND WATER DEMAND FORECASTING

Analysis of the most recent 56 months of source and service meter data for this water system indicate that the average demand day (ADD) is 281 gallons/day/equivalent residential unit, (ADD = 281 gpd/ERU) and the maximum day demand (MDD) is 1,129 gpd/ERU, and that distribution system leakage is 1,119 gallons/day, 4 ERU on ADD (1,119/281 = 4) basis and 1 ERU on MDD (1,119/1,129 = 1) basis.

2A. Current Population, Number of Services and Water Use

Residential Population- The residential population of the area serviced by the Prairie Ridge Water System is estimated at the rate of 2.5 capita per single family residence. For the 100 Single Family Residential connections the population served is estimated at 250 capita.

Total Service Connections – The total number of active service connections is 100.

Single Family Residential Connections	-	100
Multi-Family Residential Connections	-	0
Non-Residential, Other		
RV sites, motels, duplexes, institutional, commercial, business, etc.	-	0
Total Service Connections		100

2B. Projected Land Use, Future Population, and Water Demand Forecasting

Projected Land Use- Projected land use for this area is single family residences and a single parcel for public high school and a public middle school. There are several lots in the service area that are undeveloped or are capable of being further developed. Current zoning requires that new single-family residential lots have minimum area of 5 acres. At full buildout in accordance with zoning requirements the system could serve 117 single family residential connections, a high school and a middle school. Demands for the middle school and the high school are based on information provided by the North Thurston School District and by Thurston PUD. The school district parcel is currently undeveloped. Planning estimates of domestic and irrigation demands for high school and middle school are noted on the Schools Demand Summary on page 2-4.

At this time the school district plans for development of the school district parcel are indeterminate. If the 69.17 acre school district parcel were to be developed as single family residences, rather than schools, up to 13 single family residential lots could be developed based on zoning for adjacent portions of the Service Area (residential lots have minimum area of 5 acres).

The Prairie Ridge Water System service area is shown on the service area map in the appendices.

There are 100 single family residential connections within the Service Area. The service area, exclusive of the school district parcel, at full buildout would serve a total of 117 single family residential connections.

It is projected that the number of new connections in the future service area will increase according to the Washington State Office of Fiscal Management Thurston County Population Growth Projections (medium series). Based on the existing 100 single family residential connections and the medium series population projections, it is projected that the water system will serve 117 single family residential connections in 2032 and will achieve full build-out for single family residential connections. If the school district parcel were to be developed as single family residential lots, the total number of single-family residential connections in 2040 (at the end of the 20 year planning period) would be 130.

Schools are not shown on the Demand Summary because the designs of the new schools are not yet prepared. Thurston PUD will require the North Thurston School District to prepare and obtain a Project Report and submit it to the Department of Health Southwest Regional Drinking Water Office for review and approval of a water system which will include a new well, well 3 (S04), a new storage reservoir, and a new booster pump station to serve the domestic, fire suppression and irrigation demands of the two schools.

A demand summary is provided on the following page for single-family residential connections.

Demand Summary - Schools

	Ac-Ft/Yr
High School Domestic	6.0
High School Irrigation	15.9
Middle School Domestic	4.1
Middle School Irrigation	13.9
Total	39.9

Demand Summary, Single Family Residential																					
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
ADD, gpd/ERU	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281
MDD. Gpd/ERU	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119
Single Family	100	101.6	103.2	104.6	106.1	107.5	108.8	110.2	111.5	112.8	114.0	115.5	116.7	118.0	118.2	120.4	121.6	122.7	123.8	124.9	125.9
N_{ADD}	100	101.6	103.2	104.6	106.1	107.5	108.8	110.2	111.5	112.8	114.0	115.5	116.7	118.0	118.2	120.4	121.6	122.7	123.8	124.9	125.9
M_{MDD}	100	101.6	103.2	104.6	106.1	107.5	108.8	110.2	111.5	112.8	114.0	115.5	116.7	118.0	118.2	120.4	121.6	122.7	123.8	124.9	125.9
DSL N_{ADD}	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
DSL N_{MDD}	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total N_{ADD}	104.0	105.6	107.2	108.6	110.1	111.5	112.8	114.2	115.5	116.8	118.0	119.5	120.7	122.0	122.2	124.4	125.6	126.7	127.8	128.9	129.9
Total N_{MDD}	101.0	102.6	104.2	105.6	107.1	108.5	109.8	111.2	112.5	113.8	115.0	116.5	117.7	119.0	119.2	121.4	122.6	123.7	124.8	125.9	126.9
Ac-Ft/Yr	32.7	33.2	33.7	34.2	34.7	35.1	35.5	35.9	36.4	36.8	37.1	37.6	38.0	38.4	38.5	39.2	39.5	39.9	40.2	40.6	40.9
PHD, gpm	235	238	240	242	245	247	249	252	254	256	259	259	259	260	260	261	261	261	262	262	262
Demand Summary with Water Use Efficiency Goal per Thurston PUD Part A Water System Plan																					
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
ADD, gpd/ERU	281	270	260	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
MDD. Gpd/ERU	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119	1119
Single Family	100	101.5	103.0	104.5	106.0	107.5	109.0	110.5	112.0	113.5	115.0	115.3	115.5	115.8	116.0	116.3	116.5	116.8	117	117	117
N_{ADD}	100	101.5	103.0	104.5	106.0	107.5	109.0	110.5	112.0	113.5	115.0	115.3	115.5	115.8	116.0	116.3	116.5	116.8	117.0	117.0	117.0
M_{MDD}	100	101.5	103.0	104.5	106.0	107.5	109.0	110.5	112.0	113.5	115.0	115.3	115.5	115.8	116.0	116.3	116.5	116.8	117.0	117.0	117.0
DSL N_{ADD}	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
DSL N_{MDD}	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total N_{ADD}	104.0	105.5	107.0	108.5	110.0	111.5	113.0	114.5	116.0	117.5	119.0	119.3	119.5	119.8	120.0	120.3	120.5	120.8	121.0	121.0	121.0
Total N_{MDD}	101.0	102.5	104.0	105.5	107.0	108.5	110.0	111.5	113.0	114.5	116.0	116.3	116.5	116.8	117.0	117.3	117.5	117.8	118.0	118.0	118.0
Ac-Ft/Yr	32.7	33.2	33.7	34.2	34.6	35.1	35.6	36.0	36.5	37.0	37.5	37.5	37.6	37.7	37.8	37.9	37.9	38.0	38.1	38.1	38.1
PHD, gpm	235	238	240	242	245	247	249	252	254	256	259	259	259	260	260	261	261	261	262	262	262

Chapter 3 SYSTEM ANALYSIS

3A. Water System Design Standards

Design standards for the improvements will be in accordance with the standards in the listed the "Water System Design Manual" (WDOH December 2019). As noted in Chapter 2, MDD is 1119 gallons/day per ERU and ADD is 281 gallons/day per ERU. Current Peak Hourly Demand is calculated at 235 gpm according to Equation 5-3 of the Water System Design Manual. Equalizing and Standby Storage requirements are in accordance Chapter 9 of the Water System Design Manual. For domestic flows at Peak Hourly Demand, the minimum system pressure throughout the distribution system will be 30 psi or greater. Current Distribution System Leakage is 1,119 gallons per day or 4.0 ERU on an ADD basis or 1.0 ERU on a MDD basis

Fire Flow and Fire Flow Duration requirements are accordance South Bay Fire District 8 requirements for single-family residential areas. Fire Flow is not required for the single family residential areas. In the event of a structure fire in the single family residential areas, South Bay Fire Department will respond with pumper trucks and water tenders.

The parcel owned by North Thurston School District is part of the response area for City of Lacey Fire District 3. The property is currently undeveloped. Fire flow and fire flow duration requirements will be in accordance with the requirements the City of Lacey Fire District 3 based on proposed construction on the parcel. The proponent of the construction, North Thurston School District, will be responsible for constructing the necessary water system infrastructure to provide water service for domestic demands, irrigation demands, and for fire flow demand and duration. A fire district response area map is included in the Fire District Response Appendix.

3B. Water Quality Analysis

The source water does not require any treatment to meet Department of Health standards for Group A water systems.

3C. System Description and Analysis

DESCRIPTION

The water system currently consists of a two wells located on a single parcel of land which also is the location for two ground level concrete storage reservoir and a booster pump station. The wells are automatically controlled by float switches in the storage reservoirs. The storage reservoirs are connected and operate at the same water level. Water is withdrawn from the storage reservoirs to the booster pump station and pumped to the distribution system. The distribution system consists of looped

and non-looped water mains and operates as a single pressure zone. The system currently serves existing 100 single family residential connections. At full build-out for the single family residential areas, the system would serve 117 single family residential connections. The distribution system is adequately sized to serve the service area, except the school district parcel. When, and if, the school district parcel is developed, a new well (SO3), new storage reservoir, new booster pump station, and new distribution system, will need to be designed, obtain approval, and be constructed. The new facilities will operate as a new, closed, pressure zone to serve the domestic, fire, and irrigation demands of a new North Thurston School District Schools. The timeline for construction (and design) of these improvements is indeterminate.

1. Wells
    a. Well 1, S01, is equipped with a 5 hp submersible pump and a 1.5 hp submersible well pump. The well delivers 55 gpm to the storage reservoirs.

    b. Well 2, S02, is equipped with a 5 hp pump and delivers 82 gpm to the storage reservoirs.

2. Reservoirs
   The two ground level stand pipe type reservoirs provide a total of 64,915 gallons of live storage (VL = 64,915 gallons) available for equalizing and standby storage. Live storage is the storage provided between the bottom of operational storage and the top of dead storage in the bottom of the reservoirs.
    a. Reservoir 2 is 20 feet in diameter with a 10 ft wall height and provides 8.5 feet of live storage for 19,975 gallons, between the well pump off water elevation and the bottom of the reservoir the nominal volume of the reservoir is 22,230 gallons.
    b. Reservoir 3 is 30 feet in diameter with a 10 ft wall height and provides 8.5 feet of live storage for 44,940 gallons, between the well pump off water level elevation and the bottom of the reservoir, the nominal volume of the reservoir is 49,701 gallons.

3. Booster Pump Station
   The booster pump station is provided with 2 – 5 hp booster pumps and 1- 3 hp booster pump. The 3 booster pumps operate in parallel, withdrawing water from a single intake manifold pipe and discharging water to a single discharge manifold. The booster pump station adequately serves the existing 100 single family residential connections. No low pressure complaints have been received during the irrigation season. All three booster pumps are controlled using individual variable speed drives set to maintain constant discharge pressure, 60 psi, at the booster pump discharge line in near proximity to the point where the discharge line exits the

booster pump station building. Calculated peak hour demand for the existing 100 ERU is 235 gpm with MDD = 1,119 gpd/ERU per Water System Design Manual Eq. 5.1. At full buildout for the service area, except the school district parcel, the system will serve 118 ERU. (117 ERU for single family residences and 1 ERU for DSL) for a peak hour demand of 261 gpm. Operating in parallel, the booster pumps can maintain 50 psi booster pump station discharge pressure while pumping at 261 gpm. Taking into account booster pump station piping friction losses, the 3 Hp booster pump will pump at 55 gpm at 124.5 ft TDH and each of the two 5 Hp booster pumps will pump at 105 gpm at 126 ft TDH and will meet the 262 gpm PHD at full buildout while maintaining pressure throughout the distribution system in excess of 30 psi including pressure losses at service meters. The calculated TDH for the booster pumps includes individual inlet and discharge piping friction losses, friction loss for the discharge line to the point where it exits the building, as well as the booster pump discharge pressure on the discharge pipe were it exits the building and the inlet head at elevation 290 ft reservoir water level (lower elevation than the bottom of equalizing storage. A spread sheet for the booster pump sizing in included at the end of this chapter.

If the School District Parcel were to develop as single family residential connections with zoning density at 5 acres per single family residence, 13 lots could be created in addition to the 117 single family residences noted above for a total of 130 single family residential connections. If this were to occur the booster pump station would not be able meet the peak hour demand, 280 gpm

The distribution system is shown on the plan titled "Service Area Map" and in the hydraulic model in the appendix “EPANet Analysis”.

The distribution system is analyzed using EPAnet 2.0 software. The hydraulic model demonstrates that the existing system is capable of maintaining water pressure in excess of 40 psi (including service meter headloss) throughout the distribution system, not including the school district parcel, during 20 year peak hour demand, 262 gpm. A dummy reservoir is used in the hydraulic model to represent operation of the booster pump station. The EPAnet model is included in the Appendix titled, “EPANet Analysis”.

The system is currently served by two water rights, G2-25621 and G2-29250. These water rights allow for a total pumping rate of 175 gpm and an annual withdrawal of 80 acre-feet. An analysis of the water rights is provided in with the water rights self-assessment form in the “Water Rights and Self-Assessment” Appendix. When (and if) the school district parcel is developed with public schools, water right G2-27015 allows for the construction of a third well to accommodate an additional pumping rate

of 125 gpm. G2-27015 does not provide for additional annual withdrawal. The system will be limited to an annual withdrawal of 80 acre-feet and will need to transfer water rights annual withdrawal from adjacent water system owned and operated by Thurston PUD to accommodate construction of a high school and middle school on the school district parcel.

3D. Limiting Factors

For the retail service area, exclusive of the school district parcel:

1. Source Capacity Pumping Rate, Maximum Day Demand. Wells 1 and 2,

   N = [(82 gpm + 55 gpm) x 1,080 min./day]/1,119 gpd/ERU = 132.2 ERU

2. Total-Capacity Related Storage

   Please see the worksheet in the appendix titled, "Capacity Related Storage Engineering Calculations". The worksheets demonstrate that the existing reservoirs with 64,915 gallons available for Equalizing Storage and Standby Storage can accommodate 164 ERU with well 1 pumping rate = 55 gpm, Well 2 pumping rate = 82 gpm, ADD = 281 gpd/ERU, and MDD = 1,119 gpd/ERU.

   N = 164 ERU

3. Booster Pump System

   Please see the worksheets in the appendix titled, "Booster Pump Station Analysis". The worksheets demonstrate that the existing booster pumps are adequate to serve 117 ERU on a maximum day basis, Peak Hour Demand = 262 gpm. Except that the existing three booster pumps cannot supply 262 gpm with one of the largest pumps out of service.

4. Distribution System

   The existing distribution system is not limiting. The hydraulic model included in the appendix titled, "EPAnet" demonstrates that the distribution system can accommodate a Peak Hour Demand of at least 127 ERU without distribution system pressure lower than 46 psi or pipe velocities in excess of 7.3 ft per second. Please note that the maximum velocity would occur in the 4 inch piping inside the booster pump station. Underground water line velocity at peak hour demand would be substantially lower than 7.3 ft/second.

Limiting Factors, Components

Water System Component	*N, ERU*
Source Capacity, MDD	126.8
Total Capaciity Related Storage	131.7
Booster Pump System, PHD	116
Distirbution System, PHD	127

The system is limited by the capacity of the Booster Pump System.

5. Water Rights Pumping Rate, Qi, G2-25621 and G2-29250

   G2-25621 and G2-29250 provide for a total Qi = 175 gpm. On a maximum day demand basis,

   N = (175 gpm x 1440 min/day)/1,167 gpd/ERU = 215.9 ERU.

   6. Water Rights Annual, Q_A, G2-25621 and G2-29250

   G2-25621 and G2-29250 provide for a total Q_A = 80 Ac-Ft. As noted in the Demand Summary in Chapter 2, the water rights can serve up to 272.5 ERU on an annual average basis and is not limiting for service area excluding the school district parcel. At full buildout of the service area, except the school district parcel, the water system will exert an annual demand of 40.9 acre-feet/year, leaving 80.0 acre-feet/year – 40.9 acre-feet/year =39.1 acre-feet per year available for the school district parcel. Since development of schools on the school district parcel will result in an annual demand of 39.1 acre-feet/year as noted in Chapter 2, the water rights are adequate.

   If the school district parcel were to develop as 13 single family residences (rather than as schools) the system would serve 130 single family residences with 4 ERU of DSL on an ADD basis, the total demand would be 134 ERU or 42.2 AcFt/Year. The existing water rights annual Qa 80 Ac-Ft/Yr would be adequate.

3E. RECOMMENDATIONS

1. With the exception of the booster pump station, the existing water system is adequate to serve the full build-out of the existing service area, exclusive of the school district parcel, 117 single family residential connections. The booster pump station should be modified to remove the 3 hp booster pump and replace it with 2 – 5 hp booster pumps with head/discharge curves matching the head/discharge curve of the existing 5 hp booster pumps.

2. When a development schedule for the school district parcel is determined and prior to construction of the new school buildings:

    a. A new well, well 3, should be constructed and tested to serve the school district parcel. The pumping rate for well 3 will need to be limited to the pumping rate allowed for water right G2-27015.

    b. Once the building are sized and designed and the domestic demand and fire flow demand and fire flow duration and irrigation demands are known, water system infrastructure improvements need to be designed and obtain regulatory agency approval prior to construction.

3. Average Day Demand (ADD) has reduced considerably since the previous version of this water system plan was prepared. Previously ADD was 484 gpd/ERU. Currently ADD is 261 gpd/ERU. It is recommended that the features of the Water Use Efficiency Program in the Thurston PUD Part A Water System Plan be employed to reduce ADD for this water system to the goal noted in the Thurston PUD Part A Water System Plan, 250 gpd/ERU.

Check existing booster pump size

Doug Eklund
17133

for pipes headloss = 10.46 L q^1.85 /(C^1.85 D^4.87)
(Hazen Williams)

3 hp Pump Size at 55 gpm

Reservoir Water Level 290 Ft

3 hp Booster Pump at 55 gpm

	BPS Floor, ft elev	Reservoir H_20 level, ft	feet
Static Head	286	290	-4.0

Pipe	q (gpm)	d (in)	L (ft)	C	
3 inch inlet	55	3	24.7	120	0.3
3" Gate V	55	3	1.44	120	0.0
2.5" Check	55	2.5	17.1	120	0.3
2.5" discharge	55	2.5	12.2	120	0.3
4" pipe	55	4	10.0	130	0.0
			Subtotal		-3.0
4" PVC	265.0	4	32	120	1.7
Disch Setting	50	psi			115.5
Discharge H + Hf individual pump					114.2

F&W C22233 is rated at 55 gpm at 124.5 Ft TDH

5 hp Booster Pump

5 hp booster pump at 105 gpm

	BPS Floor	Reservoir H_20 level, ft	feet
Static Head	286	290	-4.0

Pipe	q (gpm)	d (in)	L (ft)	C	
3" inch inlet	105	3	24.7	120	1.0
3" Gate V	105	3	1.44	120	0.1
2.5" Check	105	2.5	17.1	120	0.5
2.5" discharge	105	2.5	10.0	120	0.9
4" pipe	105.00	4	40.0	130	0.3
			Subtotal		-1.2
4" PVC	265.0	4	32	120	1.7
Disch Setting	50	psi			115.5
Discharge H + Hf individual pump					116.0

F&W C22253 is rated at 105 gpm at 126.0 Ft TDH

5 hp Booster Pump

5 hp booster pump at 105 gpm

	BPS Floor	Reservoir H_20 level, ft	feet
Static Head	286	290	-4.0

Pipe	q (gpm)	d (in)	L (ft)	C	
3 inch inlet	105	3	24.7	120	1.0
3" Gate V	105	3	1.44	120	0.1
2.5" Check	105	2.5	17.1	120	0.5
2.5" PVC Pipe	105	2.5	10.0	120	0.9
2.5" discharge	105	4	40.0	130	0.3
			Subtotal		-1.2
4" PVC	265.0	4	32	120	1.7
Disch Setting	50	psi			115.5
Discharge H + Hf individual pump					116.0

F&W C22253 is rated at 105 gpm at 126.0 Ft TDH

Chapter 4 WATER USE EFFICIENCY AND WATER RIGHTS

A. Water Use Efficiency

The Prairie Ridge #605 Water System is fully metered and the total water produced for 2018 was 10,242,910 gallons. The system had 5% leak loss, equivalent to less than 1 gallon per minute loss. In 2018 the average household used 265 gallons per day, which exceeds the PUD's currently adopted conservation goal by 15 gallons per day.

B. Water Rights

The water system operates under three active water rights G-25621C, G2-27015, and G2-29250 and, and two wells, Well 1 (S01) and Well 2 (S02). G2-29250 is intended to allow additional instantaneous withdrawal and is pending construction of a third well to facilitate the instantaneous withdrawal. Table 4-1 summarizes water rights as recorded with the Washington State Department of Ecology. Water Rights Self-Assessment Forms and copies of the water rights are included in the Water Rights Appendix.

Table 4-1
Summary of Water Rights

Water Right Number	Point(s) of Withdrawal	Instantaneous Withdrawal (gpm)	Annual Rate (AF/Y)	Priority Date	Status
G2-25621	Well #1	50	80	6/23/1980	Active
G2-27015	Well #1, Well #2	125 (Additive), 50 (Non-Additive)	50	11/17/1986	Active
G2-29250	Well #3	125 (Additive), 80 (Non-Additive)	80	7/27/1995	Active

C. Metering Program

All service connections are metered. All new service connections will be equipped with service meters prior to providing water service.

D. Water Use Efficiency Program

Thurston PUD has chosen to implement at least three (3) water efficiency measures for the Prairie Ridge #605 Water System, which include:

1. Conservation rates for residential accounts.
2. Water bill showing consumption history for residential accounts.
3. Customer leak detection program.

The above three components have been implemented. Costs are included in the District's normal operating budget.

Chapter 5 SYSTEM MONITORING REQUIREMENTS

The schedule on the following pages lists the water quality monitoring requirements for the water system. Also included is a copy of the Coliform Monitoring Plan and Lead and Copper Sampling Plan.

Water Quality Monitoring Schedule

System: PRAIRIE RIDGE 605
Contact: Kimberly S Gubbe
SMA ID: 147

PWS ID: 02356 W
Group: A - Comm
SMA Name: PUD No 1 of Thurston County

Region: SOUTHWEST
County: THURSTON

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020
Coliform Monitoring Population	250	250	250	250	250	250	250	250	250	250	250	250
Number of Routine Samples Required	1	1	1	1	1	1	1	1	1	1	1	1

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Lead and Copper	5	Jan 2019 - Dec 2021	standard - 3 year	07/24/2018	Jul 2021	
Asbestos	0	Jan 2011 - Dec 2019	waiver - 9 year			

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S03 *WF (S01 & S02)* *Well Field* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2019 - Dec 2019	standard - 1 year	09/12/2018	***Mar 2019***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	09/15/2016	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	09/07/2017	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	09/09/2010	***Sep 2019***
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	09/09/2010	
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	09/17/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	09/17/2015	

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2019
Submit CCR certification form to ODW (Community systems only):	10/01/2019
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2019
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Southwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Sophia Petro: (360) 236-3046 or sophia.petro@doh.wa.gov
For questions regarding DBPs:	Regina Grimm, p.e.: (360) 236-3046 or regina.grimm@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Southwest Office: (360) 236-3030 or SWRO.Coli@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

COLIFORM MONITORING PLAN
Prairie Ridge #605
Source – **No Treatment**

System Information

Plan Date: 12/2019

Prairie Ridge #605	**Thurston**	**ID # 02356 W**
Name of Plan Preparer Kim Gubbe Thurston PUD	**Position** Director of Planning and Compliance	**Daytime Phone #** (360) 357-8783 ext. 125
Source: DOH Source Number, Source Name, Well Depth, Pumping Capacity	**S01 – Well #1, well in well field**, AKY156, permanent use, 8" cased, drilled to 174', 55 GPM (WFI), **S02 – Well #2, well in well field**, AAE334, permanent use, 8" cased, drilled to 170', 82 GPM (WFI) **S03 – Well Field (S01 & S02)** 156 GPM (WFI)	
Storage: List and Describe	Reservoir #2: ~20 ft x 10 ft, concrete, above ground Reservoir #3: ~30 ft x 10 ft, concrete, above ground	
Pressure Zones: Number and name	One, water system	
Population by Pressure Zone	Population: 250 Connections – Active: 100 Approved: 123	
Number of Routine Samples Required Monthly by Regulation: **One**	Number of Sample Sites Needed to Represent the Distribution System: **Three**	
Source Address / Location**: Between 7045 & 7207 44th Ave NE, TP#: 69330007101**		

Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X-1	**July**	X-1
February	X-2	**August**	X-2
March	X-3	**September**	X-3
April	X-1	**October**	X-1
May	X-2	**November**	X-2
June	X-3	**December**	X-3

Level 1 and Level 2 Assessment Contact Information

Name **Kim Gubbe**	Office Phone: **360-357-8783 ext. 125** After Hours Phone: **360-688-0827**
Address **1230 Ruddell Road SE, Lacey WA 98503**	Email **kgubbe@thurstonpud.org**
Name **Jim Campbell**	Office Phone: **360-357-8783 ext. 120** After Hours Phone: **360-790-2662**
Address **1230 Ruddell Road SE, Lacey WA 98503**	Email **jcampbell@thurstonpud.org**

Routine, Repeat, and Triggered Source Sample Locations

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat and Triggered Source Sample Sites**
X1. 7202 Prairie Ridge Dr	**1-1. Sample site #1**
(hose bib after meter)	**1-2. 7120 Prairie Ridge Dr**
	1-3. 7210 Prairie Ridge Dr
	1-4. Pumphouse after storage
	***GWR – S01**
	***GWR – S02**
X2. 7401 44th Ave NE	**2-1. Sample site #2**
(hose bib, front of house)	**2-2. 7412 44th Ave NE**
	2-3. 7221 44th Ave NE
	2-4. Pumphouse after storage
	***GWR – S01**
	***GWR – S02**
X3. 3908 Legacy Dr NE	**3-1. Sample site #3**
(hose bib, front of house)	**3-2. 4112 Legacy Dr NE**
	3-3.3908 Legacy Dr NE
	3-4. Pumphouse after storage
	***GWR – S01**
	***GWR – S02**

*You should mark the lab slip for the source sample "GWR – Ground Water Rule" in type of sample and request an analysis for E coli count. You must sample every groundwater source, **before treatment**, that was in use when the original routine sample was collected

Important notes for sample collector:

_____

_____

_____

_____

_____

E. coli-Present Sample Response

Distribution System *E. coli* Response Plan *and E. coli* Present Triggered Source Sample Response Plan
If we have *E. coli* in our distribution system, we will immediately: 1. Call DOH. 2. See attached plan: *What To Do When We Get A Positive Fecal Or E.coli Sample*

What To Do When We Get A Positive Fecal Or E-Coli Sample.

1. Call the agency that governs that system immediately of receiving the results.
   Group A's Thurston, Lewis, Grays – SW Drinking Water, 360-236-3045 or 360-236-3030.

2. Work with agency, we could put the customers on boil water now or wait until the next tests come back. I usually put them on boil water now. Distribute door hangers at this time with a copy of the E. coli MCL attached.
   K:\FORMS\Mandatory Language Forms\Acute Coliform MCL
   K:\FORMS\Mandatory Language Forms\Boil Water Advisory Door Hanger

3. Fax form and door hanger to agency after it has been hand delivered to the customers.

4. Take the repeat samples within 24 hours and run a 24 hour test on them.
   Group A's four samples – follow the Coliform Monitoring Plan. If more than 1 well was in operations then a raw sample from each will need to be taken, plus the four repeats (which should include one well).

5. Access the system; try to find where the contamination is coming from. Are there any bad tanks, what does the well head look like, what activity is going on around the well.

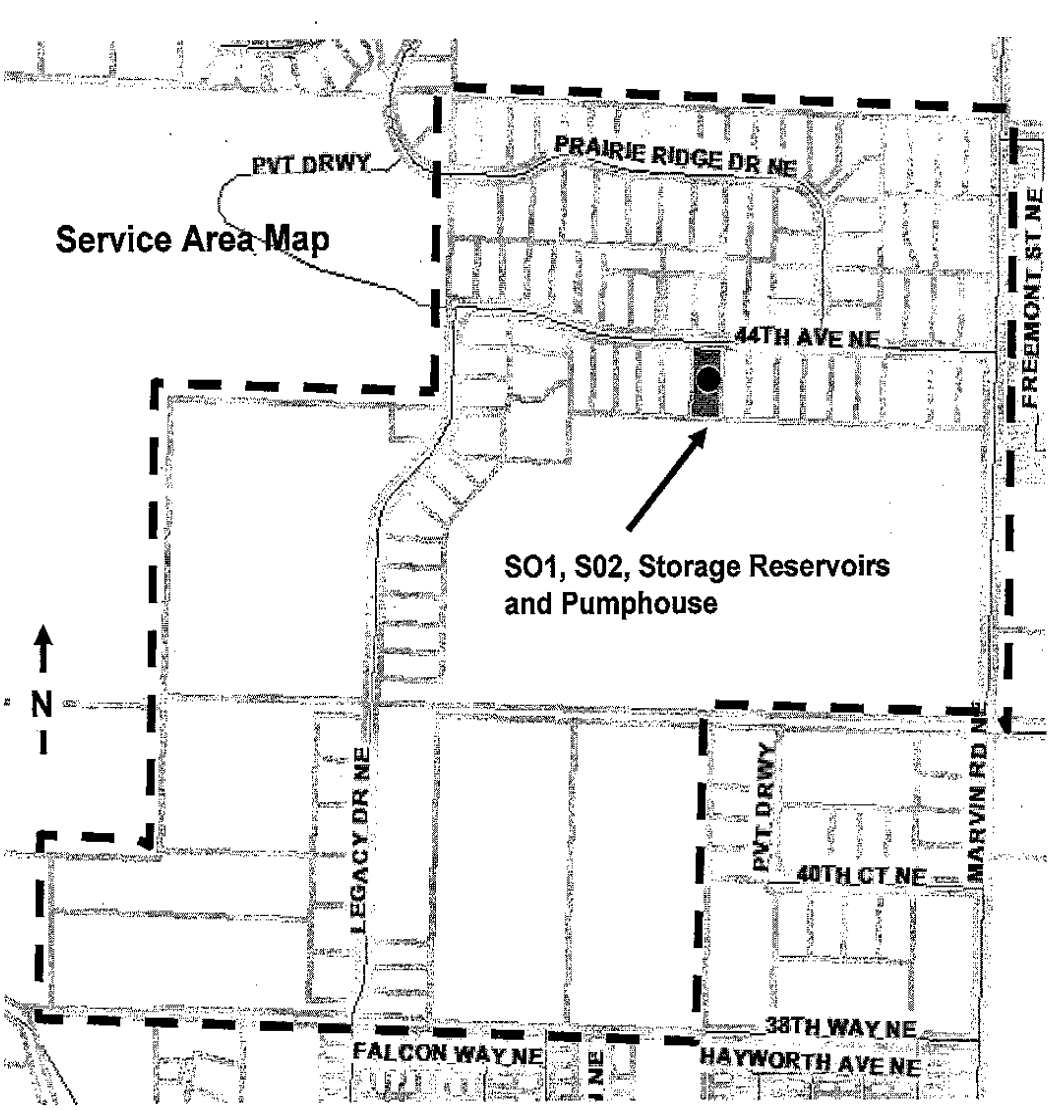
6. Call lab in 24 hours from time sample was taken if fax has not been received yet. Confirm that samples were good or bad.

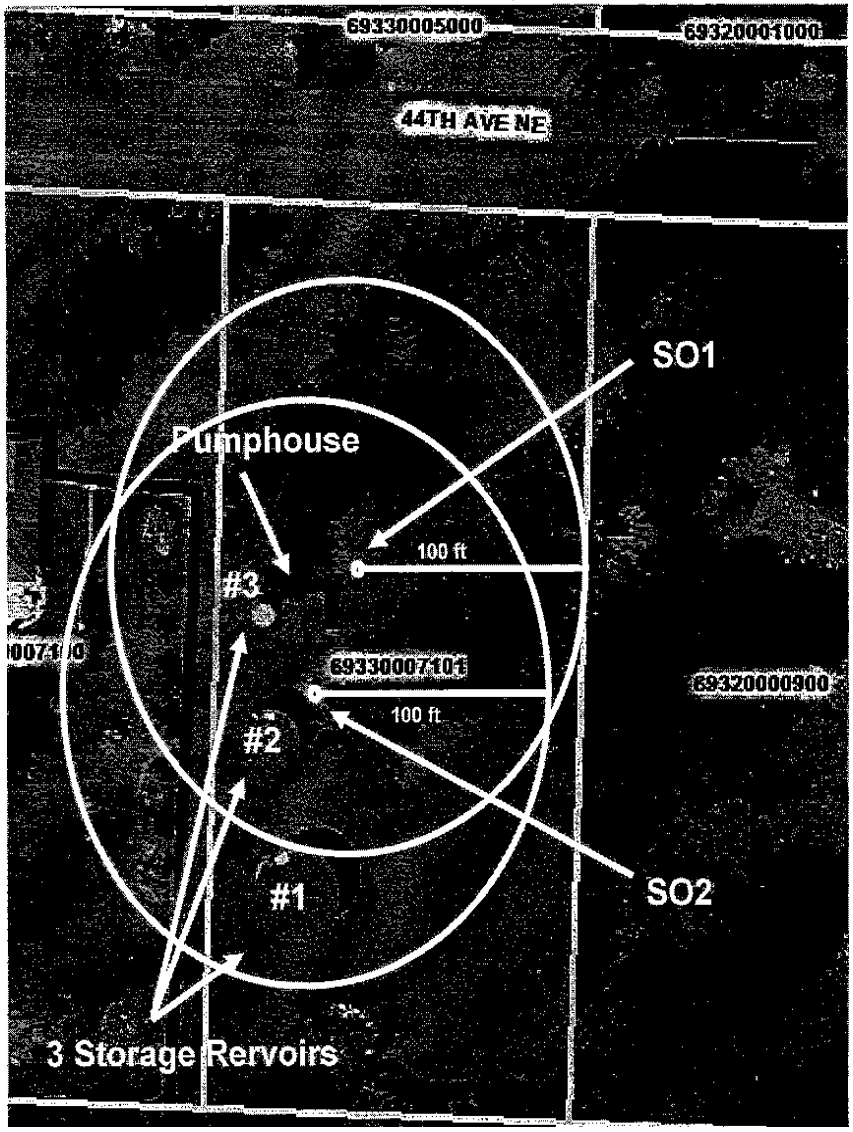
7. If samples are negative take another round of samples, immediately. Run another 24-hour test. If next round is also negative lift the boil water notice.

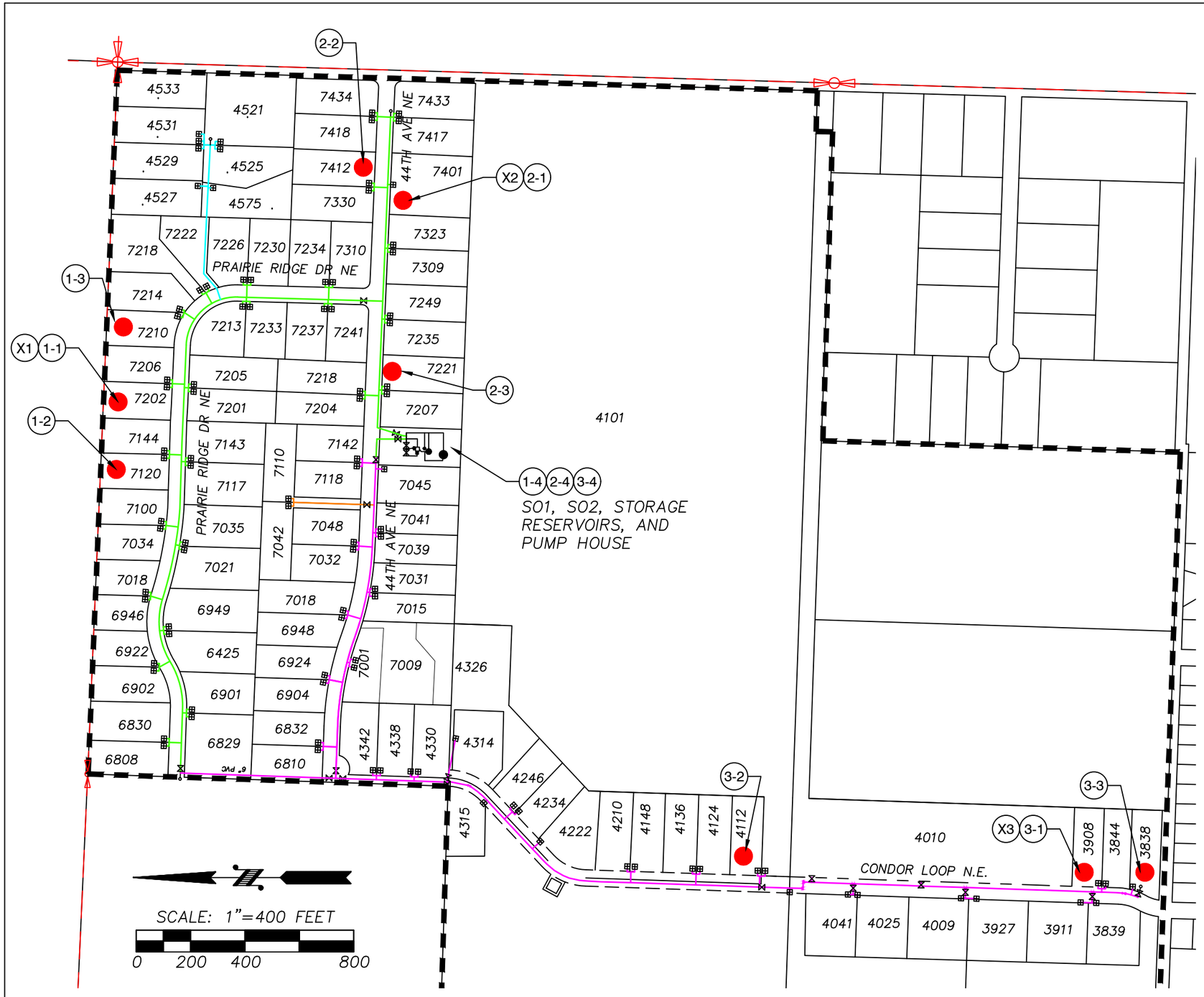
8. If one of the samples comes back positive and we haven't found the problem, then we should start continuous temporary chlorination of the system and notify the customers by door hanger of the chlorination. If the system is permanently chlorinated take chlorine residual throughout the water system to determine if chlorinated water is at the desired residual and if not, try to determine the cause of why there maybe no residual. Then flush the system to get the chlorine throughout with monitoring to make sure that chlorine residual is consistent throughout the water system.

9. Once the chlorine is throughout the system then we need to take two rounds of repeat samples under normal operating conditions (i.e., normal chlorine residual, if any, or zero residual if system is not normally not disinfected) to lift the boil water.

B. System Map


Service Area Map
PVT DRWY
PRAIRIE RIDGE DR NE
44TH AVE NE
FREEMONT ST NE
SO1, S02, Storage Reservoirs
and Pumphouse
N
LEGACY DR NE
PVT DRWY
MARWIN RD NE
40TH CT NE
38TH WAY NE
FALCON WAY NE
HAYWORTH AVE NE


69330005000
69320001000
44TH AVE NE
SO1
Pumphouse
100 ft
#3
69330007101
69320000900
100 ft
#2
#1
SO2
3 Storage Rervoirs



LEGEND

- 2 IN. PVC
- 2. 5 IN PVC
- 4 IN PVC
- 6 IN PVC
- SECTION BOUNDARY
- PRAIRIE RIDGE WATER SERVICE AREA
- SERVICE METER
- BLOW OFF
- VALVE
- COLIFORM MONITORING LOCATION

COLIFORM MONITORING LOCATIONS

X1. 7202 PRAIRIE RIDGE DR (HOSE BIB AFTER METER
1-1. 7202 PRAIRIE RIDGE DR (HOSE BIB AFTER METER)
1-2. 7120 PRAIRIE RIDGE DR
1-3. 7210 PRAIRIE RIDGE DR
1-4. PUMPHOUSE AFTER STORAGE
GWR - SO1
GWR - SO2
X2. 7401 44TH AVE NE (HOSE BIB, FRONT OF HOUSE)
2-1. 7401 44TH AVE NE (HOSE BIB, FRONT OF HOUSE)
2-2. 7412 44TH AVE NE
2-3. 7221 44TH AVE NE
2-4. PUMPHOUSE AFTER STORAGE
GWR - SO1
GWR - SO2
X3. 3908 LEGACY DR NE (HOSE BIB, FRONT OF HOUSE)
3-1. 3908 LEGACY DR NE (HOSE BIB, FRONT OF HOUSE)
3-2. 4112 LEGACY DR NE
3-3. 3838 LEGACY DR NE
3-4. PUMPHOUSE AFTER STORAGE
GWR - SO1
GWR - SO2

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil • Municipal • Geotechnical • Land Surveying
Jerome W. Morrissette & Associates Inc., P.S.
1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

DE DESIGNED BY	07-02-2019 DATE
MH C.A.D.D. BY	07-02-2019 DATE
DE CHECKED BY	07-02-2019 DATE

PRAIRIE RIDGE #605 WATER SYSTEM ID NO. 02356 W

COLIFORM MONITORING PLAN MAP

17133 COLIFORM

SHT 1 OF 1

system	ID	Year house was built	Type of Pipe	service address	Date of Report	COPPER AL 1.3	LEAD AL 0.015
PRAIRIE RIDGE 605	02356 W	2002	unknown	4246 LEGACY DRIVE NE	7/27/2018	0.300	<0.001
PRAIRIE RIDGE 605	02356 W	2005	pvc	3908 LEGACY DRIVE NE	7/27/2018	0.252	0.0017
PRAIRIE RIDGE 605	02356 W	1991	copper	6808 PRAIRIE RIDE DRIVE NE	7/27/2018	0.662	<0.001
PRAIRIE RIDGE 605	02356 W	1987	copper & pvc	6902 PRAIRIE RIDGE DRIVE NE	7/27/2018	0.027	<0.001
PRAIRIE RIDGE 605	02356 W	1994	copper	7015 44TH AVENUE NE	7/27/2018	0.204	<0.001

Chapter 6 WELLHEAD PROTECTION

The wellhead protection discussed in this section addresses the well field (SO3) comprised of well 1 (SO1) and well 2 (SO2). The Wellhead Protection Plan is included in the appendices.

6A. Potential Impact Areas

1. Susceptibility Analysis - See Ground Water Susceptibility Assessment form following the Wellhead Protection Plan.

2. Protective Covenants – See appendix titled, "Protective Covenants"

6B. Contingency Plan

The contingency plan for the Prairie Ridge #605 Water System is noted in Section 1.12 of Appendix E Thurston PUD Emergency Response Plan included in the currently approved Thurston County Public Utility District Water System Plan Part A – Umbrella.

6C. Notifications

All the property owners within with wellhead protection area have been notified of the well head protection boundaries. These notifications will include all owners/operators of potential contaminant sources. It should be noted that many of the potential contamination sources are existing residences or potential residential development in currently undeveloped areas within the well head protection area.

Chapter 7 IMPROVEMENT PROGRAM

7A. Introduction

This chapter presents the Capital Improvement Plan (CIP) for the ten and twenty-year planning periods. Recommended water system improvements and associated costs, along with scheduling information is presented int eh following section according to the Asset Management Plan, growth of the system and recommendations identified in earlier chapters of the plan.

In the future, other projects may arise which are not identified as part of the CIP. Such projects may be deemed necessary for ensuring water quality, preserving emergency water supply or addressing unforeseen problems with the water system. The PUD has collecting a Capital Surcharge that should cover all cost of replacements and anything unforeseen projects or the PUD will seek funding through Public Works or Department of Health.

The PUD retains the flexibility to reschedule proposed projects and to expand or reduce the scope of proposed projects, as best determined by the PUD when new information becomes available for evaluation. Each capital improvement should also be reevaluated to consider the most recent planning efforts, as the proposed completion date for the project approaches.

7B. Asset Management Plan

The PUD uses an Asset Management Plan (see appendix) to guide the replacement of current assets. Each asset is being tracked using last replacement date, estimated life cycle, estimated replacement date and estimated replacement costs. Capital Improvement Fee is being collected from all PUD connections to fund the replacement of current assets.

7C. 10 Year Improvements

North Thurston School District Parcel – Property will be developed by the School District and a project report will be submitted to DOH for approval of all upgrades needed to the Prairie Ridge water system to supply the two schools planned for this property.

S01 Well Pump Replacement – The well pump has been graded in fair condition in 2019 and will be replaced upon failure due to the redundancy of the other source. Costs will be paid for with the PUD Capital Improvement Fund, as needed.

S02 Well Pump Replacement – The well pump has been graded in good condition in 2019 and will be replaced upon failure due to the redundancy of the other source. Costs will be paid for with the PUD Capital Improvement Fund, as needed.

Source Meter Replacement – Scheduled for 2021 and will be paid for with the PUD Capital Improvement Fund.

Pressure Tank Replacement – Pressure tanks have been graded as, in good condition, in 2019 and will be replaced upon failure. Tanks maintenance is completed on an annual basis with visual inspections throughout the year and has an estimated life cycle of 10 years. Costs will be paid for with the PUD Capital Improvement Fund, as needed.

Service Meter Replacement – Scheduled for replacement in early 2020. Meters have already been purchased with Capital Improvements Fund and installation will be completed by the end of January 2020.

Pumphouse Replacement – The building is scheduled for replacement in 2030. The PUD performs annual maintenance on this building, and it has been graded in good condition in 2019. Replacement of the roof is completed, as needed, to extend the life of the building.

PUD staff will perform all replacement work.

7D. 20 Year Improvements

S01 and S02 Well Pump Replacements – Well pumps have an estimated life cycle of 13 years. Well pump is scheduled for replacement 13 years after replacement. Capital Improvement Funds will pay for replacement when needed.

Booster Pump and VFD Drive Replacement – Booster pumps and drives have been graded as, in good condition, in 2019 and will be replaced upon failure due to the redundancy of 3 booster pumps. Plus, O & M has extended the life of the booster pumps. Costs will be paid for with the PUD Capital Improvement Fund, as needed.

PUD staff will perform all replacements above except for generator replacement.

Chapter 8 FINANCIAL PROGRAM

8A. System Financing

The Prairie Ridge water system is just one of 275 water systems that Thurston PUD owns and operates over a 6 county area. A PUD wide Financial Program was prepared and approved in the PUD's Water System Plan Part A, section 6. The PUD adopts an annual budget and rates by the first Monday in October for the following year. PUD's current rates can be found on the website at http://www.thurstonpud.org/our-rates.htm.

8B. Costs of Improvements

In 2015 the PUD implemented a Capital Improvement Fee to pay for replacement of existing assets. It is anticipated that the cost of any necessary replacements or improvements will be funded through this reserve account. Where general funds or reserves are not adequate to provide the needed capital, the capital improvement funding is obtained through Community Development Loan/Grant programs, Public Works Trust Fund (PWTF), Drinking Water State Revolving Fund (DWSRF), Rural Development Loans/Grants, or other sources available to Thurston PUD.

8C. Financial Viability Worksheet

Thurston PUD does not budget for the operational expense on a system by system basis. A PUD wide Financial Program was prepared and approved in the PUD's Water System Plan Part A, section 6.

8D. Asset Management Plan

See appendix for Capital Asset Management Plan. Capital Asset Management Plan costs and funding are addressed in Thurston PUD's Water System Plan Part A, section 6.

Chapter 9 VULNERABILITY ASSESSMENT

The system components for this water system are all, to some greater or lesser degree, vulnerable to damage from various causes. Power outage, fire, fallen trees, earthquake, or other items can cause lengthy interruption of service. The vulnerability assessment presented here accounts for its current configuration with water supplied by well 1 and well 2 operating under level control the existing reservoirs. In the future, the system configuration may change with the construction of well 3 and infrastructure to serve the public school. When the design of those projects is complete, the vulnerability assessment should be updated accordingly. The Thurston PUD Water System Plan Part A – Umbrella includes an Emergency Response Program in Appendix E which includes:

- Emergency Contact Lists
- Priority Service Customer List
- DOH and Public Notification Procedures
- Response Procedures Tailored of Various Emergency Situations
- Contingency Plans

In case of power outage, fire, fallen trees, earthquake, or other such occurrence, the following actions may be taken to restore the system to service while permanent repairs are made. The specific action taken will depend on the conditions that exist when the problem occurs. In all cases advise customers to conserve water until the problem is corrected.

Booster Pump Failure

1. There is one booster pump station. The booster pump station is equipped with 4 booster pumps. In the event of failure of one pump, the pump must be replaced or repaired as soon as possible.

Booster Pumps - loss of electrical power

1. The booster pump station is equipped with an automatic transfer switch and propane emergency generator.

Reservoir – loss of use of reservoir

1. The system is equipped with one storage reservoir. If the reservoir must be removed from service, the customers must be notified to conserve water, cease all outdoor water use and valves be set to pressurize the system solely with the well pump.

Distribution System

1. For failures and leaks in the distribution system isolate the leaking portion by closing valves as soon as the leak is located and shut off services in the isolated leaking portions and repair the line. Use standard repair materials. If the cause of the leak is identified, try to correct the deficiency to that the leak will not re-occur. Follow accepted practice in repairing leaks, and disinfect and flush the system in accordance with Department of Health requirements. Advise customers to flush lines and if necessary to clean aerators and faucets.

Appendices

Consistency Checklist
Zoning Map
Live Storage Reservoir Diagram
Capacity Related Storage Engineering Calculations
Booster Pump Station Analysis
Well Protective Covenants
Water Rights Self-Assessment and Water Rights
Wellhead Protection Plan
Asset Management Plan
EPANet Analysis
Fire District Response
Meter Records
System Map
Service Area Map

Consistency Checklist

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: Prairie Ridge #605 PWS ID: 02356 W

Planning/Engineering Document Title: Prairie Ridge WSP, Part B Plan Date: June 2019

Local Government with Jurisdiction Conducting Review: Thurston County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Service Area Map, Zoning Map	
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	2-1	
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	N/A	
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Part A WSP	
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Part A WSP	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

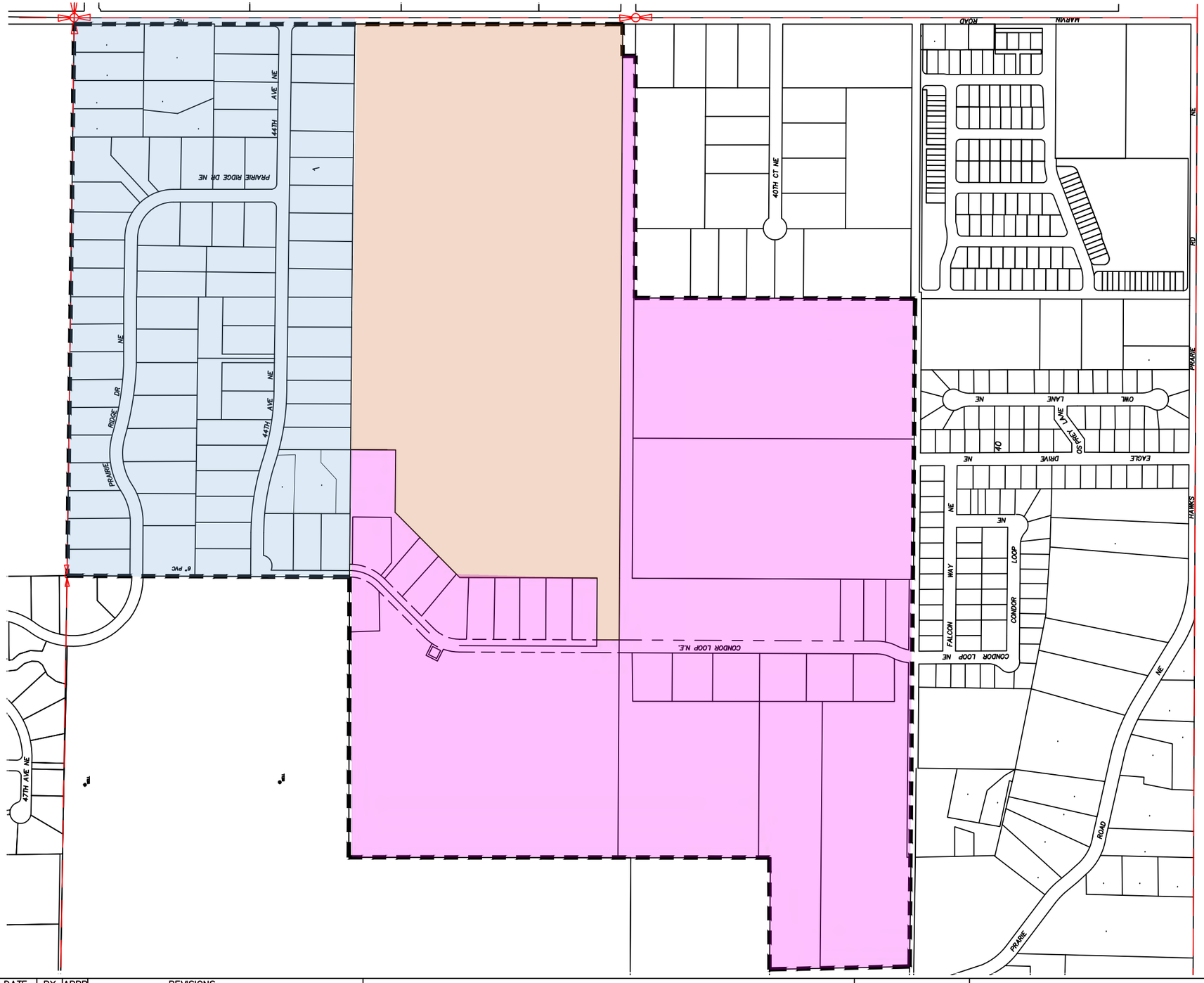
_____ _____

Signature Date

_____

Printed Name, Title, & Jurisdiction

Zoning Map



LEGEND

- RL 1/1, 1 UNIT PER 1 ACRE
- OSI-S
- RRR 1/5, 1 UNIT PER 5 ACRES
- SECTION BOUNDARY
- PRAIRIE RIDGE WATER SYSTEM SERVICE AREA

NOTE: ZONE BOUNDARIES ARE FROM THURSTON COUNTY GEODATA. ZONING OUTSIDE OF THE PRAIRIE RIDGE WATER SYSTEM SERVICE AREA NOT INCLUDED ON MAP.

SCALE: 1"= 500 FEET

0 250 500 1000

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil • Municipal • Geotechnical • Land Surveying
Jerome W. Morrissette & Associates Inc., P.S.
1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

DE	06-20-2019	DESIGNED BY DATE
MH	06-20-2019	C.A.D.D. BY DATE
DE	06-20-2019	CHECKED BY DATE

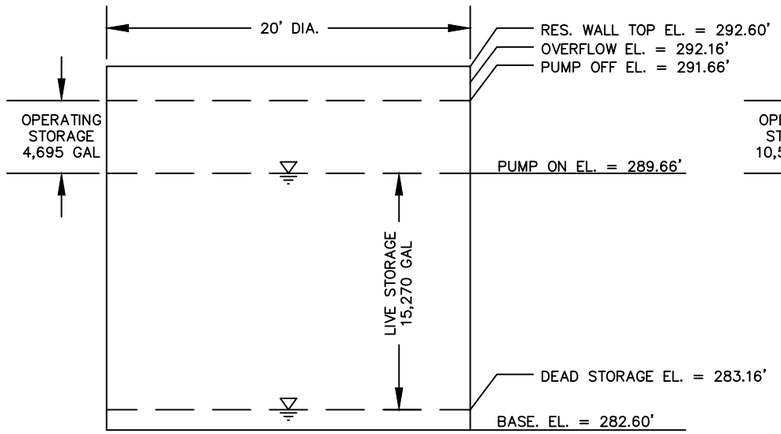
PRAIRIE RIDGE #605 WATER SYSTEM
ID NO. 02356 W

ZONING MAP

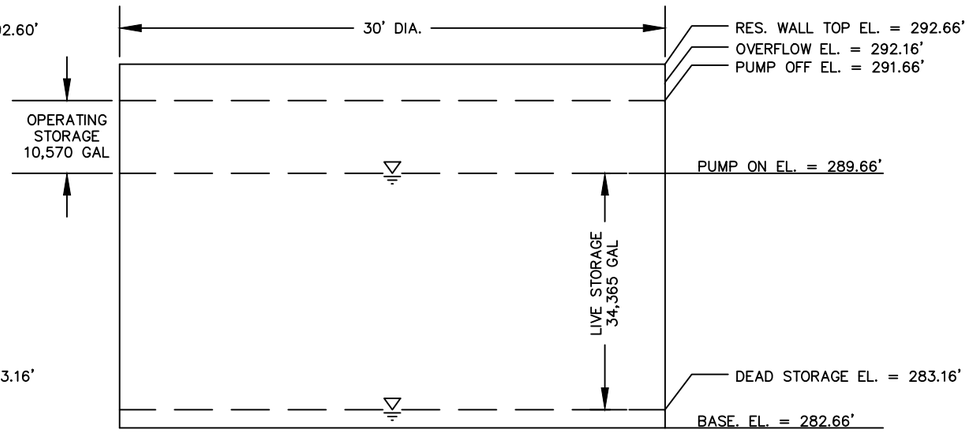
17133 ZONING

SHT 1 OF 1

Live Storage Reservoir Diagram



RESERVOIR 2



RESERVOIR 3

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil and Municipal Engineering and Planning
Jerome W. Morrissette & Associates Inc., P.S.
1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

DE 07/02/2019 DESIGNED BY DATE
MH 07/02/2019 C.A.D.D. BY DATE
DE 07/02/2019 CHECKED BY DATE

THURSTON COUNTY
PUD 1

PRAIRIE RIDGE WATER SYSTEM
LIVE STORAGE RESERVOIR DIAGRAM

JWM&A NO. 17133

SHT 1 OF 1

Prairie Ridge

Capacity-Related Storage, Sheet 1 of 2

Peak Hourly Demand

	ADD =	261	gpd/ERU
	MDD =	1,167	gpd/ERU

PHD = (MDD/1440)[(C)(N) + F] + 18

If	MDD =	1167	Gal/Conn/Day
and if	N =	182.22	Connections
then	C =	2	
	F =	75	
and	PHD =	374	gpm

Where

Range of N	C	F
15 to 50	3	0
51 to 100	2.5	25
101 to 250	2	75
251 to 500	1.8	125
> 500	1.6	225

Doug Eklund, PE
Jerome W. Morrissette Associates Inc. P.S.
1700 Cooper Point Rd SW, B2
Olympia, Wa 98502
(360) 352-9456

Capacity Related Storage Engineering Calculations

Prairie Ridge						
Capacity-Related Storage, Sheet 2 of 2						
ES, equalizing storage, Eq. 9-1						
	ES = (PHD - Os)*150 min					
	PHD =	374	gpm			
	Q_S =	137	gpm			
	ES =	35,569	gal			
	Use ES =	35,569				
SB, standy storage (multiple sources) Eq. 9-3						
	SBtms = 2 day(ADD)(N) - tm(Q_S-Q_L)					
	ADD =	261	gpd/ERU			
	N =	182.22	ERU			
	Q_S =	137	gpm			
	Q_L =	82	gpm			
	tm =	1,440	minutes			
	SBtms =	15,919	gal			
	SBmin =	36,444	gal = 200 gal/ERU x			
				182.22	ERU	
	Use SB =	36,444	gal			
FSS, fire suppression storage, Eq. 9-4						
	FSS = FF x tm					
	FF =	0	gpm			
	tm =	30	minutes			
	FSS =	0	gal			
SB + ES + FSS =			72,013	gallons		

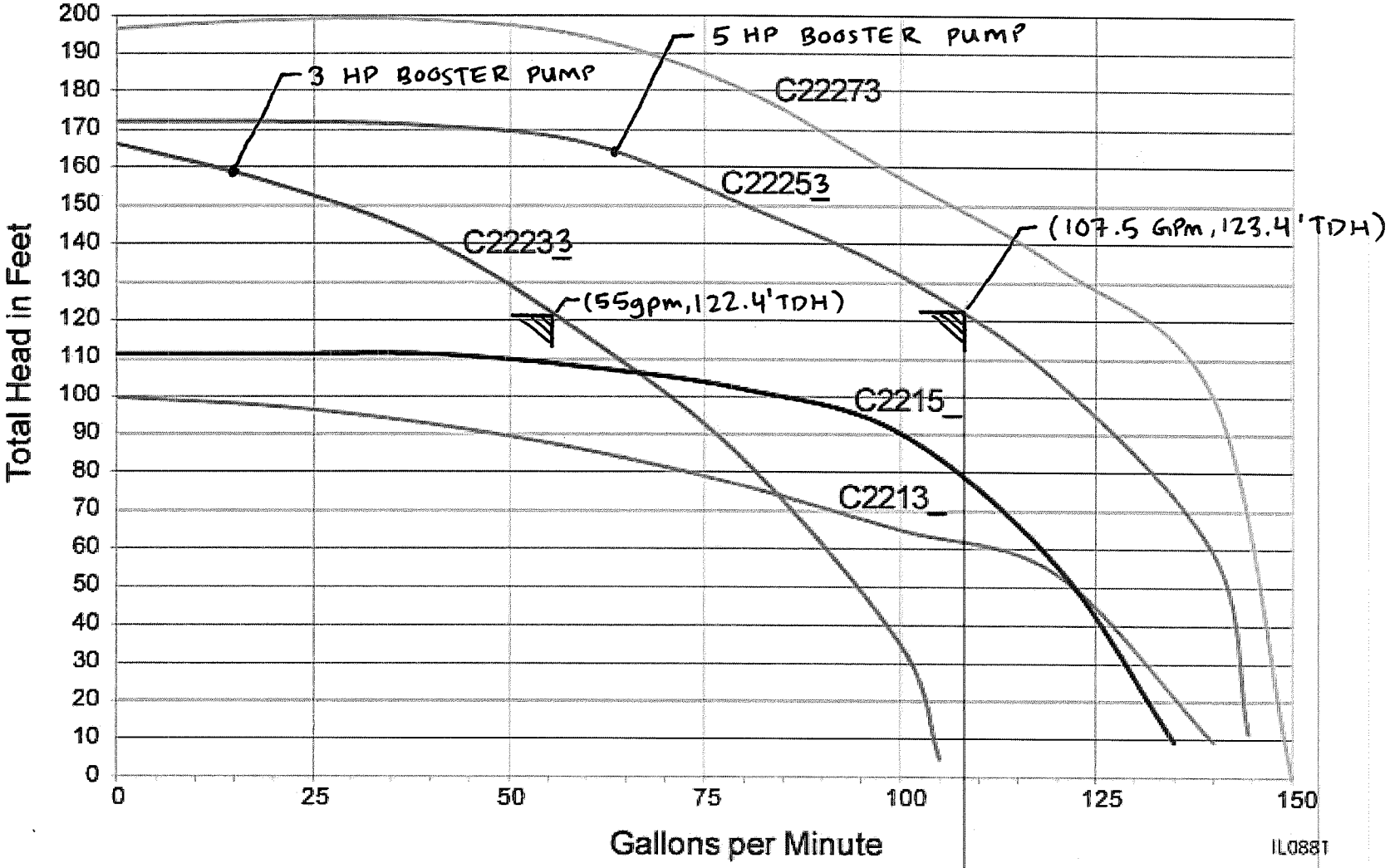
Doug Eklund, PE
Jerome W. Morrissette Associates Inc. P.S.
1700 Cooper Point Rd SW, B2
Olympia, Wa 98502
(360) 352-9456

6/23/2019	Check existing booster pump size						
Doug Eklund		Sheet 1 of 2					
07133							
	3 hp	Pump Size at		55	gpm		
for pipes headloss = 10.46 L q^1.85 /(C^1.85 D^4.87)							
(Hazen Williams)							
		Bottom ES =		287.22	Ft		
3 hp Booster Pump							
	BPS		Bottom				
	Floor		ES		feet		
Static Head	279.15		287.22		-8.1		
Disch Setting	55	psi			127.1		
Pipe	q (gpm)	d (in)	L (ft)	C			
2" pipe	55	2	2	120	0.2		
2 inch GV	55	2	Cv = 298,	Hf =	0.4		
2.5 inch CV	55	2	Cv = 466,	Hf =	0.3		
3" PVC Pipe	55	3	10.0	120	0.1		
4" pipe	270.00	4	50.0	130	2.4		
			TDH =		122.4		
F&W C22233 is rated at		55	gpm at	122.4	Ft TDH		

6/23/2019	Check existing booster pump size					
Doug Eklund		Sheet 2 of 2				
07133						
5 hp Booster Pump						
	5 hp	Pump Size at		107.5	gpm	
	BPS		Bottom			
	Floor		ES		feet	
Static Head	279.15		287.22		-8.1	
#REF!	55	psi			127.1	
Pipe	q (gpm)	d (in)	L (ft)	C		
2" pipe	107.5	2	2	120	0.6	
2 inch GV	107.5	2	Cv = 298,	Hf =	0.6	
2.5 inch CV	107.5	2	Cv = 466,	Hf =	0.5	
3" PVC Pipe	107.5	3	10.0	120	0.4	
4" pipe	270.00	4	50.0	130	2.4	
			TDH =		123.4	
F&W C22253 is rated at		107.5	gpm at	123.4	Ft TDH	

Booster Pump Station Analysis

Booster Pump Curves from Flint and Walling



Well Protective Covenants

Well #1

NE 34-19-1W

1114660

DECLARATION OF COVENANT

Know all men by these presents that I (We) the undersigned, owner__ in fee simple of the land described herein, hereby declare this covenant and place same on record.

I (We), the grantor__ herein, is (are) the owner__ in fee simple of (an interest in the following described real estate situated in Thurston County

W1/2 of N1/2 of the NE1/4 of Section 34, Tw. P 19 N. Rg 1 West W.M.

on which the grantor__ owns and operates a well and waterworks supplying water for public use located on said real estate, to wit:

N1/2 of the NE1/4 of Section 34, T.W.P. 19 North Rg 1 W.W.M. Prairie Ridge Water Company

and grantor__ is (are) required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumberated in the use of said grantor s land which might contaminate said water supply.

NOW, THEREFORE, the grantor__ agree__ and covenant__ that said grantor__, his (her) (their) heirs, successors and designs will not construct, maintain, or suffer to be constructed or maintained upon the said sland of the grantor__ and within 100 (100 feet) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: cesspools, sewers, privies, septic tanks, drainfields, manure piles garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens or other enclosures or structures for the keeping of fowls or animals or storage of liquid or dry chemicals, berbicides or insecticides.

These covenants shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in the land described herein or any part thereof, and shall inure to the benefit of each owner thereof.

WITNESS hand this 20th day of June 1980

Robert P Drehman (Seal)

Rita M Drehman (Seal)

Grantor__

THURSTON COUNTY OLYMPIA, WASH.

JUN 20 4 00 PM '60

REQUEST OF SAM S. REED, AUDITOR

DEPUTY

State of Washington
County of Thurston } ss

I, the undersigned, a Notary Public in and for the above named County and State, do hereby certify that on this 20th day of June 19 80 ; personally appeared before me Robert P Drehman and Rita M Drehman

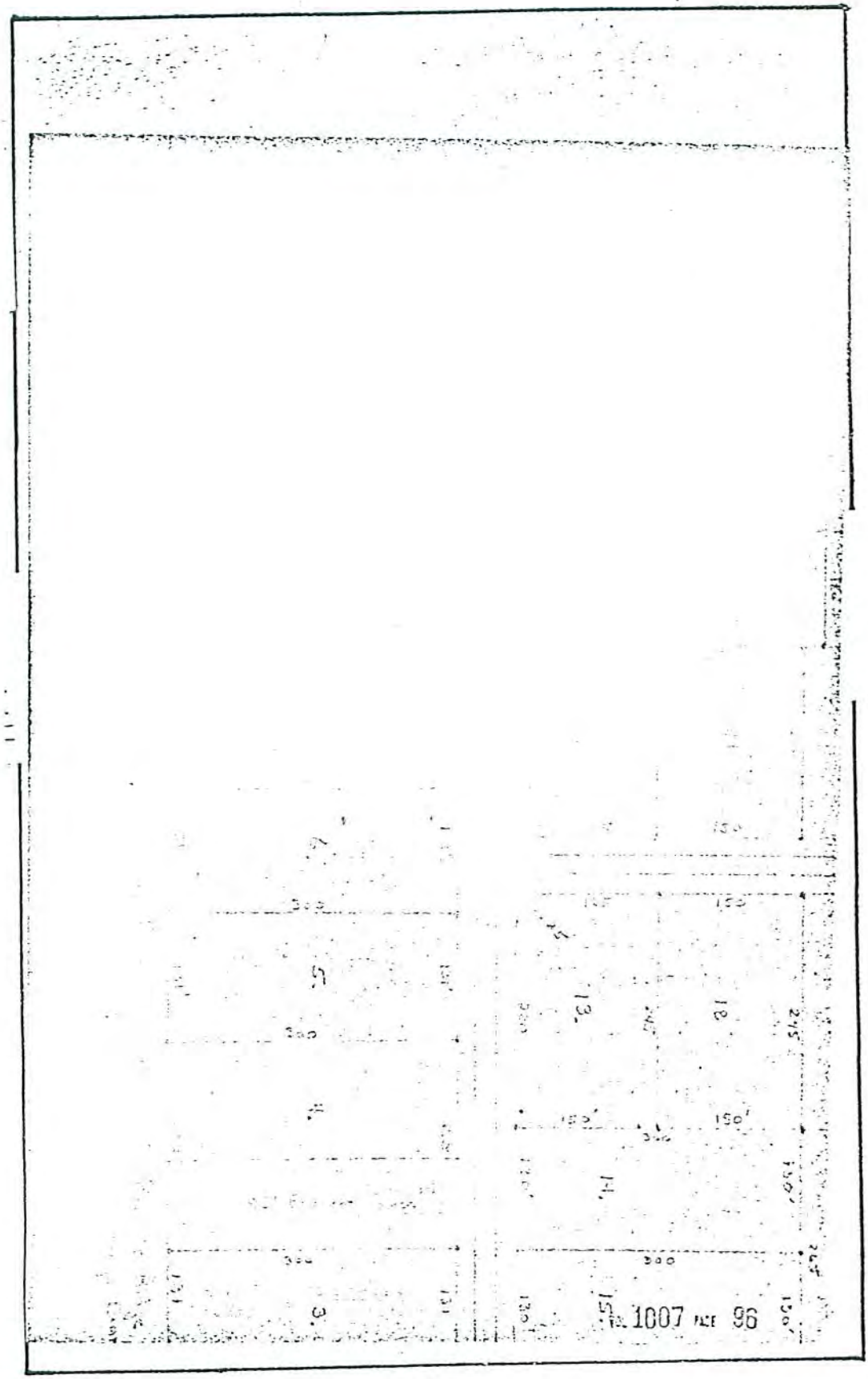
to me known to be the individual__ described in and who executed the within instrument, and ackowledge that he (they) signed and sealed the same as their free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand an official seal the day and year last above written.

Notary Public in and for the State of Washington, residing at Tenino

R. Drehman
P.O. H
Littlerock, Wa.
98556

Well #1



Vol: 2436 Page: 506
File No: 9508030093

DECLARATION OF COVENANT

Know all men by these presents that I (we) the undersigned, owner___ in fee simple of the land described herein, hereby declare this covenant and place same on record.

I (we), the grantor___ herein, is (are) the owner___ in fee simple of (an interest in) the following described real estate situated in Thurston County, State of Washington, to wit:

Lot 71 of the plat of Prairie Ridge Division 3 as recorded on Pages 91 and 92 of Vol 25 of plats of Thurston County under AF#920520025

on which the grantor___ own___ and operate___ a well and waterworks supplying water for public use located on said real estate, to wit:

Well #2 of the Prairie Ridge water system situated as shown on attached Exhibit A.

and grantor___ is (are) required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantor's land which might contaminate said water supply.

NOW, THEREFORE, the grantor___ agree___ and covenant___ that said grantor___, his (her) (their) heirs, successors and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor___ and within 100 feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: cesspools, sewers, privies, septic tanks, drainfields, manure piles, garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens, or other enclosures or structures for the keeping or maintenance of fowls or animals, or storage of liquid or dry chemicals, herbicides, or insecticides.

These covenants shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in the land described herein or any part thereof, and shall inure to the benefit of each owner thereof.

WITNESS my hand___ this 3rd day of August 1995

Robert R. Drohman

Grantor___ Rita M. Drohman

STATE OF WASHINGTON)
COUNTY OF Thurston) ss

I, the undersigned, a Notary Public in and for the above named County and State, do hereby certify that on this 3rd day of August 1995, personally appeared before me Robert R. Drohman & Rita M. Drohman to me known to be the individuals described in and who executed the within instrument, and acknowledged that he (they) signed and sealed the same as their free and voluntary act and deed, for the uses and purposes therein mentioned.

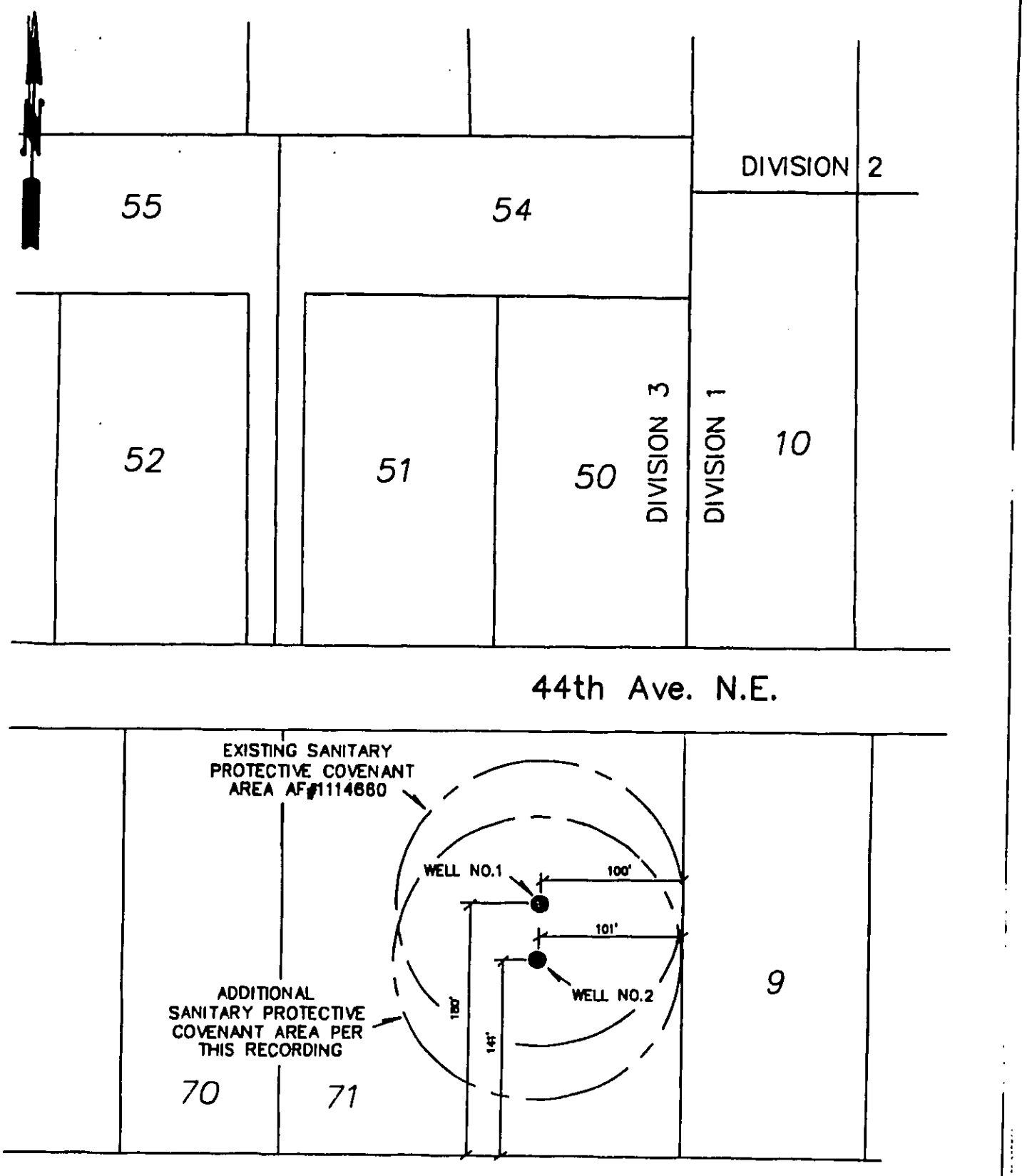
GIVEN under my hand and official seal the day and year last above written.

NOTARY PUBLIC STATE OF WASHINGTON
SANDRA K. ANDERSON
COMMISSION EXPIRES JULY 22, 1997

Notary Public in and for the State of Washington, residing at Tumwater

PRAIRIE RIDGE WATER SYSTEM
SANITARY PROTECTIVE COVENANT
WELL NO.2

SITUATED ON LOT 71 OF THE PLAT OF PRAIRIE RIDGE
DIVISION 3



NOTE: WELL LOCATION MEASUREMENTS ARE APPROXIMATE.

0' 100' 200'

SCALE IN FEET

EXHIBIT A

Water Rights Self-Assessment and Water Rights

Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1 G2-25621	SO1	50		80		50	0	15.6	24.4	50	0	17.8	22.1	50	0	17.8	0.1
2																	
3 G2-29250	SO1 & SO2	125			80	5 + 82	38	15.7	24.3	5+82	38	17.9	22.2	5+82	38	17.9	0.1
4																	
5 G2-27015	Well 3	125			80	0	125			0	125			125	0	44.0	0.1
6																	
	TOTALS =	300		80		137	163	31.3	48.7	137	163	35.7	44.3	262	38	79.7	0.3
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1															
2															
3															
TOTALS =															
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
1		
2		
3		

ADDITIONAL COMMENTS:

G2-27015 refers to SO1, SO2. Wells 1 and 2 which operate at a wellfield, S03
G2-29250 refers to well 3 (future) which will be identified as S04 when put into service.

WATER RIGHT G2-25621

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 23, 1980	G 2-25621	G 2-25621 P	G 2-25621 C

NAME
ROBERT R. DROHMAN

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
4411 Marvin Road Northeast	Olympia	Washington	98506

This is to certify, that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	50	80

QUANTITY, TYPE OF USE, PERIOD OF USE
80 acre-feet per year — community domestic supply — continuously
(80 Homes)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1420 feet west and 1140 feet south from northeast corner of Section 34

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
N½NE¼	34	19	1 W	13	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

N½NE¼ Section 34, T. 19 N., R. 1 W.W.M.
EXCEPT East 30 feet for Marvin Road

PROVISIONS

The access port shall be maintained at all times on the well (s).

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia *Washington, this* 16 *day of* March, 19 81.

DONALD W. MOOS7 Director
Department of Ecology

by E.W. Asselstine, Regional Manager

ENGINEERING DATA
OK WS 3/9/81
WRS 3/9/81

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 23, 1980	G 2-25621	G 2-25621 P	

NAME
ROBERT R. DROHMAN

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box H	Littlerock	Washington	98556

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	50	80

QUANTITY, TYPE OF USE, PERIOD OF USE
80 acre-feet per year community domestic supply continuously
(80 Homes)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1420 feet west and 1140 feet south from northeast corner of Section 34

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
N½NE¼	34	19	1 W	13	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

N½NE¼ Section 34, T. 19 N., R. 1 W.W.M.
EXCEPT East 30 feet for Marvin Road

DESCRIPTION OF PROPOSED WORKS

Well - 8" x 220' with two 5 Hp submersible pumps
Hydropneumatic pressure tanks
PVC distribution system

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 1984	July 1, 1985

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

Permittee is advised that notice of proof of appropriation of water (under which final certificates of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

A well log of the completed well shall be submitted by the driller to the Department of Ecology within thirty (30) days of completion of this well. This well log shall be complete and all information concerning the static water level in the completed well, in addition to any pump test data, shall be submitted as it is obtained.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia *Washington, this* 10th *day of* October, 19 80

JOHN F. SPENCER, Acting Director
Department of Ecology

by E.W. Asselstine
E.W. Asselstine, Regional Manager

ENGINEERING DATA
OK 10-6-80

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water. (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 23, 1980	G 2-25621		

NAME
ROBERT R. DROHMAN

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box H	Littlerock	Washington	98556

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	150	80

QUANTITY, TYPE OF USE, PERIOD OF USE		
80 acre-feet per year	community domestic supply	continuously
	(80 Homes)	

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1420 feet west and 1140 feet south from northeast corner of Section 34

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
N½NE¼	34	19	1 W	13	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

N½NE¼ Section 34, T. 19 N., R. 1 W.W.M.
EXCEPT East 30 feet for Marvin Road

DESCRIPTION OF PROPOSED WORKS

Well - 8" x 220' with two 5 Hp submersible pumps
Hydropneumatic pressure tanks
PVC distribution system

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 1984	July 1, 1985

REPORT OF EXAMINATION

~~PROVISIONS~~

BACKGROUND:
This application was received and accepted in this office on June 23, 1980. The public notice was advertised in The Daily Olympian on July 17 and 24, 1980. No objections to this proposed withdrawal were received during the 30-day protest period. Mr. Drohman has requested ground water rights from a well in the amount of 150 gallons per minute for the purpose of community domestic supply for 80 homes.

INVESTIGATION:
I examined the property and water system on August 28, 1980. The well had been drilled, one 5 Hp submersible pump installed and the distribution system was started at that time. The pumphouse and one home were under construction. Roads were being completed and the majority of lots were cleared for building the homes.

Normal annual water demand for developments of this nature is 1 acre-foot per year per home; the 80 homes projected will require 80 acre-feet per year, which may include ½ acre of lawn or garden irrigation per home.

There are no records of well interference problems in this rural area of Thurston County.

CONCLUSIONS:
In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended is a beneficial use and will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue, subject to existing rights and indicated provisions.

RECOMMENDATIONS:
I recommend approval of this application for 150 gallons per minute and 80 acre-feet per year for community domestic supply, based on the following provisions:

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

Applicant is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Water Supply and Waste Section, Department of Social and Health Services, Mail Stop LD 11, Building 4, Olympia, Washington, 98504, prior to any new construction or alterations of a public water supply.

A well log of the completed well shall be submitted by the driller to the Department of Ecology within thirty (30) days of completion of this well. This well log shall be complete and all information concerning the static water level in the completed well, in addition to any pump test data, shall be submitted as it is obtained.

REPORTED BY: [signature]

DATE: Sept. 9, 1980

The State Ground Water Code requires a $20/00 permit fee for community domestic supply.

State of Washington
Department of Ecology

APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION
(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO.	W.R.I.A.	COUNTY	PRIORITY DATE	TIME	ACCEPTED
G 225621	13	Thurston	6-23-80	10:30	RMS

APPLICANT'S NAME: Robert R. Drohman — BUSINESS TEL. 357-4915 — HOME TEL.

ADDRESS (STREET): P. O. Box H — (CITY) Littlerock — (STATE) WA — (ZIP CODE) 98556

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION:

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE):	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.): Proposed 8" Well
TRIBUTARY:	SIZE AND DEPTH: 8" X Estimated 220' deep

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.): Community Domestic Supply for 80 Residences

ENTER QUANTITY OF WATER REQUESTED, USING UNITS OF: CUBIC FEET PER SECOND ____ CFS **OR** GALLONS PER MINUTE 150 GPM — ACRE FEET PER YEAR 60

TIMES DURING YEAR WATER WILL BE REQUIRED: Continuous — Continuously

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS BY TYPE E.G. 1-HOME, 1-MOBILE HOME, 2-CAMPSITES, ETC.	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY
	80 Homes	260

DATE PROJECT WAS OR WILL BE STARTED	DATE PROJECT WAS OR WILL BE COMPLETED
July 1, 1980	September 15, 1980

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)	SECTION	TOWN	RANGE

ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION

3B. IF NOT IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL: 1420' West & 1140' South of northeast corner of Section 34

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E OR W) W.M.	COUNTY
~~NE¼ NE¼~~ N½ NE¼ (RMS 6-23-80)	34	19	1W	Thurston

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER: Applicant is well site owner

5. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY (ON WHICH THE WATER WILL BE USED) TAKEN FROM A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY, OR COPY CAREFULLY IN THE SPACE BELOW.

N½ NE¼ Section 34, T 19 N, R 1 W EXCEPT east 30' for Marvin Road

I [illegible] this application [illegible] and find it is: [ ] no[illegible]tion".
☑ [illegible]cally ex[illegible]

6/23/80 [signature]
DATE SIGNATURE

DS HS

ECY 040-1-14
Rev 12-76

APPLICATION

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, OPT. PURCHASER, ETC.)

Applicant is Owner-Developer

ARE THERE ANY EXISTING WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES) ☐ YES ☒ NO

IF YES, FROM WHAT SOURCE (i.e. SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE: SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC)

8" well with two 5 H.P. submersible well pumps, a hydropneumatic pressure tank(s), PVC distribution lines and individual service to 80 building sites.

Water system construction plans will be submitted for D.S.H.S. approval prior to construction.

REMARKS

7.

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY

SIGNATURES

Robert R. Drahman
APPLICANT'S SIGNATURE

Robert R. Drahman
LEGAL LANDOWNER'S SIGNATURE

P.O. Box H. Littlerock, Wash. 98556
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON } ss.
DEPARTMENT OF ECOLOGY }

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows:

.....

.....

.....

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before ..... 19.....

Witness my hand this ..... *day of* ..... 19.....

.....
Department of Ecology

ECY 040-1-14
Rev 12-76

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
- [ ] APPLICATION
- [ ] PERMIT
- [ ] CERTIFICATE
- [ ] OTHER

PROGRESS SHEET

THURSTON ☐ SURFACE WATER ☒ GROUND WATER

NAME: ROBERT R. DROHMAN			TELEPHONE NO.: 357-4915
ADDRESS: P.O. Box H	(CITY): Littlerock	(STATE): Washington	(ZIP CODE): 98556
ASSIGNED TO		TELEPHONE NO.	DATE ASSIGNED
ADDRESS	(CITY)	(STATE)	(ZIP CODE)
APPLICATION NO.: G225621	PERMIT NO.: P	CERTIFICATION NO.: C	
DATE AMENDED	DATE CANCELED	W.R.I.A.	

APPLICATION

DATE APPLICATION RECEIVED: 6-23-80	INITIAL $10.00 FEE RECEIVED: ☒ YES ☐ NO	DATE FEE RECEIVED: 6-23-80
STATEMENT OF ADDITIONAL EXAMINATION FEE $	DATE SENT	DATE RECEIVED
DATE RETURNED FOR COMPLETION OR CORRECTION	DATE RECEIVED	

TEMPORARY PERMIT

APPROVED BY	DATE ISSUED

PUBLICATION

APPROVED BY	DATE APPROVED	DATE NOTICE SENT: 7-9-80
PROTESTED BY AND DATE		

DATE AFFIDAVIT RECEIVED: 7/25/80	CHECKED BY: WB	TIME EXPIRED: 8/23/80	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED

DEPARTMENT OF GAME AND FISHERIES REPORT

APPROVED	PROVISO	PROTEST

EXAMINATION

DATE EXAMINATION MADE: 8-28-80	MADE BY: J	DATE REPORT OF EXAM. WRITTEN: 8-29-80	WRITTEN BY: J	CHECKED BY: DC
DATE PERMIT FEE REQUESTED: 9/9/80	AMOUNT DUE: 20.00		DATE RECEIVED: 9-12-80	

PERMIT

PERMIT APPROVED BY	DATE APPROVED	PERMIT NO.: P	DATE ISSUED: 10-10-80

BEGINNING OF CONSTRUCTION

DATE NOTICE SENT: Started	DATE FILED	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

WELL DRILLER'S AND/OR CONSTRUCTION REPORT

DATE SENT: 10-10-84	DATE FILED: 2/20/81 / ~~[illegible]~~ WB

COMPLETION OF CONSTRUCTION

DATE NOTICE SENT: 10-10-84	DATE FILED	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

PROOF OF APPROPRIATION

DATE SENT	DATE FILED	EXTENSION FEE	EXTENDED TO	
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED	DATE APPROVED FOR CERTIFICATE	APPROVED BY

CERTIFICATION

PROOF EXAM. REQUIRED ☐ YES ☐ NO	CERTIFICATE NUMBER: C	DATE ISSUED: 3-16-81

REMARKS

ECY 040-1-80 PROGRESS

WATER RIGHT G2-27015

DEPARTMENT OF
ECOLOGY
State of Washington

G2-27015
2221755

SECOND AMENDED PERMIT TO APPROPRIATE WATERS OF THE STATE OF WASHINGTON

PRIORITY DATE
11/17/1986

WATER RIGHT NUMBER
G2-27015

MAILING ADDRESS
THURSTON COUNTY PUBLIC UTILITY DISTRICT NO. 1
921 LAKERIDGE DRIVE SW, SUITE 201
OLYMPIA WA 98502

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
175	GPM	50

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE
Community Domestic Supply	125	50	GPM		50	01/01 - 12/31

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
		02356	

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Thurston			13 Deschutes

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Prairie Ridge Well #1	69330007101	AKY156	19N	01 W	34	NW NE		
Prairie Ridge Well #2	69330007101	AAE334	19N	01 W	34	NW NE		

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

Thurston Public Utility District No. 1 Prairie Ridge Water System service area within the S 1/2 S 1/2 of Section 27 and the N 1/2 and N 1/2 S 1/2 of Section 34 in T. 19 N., R. 1 W.W.M.

Proposed Works

Well #1 (AKY156): 8" x 174'
Well #2 (AAE334): 8" x 181'

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	Completed	December 31, 2016

Measurement of Water Use

How often must water use be measured?	Monthly
How often must water use data be reported to Ecology?	Upon Request by Ecology
What volume must be reported?	Total Annual Volume Monthly Total Volume
What rate must be reported?	Annual Peak Rate of Withdrawal (gpm)
How long must water use data be maintained?	Five years minimum

Provisions

The combined annual withdrawal under all rights for Prairie Ridge Water System shall not exceed 80 acre-feet per year.

Wells, Well Logs and Well Construction Standards
In accordance with WAC 173-160, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from sources of contamination. Wells shall not be located within 1,000 feet of the boundary of a solid waste landfill.

All wells constructed in the state shall meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard shall be decommissioned.

All wells shall be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional

Department of Ecology office issuing this decision. This tag shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

Installation and maintenance of an access port is required as described in WAC 173-160- 291(3) is required.

Measurements, Monitoring, Metering and Reporting
An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173.

WAC 173-173 describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Water use data shall be recorded and maintained by the water right holder for a minimum of five years. The annual peak rate, monthly total volume and total annual volume shall be submitted to the Department of Ecology upon request.

Water Level Measurements
In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Static water level is defined as the water level in a well when no pumping is occurring and the water level has fully recovered from previous pumping. Static water levels shall be measured and recorded monthly, using a consistent methodology. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

Static water level data shall be submitted in digital format and shall include the following elements:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Measurement accuracy (to nearest foot, tenth of foot, etc.)
5. Description of the measuring point (top of casing, sounding tube, etc.)
6. Measuring point elevation above or below land surface to the nearest 0.1 foot
7. Land surface elevation at the well head to the nearest foot.
8. Static water level below measuring point to the nearest 0.1 foot.

Department of Health Requirements
Prior to any new construction or alterations of a public water supply system, the State Board of Health rules require public water supply owners to obtain written approval from the Office of Drinking Water of the Washington State Department of Health. Please contact the Office of Drinking Water at Southwest Drinking Water Operations, 243 Israel Road S.E., PO Box 47823, Tumwater, WA 98504-7823, (360) 236-3030.

Water Use Efficiency
Use of water under this authorization shall be contingent upon the water right holder's maintenance of efficient water delivery systems and use of up-to-date water conservation practices consistent with established regulation requirements and facility capabilities.

Proof of Appropriation
The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the permit. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

Schedule and Inspections
Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

Permit Subject to Cancellation
This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington this 3rd day of August, 2010

Department of Ecology

OK MP

by Thomas Loranger
Thomas Loranger, Section Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

AMENDED PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
November 17, 1986	G2-27015	G2-27015	

NAME
Prairie Ridge Water c/o Robert Drohman

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
4326 Legacy Drive NE	Olympia	Washington	98516

The applicant is hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
2 Wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	175	50

QUANTITY, TYPE OF USE, PERIOD OF USE		
50 Acre-feet per year Supplemental	Community domestic supply (99 services)	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
Well 1: 1420 feet West and 1140 feet South
Well 2: 1420 feet West and 1240 feet South
Both measured from the Northeast corner of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼ NE¼	34	19	1W	13	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Prairie Ridge Water Company being within the S½ S½ of Section 27 and the N½ and N½ S½ of Section 34 in T. 19 N., R. 1 W.W.M.

DESCRIPTION OF PROPOSED WORKS

Well 1: (existing) is an 8-inch diameter drilled well having a depth of 174 feet below land surface.
Well 2: (proposed) will be an 8-inch diameter well drilled to an approximate depth of 175 feet below land surface.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	December 31, 2010

PROVISIONS

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded annually and maintained by the property owner for a minimum of five years, and shall be promptly submitted to Ecology upon request.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units, monthly meter readings including units, Department of Health WFI water system number and source number(s), well tag number and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information. Submit data to: Department of Ecology, SWRO/WR PO Box 47775, Olympia, WA 98504-7775.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

"The total annual withdrawal authorized herein is entirely supplemental to rights enjoyed from Well #1 under Certificate G2-25621C."

"Appropriations of public waters in Thurston County are subject to the provisions of WAC 713-591, the Reservation of Future Public Water Supply for Thurston County. Reserved waters have a priority date of August 13, 1986. Rights developed under this permit maybe subject to regulation in favor to reserved rights."

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 9th *day of* August, *2007.*

Department of Ecology

OK AVB

by Thomas Loranger
Thomas Loranger, Section Manager

If you require this publication in an alternate format, please contact Water Resources at (360) 407-6300, or TTY (for the speech or hearing impaired) 711 or 800-833-6388.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
November 17, 1986	G 2-27015		

NAME
Prairie Ridge Water Co. c/o Robert R. Drohman

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
4411 Marvin Road N.E.	Olympia	Washington	98506

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
2 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	175	50

QUANTITY, TYPE OF USE, PERIOD OF USE
50 acre-feet Community domestic supply as needed year round

(supplemental) (99 services)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
Well #1: 1420 feet West & 1140 feet South;
Well #2: 1420 feet West & 1240 feet South;
Both measured from the Northeast Corner of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼NW¼NE¼	34	19	1 W	13	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Prairie Ridge Water Company being within the S½S½ of Section 27 and the N½ and N½S½ of Section 34 in T. 19 N., R.1 W.W.M.

DESCRIPTION OF PROPOSED WORKS

Well #1 (existing) is an 8 inch diameter drilled well having a depth of 174 feet below land surface. Well #2 (proposed) will be an 8 inch diameter well drilled to an approximate depth of 175 feet below land surface.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	December 31, 1991	December 31, 1992

REPORT

BACKGROUND:
This application was received and accepted for pro[illegible] October 17, 1986, public notice appeared in The Olympian of Olympia, Washing[illegible] November 15 and 22, 1986. No objections were received as a result of the public

The applicant seeks a permit under the provisions of Chapter 90.44 Revised Code of Washington to appropriate public ground water from 2 wells in the amount of 175 gallons per minute (gpm) for community domestic supply for 99 services.

INVESTIGATIONS:
I conducted a field examination of this application on January 27, 1987. The applicant was not present during the site visit.

The applicant currently enjoys rights from well No. 1 under Ground Water Certificate G 2-25621 C. Said Certificate allows withdrawal of 50 GPM; 80 acre-feet per year for community domestic supply to serve 80 residences located in the N½NE¼ of Section 34. It appears that the existing water system serves 28 residences on Prairie Ridge Drive and 18 residences on 44th Avenue. More residences in the vicinity may also be served by the system.

The applicant proposed to add a second well to the system and to substantially expand the service area. Since an adequate annual quantity was granted under Certificate G 2-25621 C the annual amount authorized herein shall be totally supplemental.

This authorization will allow withdrawal of up to 175 GPM from 2 wells for use within the expanded service area.

The normal water requirements for a community domestic system in this environment should not exceed an average of 450 gallons daily per residence served. This includes sufficient water to sprinkle small lawns and gardens for each residences and amounts to 50 acre-feet per year when calculated on an annual basis.

CONCLUSIONS:
In accordance with Chapter 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended is a beneficial use and will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue, subject to existing rights and indicated provisions.

RECOMMENDATIONS:

It is recommend this application be approved and a permit be issued allowing the appropriation of 175 GPM from 2 wells for the purpose of community domestic supply for 99 services. The period of use shall be as needed year round. The total annual withdrawal under this authorization shall not exceed 50 acre-feet per year.

Approval shall be subject to the following provisions.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Water Supply and Waste Section, Department of Social and Health Services, Mail Stop LD 11, Building 4, Olympia, Washington 98504, prior to any new construction or alterations of a public water supply.

A well log of the completed well shall be submitted by the driller to the Department of Ecology within thirty (30) days of completion of this well. This well log shall be complete and all information concerning the static water level in the completed well, in addition to any pump test data, shall be submitted as it is obtained.

All water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC [illegible]inimum Standards for Construct[illegible] and Maintenance of Water Wells.)

"The total annual withdrawal authorized herein is entirely supplemental to rights enjoyed from Well No. 1 under Certificate G 2-25621 C."

"Appropriations of public waters in Thurston County are subject to the provisions of WAC 713-591, the Reservation of Future Public Water Supply for Thurston County. Reserved waters have a priority date of August 13, 1986. Rights developed under this permit maybe subject to regulation in favor to reserved rights."

REPORTED BY: Dawn Bailly

DATE: May 6, 1987

The statutory permit fee for this application is $20.00.

State of Washington Department of Ecology

APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ■ GROUND WATER

$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO.	W.R.I.A.	COUNTY	PRIORITY DATE	TIME	ACCEPTED
G 227015	13	THURSTON	11-17-86	A 11:00	

APPLICANT'S NAME — PLEASE PRINT: Prairie Ridge Water Co C/O Robert R. Drohman

BUSINESS TEL. 459-9510
HOME TEL.

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
4411 Marvin Road NE	Olympia	WA	98506

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE)	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.) Two Wells
TRIBUTARY	SIZE AND DEPTH #1 existing 8" x 174', #2 proposed 8" x 175'

I have examined this application as required by SEPA and find that it is: ☐ not an "action". ■ categorically exempt.

12-8-86 D. Walker
DATE SIGNATURE

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MANUFACTURING, ETC.)
~~Grant~~ Continuous Community Domestic Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF:	CUBIC FEET PER SECOND ..... CFS	OR	GALLONS PER MINUTE 175 ..... GPM	ACRE FEET PER YEAR 54.2

TIMES DURING YEAR WATER WILL BE REQUIRED
AS NEEDED YEAR ROUND

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS BY TYPE, E.G. 1-HOME, 1-MOBILE HOME, 2-CAMPSITES, ETC.	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY
	99 homes	

DATE PROJECT WAS OR WILL BE STARTED	DATE PROJECT WAS OR WILL BE COMPLETED
Started	July 1, 1991

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)	SECTION	TOWN	RANGE

ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION

3B. IF NOT IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER.

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL.

#1 1420' W and 1140'S of NE Corner Sec 34, #2 100'S of #1

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
SE 1/4 NW 1/4 NE 1/4	34	19	1W	Thurston

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER

Yes

5. LEGAL DESCRIPTION OF PROPERTY *ON WHICH WATER IS TO BE USED*

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY (ON WHICH THE WATER WILL BE USED) TAKEN FROM A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY. OR, COPY CAREFULLY IN THE SPACE BELOW.

The present and future service area of the Prairie Ridge Water System all lying within the S 1/2 S 1/2 Sec 27; N1/2 Sec 34; N1/2 S1/2 Sec 34, T19N, R1W, Thurston County

DS+S
HQ

OK to process

APPLICATION

ECY-040-1-14
Rev. 3/81

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)

Water Purveyor

ARE THERE ANY EXISTING WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES.) ☒ YES ☐ NO

IF YES, FROM WHAT SOURCE (i.e. SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

This application is supplemental to appropriated waters under permit G2-25621P held by the Prairie Ridge Water Co, for existing Well No 1

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE: SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.)

Two wells with 5hp submersible pumps pumping to ground level storage and dual 3hp booster pumps drawing from storage to maintain cyclic distribution system pressures hydropneumatically

REMARKS

7.

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

X Robert R. Drohman
APPLICANT'S SIGNATURE

Robert R. Drohman
LEGAL LANDOWNERS NAME (PLEASE PRINT)

SAME
LEGAL LANDOWNER'S SIGNATURE

4411 Marvin Road NE, Olympia, WA 98506
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY } *ss.*

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows: .....

.....

.....

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before....., *19*.....

Witness my hand this.....*day of*....., *19*.....

.....
Department of Ecology

WATER RIGHT G2-29250

DEPARTMENT OF
ECOLOGY
State of Washington

G2-29250
2221201

AMENDED PERMIT
TO APPROPRIATE WATERS
OF THE STATE OF WASHINGTON

PRIORITY DATE
7/27/1995

WATER RIGHT NUMBER
G2-29250

MAILING ADDRESS
THURSTON COUNTY PUBLIC UTILITY DISTRICT NO. 1
921 LAKERIDGE WAY SW, SUITE 201
OLYMPIA WA 98502

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
125	GPM	80

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE
Municipal Supply	125		GPM		80	01/01 - 12/31

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
		02356	

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Thurston			13 Deschutes

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Prairie Ridge Well #3			19N	01 W	34			

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

Thurston County Public Utility District No. 1 Prairie Ridge Water System service area within the S 1/2 S 1/2 of Section 27 and the N 1/2 N 1/2 S 1/2 of Section 34 in T. 19 N., R 1 W.W.M.

Proposed Works

Prairie Ridge Well #3: A proposed 8-inch diameter well, approximately 175 feet deep, tied into the same conveyance system as Prairie Ridge Wells #1 and #2.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
December 31, 2012	December 31, 2016	December 31, 2020

Measurement of Water Use

How often must water use be measured?	Monthly
How often must water use data be reported to Ecology?	Upon Request by Ecology
What volume must be reported?	Total Annual Volume Monthly Total Volume
What rate must be reported?	Annual Peak Rate of Withdrawal (gpm)
How long must water use data be maintained?	Five years minimum

Provisions

The combined annual withdrawal under all rights for Prairie Ridge Water System shall not exceed 80 acre-feet per year.

Wells, Well Logs and Well Construction Standards
All wells constructed in the state shall meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard shall be decommissioned.

All wells shall be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required.

Measurements, Monitoring, Metering and Reporting
An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173.

WAC 173-173 describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Water use data shall be recorded and maintained by the water right holder for a minimum of five years. The annual peak rate, monthly total volume and total annual volume shall be submitted to the Department of Ecology upon request.

Water Level Measurements
In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Static water level is defined as the water level in a well when no pumping is occurring and the water level has fully recovered from previous pumping. Static water levels shall be measured and recorded monthly, using a consistent methodology. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

Static water level data shall be submitted in digital format and shall include the following elements:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Measurement accuracy (to nearest foot, tenth of foot, etc.)
5. Description of the measuring point (top of casing, sounding tube, etc.)
6. Measuring point elevation above or below land surface to the nearest 0.1 foot
7. Land surface elevation at the well head to the nearest foot.
8. Static water level below measuring point to the nearest 0.1 foot.

Department of Health Requirements
Prior to any new construction or alterations of a public water supply system, the State Board of Health rules require public water supply owners to obtain written approval from the Office of Drinking Water of the Washington State Department of Health. Please contact the Office of Drinking Water at Southwest Drinking Water Operations, 243 Israel Road S.E., PO Box 47823, Tumwater, WA 98504-7823, (360) 236-3030.

Water Use Efficiency
Use of water under this authorization shall be contingent upon the water right holder's maintenance of efficient water delivery systems and use of up-to-date water conservation practices consistent with established regulation requirements and facility capabilities.

Proof of Appropriation
The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will

reflect the extent of the project perfected within the limitations of the permit. Elements of a proof inspection may include, as appropriate, the sources, system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

Schedule and Inspections
Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

Permit Subject to Cancellation
This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington this 3rd day of August, 2010

Department of Ecology

OK MP

by Thomas Loranger
Thomas Loranger, Section Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

December 14, 2007

CERTIFIED MAIL
7006 0100 0002 2925 6976

Prairie Ridge Water System
Attn Robert Drohman
4326 Legacy Drive NE
Olympia, WA 98516

Re: Water Right Permit No. **G2-29250**

Dear Mr. Drohman:

In response to your request, you are hereby granted an extension to begin construction on your water right for the reason below:

- Thurston County moratorium halted development on your property until August 28th, 2007. Moratorium is now lifted, and development can continue.

The new deadline to submit your *Construction Notice* is March 1, 2010.

You have a right to appeal this decision. To appeal this you must:

- File your appeal with the Pollution Control Hearings Board within 30 days of the "date of receipt" of this document. Filing means actual receipt by the Board during regular office hours.
- Serve your appeal on the Department of Ecology within 30 days of the "date of receipt" of this document. Service may be accomplished by any of the procedures identified in WAC 371-08-305(10). "Date of receipt" is defined at RCW 43.21B.001(2).

Be sure to do the following:

- Include a copy of this document that you are appealing with your *Notice of Appeal*.
- Serve and file your appeal in paper form; electronic copies are not accepted.

1. To file your appeal with the Pollution Control Hearings Board

Mail appeal to:

The Pollution Control Hearings Board
PO Box 40903
Olympia WA 98504-0903

OR Deliver your appeal in person to:

The Pollution Control Hearings Board
4224 – 6th Ave SE Rowe Six, Bldg 2
Lacey WA 98503

2. To serve your appeal on the Department of Ecology

Mail appeal to:

The Department of Ecology
Appeals Coordinator
P O. Box 47608
Olympia WA 98504-7608

OR Deliver your appeal in person to:

The Department of Ecology
Appeals Coordinator
300 Desmond Dr SE
Lacey WA 98503

3. And send a copy of your appeal to:

Thomas Loranger
Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia WA 98504-7775

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov To find laws and agency rules visit the Washington State Legislature Website: http://www1.leg.wa.gov/CodeReviser .

If you have any questions, please contact Ecology at (360) 407-6300.

Sincerely,

Thomas Loranger
Section Manager
Water Resources Program

Enclosures: *Construction Notice*
Your Right to Be Heard

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
July 24, 1995	G2-29250	G2-29250	

NAME
Robert Drohman, Prairie Ridge Water System

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
4111 Marvin Road	Olympia	Washington	98516

The applicant is pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Prairie Ridge Well #3
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	125	80*

QUANTITY, TYPE OF USE, PERIOD OF USE
80 Acre-feet per year — Municipal supply — Year-round, as needed

*Supplemental to existing rights

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
To be determined

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
	34	19	1W	13	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Prairie Ridge Water Company being within the S½ S½ of Section 27 and the N½ N½ S½ of Section 34 in T. 19 N., R. 1 W.W.M.

DESCRIPTION OF PROPOSED WORKS

Prairie Ridge Well #3, as proposed, will be 8 inches in diameter and approximately 175 feet deep. This well will tie into the same conveyance system as Wells 1 and 2.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
March 1, ~~2005~~ 2008	March 1, ~~2006~~ 2009	December 31, ~~2010~~ 2063

PROVISIONS

"If this appropriation results in the impairment of water rights existing at the time of this approval, such impairment shall be grounds for curtailment, or cessation of any withdrawal resulting from the change, or in mitigation to remedy the situation."

A completed well report of the well(s) shall be submitted by the driller to the Department of Ecology within 30 days of completing this well. All pump test data for this well shall be submitted to the Department as it is obtained.

All wells constructed in the State shall meet the construction requirements of Chapter 173-160 WAC entitled "Minimum Standards for the Construction and Maintenance of Wells" and Chapter 18-104 RCW entitled "Water Well Construction".

In accordance with Chapter 173-160 WAC, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from sources of contamination. Wells shall not be located within 1,000 feet of a solid waste landfill.

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded monthly. The maximum rate of diversion/withdrawal and the annual total volume shall be submitted to Ecology by January 31st of each calendar year.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units, monthly meter readings including units, peak monthly flow including units, Department of Health WFI water system number and source number(s), well tag number and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

(continued on page 3)

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 12th *day of* April, *2004.*

Department of Ecology

ENGINEERING DATA
OK JH

by_____
Thomas Loranger, Section Manager

Provisions Continued

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

Static water levels data shall be submitted in digital format and shall include the following elements:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

March 2, 2004

CERTIFIED MAIL

Robert Drohman
Prairie Ridge Water System
4111 Marvin Road
Olympia WA 98516

Dear Mr. Drohman:

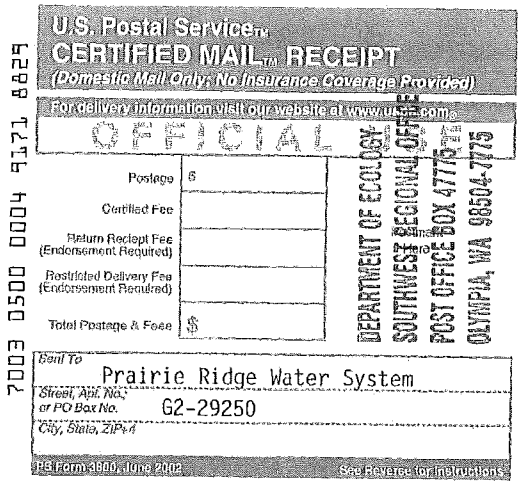
RE: Ground Water Application No. **G2-29250**

Your application has received a partial approved. Enclosed is the Report of Examination (Ecology's Order and Determination) which summarizes our findings and represents our final decision. Please read through this report carefully, as it forms the basis for your permit.

Send permit fee
Your permit will be issued after the required 30-day appeal period, and upon receipt of the **$5.00** permit fee. Please send the following to the Water Resources Program at Ecology's Southwest Regional Office:

- The **$20.00** permit fee; a check or money order made out to the Department of Ecology, and
- The completed Water Right Permit Fee Form (enclosed).
  - If appropriate, make corrections to your name and address in the space provided.

Your right to appeal
This Order may be appealed pursuant to RCW Chapter 43.21B. The person, to whom this Order is issued, if he or she wishes to file an appeal, must file the appeal with the Pollution Control Hearings Board **within thirty (30) days of receipt of this Order.** Send the appeal to: Pollution Control Hearings Board, P.O. Box 40903, Olympia, Washington 98504-0903. At the same time, a copy of the appeal **must** be sent to: Department of Ecology, Water Resources Appeals Coordinator, P.O. Box 47600, Olympia, Washington 98504-7600. All others receiving notice of this Order, who wish to file an appeal, must file the appeal with the Pollution Control Hearings Board **within thirty (30) days of the date the Order was mailed.** The appeal must be filed, with both the Pollution Controls Hearing Board and the Department of Ecology, in the same manner as described above.



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DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE
POST OFFICE BOX 47775
OLYMPIA, WA 98504-7775

Sent To: Prairie Ridge Water System
Street, Apt. No., or PO Box No.: G2-29250
City, State, ZIP+4:

PS Form 3800, June 2002 — See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

ROBERT DROHMAN
PRAIRIE RIDGE WATER SYSTEM
4111 MARVIN ROAD
OLYMPIA WA 98516

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name): Robert Drohman
C. Date of Delivery: 3/13/04

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

7003 0500 0004 9171 8829 SWRO/WR G2-29250

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1035

If we can provide any further assistance, please contact our office at (360) 407-6300.

Sincerely,

Thomas Loranger
Water Resources Section Manager
Southwest Regional Office

TL:th

Enclosures: Report of Examination
Water Right Permit Fee Form
"Your Right to Be Heard"

ROE, permit fee.doc

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
July 24, 1995	G2-29250		

NAME
Robert Drohman, Prairie Ridge Water System

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
4111 Marvin Road	Olympia	Washington	98516

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Prairie Ridge Well #3
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	125	80*

QUANTITY, TYPE OF USE, PERIOD OF USE		
80 Acre-feet per year	Municipal supply	Year-round, as needed

*Supplemental to existing rights

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
To be determined

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
	34	19	1W	13	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Prairie Ridge Water Company being within the S½ S½ of Section 27 and the N½ N½ S½ of Section 34 in T. 19 N., R. 1 W.W.M.

DESCRIPTION OF PROPOSED WORKS

Prairie Ridge Well #3, as proposed, will be 8 inches in diameter and approximately 175 feet deep. This well will tie into the same conveyance system as Wells 1 and 2.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
March 1, 2005	March 1, 2006	December 31, 2010

REPORT

BACKGROUND:

On July 24, 1995, Robert R. Drohman of Drohman Developing filed an application to withdraw public ground water from one well. The amount requested was 125 gallons per minute (gpm) and an annual quantity of 80 acre-feet (ac-ft) of water per year for multiple domestic supply. The project site is located in the Deschutes River Watershed in Water Resources Inventory Area (WRIA) 13.

Public notice was published September 21 and 28, 1995. No letters of protest were received.

Based on the provisions of Chapters 90.03 and 90.44 Revised Code of Washington (RCW), I recommend a partial approval of this application in the instantaneous amount of 125 gpm supplemental to existing rights.

INVESTIGATION:

In consideration of this application, a field investigation was conducted on April 12, 2002 by Tammy Hall. Other investigations included a review of hydrogeological information, recorded water rights, registered claims, water well reports, and information submitted with the application.

Location and Site Description

The project is located on the Johnson Point Peninsula on property that is nearly halfway between Henderson Inlet to the west and the Nisqually Reach to the east. The Johnson Point Peninsula is approximately 6 miles long and ranges in width from 4 miles to ½ mile. The southern portion of the peninsula is broad and wide and gradually narrows to a tip as it reaches Johnson Point. The land surface, for the most part, is relatively flat or gently rolling with a general decrease in elevation northward and towards the Nisqually Reach and Henderson Inlet, where the land surface terminates in steep bluffs to Puget Sound. Elevations range from approximately 300 feet above mean sea level (msl), to sea level at the northern tip of Johnson Point.

The area surrounding the project site consists of single family residences, medium density housing developments, commercial developments, and some limited agriculture, consisting mostly of vegetable gardens and pasture for livestock. Lots range from several acres to ½ acre in size. Woodland Creek flows northwest toward Henderson Inlet, approximately 1½ miles from the development. Elevations at the project site range from 300 to 260 feet above mean sea level (msl).

The Drohman property is comprised of a residential development named "Prairie Ridge" which is approximately 160 acres in size. The development is located approximately two miles north of Lacey on Marvin Road. The development is currently supplied by two wells. The developer intended this application to apply to a new well (Prairie Ridge Well No. 3) which would be drilled to approximately the same depth as Well Nos. 1 and 2 and draw water from the same aquifer. Well No. 3 was intended to serve two purposes: to serve additional residences in the remaining undeveloped area of Division IV and to reduce the amount of water storage required by the remainder of the system (Well Nos. 1 and 2) for fire suppression needs.

General Area Hydrogeology

The following geologic/ hydrogeologic information was extracted from a Department of Ecology Memorandum dated April 22, 2003 prepared by Tammy Hall, hydrogeologist, at the Department of Ecology's Southwest Regional Office.

The presented geologic/ hydrogeologic information was compiled from the following references:

- Drost, B.W., Turney, G.L., Dion, N.P., and Jones, M.A., 1999, *Conceptual Model and Numerical Simulation of the Ground-Water-Flow System in the Unconsolidated Sediments of Thurston County, Washington*: US Geological Survey Water Resources Investigations Report 99-4165.

- Drost, B.W., Turney, G.L., Dion, N.P., and Jones, M.A., 1998, *Hydrology and Quality of Ground Water in Northern Thurston County, Washington*: US Geological Survey Water-Resources Investigations Report 92-4109 (revised).

- Sinclair, Kirk and Pitz, Charles, 1999, *Estimated Baseflow Characteristics of Selected Washington Rivers and Streams*: Washington Department of Ecology Water Supply Bulletin No. 60.

A series of glacial advances and retreats is largely responsible for the resulting landscape in the Puget Sound area. These episodes of glaciation have been marked by layers of unconsolidated deposits more than 2,000 feet deep in some areas of Thurston County.

These unconsolidated deposits may be glacial or non-glacial in origin. The non-glacial deposits were left by streams carrying meltwater or by water that was impounded behind masses of ice. Glacial deposits, described as tills or hardpan, were deposited directly by the glacier.

Glacial aquifers may be composed predominately of sand and (or) gravel, but may also contain relatively thin and discontinuous lenses of clay and (or) silt. In addition, confining layers composed predominately of silt and (or) clay, may also contain local lenses of coarse sand

or gravel. The deposits are referred to as "geohydrologic" units because they were identified using a combination of geologic (primarily grain size and sorting) and hydrologic (hydraulic conductivity and hydraulic continuity) properties.

Alluvial and deltaic sand and gravel of Holocene age is the hydrologic unit exposed at the ground surface in the project area. Because of lithologic similarities, Vashon recessional outwash and Holocene alluvium are generally referred to as a single geohydrologic unit (Qvr). Recessional outwash, deposited by streams emanating from the melting and receding glacier, consists of poorly to moderately well-sorted sand and gravel. Locally, perched groundwater may exist in this unit because of the low vertical permeability of the underlying glacial till. This unit is generally between 10 and 50 feet in thickness, but locally may be as thick as 150 feet.

Underlying the Qvr unit is the Qvt hydrogeologic unit. The Qvt is composed of Vashon till and possibly some older tills. This unit is considered to be a poor source of water. Qvt is generally between 25 and 50 feet in thickness but locally may be as thick as 150 feet.

Vashon advance outwash, represented as geohydrologic unit Qva, underlies the Qvt. In the Johnson Point Peninsula area, the unit is relatively thin and has not been developed extensively. Where it is present, Qva is generally between 15 and 35 feet thick, but locally may exceed 150 feet in thickness. Thin lenses of sand and gravel in this unit can yield relatively small quantities of water suitable for domestic use. Qf is also effective in retarding the downward percolation of groundwater into the underlying units and acts as a confining layer to those materials lying below it. Qf is generally between 15 and 75 feet thick.

Underlying geohydrologic unit Qf, is unit Qc. Groundwater in this unit generally occurs under confined conditions. Unit Qc is one of the most widely used aquifers in northern Thurston County. In some locations, such as near McAllister Springs where the overlying Qf is absent, Qc merges with Qva to form a single thick and productive aquifer. Where the entire thickness of the unit has been penetrated, it is approximately 30 feet in thickness. The top of the unit is commonly between 50 and 150 feet above mean sea level (msl).

Horizontal flow directions of groundwater within aquifers Qva and Qc is generally from areas of higher head to areas of lower head. Groundwater in Qva generally moves toward marine water bodies and to surface drainage channels. Local mounds of the potentiometric surface occur beneath each of the major peninsulas. The configuration of the potentiometric surface for Qc is similar to that of Qva. Beneath the upland areas on the peninsulas, water levels in Qva are generally higher than Qc, indicating that water flows vertically downward, passing through Qf (where present) and discharging to either salt water or to surface water drainages.

Hydrologic Analysis

Extrapolating from USGS quad map, the elevation at the proposed withdrawal location is approximately 260 feet above msl. Prairie Ridge Well Nos. 1 and 2 utilize water withdrawn from an aquifer approximately 130 feet below ground surface (bgs, 130 feet above msl). This unit has been interpreted by Drost and others as being hydrologic unit Qva. Static water level (SWL) for Prairie Ridge Well Nos. 1 and 2 ranges from 133 feet bgs for Well No.1 to 140 feet bgs for Well No. 2. As discussed previously, Prairie Ridge Well No. 3 would tap the same aquifer.

Subsurface conditions encountered during the drilling of No. Well 1 consisted of alternating layers of cemented gravel and sand to depths of approximately 170 feet bgs. Well No. 2 was constructed through cemented gravel to a depth of 130 feet bgs before encountering a water-bearing zone at a depth of 130 feet.

Affects to Surface Water

Streamflow information collected on the Deschutes River suggests that most of the river flow is due to baseflow contribution, especially during the summer months (Sinclair and Pitz, 1999). Baseflow is the portion of streamflow contributed by groundwater. A comparison of annual data for the Deschutes River for the time period evaluated during the study indicates a divergence between baseflow contribution and total streamflow, suggesting that groundwater contribution to streamflow has decreased over time. This decrease may be due to several contributing factors, including an increase in surface runoff, perhaps due to an increase in impervious area (development), increased groundwater pumping, or decreased aquifer recharge.

A similar analysis for Woodland Creek indicates an even stronger dependence of groundwater contribution to stream baseflow. Based on this analysis, increased surface runoff would likely have little effect on total flow. However, a decrease in the groundwater contribution (baseflow) would likely reduce streamflow.

In Drost (1999), a conceptual model of the groundwater system is presented which identifies two components of subsurface flow, those which discharge directly to Puget Sound and those that discharge to surface water bodies. This model was constructed as a tool to increase the understanding of the groundwater flow system and provide an indication of how the groundwater flow system behaves.

A conceptual analysis using the information provided in Drost (1999) indicate that additional withdrawals in the vicinity of the Prairie Ridge Development will almost certainly capture groundwater that would otherwise discharge to Woodland Creek and its associated wetlands. Flow and volume of groundwater discharging from these surface waters would likely be reduced and senior water right holders would be impaired. However, adding a well without increasing the overall annual withdrawal amount will likely not result in any effect on senior water rights or flows in Woodland Creek.

Minimum instream flows were established in 1988 through Chapter 173-513 WAC, the Instream Resources Protection Program (IRPP) for the Deschutes River Basin Water Resource Inventory Area (WRIA) 13. The WAC closes the upper reaches of the Deschutes River year-round and the lower reach of the river mid April through October 1. This IRPP also creates minimum instream flow requirements for the lower reach of the river for the remainder of the year and closes Woodland Creek and its tributaries. The flows established in this WAC are considered an appropriation senior to all permits approved after 1988. These minimum flow regulations do not affect rights that existed at the time they were filed, but are superior to subsequent water right applications. The Department of Ecology must deny any proposed groundwater withdrawals that would impair flows in Woodland Creek.

This applicant requests water from a well that is hydraulically connected to Woodland Creek. Increasing annual withdrawals at the proposed location will likely capture water that would otherwise contribute flows to Woodland Creek and its associated wetlands. Under the provisions of WAC 173-513, Woodland Creek and all its tributaries are closed to further appropriation. Maintaining flows in Woodland Creek is necessary to provide protection for wildlife, fish, water quality, and aesthetic values.

It is my determination that increasing the annual quantity of water withdrawn from the proposed well would likely reduce the amount of water discharging into the surface water system as baseflow, and would exacerbate already impaired conditions in the watershed.

The intent of this application was to expand the water system to supply additional lots, and to reduce water storage requirements necessary for fire suppression needs. The operation of Well No. 3 should not have an effect on surface flows in Woodland Creek as long as the total annual quantity of water being produced from Prairie Well No's. 1, 2, and 3 is not increased.

Current Water Rights

Currently, the Prairie Ridge Water System serves water to 84 residences under Groundwater Certificate No.G2-25621 and Groundwater Permit No. G2-27105. The developer has recently applied for a 5-year extension to put all allocated water to full beneficial use by December 31, 2006. Both wells 1 and 2 serve Prairie Ridge Divisions I, II, III, and IV. Together, Wells 1 and 2 comprise the Prairie Ridge Water System.

Groundwater Certificate No. G2-25621, issued in March 1981, applies to Prairie Ridge Well 1 and authorizes the withdrawal of 50 gpm and 80 ac-ft per year for domestic supply to 80 homes. Groundwater Permit No. G2-27105, issued in June 1987, is supplemental to Groundwater Certificate No. G2-25621. This permit allows withdrawal from Prairie Ridge Well 2 and authorizes a combined instantaneous withdrawal from both Wells 1 and 2 of 175 gpm and an annual quantity of 50 ac-ft of water per year (supplemental) for the purposes of multiple domestic supply for a total of 99 connections.

The *"Municipal Water Supply—Efficiency Requirements Act, Chapter 5 Laws of 2003"*, also known as the Municipal Water Law, specifies that Water Right Certificates issued that specify a total annual quantity and the number of service connections are no longer limited by the number of connections if the water system has a Washington Department of Health (WDOH) approved water system plan. Currently, the Prairie Ridge Water System has been by approved WDOH to provide water service to a total of 150 connections at full built-out.

Effect on Existing Water Rights

The following water rights, claims, and well reports are on file with the Department of Ecology and may be located within a one mile radius from Prairie Ridge Development:

- Seventeen ground water rights have been issued authorizing a combined instantaneous withdrawal of 1,360 gpm and 652 ac-ft per year. Water is used for commercial, industrial, irrigation, multiple domestic supply, single domestic supply, municipal supply, and stock watering.
- Ten surface water rights have been issued authorizing a combined instantaneous diversion of 0.85 cubic feet per second (cfs) and 28 acre-feet per year. Water is used mostly for domestic use, irrigation, and stock watering.
- Eight groundwater permits have been issued authorizing a combined instantaneous withdrawal rate of 4,325 gpm and 2,241 ac-ft per year. Water is used for irrigation and multiple domestic supply.
- Forty-nine ground water and surface water claims are registered that may be located within the one mile radius.
- Department of Ecology records indicate at least 54 water wells are located within a one mile radius of Prairie Ridge Development. These wells range in depth from approximately 50 feet to 646 feet below ground surface. All wells draw water from similar glacial type deposits. The majority of the wells (32) are between 100 and 200 feet deep.

FINDINGS AND CONCLUSIONS:

This application requests water from a well that is hydraulically connected to Woodland Creek. Increasing annual withdrawals at the proposed location will likely capture water that would otherwise contribute flows to Woodland Creek and its associated wetlands. Under the provisions of WAC 173-513, Woodland Creek and all its tributaries are closed to further appropriation. Maintaining flows in Woodland Creek is necessary to provide protection for wildlife, fish, water quality, and aesthetic values.

The installation of Prairie Ridge Well No. 3 will reduce water storage requirements necessary for fire suppression needs. Because the annual quantity of water being produced from Prairie Ridge Well Nos. 1, 2, and 3 is not being increased, approving the installation of Well No. 3 should have not have an effect on surface flows in Woodland Creek. I do not anticipate any adverse effects to result from withdrawals from Prairie Ridge Well No. 3.

In accordance with Chapter 90.03 and 90.54 RCW, I find that water is not available for a new appropriation from the source in question and that the appropriation would impair senior water right holders; however, allowing the applicant to install a new point of withdrawal without increasing annual quantity of existing rights, should not result in impairment.

RECOMMENDATIONS:

I recommend the issuance of a water right permit in the amount of 125 gpm, 80 ac-ft per year supplemental to existing water rights held for the project.

This approval constitutes the Department of Ecology's authorization to construct a third well, Prairie Ridge Well No. 3 at this site, and it subject to the following provisions:

PROVISIONS:

If this appropriation results in the impairment of water rights existing at the time of this approval, such impairment shall be grounds for curtailment, or cessation of any withdrawal resulting from the change, or in mitigation to remedy the situation.

A completed well report of the well(s) shall be submitted by the driller to the Department of Ecology within 30 days of completing this well. All pump test data for this well shall be submitted to the Department as it is obtained.

All wells constructed in the State shall meet the construction requirements of Chapter 173-160 WAC entitled "Minimum Standards for the Construction and Maintenance of Wells" and Chapter 18-104 RCW entitled "Water Well Construction".

In accordance with Chapter 173-160 WAC, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from sources of contamination. Wells shall not be located within 1,000 feet of a solid waste landfill.

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded monthly. The maximum rate of diversion/withdrawal and the annual total volume shall be submitted to Ecology by January 31st of each calendar year.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units, monthly meter readings including units, peak monthly flow including units, Department of Health WFI water system number and source number(s), well tag number and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

The Water Resources Act of 1971, Chapter 90.54 RCW specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

Static water levels data shall be submitted in digital format and shall include the following elements:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

REPORTED BY: _____ Date: March 2, 2004

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-29250, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 2nd day of March, 2004.

Thomas Loranger
Water Resources Section Manager
Southwest Regional Office

Fee: $10.00

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use
Fee Paid ____
Date ____

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name Prairie Ridge Water System Home Tel:( ) -
Mailing Address 4411 Marvin Road Work Tel:(360)459 - 9510
City Olympia State WA Zip+4 98516 + FAX:(360) 438 - 9273

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☐ Same as above

Name Robert R. Drohman Home Tel:(360)459 - 9429
Mailing Address c/o Prairie Ridge Water System Work Tel:(360)459 - 9510
City State Zip+4 + FAX:(360) - None
Relationship to applicant Same

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than 125 (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of Multiple Domestic Supply. Attach a "legal" description of the place of use. (See instructions.) *NOTE: A tax parcel number or a plat number is not sufficient.*

Estimate a maximum annual quantity to be used in acre-feet per year: 80

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:
From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions:	A permit is desired for one well(s).
Source flows into (name of body of water): Henderson Inlet	Size & depth of well(s): Proposed 8" x 190' (Approximately)

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner: Approximately 1440 Ft west and 1150 Ft south of the NE corner Section 34, T19N, R1WWM, Thurston County with alternate locations in S½, NE¼, Sec 34, or the SE¼ NW ¼ or the NE¼ SW¼ Sec 34 T19N R1W

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below: Lot	Block	Subdivision
See Attached Map		34	19	1W	Thurston			

For Ecology Use Date Received: 7/27/95 Priority Date: 7/27/95
SEPA: Exempt/Not Exempt FERC License # Dept. Of Health #
Date Accepted As Complete 7/31/95 By Date Returned By WRIA: 13

ECY 040-1-14
Rev. 12/94 F

APPLICATION

Appl. No.: G2-29250

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: Prairie Ridge Water System

B. Briefly describe your proposed water system. (See instructions.)
The addition of a third well to a predominantly hydroneumatic system where Wells #1 & 2 will continue to pump to storage with booster pumps drawing from storage to maintain system pressure. Well #3 will operate similarly at either the same location or remotely within the growing and expanding distribution system.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION.
Well #1 (G2-25621-C) and Well #2 (G2-27015-P)

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested: 160 Type of connection Homes
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☒ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.* This will be an expansion of the existing Prairie Ridge Water System, State ID #02356W.

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the Washington State Department of Health? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: N/A

B. List total number of acres for other specified agricultural uses:

Use_____Acres_____
Use_____Acres_____
Use_____Acres_____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 2000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no:_____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☒ YES ☐ NO

Self contained manufactured reservoir. Size currently undetermined.

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

From the Lacey area take Marvin Road north from Interstate 5 to 44th Ave NE. Turn left (west) onto 44th and drive approx. 500' past it's intersection with Prairie Ridge DR. NE. The primary location for Well #3 is adjacent to existing Wells #1 and #2 found at this location. Alternate locations are on the adjacent 160 undeveloped acres lieing to the south. Access to that property is currently undeveloped.

Section 10. REQUIRED MAP

A. Attach a map of the project. **(See instructions.)**

See attached map and the description of the area of use provided on the next page.

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☐ YES ☒ NO

If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

Robert R. Drohman dba Drohman Developing owns the currently undeveloped property which is scheduled for residential subdivision. Prairie Ridge Water Co. is the water purveyor. Robert R. Drohman is an owner in both companies.

B. Does the applicant own the land on which the water source is located? ☒ YES ☐ NO

If no, submit a copy of agreement:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Robert R. Drohman, Prairie Ridge Water Company

x Robert R Drohman
Applicant (or authorized representative)

x July 24, 1995
Date

Same as above
Landowner for place of use (if same as applicant, write "same")

Date

Use this page to continue your answers to any questions on the application. Please indicate section number before answer.

10(A) The area of use is defined as "the area served by Prairie Ridge Water Company being within the S½ S½ of Section 27 and the N½ and N½ S½ Section 34 in T19N, R1WWM, Thurston County".

This area of use is coincident with that which is described on Permit G2-27015-P which applies to existing Wells #1 and 2.

We are returning your application for the following reason(s):	
____ Examination fee was not enclosed	APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98503-0210
____ Section number(s) _____ is/are incomplete	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:	
Please provide the additional information requested above and return your application by _____ *(date).*	

Ecology staff_____ Date_____

To receive this document in alternative format, contact Lisa Newman at (360) 407-6604 (Voice) or (360) 407-6006 (TDD).

Well Protection Plan

Prairie Ridge #605 Water System

Wellhead Protection Plan

December 2019

Developed by:

Kim Gubbe, Director of Planning and Compliance, Thurston PUD

In cooperation with:

Table of Contents

I. Introduction
- I-1. Background
- I-2. Purpose
- I-3. Plan Overview

II. Hydrology
- II-1. Location
- II-2. Well System
- II-3. Hydrogeology
- II-4. Aquifer Susceptibility

III. Identification of the Wellhead Protection Areas
- III-1. Background
- III-2. Methods
- III-3. Results

IV. Potential Contaminant Source Inventory
- IV-1. Methods
- IV-2. Results

V. Management Strategy
- V-1. Sanitary Control Area
- V-2. Wellhead Protection Area

VI. Contingency Planning
- VI-1. Alternative Supply
- VI-2. Emergency Response Notification

VII. Concluding Remarks

VIII. Figures

IX. Appendices
- Appendix A: Well Reports
- Appendix B: Susceptibility Assessment
  Water Facilities Inventory
- Appendix C: Potential Contaminant Source List
  Notification Letters
- Appendix D: Resource Contacts

I. Introduction

I-1. Background

Congress enacted the Safe Drinking Water Act (SDWA) in 1974 with the goal of providing safe drinking water to all users of public water supplies. The SDWA gave the U.S. Environmental Protection Agency (EPA) the authority to develop a uniform national drinking water program, and to establish national standards for known or suspected drinking water contaminants. The 1986 SDWA amendments authorized two new provisions for groundwater protection. One of these was the Wellhead Protection (WHP) program. The SDWA allows each state to design its own WHP program in order to maximize program effectiveness at the local level. Each state's WHP activities are designed to protect land areas surrounding public water supply wells in order to prevent groundwater contamination.

The State of Washington requires that all Group A water systems (those serving fifteen or more connections or twenty-five or more people) develop WHP plans, as stated in the Washington Administrative Code (WAC 246-290). The Washington Department of Health (DOH) has established requirements, guidelines and materials to aid water systems in the development of their WHP plans. In order to help systems comply with WHP requirements, Evergreen Rural Water of Washington provides on-site assistance to small water systems. This assistance is provided at no cost to water systems through funding provided by the DOH and EPA.

I-2. Purpose

The purpose of WHP is to provide an organized approach to effectively protect drinking water supplies from contamination. The program seeks to identify and manage potential contaminant sources near public water supply wells in order to prevent future contamination. WHP safeguards the health of community residents and avoids negative financial impacts associated with contamination. The costs of contamination typically include the investigation of sites, installing treatment facilities, and/or locating new water sources, to name just a few. In fact, Washington State health officials have identified nearly twenty different direct and indirect costs associated with well contamination. To avoid these costs and ensure a safe, quality water supply, we need to protect groundwater at its source. WHP is a straightforward and cost effective method of accomplishing this goal.

I-3. Plan Overview

This WHP report includes the following elements:

- A competed susceptibility assessment.
- Identification of the WHP zones.
- An inventory of potential contaminant sources and land use activities.
- A discussion of the management strategy.
- Contingency and emergency response planning.
- Supporting information and documentation.

Upon completion of these elements, a Group A water system is expected to meet or exceed the requirements of Washington State's WHP program.

II. Hydrology

II-1. Location

Prairie Ridge Water System is located in Thurston County. The Prairie Ridge water system serves 98 connections at this time with a population of approximately 250 residents. The surrounding area is rural residential.

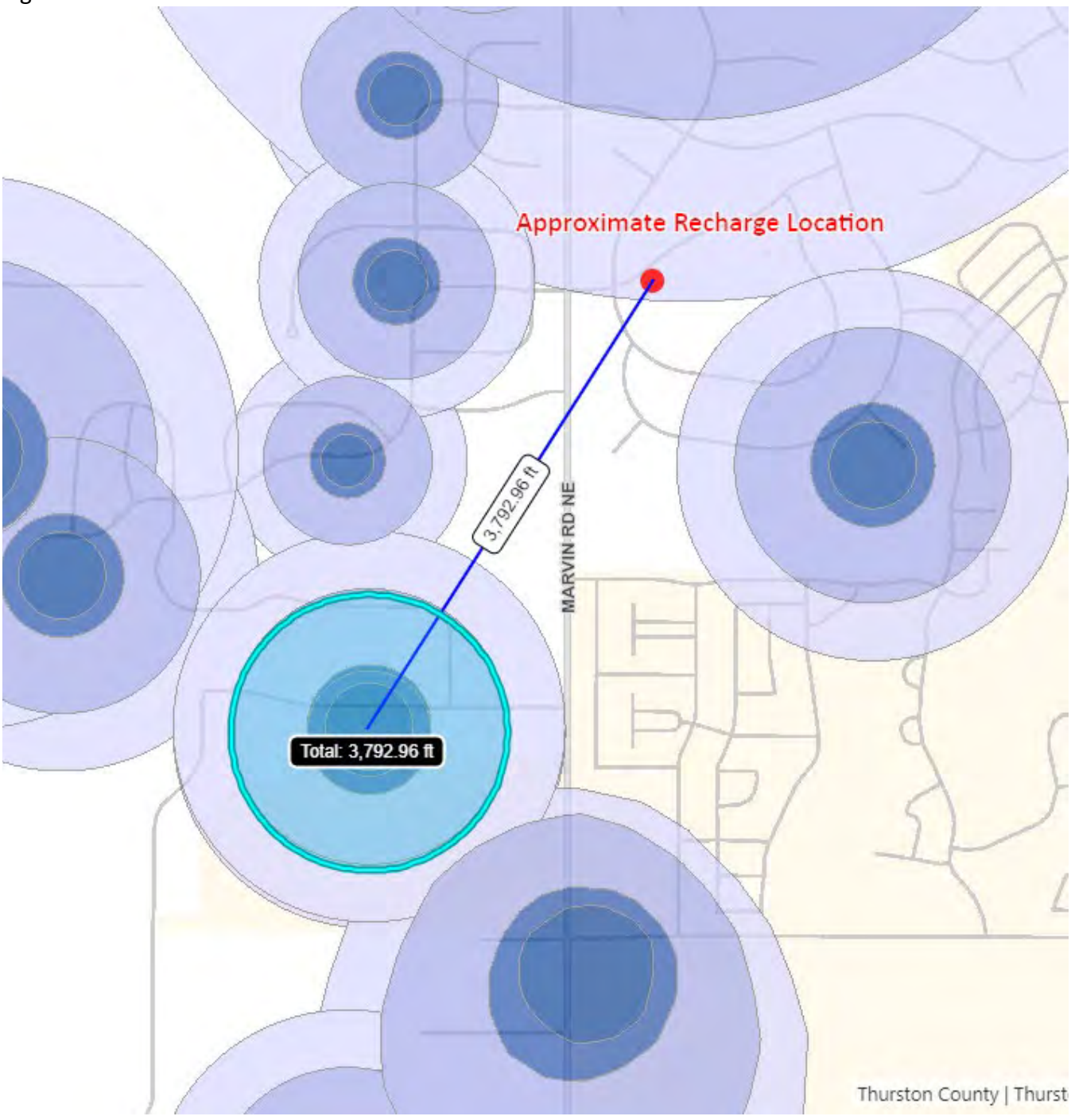
II-2. Well System

The Prairie Ridge water system maintains two ground water sources, which comprise a wellfield that is capable of producing excellent water. Water use for the system was metered at 12,786,116 gallons per year, in 2009. For details on the well construction refer to Well Logs.

II-3. Hydrogeology

After consulting with Thurston County, the water bearing strata appears to be Q_{VA} Vashon Glacier Advance Aquifer. It was previously thought to be Q_{VR} Vashon Recessional Outwash. However, Thurston County's modeling data suggests Q_{VR} is dry at this location. Q_{VA} lies below the till, rather than above, and provides an additional layer of protection to slow the process of contaminates. The recharge area is to the north east and is limited by surface recharge sources such as rain. Accordingly, water flows to the south / south west. It does not flow in a straight line, but rather curves as other wells draw water towards themselves. Recent field data is needed by Thurston County to draw an accurate protection area and to determine the size of the aquifer See Figure II-3 A

Figure II-3 A


Approximate Recharge Location
3,792.96 ft
MARVIN RD NE
Total: 3,792.96 ft
Thurston County | Thurst

II-4. Aquifer Susceptibility

Susceptibility is determined by conditions that affect the movement of groundwater, and thus contaminants, from the land surface into an aquifer. Susceptibility is a qualitative measure of how quickly and easily contamination at the surface can reach the groundwater supply. Vulnerability is directly related to a source's Susceptibility and the proximity of potentially hazardous activities, such as the use or storage of chemicals.

Confining units are critical to susceptibility determinations. In general, a confining unit is any earth material that does not readily transmit water. Typically layers of clay or shale may act as confining units, depending upon their thickness and lateral extent. When confining layers are present, wells are less susceptible to contamination because the layers impede the movement of contaminants from the land surface into underlying aquifers.

Prairie Ridge water system has provided to DOH the Ground Water Contamination Susceptibility Assessment Survey Forms for its well. SO3 (WF S01 & S02) received a MODERATE susceptibility rating from the State DOH. These ratings are based on several specific factors reported in the Susceptibility Assessment Survey. These factors include well depth, well seal, and the presence of confining units. The presence or condition of these factors can diminish the possibility that contaminants originating at the land surface could potentially affect the wells.

Washington State also uses the Susceptibility Assessment to classify the overall vulnerability of active wells. Vulnerability is composed of two factors: the physical susceptibility (as noted above) along with each source's risk of exposure to contaminants. The risk of exposure to contaminants is determined by whether or not contaminants were used in the area, or detected in the water supply.

III. Identification of the Wellhead Protection Areas

III-1. Background

Aquifer recharge occurs through the infiltration of precipitation and surface water in areas where the aquifer lies at or near the soil surface, or where confining units are thin or absent, permitting further infiltration into the aquifer. Ideally, all land areas that contribute recharge to the aquifer would be targeted for protection efforts. Unfortunately, the identification of precise recharge areas for wells is a technical and time-consuming process. Further, they can include vast areas, making them difficult to manage. To remedy these problems, the WHP program focuses protection efforts near the wellhead.

III-2. Methods

Several different methods may be used to determine the WHP areas. The most straightforward method accepted by the state is a calculated fixed radius (CFR). This method is also part of the Susceptibility Assessment, which is used to grant monitoring waivers. The CFR is an excellent preliminary WHP delineation method because it is easily implemented and inexpensive. Unfortunately, the CFR can over-simplify groundwater flow conditions and may or may not be very accurate depending upon site-specific conditions. Therefore, other more

complex delineation methods such as computer modeling and hydrogeologic mapping are encouraged, but not required for small systems.

Regardless of the method used, the state requires that the WHP areas include the sanitary control zone, along with the six month, one, five, and ten-year time of travel zones for groundwater. 'Time of travel' refers to the amount of time it would take for a particle of groundwater entering the aquifer at the boundary of the zone to reach the well after six months, one, five, or ten years of pumping.

III-3. Results

The CFR utilizes a volumetric flow equation to determine the WHPA radii:

$$r = \sqrt{Q\,t\,/\,\Pi\,n\,H}$$

Where:

Parameter	WHP Zone	S03		
r = calculated radius of protection zone (ft)	6 mo 1 year 5 year 10 year	438 619 1,384 1,957		
Q = pumping rate of well per year (cuft/yr)		2,644,385		
t = time of travel (years)		0.5,1,5,10		
Π = Pi		3.14		
n = estimated porosity (if unknown - 0.22)		.22		
H = Open interval or length of well screen (ft) ** use 10 ft if open borehole or spring		10		

The wellhead protection zones, 1, 5, and 10 year times of travel are included as Figure 1. Once again, it is important to emphasize that the WHPA demonstrated here is a useful planning tool, but may not represent actual groundwater capture zones for the wells. A more conclusive WHPA delineation would, however, require more specific information and additional financial resources that may not be available. Furthermore, developing an awareness of the system's contamination potential is of higher priority at this time.

IV. Potential Contaminant Source Inventory

IV-1. Methods

A field survey was conducted of the WHP zones in order to inventory potential sources of contamination and identify land use activities, which may pose threats to groundwater quality (Table 1). The planning team conducted windshield and walk-through surveys to identify potential contaminant sources. The type and location of all potential contamination sources identified were recorded on base maps of the WHPA (Figure 1).

IV-2. Results

Other than residential septic systems (See Table IV-2 A)and two stormwater ponds, no potential sources of contamination could be identified within the Prairie Ridge WHP Area. All residential septic systems receive their drinking water from the Prairie Ridge water system, making WHP management efforts straightforward.

One of the stormwater ponds is in the 5 year protection zone and is managed by a customer of Prairie Ridge. All stormwater that would accumulate has already traveled through the stormwater ditches in the right away before entering the pond. The other stormwater pond is in the 10 year protection zone and is managed by Forest Park Homeowners Association, Inc. As the other pond, water travels through stormwater ditches before entering the pond. Thurston PUD will keep there eye on both ponds. During inspection for this plan Prairie Ridge's pond had no water in it and Forest Park's looked to have an shallow accumulation of stormwater held in the pond due to tight soils and recent rainfaill. See pictures in Appendix E.

The most direct pathway of contamination into an aquifer is through surface water seepage along well casings. Poorly sealed wells (both public and private) and wells with deteriorated (rusted and/or cracked) casings can allow surface water to migrate into pristine aquifers below. This is caused by inadequate well construction and pertains to both abandoned wells and wells currently in use.

Because of the quality of the Prairie Ridge source wells, proper maintenance and periodic inspection should minimize this threat at the source wells. The existence and location of abandoned wells is poorly documented, making this aspect of wellhead protection difficult to address. If any abandoned wells are located, DOE's Northwestern Regional Office will be contacted for information regarding proper closure options.

Table IV-2A

Purple dots = septic systems

Provided by Thurston County QGIS Database – Kevin Hansen, Hydrogeologist

V. Management Strategy

V-1. Sanitary Control Area

Of primary concern are impacts from activities within the sanitary control area of the well. This area should already be tightly controlled to minimize direct contamination of the wells. This area should also be managed to reduce the possibility of surface flows reaching the wells and traveling down the casing.

The wells are located on Thurston PUD property. The wells are secured safely inside a locked doghouse and are located adjacent to residential property.

V-2. Wellhead Protection Area

Because WHPA's typically include diverse land use areas, it is important citizens and businesses be informed that they can have a direct impact on the quality of groundwater. To accomplish this, a public education campaign is required to inform WHP Area residents and businesses of the sensitivity of their location above the drinking water supply.

Residents have been mailed a letter (Appendix C) informing them about the sensitivity of their location with regards to their groundwater supply. These letter included information regarding the safe disposal of hazardous chemicals, the proper use of septic systems.

VI. Contingency Planning

VI-1. Alternative Supply

A contingency plan is needed in the event that a contamination event or natural disaster results in the temporary or permanent loss of any or all of the wells. The contingency plan identifies the amount of water required to sustain the community on a daily basis and the alternative sources of supply for both short term and long term emergencies. This also includes a firm understanding of the costs and difficulties of siting and drilling a replacement well.

The Prairie Ridge water system maintains two source wells (S03) and the system maintains 79,830 gallons storage capacity. In the event of a prolonged power outage, Thurston PUD will bring in a gas powered generator. In the event of well failure or aquifer contamination the water system has no backup water supply, and would be faced with well replacement. The system is aware of the expense and difficulty involved with siting, constructing and bringing a new well online. Thurston PUD and the community are prepared to undertake this process in the event of aquifer contamination or complete well failure. For an alternative supply until well replacement could be facilitated, trucking water from a neighboring water system is the only possibility. Neighboring systems, which the PUD owns several, have been contacted including City of Lacey and are capable of providing an emergency supply. The system will also contact the County Emergency Government Office for assistance.

VI-2. Emergency Response

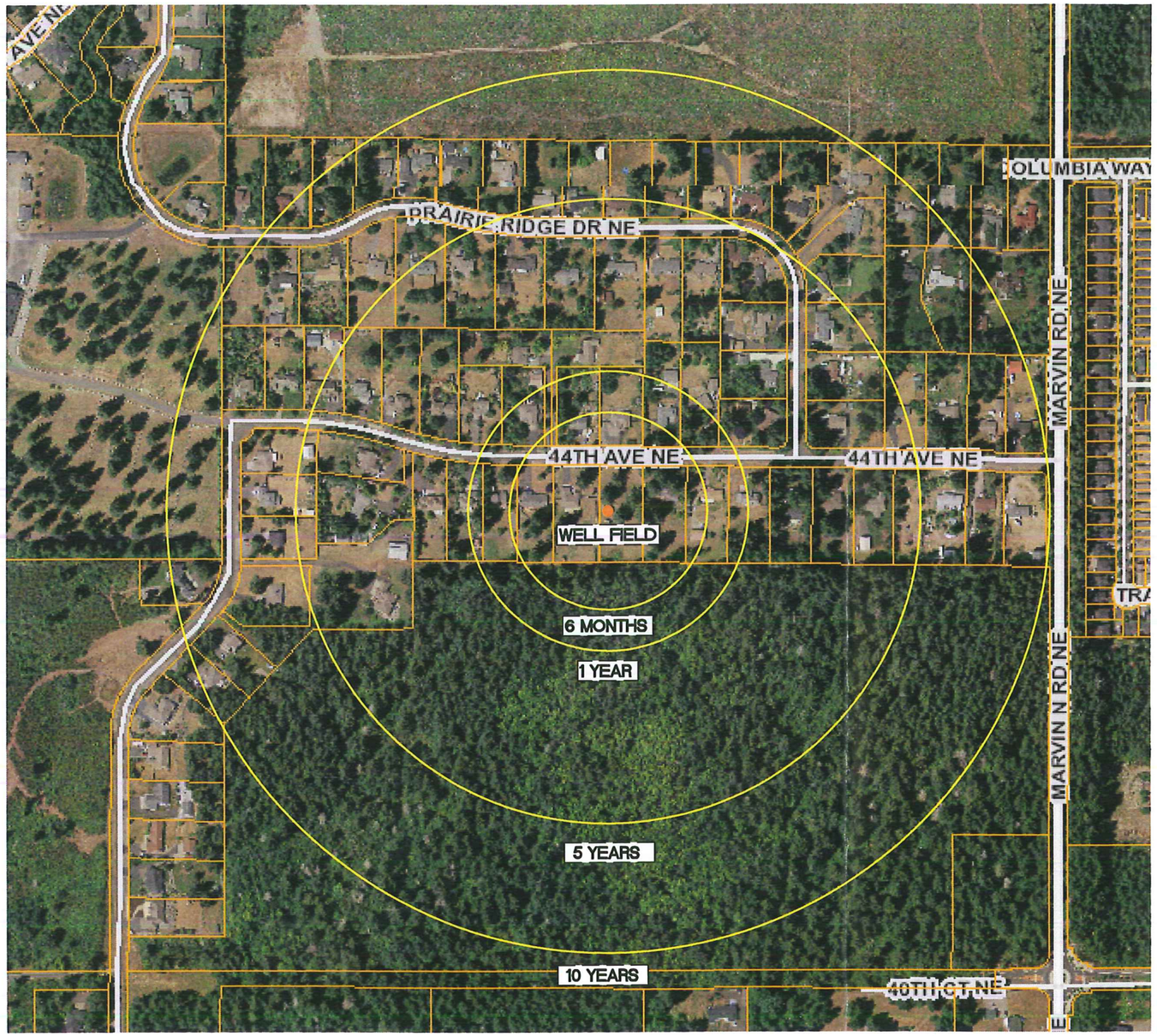
As with anywhere, a hazardous spill event is possible within the Prairie Ridge WHPA. An incident/spill response notice (Appendix C) has been sent to local emergency responders and planning agencies notifying them of the location of Prairie Ridge WHPA and the potential contaminant sources. After assessing the water system's vulnerability, these agencies will evaluate whether changes in hazardous spill, disaster response, and future planning procedures are needed to adequately protect the Prairie Ridge's water supply.

VII. Concluding Remarks

Prairie Ridge water system is in a good position to continue providing a safe and reliable drinking water supply. The community recognizes that the most effective way to protect their water supply is to prevent contamination. This plan serves the interests of Prairie Ridge residents by protecting their drinking water supply at minimal cost to consumers, while maintaining compliance with drinking water program regulations. With the continued dedication of the water operator and a heightened awareness of groundwater protection by residents and local businesses, Prairie Ridge is likely to have a clean, reliable water supply far into the future.

VIII. Figures

1. Wellhead Protection Area Map



SCALE: 1 INCH = 500 FEET

0 250 500 1000

LEGEND

TIME OF TRAVEL RADIUS

TIME OF TRAVEL	
6 MONTH	305 FT.
1 YEAR	432 FT.
5 YEARS	965 FT.
10 YEARS	1365 FT.

$$r = \sqrt{\frac{Q*t}{\pi*n*H}}$$

WHERE:

- Q = PUMPING RATE = 1,286,925 FT^3/YEAR
- t = TIME OF TRAVEL IN YEARS
- n = SOIL POROSITY = ASSUMED TO BE 0.22
- H = THE SCREENED INTERVAL = 10 FT
- π = PI = 3.1416
- r = RADIUS IN FEET

WELL HEAD PROTECTION AREA MAP

AERIAL DATA FROM THURSTON COUNTY GEODATA.

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil and Municipal Engineering and Planning
Jerome W. Morrissette & Associates Inc., P.S.
1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

DE 05/31/2019 DESIGNED BY DATE
MH 05/31/2019 C.A.D.D. BY DATE
DE 05/31/2019 CHECKED BY DATE

THURSTON COUNTY
PUD 1

PRAIRIE RIDGE WATER SYSTEM
WELL FIELD TIME OF TRAVEL

JWM&A NO. 17133

SHT 1 OF 1

IX. Appendices

Appendix A: Well Reports

Appendix B: Ground Water Contamination Susceptibility Assessment

Water Facilities Inventory

Appendix C: Potential Contaminant Source List

Notification Letters

Appendix D: Resource Contacts

Appendix A:

Well Reports

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name ROBERT DROHMAN Address P.O. BOX H

(2) LOCATION OF WELL: County THURSTON — SE ¼ NW ¼ Sec. 34 T. 19 N., R. 1W W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [ ] Jetted [ ]

(5) DIMENSIONS: Diameter of well 8" inches.
Drilled 173' 2½" ft. Depth of completed well 174 ½ ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8" Diam. from 0 ft. to 163' 7" ft.
Threaded [ ] ." Diam. from ft. to ft.
Welded [ ] ." Diam. from ft. to ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [X] No [ ] JOHNSON
Manufacturer's Name
Type Model No
Diam. 8 Slot size 30 from TOP ft. to 5' ft.
Diam. Slot size 30 from BOTT. ft. to 5' ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 133' 7" ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
			N/A		

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
BROWN TOP SOIL SANDY CLAY	0	3
BROWN CLAY BOUND GRAVEL	3	22
GREY CEMENTED GRAVEL	22	45
" " "	45	69
BROWN CLAY BOUND GRAVEL	69	72
GRAY HARD PAN	72	80
GRAY HARD PAN, BOULDERS	80	105
GRAY SAND-GRAVEL, TR WATER	105	108
GRAY HARD PAN	108	130
BROWN CEMENTED SAND, COB.	130	142
GRAY CEMENTED GRAVEL	142	149
BROWN HARD PAN	149	152
BOT. OUT, BROWN HARD PAN	152	173

RECEIVED
SEP 23 1980
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

Work started 19 Completed 19

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME KINCY HARDWARE INC.
(Person, firm, or corporation) (Type or print)

Address 2643 MOTTMAN RD. SW

[Signed] Ray McGill
(Well Driller)

License No. C165 Date July 28, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

The Department of Ecology does NOT [illegible]rranty the Data and/or the Information on this W[illegible] Report.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Well Tagging Form

PWS ID #: 02356 Source #: S01

Unique Well Tag No: AKY 156

RECORD VERIFICATION (check ✓ one)

- [x] Well Report available *(please attach this form to the well report and submit it to the Ecology Regional Office near you)*
- [ ] Verification inconclusive
- [ ] Well Report not available

RECEIVED
JAN 15 2009
DEPARTMENT OF ECOLOGY

PUBLIC WATER SYSTEM INFORMATION

Water System Name: Prairie Ridge c/o Robert Drahman

Street Address: 4326 Legacy Drive NE

City: Olympia State: WA 98516

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address: 7045 44th Ave NE

City: Olympia WA County: Thurston

T. _____ N. R. _____ _____ W.M. Sec. _____ _____ 1/4 of the _____

FOR AGENCY USE ONLY

Latitude _____ ° _____ ' _____ " _____

Longitude _____ ° _____ ' _____ " _____

- [ ] GPS
- [ ] Topographic Map
- [ ] Survey
- [ ] Computer generated

Elevation at land surface _____ feet/meters *(circle one)*

- [ ] Digital Altimeter
- [ ] Topographic Map
- [ ] Other _____

Additional information, if available:

- [ ] Location marked on topographic map *(please attach)*
- [x] Location marked on air photo *(please attach)*

The Department of Ecology does NOT W[illegible]rranty the Data and/or the Information on this W[illegible] Report.

FOR AGENCY USE ONLY

WELL CHARACTERISTICS

Physical Description of well (size of casing, type of well, housing, etc.)

8" casing 173' deep

Location of Well identification Tag:

banded on well discharge pipe

Was supplemental tag needed for ease of identifying well? ☐ Yes ☒ No

If yes, where was tag placed? _____

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

Scale 1:24,000 (1"=2,000')

Indicate the location of the well within the Section by drawing a dot at that point.

SECTION 34 F

COMMENTS:

FOR ECOLOGY WATER RESOURCES PROGRAM ONLY

Water Right # _____ Date Issued _____

Circle One: Application Permit Certificate Claim Exempt

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W026340

Water Right Permit No. AAE 334 98376

(1) OWNER: Name BOB DROHMAN Address 4411 MARVIN RD NE OLYMPIA WA

(2) LOCATION OF WELL: County THURSTON NE ¼ NE ¼ Sec 34 T 19 N., R 1W W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) 4411 MARVIN RD NE 98516

(3) PROPOSED USE: [X] Domestic [ ] Irrigation [ ] DeWater Industrial [ ] Test Well [ ] Municipal [X] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) 2
Abandoned [ ] New well [X] Deepened [ ] Reconditioned [ ] Method: Dug [ ] Cable [X] Rotary [ ] Bored [ ] Driven [ ] Jetted [ ]

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 181 feet. Depth of completed well 182 9⅛ ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8" Diam. from 0 ft. to 170 3⅛ ft.
Welded [X] " Diam. from ___ ft. to ___ ft.
Liner installed [ ] " Diam. from ___ ft. to ___ ft.
Threaded [ ]

Perforations: Yes [ ] No [X]
Type of perforator used ___
SIZE of perforations ___ in. by ___ in.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.

Screens: Yes [X] No [ ]
Manufacturer's Name HOWARD SMITH
Type STAINLESS Model No. ___
Diam. 8 Slot size .040 from 170 3⅛ ft. to 180 9⅛ ft.
Diam. ___ Slot size ___ from ___ ft. to ___ ft.

Gravel packed: Yes [ ] No [X] Size of gravel ___
Gravel placed from ___ ft. to ___ ft.

Surface seal: Yes [X] No [ ] To what depth? 20 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? ___ Depth of strata ___
Method of sealing strata off ___

(7) PUMP: Manufacturer's Name UNKNOWN
Type: ___ H.P. ___

(8) WATER LEVELS: Land-surface elevation above mean sea level 350 ? ft.
Static level 140 ft. below top of well Date 1-22-95
Artesian pressure ___ lbs. per square inch Date ___
Artesian water is controlled by ___ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom? ___
Yield: ___ gal./min. with ___ ft. drawdown after ___ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ___
Bailer test 20 gal./min. with 0 ft. drawdown after 2 hrs.
Airtest ___ gal./min. with stem set at ___ ft. for ___ hrs.
Artesian flow ___ g.p.m. Date ___
Temperature of water COLD Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
COMPACT BROWN SILTS GRAVEL	0	130
LOOSE GRAVEL	130	134
COMPACT SILTS AND GRAVEL.	134	144
SAND AND GRAVEL	144	181
	STOP	
NOT END OF FORMATION		

RECEIVED '95 JAN 31 P2:46 S.W. REGIONAL OFFICE

Work started 11-25-94, 19. Completed 1-22-95, 19

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME KEITH KINCY WELL DRILLING (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 221 RUBY ST TUMWATER WA
(Signed) [signature] (WELL DRILLER) License No. 0242
Contractor's Registration No. KEITHKW093KA Date JAN-23, 1995

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329-

The Department of Ecology does NOT Warrant the Data and/or the Information on this Well Report

Appendix B:

Susceptibility Assessments
Water Facilities Inventory

WATER FACILITIES INVENTORY (WFI) FORM

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

ONE FORM PER SYSTEM

Quarter: 1
Updated: 01/15/2019
Printed: 5/31/2019
WFI Printed For: On-Demand
Submission Reason: Contact Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
02356 W	PRAIRIE RIDGE 605	THURSTON	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

KIMBERLY S. GUBBE [COMPLIANCE DIRECTOR]
1230 RUDDELL RD SE
LACEY, WA 98503

7. OWNER NAME & MAILING ADDRESS | **8. OWNER NUMBER: 018163**

PUD NO 1 OF THURSTON COUNTY — GENERAL MANAGER
JOHN G. WEIDENFELLER
1230 RUDDELL RD. SE.
LACEY, WA 98503

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: xxx xxx-xxxx		Owner Daytime Phone: (360) 357-8783	
Primary Contact Mobile/Cell Phone: xxx xxxx-xxxx		Owner Mobile/Cell Phone: (360) 628-0080	
Primary Contact Evening Phone: xxx xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax: (360) 357-1172	E-mail: xxxxxxxxxxxxxxxxxxx	Fax: (360) 357-1172	E-mail: xxxxxxxxxxxxxxxxxxx

SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☒ Owned and Managed — SMA NAME: PUD No 1 of Thurston County — SMA Number: 147
- ☐ Managed Only
- ☐ Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- ☐ Agricultural
- ☐ Commercial / Business
- ☐ Day Care
- ☐ Food Service/Food Permit
- ☐ 1,000 or more person event for 2 or more days per year
- ☐ Hospital/Clinic
- ☐ Industrial
- ☐ Licensed Residential Facility
- ☐ Lodging
- ☐ Recreational / RV Park
- ☒ Residential
- ☐ School
- ☐ Temporary Farm Worker
- ☐ Other (church, fire station, etc.):

13. WATER SYSTEM OWNERSHIP (mark only one)

- ☐ Association
- ☐ City / Town
- ☐ County
- ☐ Federal
- ☐ Investor
- ☐ Private
- ☒ Special District
- ☐ State

14. STORAGE CAPACITY (gallons)

79,830

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE				TREATMENT						DEPTH					
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN TERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
	Well #1 WW AKY156				X							X			Y	X						174	55	NW NE	34	19N	01W
S02	Well #2 WW AAE334				X							X			Y	X						170	82	NW NE	34	19N	01W
S03	WF (S01 & S02)			X								X			Y	X						170	137	NW NE	34	19N	01W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
02356 W	PRAIRIE RIDGE 605	THURSTON	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		100	123
A. Full Time Single Family Residences (Occupied 180 days or more per year)	100		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	0		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	0
28. TOTAL SERVICE CONNECTIONS		100	123

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 250

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?												
B. How many days per month is water accessible to the public?												

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	1	1	1	1	1	1	1	1	1	1	1	1

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: Kim Gubbe DATE: 5/31/2019

PRINT NAME: Kim Gubbe TITLE: DPC

Note on Susceptibility Assessments

Three Susceptibility Assessment forms are provided in the following order: Wellfield (S03), Well 1 (S01), and well 2 (S02). The annual volume of water pumped is the total gallons pumped in 2017 per meter records. See VIII. Figures for the Wellhead Protection Area Map. The time of travel radii calculated for the wellfield (S03) apply to wells 1 and 2 because they operate as a wellfield and both wells have the same length of open interval (screened interval length).

Washington State Department of Health
Environmental Health Programs
Division of Drinking Water

Ground Water Contamination
Susceptibility Assessment Survey Form

Complete **one** form for **each** ground water source (well, wellfield, spring) used in your water system (photocopy as necessary).

PART I: System Information

Well owner/manager: Thurston Public Utility District No. 1

Water system name: Prairie Ridge 605

County: Thurston

Water system ID number: 02356 W Source number: S03, Wellfield

Well depth: n/a feet

Source name: Wellfield (Composed of Well 1, SO1, and Well 2 (SO2)

WA well identification tag number: AKY-156 (SO1), AAE-334 (SO2)

☐ Well not tagged

Number of connections: 100 Population served: 248

Township: 19N Range: 1W

Section: 34 ¼ ¼ Section: NW ¼, NE 1/4

Latitude/longitude (if available): _____/_____

How was latitude/longitude determined?

_____Global positioning device_____survey_____topographical map
_____other:_____

*Please refer the instructions for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: ___/___/___month/day/year

last reconstruction: ___/___/___month/day/year

❑ Information unavailable

2) Well driller:_____

_____

_____

❑ Well driller unknown

3) Type of well: ___ Drilled: ❑ rotary ❑ bored ❑cable (percussion) ❑ Dug

___ other: ❑ spring(s) ❑ lateral collector (Ranney)

❑ driven ❑ jetted ❑ other:_____

4) Well report available ❑ Yes (attach copy to form) ❑ No

5) Average pumping rate: _____(gallons/min)

Source of information_____

If not documented, how was pumping rate determined?_____

_____

❑ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

❑ disinfection ❑ filtration ❑ carbon filter ❑ air stripper ❑ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

_____

7) If source is chlorinated, is a chlorine residual maintained: ❑ Yes ❑ No

Residual level:_____ (At the point closest to the source.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

❑ <20 ft ❑ 20-50ft ❑ 50-100ft ❑ 100-200ft ❑ >200ft

❑ information unavailable

2) Depth to ground water (static water level):

❑ <20ft ❑ 20-50ft ❑ 50-100ft ❑ >100ft

❑ flowing well/spring (artesian)

How was water level determined?

❑ well log ❑ other _____

❑ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch) **or**

_____feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ❑ Yes ❑ No

5) Wellhead elevation (height above mean sea level): _____ feet

How was elevation determined? ❑ topographic map ❑ Drilling/Well Log ❑ altimeter

❑ other:_____

❑ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_____ evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? ❑ Yes ❑ No

❑ information unavailable

7) Sanitary setback:

☐ < 100ft* ☐ 100-120ft ☐ 120-200 ft ☐ >200ft

* If less than 100ft, describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

☐ wellhead enclosed in a wellhouse

☐ controlled access (describe): _____

_____

☐ other uses for wellhouse (describe): _____

_____

☐ no wellhead control

9) Surface seal:

☐ 18 ft

☐ <18 ft (no Department of Ecology approval)

☐ <18 ft (Approved by Ecology, include documentation)

☐ depth of seal unknown

☐ no surface seal

10) Annual rainfall (inches per year):

☐ <10 in/yr ☐ 10-25 in/yr ☒ >25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 9,626,200 (gallons)

How was this determined?

☒ meter

☐ estimated: ☐ pumping rate (_____)

☐ pump capacity (_____)

☐ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6-month ground water travel time: 305 feet

1-year ground water travel time: 432 feet

5-year ground water travel time: 965 feet

10-year ground water travel time: 1365 feet

Information available on length of screened/open interval?

☒ Yes ☐ No

Length of screened/open interval: 10 (for both S01, S02) feet

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6- month time of travel boundary?

☐ Yes ☒ No (mark and identify on map)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time of travel boundary?

☒ Yes ☐ No (mark and identify on map)

Comments: Private septic systems

PART V: Assessment of Water Quality

1) **Regional sources of risk to ground water**:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five-year ground water travel time. If you do not know if one of the following is present, mark the "unknown" space.

	6-month	1-year	5-year	unknown
• likely pesticide application				
• stormwater injection wells				
• other injection wells				
• abandoned ground water well				
• landfills, dumps, disposal areas				
• known hazardous materials clean-up site				
• water system(s) with known quality problems				
• population density >1 house/acre			Y	
• residences commonly have septic tanks	Y	Y	Y	
• Wastewater treatment lagoons				
• sites used for land application of waste				

Mark and identify on map any of the risks listed above which are located within the 6-month time of travel boundary. (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten-year time of travel circular zone around your water supply, please describe:

2) **Source-specific water quality records:** For each type of test below, mark the row that applies to the sample results for this source. Consider all the sample results from the past 12 years. (MCLs are noted next to the specific test or listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)

Results greater than MCL _____

<2 mg/liter nitrate _____

2-5 mg/liter nitrate _____

<5 mg/liter nitrate _____

Nitrate sampling records unavailable _____

B. **VOCs:** (VOC detection level is 0.5 ug/l or 0.0005 mg/l)

Results greater than MCL or SAL _____

VOCs detected at least once _____

VOCs never detected _____

VOC sampling records unavailable _____

C. **EDB/DBCP:**

(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

EDB/DBCP detected below MCL at least once _____

EDB/DBCP detected above MCL at least once _____

EDB/DBCP never detected _____

EDB/DBCP tests required but not yet completed _____

EDB/DBCP tests not required _____

D. **Other SOCs (Pesticides):**

Other SOCs detected

(pesticides and other synthetic organic chemicals)_____

Other SOC tests performed but none detected

(list test methods in comments) _____

Other SOC tests not performed _____

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here:_____

_____

_____

_____

E. **Bacterial contamination:**

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)? _____

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source? _____

Source sampling records for bacteria unavailable _____

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

☐ Yes ☒ No

Describe with references to map produced in Part IV:

_____

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

☐ Yes ☐ No

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

☐ Yes ☐ No

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

☐ Yes ☐ No

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within…

	YES	NO	unknown
<6-month travel time	_____	X	_____
6 month—1 year travel time	_____	X	_____
1—5 year travel time	_____	X	_____
5—10 year travel time	_____	X	_____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within…

	YES	NO	unknown
<1-year travel time	_____	X	_____
1—5 year travel time	_____	X	_____
5—10 year travel time	_____	X	_____

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

_____

_____

_____

_____

_____

_____

_____

FORM COMPLETED BY:

Doug Eklund — June 20, 2019

Print Name — Date

Signature

Washington State Department of Health
Environmental Health Programs
Division of Drinking Water

Ground Water Contamination
Susceptibility Assessment Survey Form

Complete **one** form for **each** ground water source (well, wellfield, spring) used in your water system (photocopy as necessary).

PART I: System Information

Well owner/manager: Thurston Public Utility District No. 1

Water system name: Prairie Ridge 605

County: Thurston

Water system ID number: 02356 W Source number: SO1 (Component of Well Field SO3)

Well depth: 173 feet

Source name: Well 1 (S01)

WA well identification tag number: AKY-156

☐ Well not tagged

Number of connections: 100 Population served: 248

Township: 19N Range: 1W

Section: 34 ¼ ¼ Section: NW 1/4, NE 1/4

Latitude/longitude (if available): 47°05'40.00"N / 122°47'11.06"W

How was latitude/longitude determined?

_____Global positioning device_____survey_____topographical map
__X__Other: __Google Earth__

*Please refer the instructions for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 07/28/1980 month/day/year

last reconstruction: ___/___/___month/day/year

☐ Information unavailable

2) Well driller: Kincy Hardware Inc.

☐ Well driller unknown

3) Type of well: ___ Drilled: ☐ rotary ☐ bored ☒ cable (percussion) ☐ Dug

___ other: ☐ spring(s) ☐ lateral collector (Ranney)

☐ driven ☐ jetted ☐ other:_____

4) Well report available ☒ Yes (attach copy to form) ☐ No

5) Average pumping rate: 55 (gallons/min)

Source of information Clocked pump, check previous Water System Plan

If not documented, how was pumping rate determined?_____

☐ Pumping rate unknown

6) Is this source treated? No

If so, what type of treatment:

☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained: ☐ Yes ☐ No

Residual level:_____ (At the point closest to the source.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

☐ <20 ft ☐ 20-50ft ☐ 50-100ft ☒ 100-200ft ☐ >200ft

☐ information unavailable

2) Depth to ground water (static water level):

☐ <20ft ☐ 20-50ft ☐ 50-100ft ☒ >100ft

☐ flowing well/spring (artesian)

How was water level determined?

☒ well log ☐ other _____

☐ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch) **or**

_____feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ☐ Yes ☐ No

5) Wellhead elevation (height above mean sea level): __282__ feet

How was elevation determined? ☒ topographic map ☐ Drilling/Well Log ☐ altimeter

☐ other:_____

☐ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_____X_____ evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? ☐ Yes ☒No

☐ information unavailable

7) Sanitary setback:

☐ < 100ft* ☒ 100-120ft ☐ 120-200 ft ☐ >200ft

* If less than 100ft, describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

☒ wellhead enclosed in a wellhouse

☐ controlled access (describe): _____

_____

☐ other uses for wellhouse (describe): _____

_____

☐ no wellhead control

9) Surface seal:

☒ 18 ft

☐ <18 ft (no Department of Ecology approval)

☐ <18 ft (Approved by Ecology, include documentation)

☐ depth of seal unknown

☐ no surface seal

10) Annual rainfall (inches per year):

☐ <10 in/yr ☐ 10-25 in/yr ☒ >25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 9,626,200 (gallons)

How was this determined?

☒ meter

☐ estimated: ☐ pumping rate (_____)

☐ pump capacity (_____)

☐ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6-month ground water travel time: 305 feet

1-year ground water travel time: 432 feet

5-year ground water travel time: 965 feet

10-year ground water travel time: 1365 feet

Information available on length of screened/open interval?

☒ Yes ☐ No

Length of screened/open interval: 10 feet

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6- month time of travel boundary?

☐ Yes ☒ No (mark and identify on map)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time of travel boundary?

☒ Yes ☐ No (mark and identify on map)

Comments: Private septic systems.

PART V: Assessment of Water Quality

1) **Regional sources of risk to ground water:**

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five-year ground water travel time. If you do not know if one of the following is present, mark the "unknown" space.

	6-month	1-year	5-year	unknown
• likely pesticide application				
• stormwater injection wells				
• other injection wells				
• abandoned ground water well				
• landfills, dumps, disposal areas				
• known hazardous materials clean-up site				
• water system(s) with known quality problems				
• population density >1 house/acre			Y	
• residences commonly have septic tanks	Y	Y	Y	
• Wastewater treatment lagoons				
• sites used for land application of waste				

Mark and identify on map any of the risks listed above which are located within the 6-month time of travel boundary. (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten-year time of travel circular zone around your water supply, please describe:

2) **Source-specific water quality records:** For each type of test below, mark the row that applies to the sample results for this source. Consider all the sample results from the past 12 years. (MCLs are noted next to the specific test or listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)

Results greater than MCL	_____
<2 mg/liter nitrate	_____
2-5 mg/liter nitrate	X
<5 mg/liter nitrate	_____
Nitrate sampling records unavailable	_____

B. **VOCs:** (VOC detection level is 0.5 ug/l or 0.0005 mg/l)

Results greater than MCL or SAL	_____
VOCs detected at least once	_____
VOCs never detected	X
VOC sampling records unavailable	_____

C. **EDB/DBCP:**
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

EDB/DBCP detected below MCL at least once	_____
EDB/DBCP detected above MCL at least once	_____
EDB/DBCP never detected	_____
EDB/DBCP tests required but not yet completed	_____
EDB/DBCP tests not required	X

D. **Other SOCs (Pesticides):**

Other SOCs detected (pesticides and other synthetic organic chemicals)	_____
Other SOC tests performed but none detected (list test methods in comments)	_____
Other SOC tests not performed	X

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here:_____

_____

_____

_____

E. **Bacterial contamination:**

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)? __No__

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source? __No__

Source sampling records for bacteria unavailable _____

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

☐ Yes ☒ No

Describe with references to map produced in Part IV:

_____

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

☐ Yes ☒ No

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

☐ Yes ☒ No

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

☐ Yes ☒ No

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within…

	YES	NO	unknown
<6-month travel time	_____	X	_____
6 month—1 year travel time	_____	X	_____
1—5 year travel time	_____	X	_____
5—10 year travel time	_____	X	_____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within…

	YES	NO	unknown
<1-year travel time	_____	X	_____
1—5 year travel time	_____	X	_____
5—10 year travel time	_____	X	_____

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

_____

_____

_____

_____

_____

_____

_____

FORM COMPLETED BY:

DOUG EKLUND — JUNE 20, 2019

Print Name — Date

Signature

Washington State Department of Health
Environmental Health Programs
Division of Drinking Water

Ground Water Contamination
Susceptibility Assessment Survey Form

Complete **one** form for **each** ground water source (well, wellfield, spring) used in your water system (photocopy as necessary).

PART I: System Information

Well owner/manager: Thurston Public Utility District No. 1

Water system name: Prairie Ridge 605

County: Thurston County

Water system ID number: 02356 W Source number: SO2 (Component of Well Field SO3)

Well depth: 182 feet

Source name: Well 2 (S02)

WA well identification tag number: AAE-334

☐ Well not tagged

Number of connections: 100 Population served: 248

Township: 19N Range: 01W

Section: 34 ¼ ¼ Section: NW 1/4, NE 1/4

Latitude/longitude (if available): 47°05'40.00"N / 122°47'11.06"W

How was latitude/longitude determined?

_____Global positioning device _____survey _____topographical map
__X__other: Google Earth

*Please refer the instructions for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 01/22/1995 month/day/year

last reconstruction: ___/___/___month/day/year

☐ Information unavailable

2) Well driller: Keith Kincy Well Drilling

☐ Well driller unknown

3) Type of well: ___ Drilled: ☐ rotary ☐ bored ☒ cable (percussion) ☐ Dug

___ other: ☐ spring(s) ☐ lateral collector (Ranney)

☐ driven ☐ jetted ☐ other:

4) Well report available ☒ Yes (attach copy to form) ☐ No

5) Average pumping rate: 82 (gallons/min)

Source of information Clocked pump, check previous Water System Plan

If not documented, how was pumping rate determined?

☐ Pumping rate unknown

6) Is this source treated? No.

If so, what type of treatment:

☐ disinfection ☐ filtration ☐ carbon filter ☐ air stripper ☐ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained: ☐ Yes ☐ No

Residual level:_____ (At the point closest to the source.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

☐ <20 ft ☐ 20-50ft ☐ 50-100ft ☒ 100-200ft ☐ >200ft

☐ information unavailable

2) Depth to ground water (static water level):

☐ <20ft ☐ 20-50ft ☐ 50-100ft ☒ >100ft

☐ flowing well/spring (artesian)

How was water level determined?

☒ well log ☐ other _____

☐ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch) **or**

_____feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ☐ Yes ☐ No

5) Wellhead elevation (height above mean sea level): __282__ feet

How was elevation determined? ☒ topographic map ☐ Drilling/Well Log ☐ altimeter

☐ other:_____

☐ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_____X_____ evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? ☐ Yes ☒ No

☐ information unavailable

7) Sanitary setback:

☐ < 100ft* ☒ 100-120ft ☐ 120-200 ft ☐ >200ft

* If less than 100ft, describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

☒ wellhead enclosed in a wellhouse

☐ controlled access (describe): _____

_____

☐ other uses for wellhouse (describe): _____

_____

☐ no wellhead control

9) Surface seal:

☒ 18 ft Note: Listed at 20 ft. in Well Log.

☐ <18 ft (no Department of Ecology approval)

☐ <18 ft (Approved by Ecology, include documentation)

☐ depth of seal unknown

☐ no surface seal

10) Annual rainfall (inches per year):

☐ <10 in/yr ☐ 10-25 in/yr ☒ >25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 9,626,200 (gallons)

How was this determined?

☒ meter

☐ estimated: ☐ pumping rate (_____)

☐ pump capacity (_____)

☐ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6-month ground water travel time: 305 feet

1-year ground water travel time: 432 feet

5-year ground water travel time: 965 feet

10-year ground water travel time: 1365 feet

Information available on length of screened/open interval?

☒ Yes ☐ No

Length of screened/open interval: 10 feet

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6- month time of travel boundary?

☐ Yes ☒ No (mark and identify on map)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time of travel boundary?

☒ Yes ☐ No (mark and identify on map)

Comments: Private septic systems.

PART V: Assessment of Water Quality

1) **Regional sources of risk to ground water**:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five-year ground water travel time. If you do not know if one of the following is present, mark the "unknown" space.

	6-month	1-year	5-year	unknown
• likely pesticide application				
• stormwater injection wells				
• other injection wells				
• abandoned ground water well				
• landfills, dumps, disposal areas				
• known hazardous materials clean-up site				
• water system(s) with known quality problems				
• population density >1 house/acre			Y	
• residences commonly have septic tanks	Y	Y	Y	
• Wastewater treatment lagoons				
• Site used for land application of waste				

Mark and identify on map any of the risks listed above which are located within the 6-month time of travel boundary. (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten-year time of travel circular zone around your water supply, please describe:

2) **Source-specific water quality records**: For each type of test below, mark the row that applies to the sample results for this source. Consider all the sample results from the past 12 years. (MCLs are noted next to the specific test or listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)

Results greater than MCL	_____
<2 mg/liter nitrate	_____
2-5 mg/liter nitrate	X
<5 mg/liter nitrate	_____
Nitrate sampling records unavailable	_____

B. **VOCs:** (VOC detection level is 0.5 ug/l or 0.0005 mg/l)

Results greater than MCL or SAL	_____
VOCs detected at least once	_____
VOCs never detected	X
VOC sampling records unavailable	_____

C. **EDB/DBCP:**

(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

EDB/DBCP detected below MCL at least once	_____
EDB/DBCP detected above MCL at least once	_____
EDB/DBCP never detected	_____
EDB/DBCP tests required but not yet completed	_____
EDB/DBCP tests not required	X

D. **Other SOCs (Pesticides):**

Other SOCs detected (pesticides and other synthetic organic chemicals)	_____
Other SOC tests performed but none detected (list test methods in comments)	_____
Other SOC tests not performed	X

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here:_____

_____

_____

_____

E. **Bacterial contamination:**

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)? N_____

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source? N_____

Source sampling records for bacteria unavailable N_____

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

☐ Yes ☒ No

Describe with references to map produced in Part IV:

_____

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

☐ Yes c No

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

☐ Yes ☒ No

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

☐ Yes ☒ No

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within…

	YES	NO	unknown
<6-month travel time	_____	X	_____
6 month—1 year travel time	_____	X	_____
1—5 year travel time	_____	X	_____
5—10 year travel time	_____	X	_____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within…

	YES	NO	unknown
<1-year travel time	_____	X	_____
1—5 year travel time	_____	X	_____
5—10 year travel time	_____	X	_____

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

_____

_____

_____

_____

_____

_____

_____

FORM COMPLETED BY:

Doug Eklund — June 20, 2019

Print Name — Date

Signature

Appendix C:

Potential Contaminant Source List
Notification Letters

Prairie Ridge #605 Water System

WHP Area Potential Contaminant Source List

Potential Contaminant Source	Address	Phone Number
Residential Septic System	All within WHPA	
Stormwater Pond – Prairie Ridge	6829 Prairie Ridge Dr	
Stormwater Pond – Forest Park	6627 47th Ave NE	

This list was provided to the following agencies:

Washington State Department of Ecology
Thurston County Department of Emergency Management
Local Fire District
Local Law Enforcement Officials and County Sheriff's Office

Letter of Notification - Wellhead Protection Plan

September 14, 2018

Dear Cedar Ridge Residents:

Thurston PUD is required by the Washington Department of Health to develop a wellhead protection plan for the Cedar Ridge #617 water system. Wellhead protection involves protecting the land area surrounding our wells in order to prevent contamination of our drinking water supply. Cedar Ridge has one well located at 2121 107th Ln SE, Olympia WA. Part of the plan is this letter of notification to all potential sources of contamination to our wells. Most of Cedar Ridge residents live within the wellhead protection zones surrounding our well field, all which use septic systems (see map on other side).

This letter is intended to inform you of the location of our well and protection zone, and to serve as a reminder that any hazardous material put onto the ground or into your septic system has the potential of contaminating our drinking water supply. Some potentially harmful activities to avoid are…

- Improper use of a septic system (dumping paint, household cleaners, or solvents into your septic system).
- Dumping motor oil, gasoline, antifreeze or similar fluids onto the ground.
- Heavy use of fertilizers and pesticides.
- Dumping or burying garbage in the ground.

Any unwanted or unused household hazardous materials (like those mentioned above) can be disposed of at Thurston County Waste and Recovery Center. Call 360-339-4476 for details, hours of operation, etc.

We are fortunate to have a very good supply of high quality water. It should be everyone's intent to keep it that way for our continued good use, and for the ones that come along after us. Thank you for following these guidelines. If you have any questions about this matter, please feel free to contact Kim at Thurston PUD 360-357-8783 ext. 125.

Tips to Avoid Septic System Trouble:

- DO take leftover household chemicals to a hazardous waste collection center for disposal.
- DO practice water conservation. Repair dripping faucets and leaking toilets, run dishwashers and washing machines only when full.
- DO learn the location of your septic system and drain field.
- DON'T allow anyone to drive or park over any part of the system. Areas should be left undisturbed with only a mowed grass cover. Roots from nearby trees or shrubs may clog and damage your drain lines.
- DON'T use commercial septic tank additives. These products usually do not help and some may hurt your system in the long run.
- DON'T poison your system by pouring chemicals down the drain. They can kill the beneficial bacteria that treat your wastewater.

Letter of Notification: Wellhead Protection Plan

September 14, 2018

RE: CEDAR RIDGE #617 WATER SYSTEM ID #29386

Dear Emergency Responder:

Thurston PUD is developing a wellhead protection plan as required by the State Department of Health for the Cedar Ridge #617 water system (2121 107th Ln SE, Olympia WA). As part of this plan, the Cedar Ridge water system must provide wellhead protection information to agencies responsible for incident/spill response procedures. Using the results of the susceptibility assessment and the findings of the wellhead protection area inventory, local emergency responders are asked to evaluate whether changes in incident/spill response procedures are needed to better protect groundwater within wellhead protection areas. As stated in the Wellhead Protection Program Guidance Document, "If a public water system's source water is determined to be vulnerable to surface activities, special procedures may need to be incorporated into local emergency response plans."

The State DOH has given the Cedar Ridge #617 Water System SO1 well a low susceptibility rating.

A map of the wellhead protection areas with potential contaminant sources are enclosed for your review. An acknowledgement of receipt of this information or a response from your office is not required as part of the wellhead protection plan documentation.

Thank you for your attention in this matter. If you have any questions about the plan, please feel free to contact me.

Sincerely,

Kim Gubbe
Director of Planning and Compliance
Thurston PUD
360-357-8783 ext. 125

September 14, 2018

Washington State Department of Ecology
Southwest Regional Office
PO Box 47600
Olympia, WA 98504-7600

Regarding: Abandoned wells

Dear Sir or Madam:

As part of the Cedar Ridge #617 water system wellhead protection plan, Thurston PUD is required to provide notification of the existence of abandoned wells within wellhead protection areas. We are unsure if there are any abandoned wells within the Cedar Ridge wellhead protection area.

The association is unaware of whether any wells which may be abandoned or inactive, have been properly closed according to DOE guidelines. We have enclosed a map depicting the location of the Cedar Ridge source well and the associated Wellhead Protection Area (WHPA). This map is intended to serve as a tool for you to manage the closure of any wells located on private property within our WHPA.

For additional information, please feel free to contact me at 360-357-8783 ext. 125.

Sincerely;

Kim Gubbe
Director of Planning and Compliance
Thurston PUD

September 14, 2018

Washington State Department of Ecology
Southwest Regional Office
PO Box 47600
Olympia, WA 98504-7600

Regarding: Cedar Ridge #617 Water System's Wellhead Protection Area (WHPA)

Dear Sir or Madam:

As part of the Cedar Ridge's Wellhead Protection Plan, Thurston PUD is required to provide notification of the WHPA boundary and the potential contaminant sources within that boundary. Please use the enclosed WHPA map and potential contaminant source list accordingly when considering future inspections and permitting for the storage, use, and disposal of hazardous materials within our WHPA.

Sincerely;

Kim Gubbe
Director of Planning and Compliance
Thurston PUD
360-357-8783 ext. 125

Appendix D: Resource Contacts

1. DOH regional planner and engineer

Kay Rottell, P.E.
SW Drinking Water Regional Operations
PO Box 47823
Olympia, WA 98504-7823
360-236-3034

2. DOE Regional Office

Department of Ecology
300 Desmond Dr
Lacey, WA 98503
360-407-6000

3. County Health District

Thurston County
Environmental Health
360-786-5490

4. County Fire District, Local Fire Department, County Emergency Response Unit, DOE Emergency Spill Response Unit.

DOE 24 Hour Spill Respond
SW Regional Office
360-407-6300

Thurston County Sheriff
2000 Lakeridge Dr SW
Olympia, WA 98502
360-786-5527

East Olympia Fire District #6
8047 Normandy St SE
Olympia WA, 98501
Phone: 360-491-5533

Thurston County Emergency Management
2703 Pacific Avenue SE, Suite B
Olympia, WA 98501-2036

Phone (360) 754-3360
Fax (360) 704-2775

5. Evergreen Rural Water of WA

ERWoW
18840 N US Highway 101
Shelton, WA 98584
360-462-9287

6. US EPA:

US EPA Region 10
1200 Sixth Ave, Suite 900
(OWW-136)
Seattle, WA 98101
Phone: 206-553-1806
Toll free: 800-424-4372

7. Any other agencies, companies, or individuals you feel may be helpful with protecting your drinking water. Include consultants and attorneys contracted by the water system.

Thurston PUD
1230 Ruddell Rd SE
Lacey, WA 98503
360-357-8783

Doug Eklund, P.E.
JWM&A
1700 Cooper Point Rd SW #B-2
Olympia, WA 98502
360-352-9456

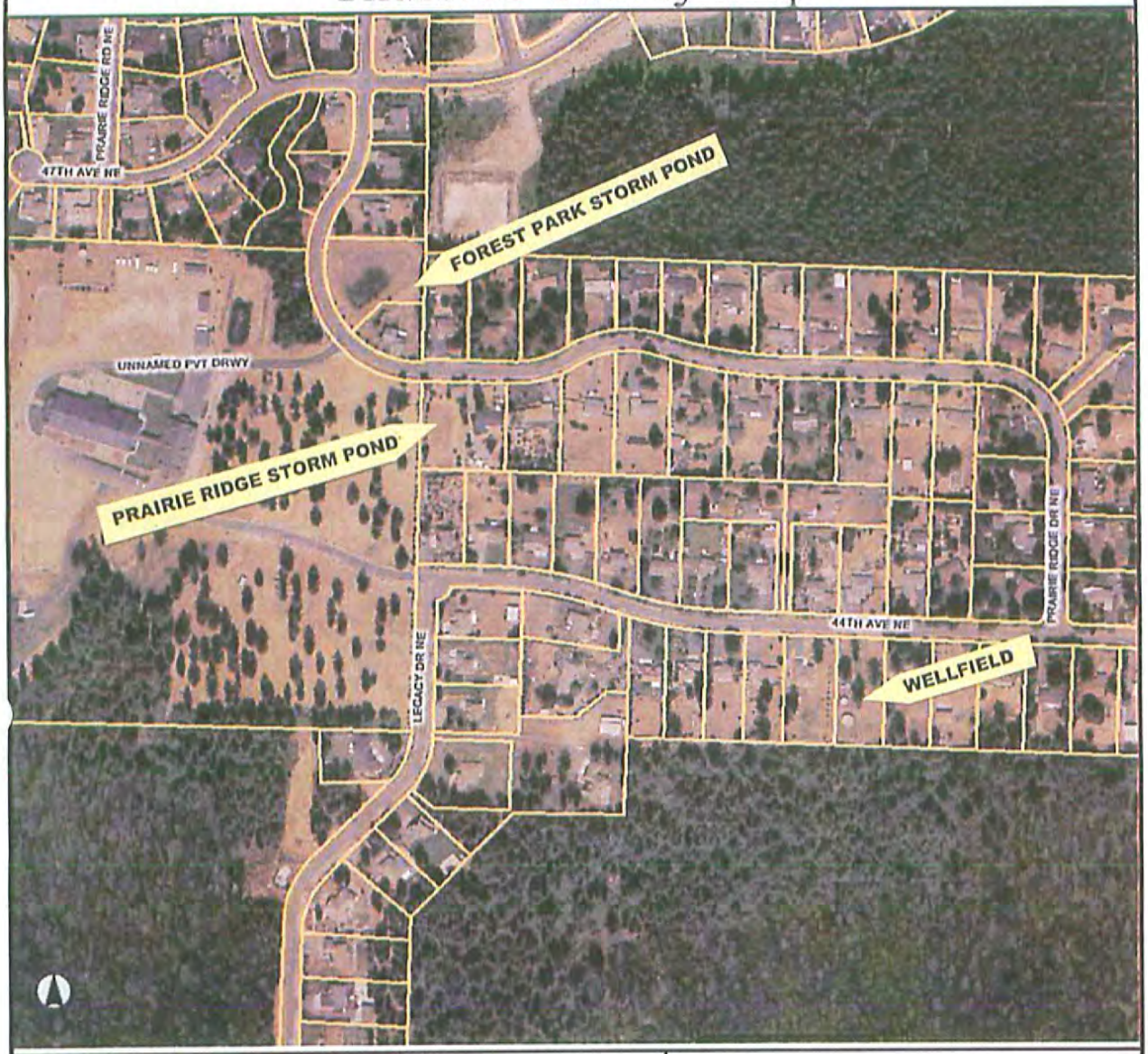
NAME	MAILING ADDRESS	CITY	STATE	ZIP
MILLER TRUSTEES ROBERT B & PHILOMENA MARY	4112 LEGACY DR NE	OLYMPIA	WA	98516
ABRAHAMSON EDWARD V & ROBIN M	6904 44TH AVE NE	OLYMPIA	WA	98516
AMPTMAN CHARLES J & ZELMA D	7206 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
ANTHE KELLY & ANNMARIE	7214 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
ARNESON MATTHEW	7018 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
BALCOM, WILLIAM E	1401 MARVIN RD NE STE 307 PMB 451	LACEY	WA	98516
BEHRENDS, MARK W	7434 44TH AVE NE	OLYMPIA	WA	98516
BEITZ, ERIC W	7323 44TH AVE NE	OLYMPIA	WA	98516
BELANGER, ELYSE THERESA	4136 LEGACY DR NE	OLYMPIA	WA	98516
BELL KATRINA & LOREN	6922 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
BERGMAN, DONALD RODNEY	7210 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
BERGMAN, DONALD RODNEY	11647 SCHOOL LAND RD SW	ROCHESTER	WA	98579
BERNTSEN, STEVEN G	6902 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
BINGHAM BAKER, CLAUDIA K & BAKER, THOMAS E	7118 44TH AVE NE	OLYMPIA	WA	98516
BOVE STEVEN J & MONICA LEE	7009 44TH AVE NE	OLYMPIA	WA	98516
BRYAN JAMES A & SUZANNE	7048 44TH AVE NE	OLYMPIA	WA	98516
BULLINGER ROSS & TERESA	7143 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
CFS INVESTMENTS LLC	3025 LIMITED LN NW	OLYMPIA	WA	98502
CHILDERS WAYNE & CHERYL	6925 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516-1151
CHIM DYVIRATH	7417 44TH AVE NE	OLYMPIA	WA	98516
CHUNG TAEYONG & IN SOON	7035 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
CLARKE, CAROL A & WINGARD, THOMAS R	7201 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
COCUZZI RUTH	6808 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
COX AMY	7042 44TH AVE NE	OLYMPIA	WA	98516
CRAIG, E JEAN	4148 LEGACY DR NE	OLYMPIA	WA	98516
DAHLGREN KURT N & CLORY A	7110 44TH AVE NE	OLYMPIA	WA	98516
DE BOER DAVID & SHIRLEY	7202 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
DERGAN JR WILLARD E & SANDRA D	4210 LEGACY DR NE	OLYMPIA	WA	98516
DNR JENSEN RENTALS LLC	11012 CANYON RD E STE 8 PMB 390	PUYALLUP	WA	98373
DOLIVEIRA-NOAHR LORRELL & NOAHR, JASON R	4529 MARVIN RD NE	OLYMPIA	WA	98516
DROCHAK TERRENCE G & MICHELE Y	7031 44TH AVE NE	OLYMPIA	WA	98516
DUPERE JOSHA L & LORETTA M	7207 44TH AVE NE	OLYMPIA	WA	98516
ELLIOTT, MARY L	7235 44TH AVE NE	OLYMPIA	WA	98516
EVANS, EUGENE E	6901 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
GALVIN, JAMES T	6924 44TH AVE NE	OLYMPIA	WA	98516
GASPORRA GABRIEL & LISA	6832 44TH AVE NE	OLYMPIA	WA	98516
HADLEY JERRY & LISA P	7045 44TH AVE NE	OLYMPIA	WA	98516
HALL SR, ROBERT L	7034 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
HANCOCK JAMES M & KATHLEEN B	7249 44TH AVE NE	OLYMPIA	WA	98516
HARGIS WILLIAM L & TIFFINIE J	7230 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
HOLLINGER, MARLISA KAYE	7142 44TH AVE NE	OLYMPIA	WA	98516
HOLMAN, DAVID C	7330 44TH AVE NE	OLYMPIA	WA	98516
ITH WILLIAM & VIRGINIA	7237 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
JOHNSON TERRY & WENDY	4342 LEGACY DR NE	OLYMPIA	WA	98516
KIIKKUNI KATHRYN E & CARY H	7015 44TH AVE NE	OLYMPIA	WA	98516
KING GREGORY F & NANCY A	7039 44TH AVE NE	OLYMPIA	WA	98516
KULICH STEVEN D & REBECCA J	7021 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
LAMPERS, CALVIN F	7401 44TH AVE NE	OLYMPIA	WA	98516
LANGE DONALD & MARGIE	7018 44TH AVE NE	OLYMPIA	WA	98516
LARSON, CORY G	7226 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
LEWIS SHAWN M & CHRISTINE E	PO BOX 798	DUPONT	WA	98327-0798
LITWAK MARTIN M & CHRISTINA	7205 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
LORD JULIE	7120 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
MANKER, JULIE ANN	7309 44TH AVE NE	OLYMPIA	WA	98516
MAUERMAN WILLIAM R & PATRICIA	4338 LEGACY DR NE	OLYMPIA	WA	98516
MCKUNE RONALD SCOTT & GINA MARIE	4330 LEGACY DR NE	OLYMPIA	WA	98516
MONTECUCCO, LESLIE R	6948 44TH AVE NE	OLYMPIA	WA	98516

NAME	MAILING ADDRESS	CITY	STATE	ZIP
MORRISETTE WESLEY & COLLEEN	7418 44TH AVE NE	OLYMPIA	WA	98516
MURDAUGH JOSHUA	7100 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
NEAD STEPHEN L & CAROLYN S	7234 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
NORRIS GAYLE & KERRY	7233 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
OGDEN, KENNETH E	7221 44TH AVE NE	OLYMPIA	WA	98516
OLSZYK DAVID & ANITA	PO BOX 5631	LACEY	WA	98509-5631
PIERPOINT ROBERT B & ELIZABETH A	7402 44TH AVE NE	OLYMPIA	WA	98516
RHUBRIGHT, MICHAEL P	7032 44TH AVE NE	OLYMPIA	WA	98516
ROBERT & RITA DROHMAN LIV TR	4326 LEGACY DR NE	OLYMPIA	WA	98516
ROMERO JOSEPH G & RAQUEL	7001 44TH AVE NE	OLYMPIA	WA	98516
SCHOOL DISTRICT #3	305 COLLEGE ST NE	OLYMPIA	WA	98516
SMITH TRUST, WILBUR/LINDA	7241 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
SPONSELLER, MATTHEW N	7117 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
STACEY, SHARON R	6949 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
STEWART, JASON J	7218 44TH AVE NE	OLYMPIA	WA	98516
STINSON, DEREK W & COLLEEN M	4527 MARVIN RD NE	OLYMPIA	WA	98516
STOMIEROSKI IV JOHN & BREWSTER-STOMIEROSKI, LANA	7433 44TH AVE NE	OLYMPIA	WA	98516
STRIKER DEALS LLC	13112 NE 20TH ST STE 100	BELLEVUE	WA	98005
SUR JONG W & SUJIN	4222 LEGACY DR NE	OLYMPIA	WA	98516
TEEFY KATHERIN	7218 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
THULINE BREN M & CHRISTINE A	7222 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
TILLEY A GEORGE & BONNIE B	4124 LEGACY DR NE	OLYMPIA	WA	98516
TOZZI CASEY A & RANDY	4315 LEGACY DR NE	OLYMPIA	WA	98516
TURK ROBERT J & LAURENE M	1420 MARVIN RD NE	LACEY	WA	98516
TURK ROBERT J & LAURENE M	426 20TH ST NW	PUYALLUP	WA	98371-5102
UMPSTEAD BRAIN & SHELLY	6946 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
WATTS, LEE M	6829 PRAIRIE RIDGE DR NE	OLYMPIA	WA	98516
WEST SCOTT & CAROL	7041 44TH AVE NE	OLYMPIA	WA	98516
WINGATE, DOUGLAS J	4531 MARVIN RD NE	OLYMPIA	WA	98516
ZVIRDYS JACOB	7310 44TH AVE NE	OLYMPIA	WA	98516

Appendix E:

Stormwater Ponds

Thurston County Map



Thurston GeoData Center

929 Lakeridge Drive SW, Suite 216, 3rd Floor
Olympia, WA 98502-6031

LEGEND

- Major Roads
- Roads
- Streams
- Contours
- Wetlands
- Wetland Buffers
- Flood Zones
- Water Bodies
- Zoning
- Cities
- Parcels

5/15/2011

Prairie Ridge Stormwater Pond

Forest Park Stormwater Pond

Asset Management Plan

Capital Asset Management Plan Class A Systems

Name of System__Prairie Ridge

System Infrastructure		Aprox. Date Built	Pipe Footage or # of Items	Depreciation Period Years	Full Depreciation Date	Replacement Cost per Ft/ 2018	Total Replacement Cost 2018	Replacement Cost at end of Service Life
Pump House								
Building TIII size: 14x14		1980	1	50	2030	$ 25,000.00	$ 25,000.00	$35,644
Building Electrical 150 AMP 15/30 SP Breaker Panel		2013	1	30	2043	$ 6,000.00	$ 6,000.00	$12,563
Well, AAE334								
size: 6"	S02	1996	170	75	2071	$ 300.00	$ 51,000.00	$244,311
Water Quality Tests		1996	1	75	2071	$ 1,200.00	$ 1,200.00	$5,748
Well Pumps & Controls size: 5HP make:		2011	1	13	2024	$ 4,500.00	$ 4,500.00	$5,373
Source Meter	size: 2" MASTER METER	1996	1	25	2021	$ 600.00	$ 600.00	$656
Well, AKY156								
size: 8"	S01	1980	174	75	2055	$ 300.00	$ 52,200.00	$155,829
Water Quality Tests		1980	1	75	2055	$ 1,200.00	$ 1,200.00	$3,582
Well Pumps & Controls size: 5HP make:Franklin Control		1980	1	30	2010	$ 5,000.00	$ 5,000.00	$5,150
Source Meter	size: 2" MASTER METER	1980	1	25	2005	$ 1,000.00	$ 1,000.00	$1,030
Booster Station								
Booster Pump	size: 3 hp make: Goulds VFD	2013	1	20	2033	$ 3,200.00	$ 3,200.00	$4,985
Booster Pumps	size:5HP make:Goulds VFD	2013	2	20	2033	$ 4,500.00	$ 9,000.00	$14,022
VFD drives	Yaskawa	2013	3	20	2033	$ 1,500.00	$ 4,500.00	$7,011
Pressure Tanks	size:80gal make:WelMate#WM-23	2013	1	10	2023	$ 425.00	$ 425.00	$493
Water Mains								
6"	# of feet: 8600'	1980	5100	65	2045	$ 106.00	$ 540,600.00	$1,200,829
4"		1980	3700	65	2045	$ 81.00	$ 299,700.00	$665,720
2.5"		1980	600	65	2045	$ 81.00	$ 48,600.00	$107,955
2"		1980	330	65	2045	$ 31.00	$ 10,230.00	$22,724
Service Lines								
1" SERVICE LINES=		1980	100	65	2045	$ 875.00	$ 87,500.00	$194,363
Isolation Valves								
6"		1980	4	65	2045	$ 1,000.00	$ 4,000.00	$8,885
4"		1980	2	65	2045	$ 750.00	$ 1,500.00	$3,332
2.5"		1980	1	65	2045	$ 600.00	$ 600.00	$1,333
2"		1980	1	65	2045	$ 600.00	$ 600.00	$1,333
Blowoff Assembly								
Blowoff Assembly		1980	5	65	2045	$ 1,500.00	$ 7,500.00	$16,660
Reservoirs								
	20'x10' concrete	1980	23500	75	2055	$ 4.00	$ 94,000.00	$280,611
	30'x10' concrete	2000	52,800	75	2075	$ 4.00	$ 211,200.00	$1,138,717
Meter Replacement								
3/4"	#	2010	100	20	2030	$ 85.00	$ 8,500.00	$12,119
Total Estimated Costs							$ 1,479,355.00	$ 4,150,976.68

Capital Asset Management Plan Class A Systems

Name of System_ Prairie Ridge

System Infrastructure		Aprox. Date Built	Pipe Footage or # of Items	Depreciation Period Years	Full Depreciation Date	Replacement Cost per Ft/ 2018	Total Replacement Cost 2018	Replacement Cost at end of Service Life	Costs Per Year 2020	Costs Per Year 2021	Costs Per Year 2022	Costs Per Year 2023	Costs Per Year 2024	Costs Per Year 2025	Costs Per Year 2026	Costs Per Year 2027	Costs Per Year 2028	Costs Per Year 2029	Costs Per Year 2030	Costs Per Year 2031	Costs Per Year 2032	Costs Per Year 2033	Costs Per Year 2034	Costs Per Year 2035	Costs Per Year 2036	Costs Per Year 2037	Costs Per Year 2038	Costs Per Year 2039	Costs Per Year 2040
Pump House																												
Building TIII size: 14x14		1980	1	50	2030	$ 25,000.00	$ 25,000.00	$35,644											$ 35,644									
Building Electrical 150 AMP 15/30 SP Breaker Panel		2013	1	30	2043	$ 6,000.00	$ 6,000.00	$12,563																				
Well, AAE334																												
size: 6"	S02	1996	170	75	2071	$ 300.00	$ 51,000.00	$244,311																				
Water Quality Tests		1996	1	75	2071	$ 1,200.00	$ 1,200.00	$5,748																				
Well Pumps & Controls size: 5HP make:		2011	1	13	2024	$ 4,500.00	$ 4,500.00	$5,373					$ 5,373												$ 7,661			
Source Meter	size: 2" MASTER METER	1996	1	25	2021	$ 600.00	$ 600.00	$656																				
Well, AKY156																												
size: 8"	S01	1980	174	75	2055	$ 300.00	$ 52,200.00	$155,829																				
Water Quality Tests		1980	1	75	2055	$ 1,200.00	$ 1,200.00	$3,582																				
Well Pumps & Controls size: 5HP make:Franklin Control		1980	1	30	2010	$ 5,000.00	$ 5,000.00	$5,150	$ 5,150													$ 7,343						
Source Meter	size: 2" MASTER METER	1980	1	25	2005	$ 1,000.00	$ 1,000.00	$1,030	$ 1,030																			
Booster Station																												
Booster Pump	size: 3 hp make: Goulds VFD	2013	1	20	2033	$ 3,200.00	$ 3,200.00	$4,985														$ 4,985						
Booster Pumps	size:5HP make:Goulds VFD	2013	2	20	2033	$ 4,500.00	$ 9,000.00	$14,022														$ 14,022						
VFD drives	Yaskawa	2013	3	20	2033	$ 1,500.00	$ 4,500.00	$7,011														$ 7,011						
Pressure Tanks	size:80gal make:WelMate#WM-23	2013	1	10	2023	$ 425.00	$ 425.00	$493				$ 493										$ 662						
Water Mains																												
6"	# of feet: 8600'	1980	5100	65	2045	$ 106.00	$ 540,600.00	$1,200,829																				
4"		1980	3700	65	2045	$ 81.00	$ 299,700.00	$665,720																				
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2"		1980	330	65	2045	$ 31.00	$ 10,230.00	$22,724																				
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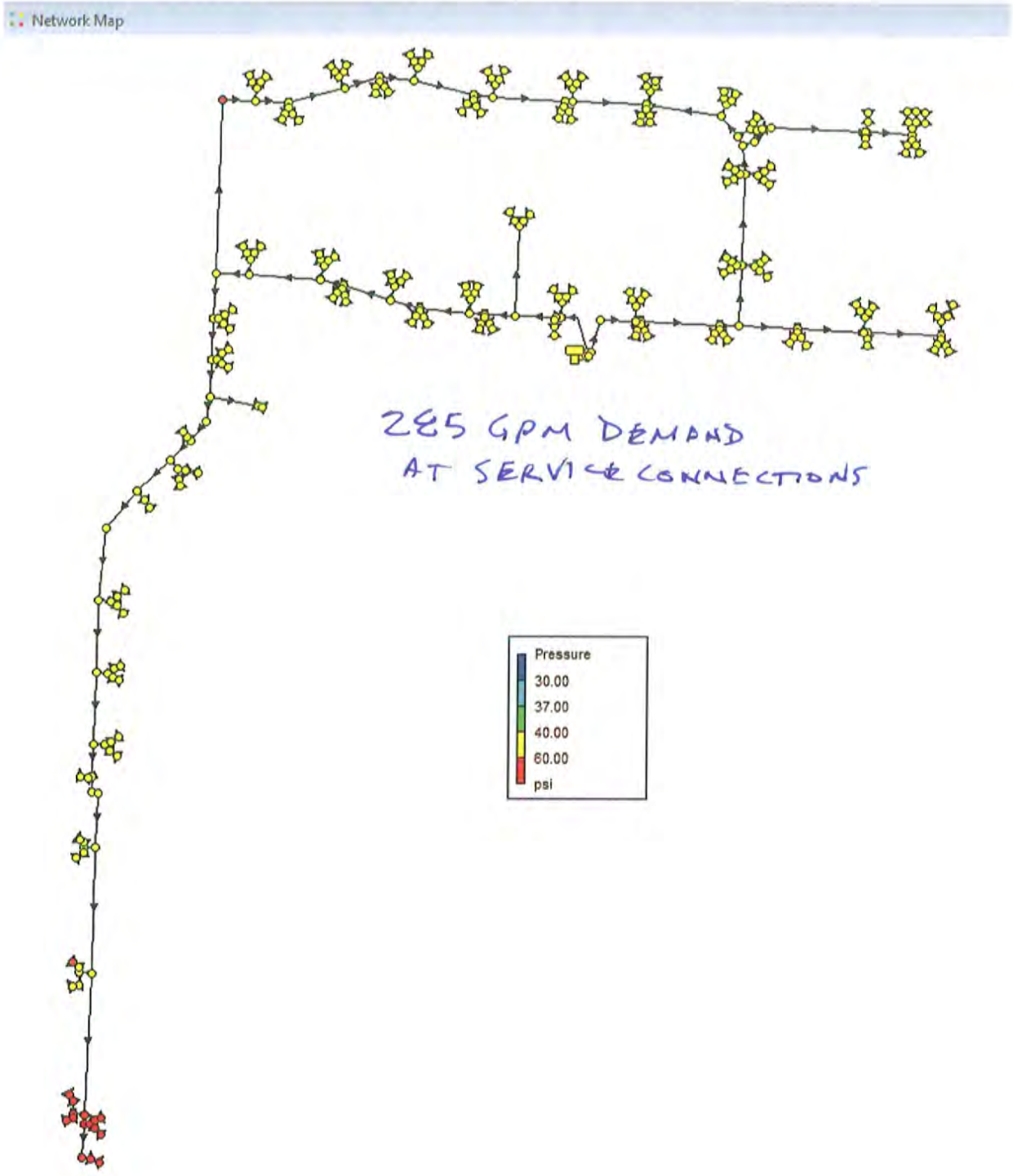
2"		1980	1	65	2045	$ 600.00	$ 600.00	$1,333																				
Blowoff Assembly																												
Blowoff Assembly		1980	5	65	2045	$ 1,500.00	$ 7,500.00	$16,660																				
Reservoirs																												
	20'x10' concrete	1980	23500	75	2055	$ 4.00	$ 94,000.00	$280,611																				
	30'x10' concrete	2000	52,800	75	2075	$ 4.00	$ 211,200.00	$1,138,717																				
Meter Replacement																												
3/4"	#	2010	100	20	2030	$ 85.00	$ 8,500.00	$12,119											$ 12,119									
Total Estimated Costs							$ 1,479,355.00	$ 4,150,976.68	TOTALS FO $ 6,180	$ -	$ -	$ 493	$ 5,373	$ -	$ -	$ -	$ -	$ -	$ 47,763	$ -	$ -	$ 34,023	$ -	$ -	$ -	$ 7,661	$ -	$ -	$ -

EPANet Analysis

DISTRIBUTION SYSTEM PRESSURE



Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 1	278	0.00	397.98	51.99
Junc 2	278	0.00	397.33	51.71
Junc 3	278	0.00	396.92	51.53
Junc 4	278	0.00	396.92	51.53
Junc 5	279	0.00	396.92	51.09
Junc 6	279	2.82	396.92	51.09
Junc 7	278	2.82	396.92	51.53
Junc 8	278	2.82	396.92	51.53
Junc 9	278	0.00	397.67	51.85
Junc 10	278	0.00	397.26	51.68
Junc 11	279	0.00	397.26	51.24
Junc 12	279	2.82	397.26	51.24
Junc 13	278	2.82	397.26	51.68
Junc 14	277	0.00	398.33	52.57
Junc 15	276	0.00	398.07	52.89
Junc 16	276	2.82	398.07	52.89
Junc 17	277	0.00	398.34	52.58
Junc 18	277	0.00	398.09	52.47
Junc 19	277	2.82	398.09	52.47
Junc 21	288	0.00	399.69	48.40
Junc 22	290	0.00	400.01	47.67
Junc 23	292	0.00	400.19	46.88
Junc 24	290	0.00	400.17	47.74
Junc 25	289	0.00	399.56	47.91
Junc 26	289	0.00	399.15	47.73

NODE REPORT

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 27	289	2.82	399.15	47.73
Junc 28	289	0.00	399.15	47.73
Junc 29	289	2.82	399.15	47.73
Junc 30	288	0.00	400.16	48.60
Junc 31	289	0.00	399.55	47.90
Junc 33	290	0.00	399.14	47.29
Junc 34	290	0.00	399.14	47.29
Junc 35	292	2.82	399.14	46.42
Junc 36	291	2.82	399.14	46.86
Junc 37	284	0.00	400.15	50.33
Junc 38	285	0.00	399.54	49.63
Junc 39	285	0.00	399.13	49.45
Junc 40	286	0.00	399.13	49.02
Junc 41	286	2.82	399.13	49.02
Junc 42	285	2.82	399.13	49.45
Junc 43	284	0.00	400.15	50.33
Junc 44	284	0.00	400.03	50.27
Junc 45	285	0.00	399.62	49.66
Junc 46	285	0.00	399.62	49.66
Junc 47	286	2.82	399.62	49.23
Junc 48	285	2.82	399.62	49.66
Junc 49	278	0.00	400.16	52.93
Junc 50	278	0.00	399.54	52.67
Junc 51	278	0.00	399.13	52.49
Junc 52	278	0.00	399.13	52.49
Junc 53	278	2.82	399.13	52.49

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 54	278	2.82	399.13	52.49
Junc 55	278	0.00	400.16	52.93
Junc 56	279	0.00	399.63	52.27
Junc 57	279	0.00	399.63	52.27
Junc 58	279	2.82	399.63	52.27
Junc 59	279	2.82	399.63	52.27
Junc 60	275	0.00	400.24	54.27
Junc 61	275	0.00	399.63	54.00
Junc 62	275	0.00	399.22	53.82
Junc 63	274	2.82	399.22	54.26
Junc 64	276	0.00	399.22	53.39
Junc 65	277	2.82	399.22	52.96
Junc 66	274	0.00	400.28	54.72
Junc 67	274	0.00	400.16	54.66
Junc 68	275	0.00	399.75	54.05
Junc 69	275	0.00	399.75	54.05
Junc 70	275	2.82	399.75	54.05
Junc 71	276	2.82	399.75	53.62
Junc 72	272	0.00	400.45	55.66
Junc 73	270	0.00	399.84	56.26
Junc 74	271	0.00	399.43	55.65
Junc 75	270	2.82	399.43	56.08
Junc 76	271	0.00	399.43	55.65
Junc 77	271	2.82	399.43	55.65
Junc 78	270	0.00	400.58	56.58
Junc 79	270	0.00	400.46	56.53

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 80	269	0.00	400.05	56.78
Junc 81	269	0.00	400.05	56.78
Junc 82	269	2.82	400.05	56.78
Junc 83	269	2.82	400.05	56.78
Junc 84	268	0.00	400.76	57.52
Junc 85	267	0.00	400.15	57.69
Junc 86	268	0.00	399.74	57.08
Junc 87	267	0.00	399.74	57.51
Junc 88	268	2.82	399.74	57.08
Junc 89	268	2.82	399.74	57.08
Junc 90	266	0.00	401.14	58.56
Junc 91	266	0.00	401.02	58.50
Junc 92	268	0.00	400.61	57.46
Junc 93	268	2.82	400.61	57.46
Junc 94	269	0.00	400.61	57.03
Junc 95	269	2.82	400.61	57.03
Junc 96	265	0.00	401.41	59.11
Junc 97	268	0.00	400.80	57.54
Junc 98	271	0.00	400.39	56.07
Junc 99	272	2.82	400.39	55.63
Junc 100	269	0.00	400.39	56.93
Junc 101	269	2.82	400.39	56.93
Junc 102	291	0.00	400.32	47.37
Junc 103	291	0.00	400.20	47.32
Junc 104	291	0.00	399.79	47.14
Junc 105	291	2.82	399.79	47.14

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 106	291	0.00	399.79	47.14
Junc 107	290	2.82	399.79	47.57
Junc 108	290	0.00	399.71	47.54
Junc 109	290	0.00	399.30	47.36
Junc 110	289	2.82	399.30	47.79
Junc 111	291	0.00	399.30	46.93
Junc 112	290	2.82	399.30	47.36
Junc 113	292	0.00	401.01	47.23
Junc 114	294	0.00	400.88	46.31
Junc 115	293	0.00	400.47	46.57
Junc 116	292	2.82	400.47	47.00
Junc 117	293	0.00	400.47	46.57
Junc 118	292	2.82	400.47	47.00
Junc 119	291	0.00	400.39	47.40
Junc 120	292	0.00	399.98	46.79
Junc 121	293	2.82	399.98	46.36
Junc 122	292	0.00	399.98	46.79
Junc 123	292	2.82	399.98	46.79
Junc 124	278	0.00	401.33	53.44
Junc 125	279	0.00	400.03	52.44
Junc 126	279	0.00	399.62	52.26
Junc 127	279	2.82	399.62	52.26
Junc 128	279	2.82	398.55	51.80
Junc 129	279	2.82	398.55	51.80
Junc 130	279	0.00	401.20	52.95
Junc 131	279	0.00	400.79	52.77

LOWEST DIST. SYSTEM PRESSURE
- DIST. SYSTEM HIGHEST ELEVATION

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 132	279	2.82	400.79	52.77
Junc 133	279	0.00	400.79	52.77
Junc 134	279	2.82	400.79	52.77
Junc 135	278	0.00	401.38	53.46
Junc 136	278	0.00	401.28	53.42
Junc 137	279	2.82	401.28	52.99
Junc 138	278	0.00	401.39	53.46
Junc 139	277	0.00	400.77	53.63
Junc 140	276	0.00	400.37	53.89
Junc 141	276	2.82	400.37	53.89
Junc 142	276	0.00	400.37	53.89
Junc 143	276	2.82	400.37	53.89
Junc 144	282	0.00	401.51	51.78
Junc 145	286	0.00	401.39	50.00
Junc 146	287	0.00	400.98	49.39
Junc 147	287	2.82	400.98	49.39
Junc 148	284	0.00	400.98	50.69
Junc 149	282	2.82	400.98	51.55
Junc 150	291	0.00	401.67	47.96
Junc 151	290	0.00	402.12	48.58
Junc 152	291	0.00	402.00	48.10
Junc 153	292	0.00	401.59	47.49
Junc 154	292	2.82	401.59	47.49
Junc 155	292	0.00	401.59	47.49
Junc 156	292	2.82	401.59	47.49
Junc 157	286	0.00	404.13	51.19

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 158	286	0.00	404.01	51.13
Junc 161	286	0.00	403.60	50.96
Junc 162	285	0.00	403.60	51.39
Junc 163	285	2.82	403.60	51.39
Junc 164	287	2.82	403.60	50.52
Junc 165	285	0.00	404.31	51.70
Junc 166	284	0.00	403.70	51.87
Junc 167	285	0.00	403.29	51.26
Junc 168	285	0.00	403.67	51.42
Junc 169	285	2.82	403.67	51.42
Junc 170	284	2.82	403.29	51.69
Junc 171	282	0.00	405.53	53.53
Junc 172	280	0.00	404.92	54.13
Junc 173	282	0.00	404.31	53.00
Junc 174	281	0.00	403.90	53.25
Junc 175	281	2.82	403.90	53.25
Junc 176	282	0.00	404.27	52.98
Junc 177	283	2.82	404.27	52.55
Junc 178	281	0.00	404.85	53.67
Junc 179	281	0.00	404.41	53.47
Junc 180	281	2.82	404.41	53.47
Junc 181	278	0.00	404.05	54.62
Junc 182	278	0.00	403.64	54.44
Junc 183	277	2.82	403.64	54.87
Junc 184	278	0.00	403.64	54.44
Junc 185	277	2.82	403.64	54.87

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 186	278	0.00	404.42	54.78
Junc 187	278	0.00	404.10	54.64
Junc 188	278	0.00	403.98	54.59
Junc 189	278	0.00	403.57	54.41
Junc 190	278	0.00	403.57	54.41
Junc 191	278	2.82	403.57	54.41
Junc 192	278	2.82	403.57	54.41
Junc 193	277	0.00	403.95	55.01
Junc 194	278	0.00	403.33	54.31
Junc 195	277	0.00	402.92	54.56
Junc 196	278	0.00	402.92	54.13
Junc 197	277	2.82	402.92	54.56
Junc 198	279	2.82	402.92	53.70
Junc 199	276	0.00	403.50	55.24
Junc 200	277	0.00	403.37	54.76
Junc 201	277	0.00	402.96	54.58
Junc 202	278	2.82	402.96	54.15
Junc 203	277	0.00	402.96	54.58
Junc 204	278	2.82	402.96	54.15
Junc 205	276	0.00	403.24	55.13
Junc 206	276	0.00	402.63	54.87
Junc 207	278	0.00	402.22	53.82
Junc 208	278	2.82	402.22	53.82
Junc 209	277	0.00	402.22	54.26
Junc 210	277	2.82	402.22	54.26
Junc 211	274	0.00	402.84	55.83

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 212	276	0.00	402.72	54.91
Junc 213	276	0.00	402.31	54.73
Junc 214	277	0.00	402.31	54.30
Junc 215	276	2.82	402.31	54.73
Junc 216	277	2.82	402.31	54.30
Junc 217	274	0.00	402.68	55.76
Junc 218	273	0.00	402.06	55.92
Junc 219	273	0.00	401.66	55.75
Junc 220	273	2.82	401.66	55.75
Junc 221	273	0.00	401.66	55.75
Junc 222	273	2.82	401.66	55.75
Junc 223	274	0.00	402.20	55.55
Junc 224	274	0.00	401.58	55.28
Junc 225	274	0.00	401.17	55.10
Junc 226	274	2.82	401.17	55.10
Junc 227	274	0.00	401.17	55.10
Junc 228	274	2.82	401.17	55.10
Junc 229	273	0.00	401.89	55.85
Junc 230	273	0.00	401.58	55.71
Junc 231	274	0.00	401.17	55.10
Junc 232	276	2.82	401.17	54.24
Junc 233	274	0.00	401.17	55.10
Junc 234	276	2.82	401.17	54.24
Junc 235	274	0.00	401.81	55.38
Junc 236	275	0.00	401.50	54.81
Junc 237	276	0.00	401.09	54.20

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 238	276	0.00	401.09	54.20
Junc 239	276	2.82	401.09	54.20
Junc 240	276	2.82	401.09	54.20
Junc 241	277	0.00	401.75	54.06
Junc 242	280	0.00	401.72	52.74
Junc 243	279	0.00	401.69	53.16
Junc 244	278	0.00	401.59	53.55
Junc 246	277	2.82	401.59	53.98
Junc 247	279	0.00	401.66	53.15
Junc 248	279	0.00	401.05	52.88
Junc 249	279	0.00	400.64	52.71
Junc 250	280	2.82	400.64	52.27
Junc 251	280	0.00	400.64	52.27
Junc 252	281	2.82	400.64	51.84
Junc 253	277	0.00	401.61	53.99
Junc 254	277	0.00	401.11	53.78
Junc 255	278	2.82	401.11	53.34
Junc 256	270	0.00	401.57	57.01
Junc 257	276	0.00	401.51	54.38
Junc 258	278	0.00	400.89	53.25
Junc 259	280	0.00	400.48	52.21
Junc 260	282	2.82	400.48	51.34
Junc 261	280	0.00	400.48	52.21
Junc 262	282	2.82	400.48	51.34
Junc 263	279	0.00	401.45	53.06
Junc 264	280	0.00	400.84	52.36

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 265	281	0.00	400.43	51.75
Junc 266	280	0.00	400.43	52.18
Junc 267	280	2.82	400.43	52.18
Junc 268	282	2.82	400.43	51.32
Junc 269	273	0.00	401.42	55.64
Junc 270	274	0.00	400.80	54.94
Junc 271	275	0.00	400.39	54.33
Junc 272	276	2.82	400.39	53.90
Junc 273	276	0.00	400.39	53.90
Junc 274	278	2.82	400.39	53.03
Junc 275	268	0.00	401.40	57.80
Junc 276	266	0.00	401.30	58.63
Junc 277	265	2.82	401.30	59.06
Junc 278	266	0.00	401.40	58.67
Junc 279	266	0.00	401.40	58.67
Junc 281	268	0.00	401.38	57.79
Junc 283	281	0.00	400.11	51.61
Junc 284	282	2.82	400.11	51.18
Junc 285	270	0.00	401.98	57.19
Junc 286	262	0.00	401.74	60.55
Junc 287	266	0.00	400.77	58.39
Junc 288	266	0.00	400.36	58.22
Junc 289	265	2.82	400.36	58.65
Junc 290	265	0.00	400.36	58.65
Junc 291	265	2.82	400.36	58.65
Junc 292	265	0.00	401.35	59.08

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 293	265	0.00	400.74	58.82
Junc 294	264	0.00	400.66	59.21
Junc 295	263	0.00	400.13	59.42
Junc 296	262	2.82	400.66	60.08
Junc 297	262	2.82	400.13	59.85
Junc 298	254	0.00	401.34	63.84
Junc 299	254	0.00	400.73	63.58
Junc 300	253	0.00	400.11	63.74
Junc 301	252	2.82	400.11	64.18
Junc 302	252	0.00	400.52	64.35
Junc 303	252	2.82	400.52	64.35
Junc 304	254	0.00	401.34	63.84
Junc 305	256	0.00	401.22	62.92
Junc 306	258	0.00	400.81	61.88
Junc 307	257	0.00	400.81	62.31
Junc 308	259	2.82	400.81	61.45
Junc 309	257	2.82	400.81	62.31
Junc 310	249	0.00	401.34	66.01
Junc 311	252	0.00	401.24	64.66
Junc 312	252	2.82	401.24	64.66
Junc 313	278	0.00	400.04	52.88
Junc 314	281	0.00	404.82	53.65
Junc 321	282	0.00	405.28	53.42
Junc 322	282	0.00	405.61	53.56
Junc 327	279.15	0.00	406.53	55.19
Junc 328	279.15	0.00	406.17	55.04

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 329	279.15	0.00	405.80	54.88
Tank 20	279.15	-285.00	408.35	55.98

LINK REPORT

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 1	34.76	4	120	-17.40	0.44	Open
Pipe 2	41	2.5	120	19.75	1.29	Open
Pipe 3	75	2.5	120	-19.75	1.29	Open
Pipe 4	316.26	2.5	120	19.75	1.29	Open
Pipe 5	5	2.5	120	-16.93	1.11	Open
Pipe 6	152	2.5	120	-14.11	0.92	Open
Pipe 7	86.35	4	120	11.76	0.30	Open
Pipe 8	241	4	120	6.12	0.16	Open
Pipe 9	5	4	120	0.47	0.01	Open
Pipe 10	247.53	4	120	-5.17	0.13	Open
Pipe 11	24.61	4	120	-10.81	0.28	Open
Pipe 12	267	4	120	16.46	0.42	Open
Pipe 13	66	4	120	-22.10	0.56	Open
Pipe 14	210	4	120	-27.74	0.71	Open
Pipe 15	115	4	120	-33.39	0.85	Open
Pipe 16	117	4	120	-39.03	1.00	Open
Pipe 17	196	4	120	-44.67	1.14	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 18	111	4	120	-50.32	1.28	Open
Pipe 19	96	4	120	-37.16	0.95	Open
Pipe 20	301	4	120	-48.44	1.24	Open
Pipe 21	248	4	120	-14.11	0.36	Open
Pipe 22	11	4	120	-16.93	0.43	Open
Pipe 23	223	4	120	-22.57	0.58	Open
Pipe 25	199.24	4	120	-59.73	1.52	Open
Pipe 26	195	4	120	-28.22	0.72	Open
Pipe 27	65	4	120	-87.95	2.25	Open
Pipe 28	261	4	120	-93.59	2.39	Open
Pipe 29	21	4	120	-99.24	2.53	Open
Pipe 30	128	4	120	-104.88	2.68	Open
Pipe 31	20	6	120	174.48	1.98	Open
Pipe 32	133	6	120	-171.65	1.95	Open
Pipe 33	102	6	120	-166.01	1.88	Open
Pipe 34	53	6	120	-160.37	1.82	Open
Pipe 35	166.2	6	120	-154.72	1.76	Open
Pipe 36	168	6	120	-143.44	1.63	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 37	101	6	120	-149.08	1.69	Open
Pipe 38	76	6	120	137.79	1.56	Open
Pipe 39	238	6	120	-132.15	1.50	Open
Pipe 40	139	6	120	64.90	0.74	Open
Pipe 41	121	6	120	59.26	0.67	Open
Pipe 42	75	6	120	56.43	0.64	Open
Pipe 43	84	6	120	56.43	0.64	Open
Pipe 44	75	6	120	53.61	0.61	Open
Pipe 45	150	6	120	47.97	0.54	Open
Pipe 46	150	6	120	45.15	0.51	Open
Pipe 47	238	6	120	45.15	0.51	Open
Pipe 48	239	6	120	39.50	0.45	Open
Pipe 49	234	6	120	33.86	0.38	Open
Pipe 50	112	6	120	28.22	0.32	Open
Pipe 51	10	0.75	120	2.82	2.05	Open
Pipe 52	10	0.75	120	2.82	2.05	Open
Pipe 53	50	1.25	120	-5.64	1.48	Open
Pipe 56	50	1.25	120	5.64	1.48	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 57	10	0.75	120	2.82	2.05	Open
Pipe 58	10	0.75	120	2.82	2.05	Open
Pipe 61	10	1.25	120	5.64	1.48	Open
Pipe 62	10	0.75	120	2.82	2.05	Open
Pipe 63	10	0.75	120	2.82	2.05	Open
Pipe 66	50	1.25	120	5.64	1.48	Open
Pipe 67	10	0.75	120	2.82	2.05	Open
Pipe 68	10	0.75	120	2.82	2.05	Open
Pipe 71	10	1.25	120	-5.64	1.48	Open
Pipe 72	10	0.75	120	2.82	2.05	Open
Pipe 73	10	0.75	120	2.82	2.05	Open
Pipe 76	163	1	120	2.82	1.15	Open
Pipe 78	115	6	120	-126.51	1.44	Open
Pipe 79	149	6	120	70.54	0.80	Open
Pipe 80	111	4	120	55.96	1.43	Open
Pipe 81	572	6	120	-55.96	0.64	Open
Pipe 82	296	2	120	5.64	0.58	Open
Pipe 83	10	0.75	120	2.82	2.05	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 84	10	0.75	120	2.82	2.05	Open
Pipe 87	10	1	120	2.82	1.15	Open
Pipe 89	45	6	120	25.40	0.29	Open
Pipe 90	23	6	120	25.40	0.29	Open
Pipe 91	185	6	120	25.40	0.29	Open
Pipe 92	50	1.25	120	5.64	1.48	Open
Pipe 93	10	0.75	120	2.82	2.05	Open
Pipe 94	10	0.75	120	2.82	2.05	Open
Pipe 97	405	6	120	19.75	0.22	Open
Pipe 98	50	1.25	120	5.64	1.48	Open
Pipe 99	2	0.75	120	2.82	2.05	Open
Pipe 100	15	0.75	120	2.82	2.05	Open
Pipe 103	458	6	120	14.11	0.16	Open
Pipe 104	35	6	120	8.47	0.10	Open
Pipe 105	108	6	120	2.82	0.03	Open
Pipe 106	50	1.25	120	-5.64	1.48	Open
Pipe 107	15	0.75	120	2.82	2.05	Open
Pipe 108	5	0.75	120	2.82	2.05	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 111	10	1.25	120	5.64	1.48	Open
Pipe 112	10	0.75	120	2.82	2.05	Open
Pipe 113	10	0.75	120	2.82	2.05	Open
Pipe 116	10	1	120	2.82	1.15	Open
Pipe 118	50	1.25	120	5.64	1.48	Open
Pipe 119	10	0.75	120	2.82	2.05	Open
Pipe 120	10	0.75	120	2.82	2.05	Open
Pipe 123	50	1.25	120	5.64	1.48	Open
Pipe 124	10	0.75	120	2.82	2.05	Open
Pipe 125	10	0.75	120	2.82	2.05	Open
Pipe 128	50	1.25	120	5.64	1.48	Open
Pipe 129	10	0.75	120	2.82	2.05	Open
Pipe 130	10	0.75	120	2.82	2.05	Open
Pipe 133	50	1	120	2.82	1.15	Open
Pipe 135	50	1.25	120	5.64	1.48	Open
Pipe 136	10	0.75	120	2.82	2.05	Open
Pipe 137	10	0.75	120	2.82	2.05	Open
Pipe 140	10	1	120	2.82	1.15	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 142	25	1.25	120	5.64	1.48	Open
Pipe 143	10	0.75	120	2.82	2.05	Open
Pipe 144	10	0.75	120	2.82	2.05	Open
Pipe 147	25	1.25	120	5.64	1.48	Open
Pipe 148	10	0.75	120	2.82	2.05	Open
Pipe 149	10	0.75	120	2.82	2.05	Open
Pipe 152	50	1.25	120	5.64	1.48	Open
Pipe 153	10	0.75	120	2.82	2.05	Open
Pipe 154	10	0.75	120	2.82	2.05	Open
Pipe 157	10	1.25	120	5.64	1.48	Open
Pipe 158	10	0.75	120	2.82	2.05	Open
Pipe 159	10	0.75	120	2.82	2.05	Open
Pipe 162	50	1.25	120	5.64	1.48	Open
Pipe 163	10	0.75	120	2.82	2.05	Open
Pipe 164	10	0.75	120	2.82	2.05	Open
Pipe 167	10	1.25	120	5.64	1.48	Open
Pipe 168	10	0.75	120	2.82	2.05	Open
Pipe 169	10	0.75	120	2.82	2.05	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 172	50	1.25	120	5.64	1.48	Open
Pipe 173	10	0.75	120	2.82	2.05	Open
Pipe 174	10	0.75	120	2.82	2.05	Open
Pipe 177	10	1.25	120	5.64	1.48	Open
Pipe 178	10	0.75	120	-2.82	2.05	Open
Pipe 179	10	0.75	120	2.82	2.05	Open
Pipe 182	50	1.25	120	5.64	1.48	Open
Pipe 183	10	0.75	120	2.82	2.05	Open
Pipe 184	10	0.75	120	2.82	2.05	Open
Pipe 187	10	1.25	120	5.64	1.48	Open
Pipe 188	10	.75	120	-2.82	2.05	Open
Pipe 189	10	.75	120	2.82	2.05	Open
Pipe 192	50	1.25	120	5.64	1.48	Open
Pipe 193	10	.75	120	2.82	2.05	Open
Pipe 194	10	.75	120	2.82	2.05	Open
Pipe 197	10	1.25	120	5.64	1.48	Open
Pipe 198	10	.75	120	2.82	2.05	Open
Pipe 199	10	.75	120	2.82	2.05	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 202	50	1.25	120	5.64	1.48	Open
Pipe 203	50	1.25	120	5.64	1.48	Open
Pipe 204	10	.75	120	2.82	2.05	Open
Pipe 205	10	.75	120	2.82	2.05	Open
Pipe 206	10	.75	120	2.82	2.05	Open
Pipe 207	10	.75	120	-2.82	2.05	Open
Pipe 210	50	1.25	120	5.64	1.48	Open
Pipe 211	10	.75	120	2.82	2.05	Open
Pipe 212	10	0.75	120	2.82	2.05	Open
Pipe 215	25	1	120	2.82	1.15	Open
Pipe 216	25	1	120	2.82	1.15	Open
Pipe 219	25	1.25	120	8.47	2.21	Open
Pipe 220	25	1.25	120	5.64	1.48	Open
Pipe 221	10	.75	120	2.82	2.05	Open
Pipe 222	10	0.75	120	2.82	2.05	Open
Pipe 223	10	0.75	120	2.82	2.05	Open
Pipe 224	10	0.75	120	2.82	2.05	Open
Pipe 225	10	0.75	120	2.82	2.05	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 231	50	1.25	120	5.64	1.48	Open
Pipe 232	10	0.75	120	2.82	2.05	Open
Pipe 233	10	0.75	120	2.82	2.05	Open
Pipe 236	10	1.25	120	-5.64	1.48	Open
Pipe 237	10	.75	120	2.82	2.05	Open
Pipe 238	10	.75	120	2.82	2.05	Open
Pipe 243	10	1.25	120	2.82	0.74	Open
Pipe 244	10	0.75	120	2.82	2.05	Open
Pipe 245	50	1.25	120	5.64	1.48	Open
Pipe 246	10	0.75	120	2.82	2.05	Open
Pipe 247	10	1.25	120	2.82	0.74	Open
Pipe 249	50	1.25	120	5.64	1.48	Open
Pipe 250	10	0.75	120	2.82	2.05	Open
Pipe 251	10	1.25	120	2.82	0.74	Open
Pipe 254	10	1.25	120	5.64	1.48	Open
Pipe 255	10	0.75	120	2.82	2.05	Open
Pipe 256	10	0.75	120	2.82	2.05	Open
Pipe 259	10	1.25	120	5.64	1.48	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 260	10	0.75	120	-2.82	2.05	Open
Pipe 261	10	0.75	120	2.82	2.05	Open
Pipe 264	10	1.25	120	5.64	1.48	Open
Pipe 265	10	0.75	120	2.82	2.05	Open
Pipe 266	10	0.75	120	2.82	2.05	Open
Pipe 271	50	1.25	120	5.64	1.48	Open
Pipe 272	10	0.75	120	2.82	2.05	Open
Pipe 273	10	0.75	120	2.82	2.05	Open
Pipe 274	10	1	120	2.82	1.15	Open
Pipe 275	50	1.25	120	8.46	2.21	Open
Pipe 276	10	0.75	120	5.64	4.10	Open
Pipe 277	10	0.75	120	2.82	2.05	Open
Pipe 278	10	1.25	120	5.64	1.48	Open
Pipe 279	10	0.75	120	2.82	2.05	Open
Pipe 280	10	0.75	120	2.82	2.05	Open
Pipe 285	10	1.25	120	5.64	1.48	Open
Pipe 286	10	0.75	120	2.82	2.05	Open
Pipe 287	10	0.75	120	2.82	2.05	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 288	50	1.25	120	5.64	1.48	Open
Pipe 289	10	0.75	120	2.82	2.05	Open
Pipe 290	10	0.75	120	2.82	2.05	Open
Pipe 295	10	1.25	120	5.64	1.48	Open
Pipe 296	10	0.75	120	2.82	2.05	Open
Pipe 297	10	0.75	120	2.82	2.05	Open
Pipe 298	50	1.25	120	5.64	1.48	Open
Pipe 299	10	0.75	120	-2.82	2.05	Open
Pipe 300	10	0.75	120	2.82	2.05	Open
Pipe 319	6	4	120	285.00	7.28	Open
Pipe 320	6	4	120	285.00	7.28	Open
Pipe 322	8.44	4	120	-104.88	2.68	Open
Pipe 323	14	4	120	-180.12	4.60	Open
Pipe 324	20	4	120	104.88	2.68	Open
Pipe 325	20	4	120	-180.12	4.60	Open
Pipe 305	30	4	120	-285.00	7.28	Open
Valve 24	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 54	#N/A	0.625	#N/A	-2.82	2.95	Open

MAX VELOCITY*

* BOOSTER PUMP MANIFOLD

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Valve 55	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 59	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 60	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 64	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 65	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 69	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 70	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 74	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 75	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 77	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 85	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 86	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 88	#N/A	0.675	#N/A	2.82	2.53	Open
Valve 95	#N/A	0.675	#N/A	2.82	2.53	Open
Valve 96	#N/A	0.675	#N/A	2.82	2.53	Open
Valve 101	#N/A	0.675	#N/A	2.82	2.53	Open
Valve 102	#N/A	0.675	#N/A	2.82	2.53	Open
Valve 109	#N/A	0.625	#N/A	2.82	2.95	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Valve 110	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 114	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 115	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 117	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 121	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 122	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 126	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 127	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 131	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 132	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 134	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 138	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 139	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 141	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 145	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 146	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 150	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 151	#N/A	0.625	#N/A	2.82	2.95	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Valve 155	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 156	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 160	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 161	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 165	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 166	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 170	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 171	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 175	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 176	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 180	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 181	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 185	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 186	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 190	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 191	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 195	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 196	#N/A	0.75	#N/A	2.82	2.05	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Valve 200	#N/A	.625	#N/A	2.82	2.95	Open
Valve 201	#N/A	.625	#N/A	2.82	2.95	Open
Valve 208	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 209	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 213	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 214	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 217	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 218	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 226	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 227	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 228	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 229	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 230	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 234	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 235	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 239	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 240	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 241	#N/A	0.625	#N/A	2.82	2.95	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Valve 242	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 248	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 252	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 253	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 257	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 258	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 262	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 263	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 267	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 268	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 269	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 270	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 281	#N/A	0.625	#N/A	-2.82	2.95	Open
Valve 282	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 283	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 284	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 291	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 292	#N/A	0.625	#N/A	2.82	2.95	Open

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Valve 293	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 294	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 301	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 302	#N/A	0.75	#N/A	-2.82	2.05	Open
Valve 303	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 304	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 326	#N/A	0.625	#N/A	2.82	2.95	Open
Valve 327	#N/A	0.625	#N/A	-2.82	2.95	Open

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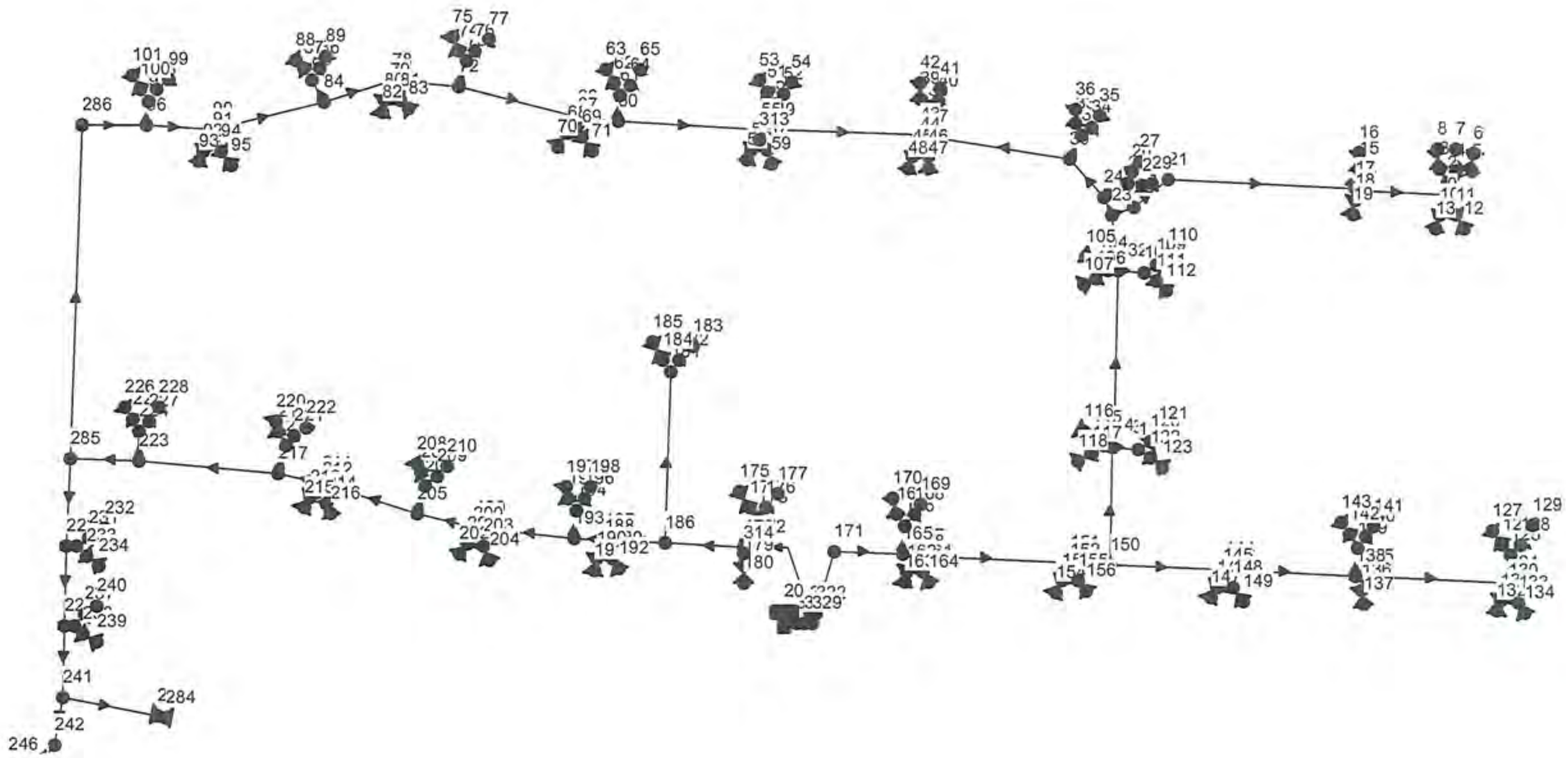
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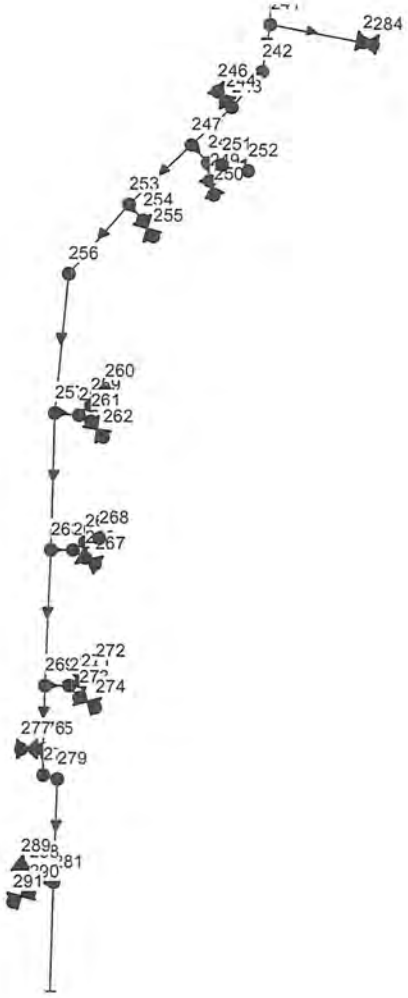
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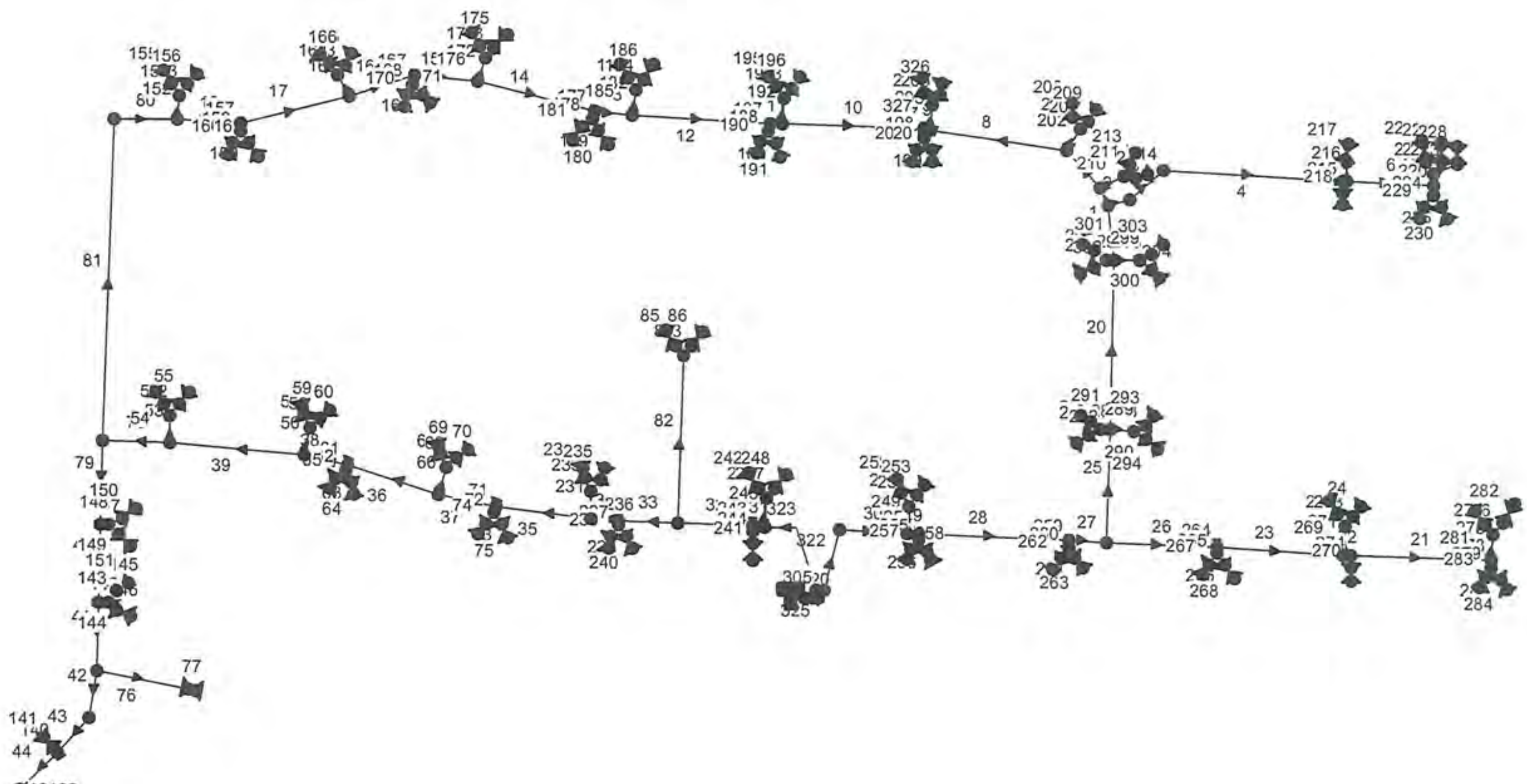

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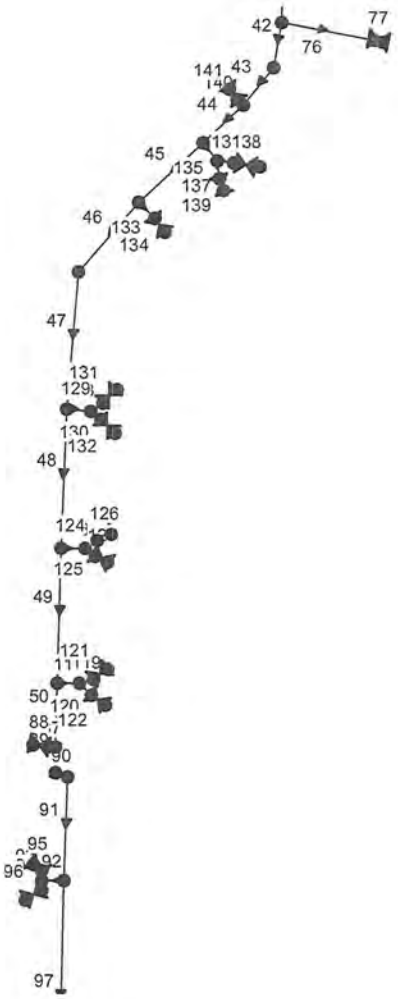
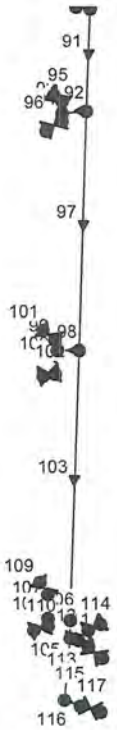


Day 1, 12:

LINK IDS



Fire District Response

Memorandum of Understanding

TO: South Bay Fire District 8, Assistant Chief Brandon LeMay

DATE: June 10, 2019

FROM: Doug Eklund DE

Jerome W. Morrissette & Associates Inc., P.S.
1700 Cooper Point Road SW, # B2
Olympia, WA 98502-1110
tel (360) 352-9456 FAX 360 352-9990

RE: Fire Suppression Storage at Prairie Ridge #605
Water System, ID #02356W

Please find attached a map showing the service area of the Prairie Ridge Water System with an overlay of the Thurston County Fire District Response Map. Please note that the Fire District Response Overlay show that the single family residence are is part of the response area for the South Bay Fire District and that the large parcel is owned by North Thurston School District is vacant and will receive fire response from Lacey Fire District 8 when and if the parcel is developed with school buildings.

My understanding of the Thurston County fire suppression requirements for the Prairie Ridge Water System is as follows:

The water system serves single family residences. Zoning for the Prairie Ridge Water System service area is for single family residences at the density of 1 single family residence per 5 acres. The system currently serves 99 single family residences. In ten years we project that it will serve 114 single family residences and will be at full build-out. The existing water distribution system is not fire flow capable. Fire flow is not required for the water distribution system.

South Bay Fire District 3 8 will respond with pumper trucks and tenders to single family residence fires in the Prairie Ridge Water System service area. If fire suppression volumes provided by the tenders is not sufficient, tenders will be used to relay additional fire suppression volume.

If my understanding of the fire flow requirements for the Prairie Ridge #605 Water System, so far as South Bay Fire District 8 is concerned, is incorrect please notify me and I will revise this memo. If my understanding is correct, kindly stamp or initial the memo and send it back to me.

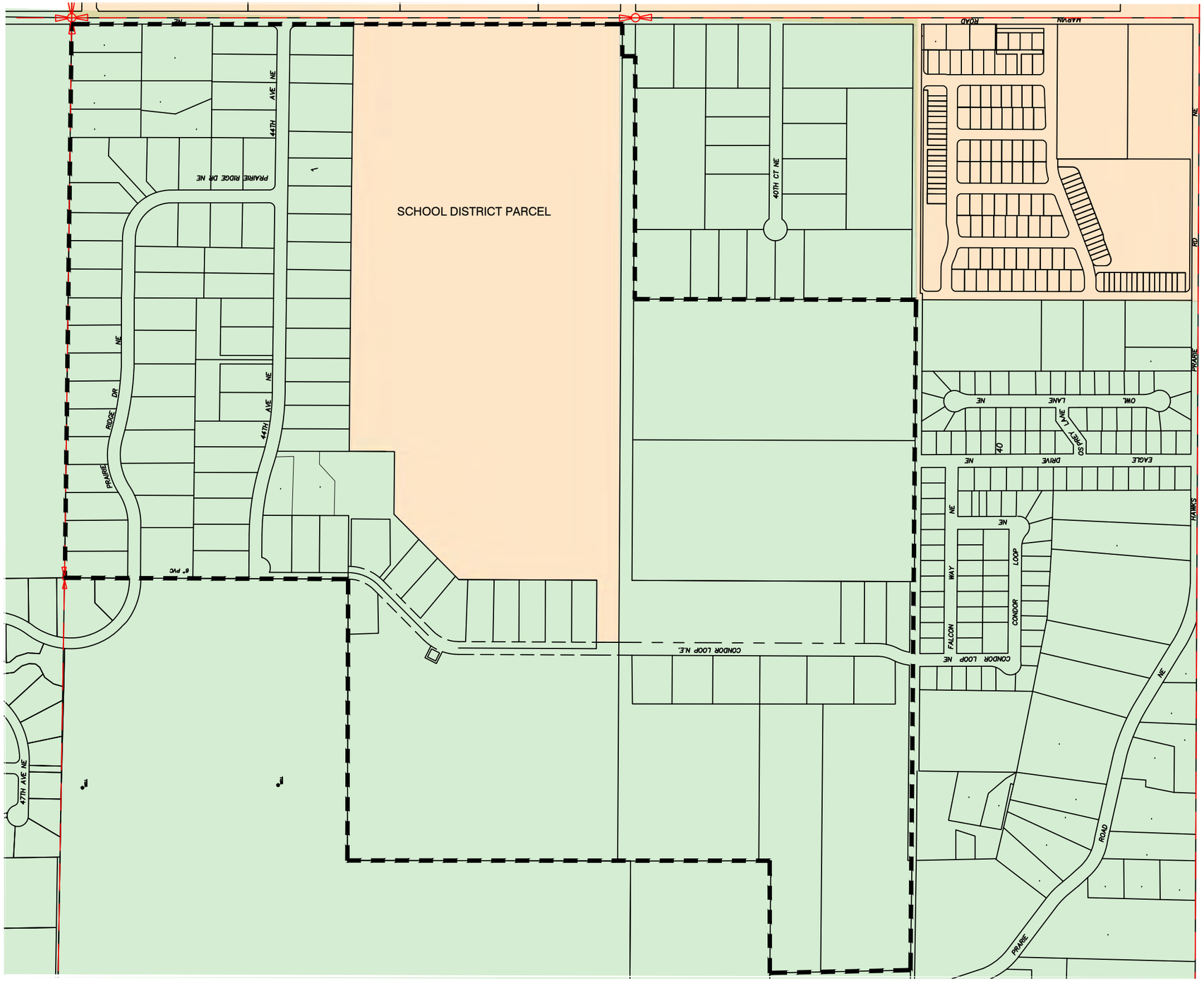
Thank you.

OTHERWISE CORRECT 16 JUN 19

SOUTH BAY FIRE DEPARTMENT
THURSTON COUNTY FIRE PROTECTION DISTRICT 8

BRIAN K. VANCAMP CFO, EFO, MIFireE
FIRE CHIEF

3506 SHINCKE RD. NE
OLYMPIA, WA 98506
PHONE: 360-491-5320
FAX: 360-438-0523
E-MAIL: vancamp@southbayfire.com



LEGEND

- SOUTH BAY (FD08) FIRE RESPONSE DISTRICT
- LACEY (FD03) FIRE RESPONSE DISTRICT
- SECTION BOUNDARY
- PRAIRIE RIDGE WATER SYSTEM SERVICE AREA

SCALE: 1"= 500 FEET

0 250 500 1000

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil • Municipal • Geotechnical • Land Surveying
Jerome W. Morrissette & Associates Inc., P.S.
1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

DE 06-19-2019 DESIGNED BY DATE
MH 06-19-2019 C.A.D.D. BY DATE
DE 06-19-2019 CHECKED BY DATE

PRAIRIE RIDGE #605 WATER SYSTEM ID NO. 02356 W

FIRE DISTRICT RESPONSE MAP

17133 FIRE RESPONSE

SHT 1 OF 1

Meter Records

System #	Name	Group	# of active water svcs	BILL DATE	MONTHLY SOLD GALLONS	BLOW OFF / TREATMENT GALLONS	MONTHLY PUMPED GALLONS	LOSS IN GAL (TP-AC)	GPM Leak Loss (LOSS GALLONS/43200)	MONTHLY DSL % (TP-(AC)/TP)	MONTHLY GAL PER DAY PER CONN ((SOLD/Act Svcs)/30)	YTD (AC) SOLD + BLOW OFF GALLONS	YTD (TP) PUMPED GALLONS	YTD DSL % ((TP-AC)/TP)	YTD Gallons Per Day Per Conn	*ytd gpm leak loss (tp-ac)/525600*	% of WR Used
605	Prairie Ridge	A	101	January-18	273,491	0	278,802	5,311	0.12	2%	90	273,491	278,802	2%	90		1.1%
605	Prairie Ridge	A	101	February-18	394,772	0	398,198	3,426	0.08	1%	130	668,263	677,000	1%	110		2.6%
605	Prairie Ridge	A	101	March-18	367,208	0	351,897	-15,312	-0.35	-4%	121	1,035,471	1,028,896	-1%	114		3.9%
605	Prairie Ridge	A	101	April-18	459,489	0	507,802	48,313	1.12	10%	152	1,494,960	1,536,699	3%	123		5.9%
605	Prairie Ridge	A	101	May-18	456,033	0	478,301	22,268	0.52	5%	151	1,950,993	2,015,000	3%	129		7.7%
605	Prairie Ridge	A	101	June-18	981,129	0	1,036,002	54,873	1.27	5%	324	2,932,123	3,051,002	4%	161		11.7%
605	Prairie Ridge	A	101	July-18	1,381,930	0	1,428,598	46,668	1.08	3%	456	4,314,053	4,479,600	4%	203		17.2%
605	Prairie Ridge	A	101	August-18	2,037,335	0	2,179,642	142,307	3.29	7%	672	6,351,388	6,659,242	5%	262		25.5%
605	Prairie Ridge	A	101	September-18	1,902,688	0	2,070,658	167,971	3.89	8%	628	8,254,075	8,729,901	5%	303		33.5%
605	Prairie Ridge	A	101	October-18	578,511	0	847,604	269,093	6.23	32%	191	8,832,586	9,577,504	8%	292		36.7%
605	Prairie Ridge	A	101	November-18	514,130	0	246,002	-268,128	-6.21	-109%	170	9,346,716	9,823,506	5%	280		37.7%
605	Prairie Ridge	A	101	December-18	404,331	0	419,404	15,072	0.35	4%	133	9,751,048	10,242,910	5%	265	*0.94*	39.3%

BILLING DATE	MONTHLY (AC) SOLD +BLOW OFF GALLONS	MONTHLY PUMPED GALLONS	MONTHLY DSL %	MONTHLY GA PER DAY PER CONN	YTD (AC) SOLD + BLOW OFF GALLONS	YTD PUMPED GALLONS	YTD DSL %	YTD % of WATER RIGHT	# OF DAYS
Dec-17	346,608	362,500	4%	133	9,145,161	9,530,800	4%	37%	359
Nov-17	413,001	411,900	0%	142	8,798,553	9,168,300	4%	35%	333
Oct-17	551,972	555,800	1%	184	8,385,552	8,756,400	4%	34%	304
Sep-17	1,482,042	1,526,200	3%	463	7,833,580	8,200,600	4%	31%	274
Aug-17	1,768,990	1,647,300	-7%	610	6,351,538	6,674,400	5%	26%	242
Jul-17	1,694,863	2,063,400	18%	547	4,582,548	5,027,100	9%	19%	213
Jun-17	876,746	918,300	5%	266	2,887,685	2,963,700	3%	11%	182
May-17	426,360	419,900	-2%	152	2,010,939	2,045,400	2%	8%	149
Apr-17	434,521	464,600	6%	132	1,584,579	1,625,500	3%	6%	121
Mar-17	377,426	364,300	-4%	130	1,150,058	1,160,900	1%	4%	88
Feb-17	360,521	375,100	4%	129	772,632	796,600	3%	3%	59
Jan-17	412,111	421,500	2%	133	412,111	421,500	2%	2%	31
Dec-16	450,820	460,000	2%	137	9,104,043	9,501,300	4%	36%	369
Nov-16	372,511	392,800	5%	133	8,653,223	9,041,300	4%	35%	336
Oct-16	578,728	592,300	2%	170	8,280,712	8,648,500	4%	33%	308
Sep-16	1,105,768	1,154,300	4%	395	7,701,984	8,056,200	4%	31%	274
Aug-16	1,613,144	1,683,500	4%	520	6,596,216	6,901,900	4%	26%	246
Jul-16	1,305,896	1,369,300	5%	396	4,983,072	5,218,400	5%	20%	215
Jun-16	1,070,755	1,144,700	6%	382	3,677,176	3,849,100	4%	15%	182
May-16	954,448	1,018,400	6%	289	2,606,421	2,704,400	4%	10%	154
Apr-16	454,171	466,900	3%	157	1,651,973	1,686,000	2%	6%	121
Mar-16	360,708	368,400	2%	129	1,197,802	1,219,100	2%	5%	92
Feb-16	393,523	380,700	-3%	116	837,094	850,700	2%	3%	64
Jan-16	443,571	470,000	6%	148	443,571	470,000	6%	2%	30
Dec-15	371,965	373,200	0%	128	9,317,387	9,626,200	3%	37%	362
Nov-15	414,235	431,400	4%	129	8,945,422	9,253,000	3%	35%	333
Oct-15	485,213	488,600	1%	167	8,531,187	8,821,600	3%	34%	301
Sep-15	863,274	915,100	6%	288	8,045,974	8,333,000	3%	32%	272
Aug-15	1,800,997	1,913,700	6%	563	7,182,700	7,417,900	3%	28%	242
Jul-15	1,925,591	1,970,400	2%	664	5,381,703	5,504,200	2%	21%	210
Jun-15	1,290,412	1,327,100	3%	416	3,456,112	3,533,800	2%	14%	181
May-15	562,264	585,900	4%	176	2,165,700	2,206,700	2%	8%	150
Apr-15	389,005	385,200	-1%	144	1,603,436	1,620,800	1%	6%	118
Mar-15	387,068	359,325	-8%	129	1,214,431	1,235,600	2%	5%	91
Feb-15	376,379	439,475	14%	130	827,363	876,275	6%	3%	61
Jan-15	450,984	436,800	-3%	141	450,984	436,800	-3%	2%	32

System Map

SECTION 34, TOWNSHIP 19 N, RANGE 01 W, W.M.

SCALE: 1"=200 FEET

0 100 200 400

LEGEND

- 2 IN. PVC
- 2. 5 IN PVC
- 4 IN PVC
- 6 IN PVC
- SECTION BOUNDARY
- SERVICE METER
- BLOW OFF
- VALVE

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil • Municipal • Geotechnical • Land Surveying

Jerome W. Morrissette & Associates Inc., P.S.

1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

Approved By

DE 06/07/2019 DESIGNED BY DATE

MH 06/07/2019 C.A.D.D. BY DATE

DE 06/07/2019 CHECKED BY DATE

THURSTON COUNTY PUD NO. 1

PRAIRIE RIDGE WATER SYSTEM SYSTEM MAP

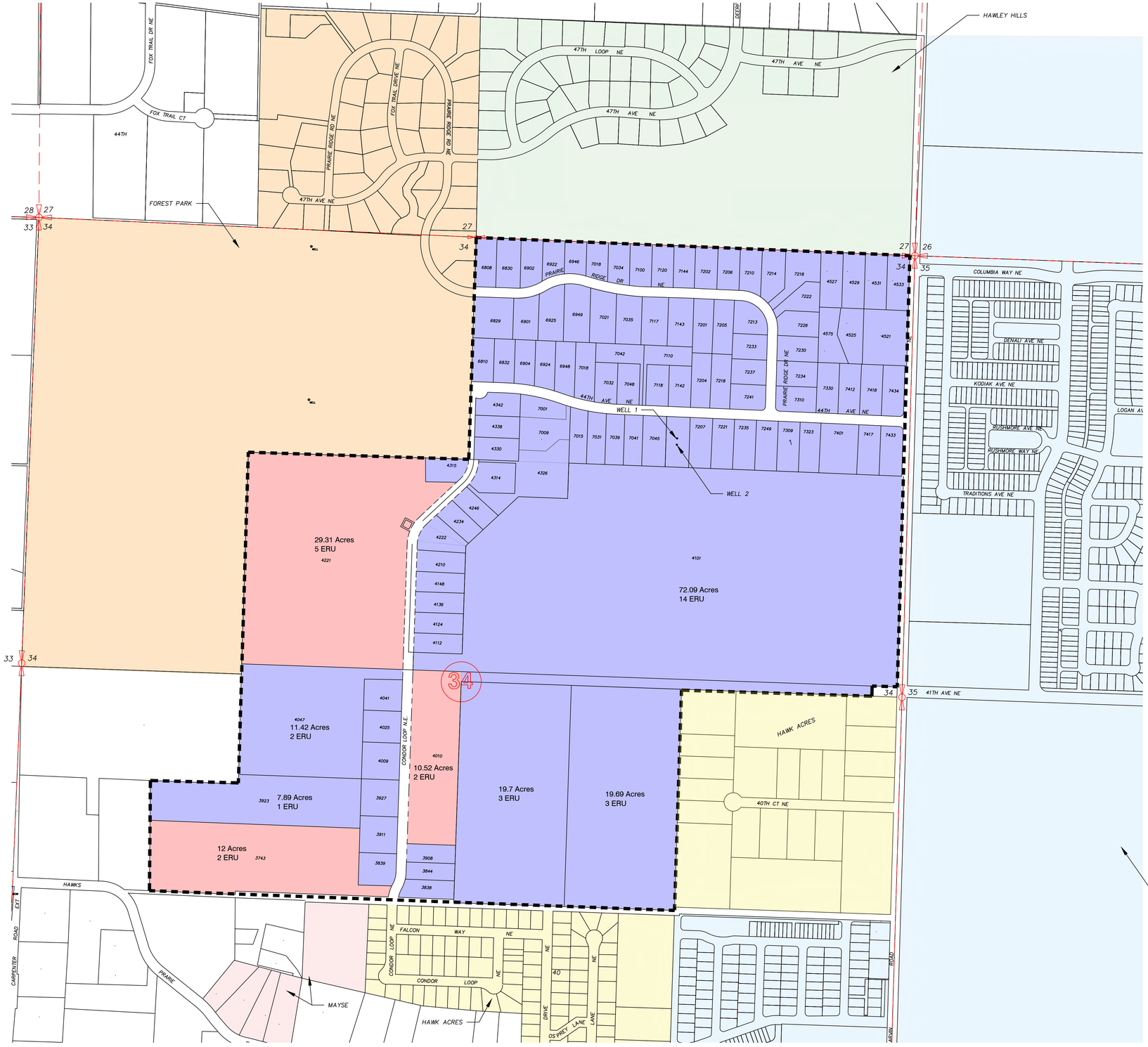
17133

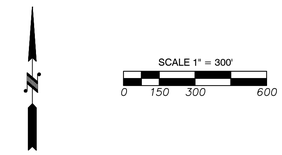
SHEET 1 OF 1

Z:\2017 Projects\17133 Thurston PUD Prairie Ridge WSP\JWMA Drawings\SYSTEM MAP, SERVICE AREA, CMP\17133 SYSTEM MAP.dwg, 6/7/2019 2:01:19 PM

Service Area Map

SECTION 34, TOWNSHIP 19 N, RANGE 01 W, W.M.





LEGEND

- SERVICE AREA
- RETAIL SERVICE AREA
- PRAIRIE RIDGE WATER SYSTEM SERVICE AREA
- SECTION BOUNDARY

ADJAECENT WATER SYSTEMS

WATER SYSTEM	ID NUMBER	CONTACT NAME	PHONE
HAWLEY HILLS	AB037	KIMBERLY GUBBE	(360) 357-8783
FOREST PARK	07167	SHAWN H. ODELL	(360) 851-4060
HAWK ACRES	31845	KIMBERLY GUBBE	(360) 357-8783
MAYSE	02534	ANDREW NOBLE	(360) 888-3201
LACEY WATER DEPT.	43500	PETER BROOKS	(360) 413-4395

NO	DATE	BY	APPR	REVISIONS

JWM&A Civil • Municipal • Geotechnical • Land Surveying

Jerome W. Morrissette & Associates Inc., P.S.

1700 Cooper Pt. Road S.W. #B-2, Olympia, Wa. 98502-1110 Ph 360.352.9456 Fx 360.352.9990

Approved By

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THURSTON COUNTY
PUD NO. 1

PRAIRIE RIDGE WATER SYSTEM SERVICE AREA MAP

17133 Prairie Ridge Service Area

SHEET 1 OF 1