City of Winlock
Water System Plan

G&O No. 15254
DOH ID No. 97500C
March 2020

Gray & Osborne, Inc.

CITY OF WINLOCK

LEWIS COUNTY **WASHINGTON**

WATER SYSTEM PLAN

G&O #15254
MARCH 2020

Gray & Osborne, Inc.
CONSULTING ENGINEERS

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER REGIONAL OPERATIONS
PO Box 47823, Olympia, Washington 98504-7823
TDD Relay 1-800-833-6388

March 12, 2020

Rodney Cecil
City of Winlock
Post Office Box 777
Winlock, Washington 98596

Subject: City of Winlock Water System, ID #97500, Lewis County; Water System Plan Update, ODW Project #17-0907, **APPROVAL**

Dear Rodney Cecil:

The Water System Plan (WSP) received by the Office of Drinking Water (ODW) on September 29, 2017, along with subsequent submittals received on July 2, 2018, October 29, 2019, and February 27, 2020, have been reviewed and are **APPROVED**.

Approval of this WSP is valid as it relates to the standards outlined in WAC 246-290 revised January 14, 2017, WAC 246-293 revised January 1991, and RCW 70.116 (Municipal Water Law) effective September 2003, and is subject to the qualifications herein. Future changes in the rules and statutes may be more stringent and require facility modification or corrective action.

An approved update of this WSP is required on or before March 12, 2030, unless ODW requests an update or plan amendment pursuant to WAC 246-290-100(9).

APPROVED NUMBER OF CONNECTIONS

This document includes an evaluation of the physical and legal (water right limitations) ability of this proposed new water system to provide water. Based on the analysis presented in this document, this water system demonstrates service capacity to adequately serve a total of 1149 equivalent residential units (ERUs). The capacity was determined based on a Maximum Day Demand (MDD) of 613 gallons per day (gpd)/ERU. The limiting factor described in the water system plan is source capacity.

This water system is approved for a total of 853 connections. The following summarizes the breakdown of approved connections and their associated ERUs:

Total Water Budget (ERUs)	1149
2015 Usage (ERUs)	856
Water Available for Additional Connections (ERUs)	293
2015 Number of Connections (connections)	560
Total Number of Service Connections (assumes all future connections serve single family residences)	560 + 293 = 853

The approved number of connections is based on an assumption that each future connection will use water consistent with an average single-family residence supplied by the water system. Other types of new connections, such as apartments, businesses, or parks, may use more or less water than an average single-family residence.

You are responsible for permitting additional new connections in a manner that recognizes all new connections added and the water demands associated with each new connection. Your process must ensure an accurate assessment of the remaining service capacity available, expressed as ERUs, so that physical capacity and water right limitation are not exceeded.

LOCAL GOVERNMENT CONSISTENCY

Fred Evander, Planner, signed the local government consistency statement for Lewis County on October 24, 2017. This meets local government consistency requirements for WSP approval pursuant to RCW 90.03.386 and RCW 43.20.

SERVICE AREA AND DUTY TO SERVE

Pursuant to RCW 90.03.386(2), the service area identified in this WSP service area map may now represent an expanded "place of use" for this system's water rights. Changes in the service area should be made through a WSP amendment.

The City of Winlock has a duty to provide new water service within its retail service area. This WSP includes service policies to describe how your system plans to provide new service within your retail service area. Your plan specifies the retail service area is the same as your service area.

CONSTRUCTION WAIVERS

Standard Construction Specifications for distribution main extensions in this WSP are approved. Consistent with WAC 246-290-125(2), this system may proceed with the installation of distribution main extensions provided this system completes and keeps on file a construction

completion report form in accordance with WAC 246-290-125(2) and WAC 246-290-120(5) and makes it available for review upon request by ODW.

WATER RESOURCES

Our approval of your WSP does not confer or guarantee any right to a specific quantity of water. The approved number of service connections is based on your representation of available water quantity. If the Washington Department of Ecology (Ecology), a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represented, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

WATERSHED PLANNING

The City of Winlock Water System Service Area is located in Water Resource Inventory Area (WRIA) 26 (Cowlitz). Please contact Ecology for more information regarding watershed planning.

CLOSING

If you have any questions, please contact Mark Mazeski at (360) 236-3038 or by e-mail at mark.mazeski@doh.wa.gov, or Scott Pollock at (360) 236-30318 or by e-mail at scott.pollock@doh.wa.gov.

Sincerely,

Mark J. Mazeski
Office of Drinking Water, Regional Planner

R Scott Pollock
Scott Pollock, P.E.
Office of Drinking Water, Regional Engineer

cc: Jon Hinton Gray & Osborne, Inc.
Sue Kennedy, Lewis County Environmental Health Department
Lee Napier, Lewis County Community Development Services
Tammy Hall, Department of Ecology

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LIST OF ABBREVIATIONS AND ACRONYMS

µg/L	Micrograms Per Liter
AC	Asbestos Cement (pipe)
ac-ft	Acre-foot or Acre-feet
ac-ft/yr	Acre-Foot per Year or Acre-Feet per Year
ADD	Average Day Demand (per ERU)
AVB	Air Vacuum Breaker
AWWA	American Water Works Association
BAT	Backflow Assembly Tester
CAD	Computer Aided Drafting
CCC	Cross Connection Control
CCS	Cross Connection Control Specialist
CEU	Continuing Education Unit
CFR	Code of Federal Regulations
CFR	Calculated Fixed Radius (a WHPA determination methodology)
cfs	Cubic Feet per Second
CIP	Capital Improvement Program
Comm	Community Water System
DBP	Disinfectant Byproduct
DCVA	Double Check Valve Assembly
DI	Ductile Iron Pipe
DOH	Washington State Department of Health
DOT	Washington State Department of Transportation
DSL	Distribution System Leakage
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
ERU	Equivalent Residential Unit
ft	Foot or Feet
GIS	Geographic Information System
GMA	Growth Management Act
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
gpm	Gallons per Minute
HAA5	Haloacetic Acid 5, a group of regulated disinfection byproducts
HDPE	High Density Polyethylene Pipe
HOA	Homeowners Association
HP	Horsepower
ID	Identification
IDSE	Initial Distribution System Evaluation
IOC	Inorganic Chemical
kW	Kilowatts
LID	Local Improvement District
LRAA	Locational Running Annual Average
LUST	Leaking Underground Storage Tank

LIST OF ABBREVIATIONS AND ACRONYMS

MCL	Maximum Contaminant Level
MDD	Maximum Day Demand (per ERU)
MFL	Million Fibers per Liter (referring to asbestos fibers)
MFL>10µm	Million Fibers per Liter greater than 10 microns in length
MG	Million Gallons
mg/L	Milligrams Per Liter
MGD	Million Gallons per Day
MHI	Median Household Income
MSL	Feet Above Mean Sea Level (Elevation)
MWL	Municipal Water Law
N/A or NA	Not Applicable, Not Available, or Not Analyzed
No.	Number
NTNC	Non-Transient Non-Community water system
O&M	Operation and Maintenance
OFM	Washington State Office of Financial Management
PE	Polyethylene Pipe
PHD	Peak Hour Demand
PLC	Programmable Logic Controller
PM	Preventive Maintenance
ppb	Parts per Billion
ppm	Parts per Million
PRV	Pressure Reducing Valve
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride Plastic
RAD	Radionuclide
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RPBA	Reduced Pressure Principle Backflow Prevention Assembly
SEPA	Washington State Environmental Policy Act
SOC	Synthetic Organic Chemical
THM	Trihalomethane
TNC	Transient Non-Community Water system
TTHM	Total Trihalomethanes
UGA	Urban Growth Area
USEPA	US Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WD	Water District
WDM	Water Distribution Manager
WETRC	Washington Environmental Training Resource Center
WFI	Water Facilities Inventory Report
WHPA	Wellhead Protection Area
WMR	Water Main Replacement (program)

LIST OF ABBREVIATIONS AND ACRONYMS

WSP	Water System Plan
WTPO	Water Treatment Plant Operator
WUE	Water Use Efficiency
ZOC	Zone of Contribution (to a WHPA)

CHAPTER 1

WATER SYSTEM DESCRIPTION

OBJECTIVE

SCOPE OF WORK

This Water System Plan (WSP) is an update of previous WSPs prepared for and adopted by the City of Winlock (the City) in accordance with requirements set forth in Chapter 246-290 WAC (Water Regulations). Previous WSPs include a 1995 WSP by Gibbs and Olson, Inc., a 2003 WSP by Kennedy/Jenks Consultants, a 2004 WSP by Gibbs & Olson, Inc., a 2005 WSP Amendment by Gibbs & Olson, Inc., and a 2008 WSP Amendment by Gibbs & Olson, Inc. This WSP is intended to meet all requirements of Part 246-290-100 WAC, as well as the needs and concerns of the City. Pursuant to Water Regulations, this WSP must receive approval of DOH and be adopted by the City. Gray & Osborne's scope of work on this WSP was authorized by contract dated May 2015. The scope includes updating WSP Chapters 1 through 4 and Chapters 6 through 9. WSP Chapter 5 (Source Protection) was contracted to be completed by Evergreen Rural Water Association.

CHAPTER OBJECTIVE

The objective of this chapter is to present background information for the City's WSP. Subjects covered include the following:

- Ownership and Management
- System Background
- Existing System
- Related Planning Documents
- Service Area Characteristics
- Water System Policies

Later chapters of this WSP assess the projected water system demands, and current water system capabilities and limits relative to projected demand and regulatory requirements. Chapters address water use efficiency (conservation) requirements, water source protection requirements, water system operations program requirements, and water system design standards. The final chapters of the WSP evaluate capital and non-capital improvement options for the City water system, present a schedule for completing the preferred improvement options, evaluate the cost impact of the improvement schedule on the City budget and water rates, and present a financing plan for implementing the WSP.

OWNERSHIP AND MANAGEMENT

SYSTEM NAME AND DOH ID NUMBER

The name of the water system on the DOH data system is *"WINLOCK CITY."* The DOH public water system ID Number is **97500C**.

TYPE OF OWNERSHIP

The City of Winlock is a Code City with a Mayor-Council government, and was incorporated in 1883. Pursuant to Water Regulations, the Winlock water system is a Group A, Community public water system.

MANAGEMENT STRUCTURE

The water system is managed by the Water Sewer Superintendent, Rodney Cecil, who answers to the Mayor and City Council. The Water Sewer Department has four employees, who work on all aspects of the City's public facilities, including the sewer system, storm drainage facilities, streets, street lighting, and parks, in addition to the water system. The City Council and staff are as follows:

Mayor .....Don Bradshaw
Council Position 1..... Brandon Swenson
Council Position 2..... Eric Conterras
Council Position 3..... Lonnie Dowell
Council Position 4..... Connie Sneed
Council Position 5..... Anne Randt
Attorney .....Sam Satterfield
Water Sewer Superintendent.....Rodney Cecil
Water Sewer Operator.....Marty Martin
City Clerk Treasurer .....Tedi Curry

WATER FACILITIES INVENTORY FORM

A copy of the City's Water Facilities Inventory (WFI) form, updated September 18, 2014, is included in Appendix A. The WFI indicates 491 full-time single-family residential connections, 19 apartments, condos, or duplexes with 72 full-time residential units, and 68 institutional, commercial/business, school, day care, or industrial services, for a total of 631 service connections. City billing records for 2015 indicate that there were an average of 433 active Residential water services, 61 active Commercial water services, and 66 connections under other categories, including Apartment Buildings, Churches, City Parks, Duplexes to 4-Plexes, Industrial, Manufactured Homes, Mobile Home Parks, Schools and Hydrant Rentals, for an annual average of 560 active water services. The differences between the WFI and the 2015 average active connections is due to a number of factors, including whether or not

apartments are counted as separate connections, whether or not inactive connections are counted, and when the connections are counted. The WFI indicates an estimated full-time residential population of 1,400, an estimated transient population averaging up to 11,000 people per month, and an estimated non-transient, non-residential population of 400 to 700 people per month.

CONTACTING WINLOCK

The City of Winlock's current mailing address and telephone number is:

City of Winlock
323 NE First Street
P.O. Box 777
Winlock, Washington 98596
Phone: (360) 785-3811

In addition, City of Winlock staff can be can be contacted by email at the following:

Water Sewer Superintendent, Rodney Cecil.....rodneycecil991@yahoo.com
City Clerk Treasurer, Tedi Curry.....wincity@toledotel.com

SYSTEM BACKGROUND

HISTORY OF WATER SYSTEM DEVELOPMENT AND GROWTH

The history of the City of Winlock written by C. C. Wall dated 1952, is posted on the Winlock City web site. The document is 49 pages long and covers many colorful details of the City's history. The following is the section from that report on the water system:

> One of the first problems the City had to face was WATER. There used to be a large community spring where the City Hall now stands. Up to 1902 everyone within the present business district carried their water from this spring.
>
> There was also a large spring on the N.P. right-of-way, near the present Standard Oil bulk station, and all residents in the north part of town carried their water from this spring.
>
> A spring on the present school property, and one on the Seaman property, (now Wayne Bevis), together with a few wells, supplied the west side of town.
>
> A spring on Sammy Stewart's property, together with a few wells, supplied the south part of town.
>
> In 1902, Mr. George I. Brooks, who then lived where Pink Crocker now lives, applied to the council for a water franchise. It was instantly granted, as they

thought they would then have a general water system. He had a good spring on his place, but all he did was build it up, and run a 2-inch pipe from there to the business district. At least it was a start.

In 1903, Mr. C.E. Leonard applied for a general water franchise. On objection by Mr. Brooks, it was turned down.

By 1907, there was a general need, and a clamor for a water system. The council then decided they would keep on with their springs and wells for drinking water, but would put in a limited system of mains for fire protection only. They figured on 1,600 feet of 6-inch mains, and about seven hydrants, and entered into an agreement with J.A. Veness Lumber Company to pump water from the Olequa Creek into the mains for $30.00 per month.

They called for bids on the above amount of pipe. Secor Brothers of Portland happened to have 2000 feet of 8-inch pipe which they agreed to sell the City for $1,809.00, but the City turned it down as too high.

In 1908, the City decided to hire a competent Engineer to come in and make a thorough survey for a water system. They hired a Mr. Hall to make said survey. He did, and recommended that they go way up the west fork of the Olequa Creek and put in a gravity system, using said Olequa Creek as the source of supply. This didn't sound too good to the council, so they decided to have another Engineer come in and make a survey.

This time they got a Mr. Allen. He recommended they go up the east fork of the Olequa Creek, but not so far, and pipe the water into town, and then use a hydraulic ram to boost the water into a reservoir on the hill east of the business district, and recommended that a system be installed capable of serving a population of at least 2,500, estimated cost of $15,000.00.

This sounded pretty good to the council, and they immediately called for a special election to vote the $15,000.00. The bond election carried by a good majority. But since the bonds were to be Utility bonds instead of General Obligation bonds, they could not find a buyer. By then they had spent over $1,000.00 for engineering and election, and still had no water system.

It was then that Mr. C.E. Leonard stepped into the picture. He told the Council that if they would give him exclusive franchise for 40 years he would put in a good water system, with good water. They said okay, provided he cover the entire town, and it was not to exceed 14 months. This was done, and today Winlock has one of the best water systems, and the best water in the state.

The date when Mr. Leonard constructed the water system is not stated in the above history, however, if Mr. Hall was hired in 1908 and completed a study, then Mr. Allen

was subsequently hired and completed another study, then bonds were authorized but did not sell, then it was probably around 1910 that Mr. Leonard began constructing a water system, and with a 40-year franchise, he or his heirs may have owned the system through 1950. Therefore, at least some portions of the existing system may have been originally installed by Mr. Leonard. The time line for construction of major system facilities is as follows:

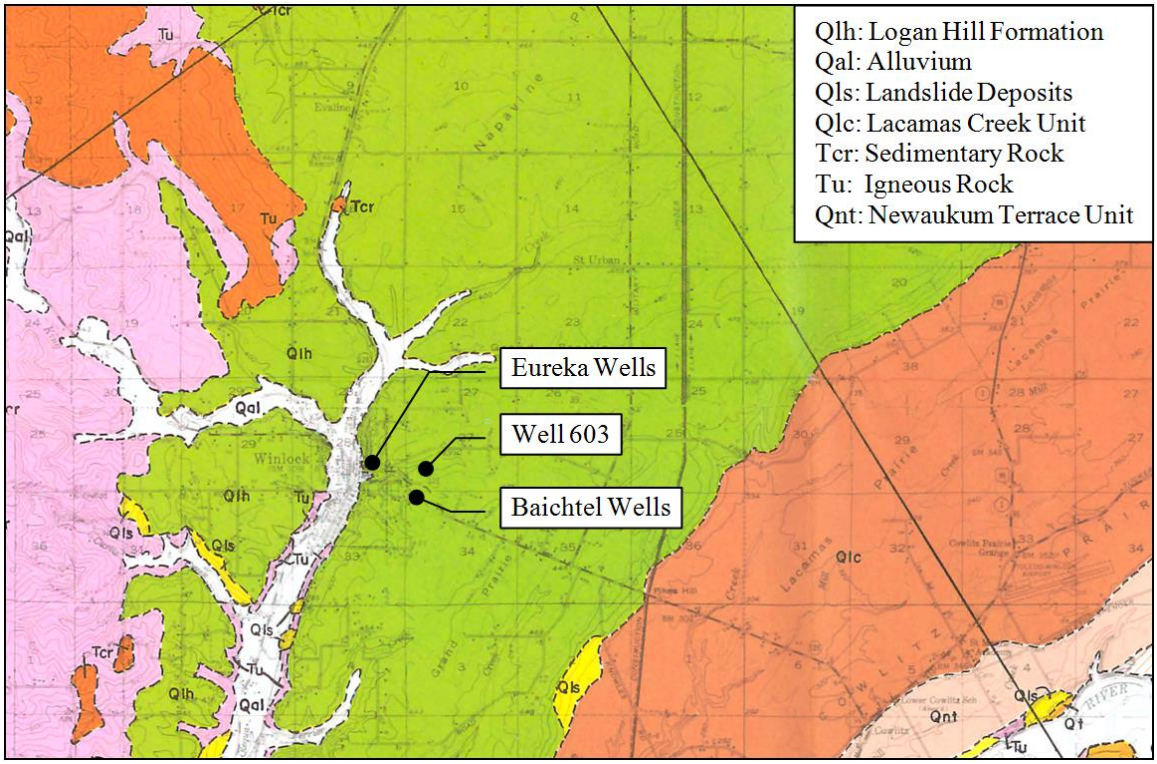
1932 Wells Eureka 1, Eureka 2, and Ash Street Well were drilled
1957 Well Eureka 3 was drilled
1973 Well Baichtel 1 was drilled
1980 Well 603 was drilled
1988 The 603 reservoirs were constructed
2001 Well Baichtel 2 was drilled

Location

Winlock is located in Lewis County about 12 miles south of Chehalis and about 2.5 miles west of Interstate 5 in the upper Olequa Creek valley. The location of Winlock is shown in Figure 1-1. The Burlington-Northern rail line passes through the middle of the town. The Newaukum River Valley lies to the north and Stearns Creek lies to the West and south. Rush Road and Forest-Winlock Road provide direct access to Interstate-5 (I-5), which passes 1 mile to the east. Olequa Creek runs through the middle of the City, draining to the south through the City of Vader to the Cowlitz River. State Highway 505 connects Winlock to Interstate 5 and the City of Toledo to the east, and State Highway 603 connects Winlock to Napavine to the north.

GEOLOGY

The geology of the Winlock area is described in a report titled *Geology and Ground-Water Resources of West-Central Lewis County, Washington,* by J. M. Weigle and B. L. Foxworthy, published by the Washington State Department of Conservation, Division of Water Resources in 1962 (Weigle report). A copy of a section of the hydrogeologic map from the Weigle Report is shown in Figure 1-2. Based on the Weigle report the downtown and older portions of the City of Winlock are situated on alluvium of Olequa Creek. Outcrops of bedrock are found on both sides of Olequa Creek south of Winlock. East and west of Winlock is what is known as the Logan Hill Formation, which is a deposit of gravel and sand with minor amounts of silt and clay. The Logan Hill Formation underlies the Grand Prairie to the east of Winlock, and the Napavine Prairie north of Winlock. Isolated remnants of the Logan Hill Formation also exist west of Winlock. All of the City of Winlock's wells draw from or from below the Logan Hill Formation.



From *Geology and Ground-Water Resources of West-Central Lewis County, Washington,* by J. M. Weigle and B. L. Foxworthy, Washington State Department of Conservation, 1962, Plate 2.

FIGURE 1-2

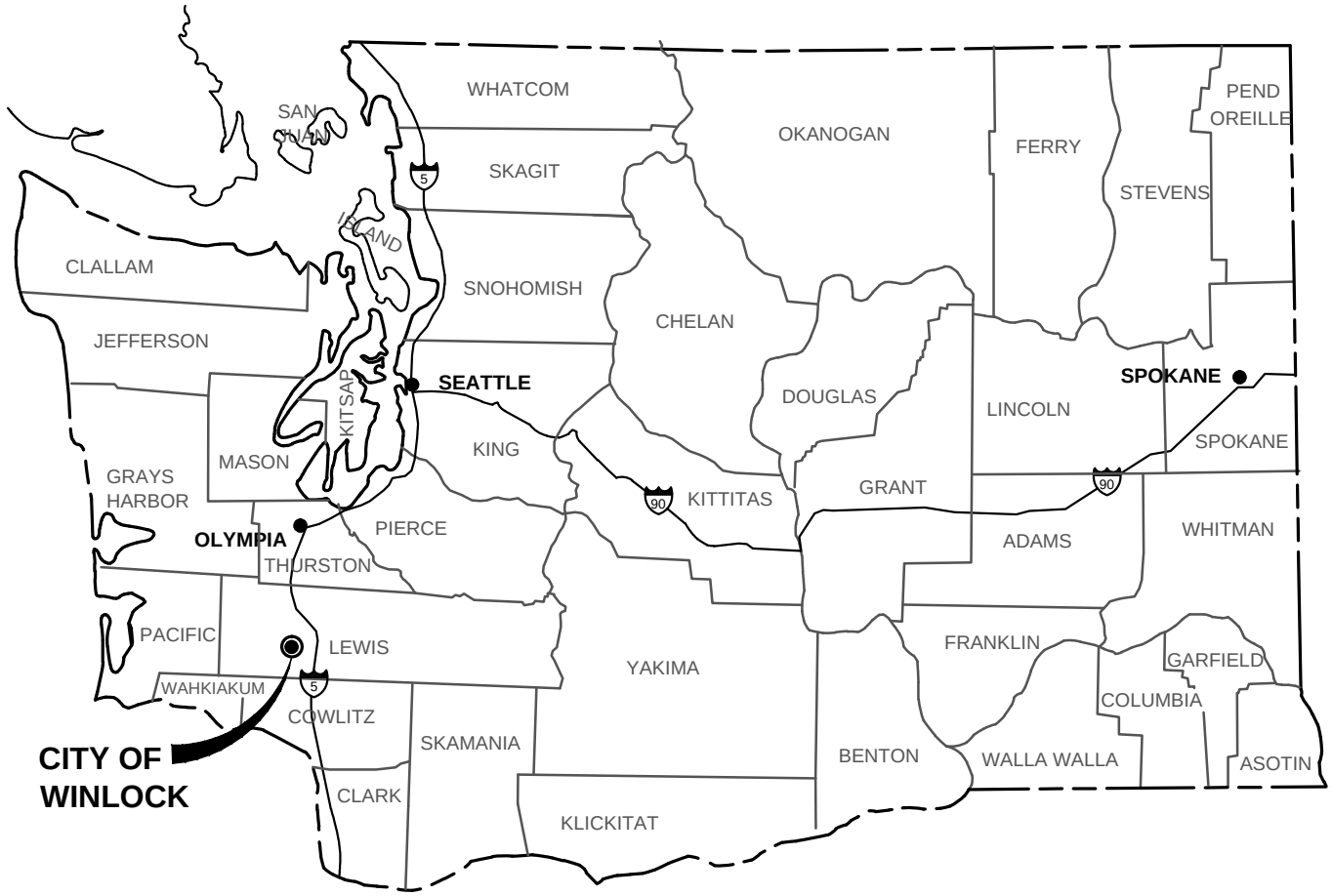
Hydrogeologic Map

A geologic report by Robinson & Noble, Inc. dated November 2003, included in the appendix of the 2004 WSP further describes the geology in the immediate vicinity of Winlock and at the Winlock wells.

Logan Hill Formation

The Logan Hill formation, according to the Weigle report, was laid down in the early Pleistocene[1]. Where unweathered, it consists of a heterogeneous mixture of gravel and sand with minor amounts of silt and clay. Generally the upper 20 to 50 feet are highly weathered and appear as yellow to red clay and soft gravel. At depths of 10 to 20 feet the outlines of the pebbles and cobbles in the altered material are retained, although these gravel-sized particles are so soft that a finger can be thrust through them or through the interstitial clay with equal ease. A few feet farther below the surface, pebble and cobble outlines become more distinct and some grit, sand and a few relatively sound pebbles and cobbles occur. The vertical progression caused by weathering is gradual rather than

[1] The Pleistocene is the geological epoch that lasted from about 2,588,000 to 11,700 years ago.



VICINITY MAP

NOT TO SCALE

CITY OF WINLOCK

WATER SYSTEM PLAN

FIGURE 1-1

VICINITY MAP

Gray & Osborne, Inc.

CONSULTING ENGINEERS

abrupt. Below the weathered zone, the Logan Hill Formation consists of mainly beds of gravel, sand and clay mixed in various proportions, with gravel and sand predominating.

Winlock's wells all withdraw from the Logan Hill Formation with the possible exception of Eureka Well 1, which may be withdrawing from below the Logan Hill Formation.

ADJACENT AND NEARBY PURVEYORS

A listing of public water systems in the Winlock area[2] was obtained from the Washington State Department of Health SENTRY database system. The largest water system near the City of Winlock is the Timberlane Mobile Home Park, ID No. 88381Q, which serves up to 17 mobile homes. There are also three Group A Non-Transient Non-Community systems in the area, including the Winlock High School, ID No. 565552, which serves both Winlock High School and Winlock Middle School, Evaline School, ID No. 239538, and Lewis County Forest Products, LLC, ID No. 06991C. The majority of the systems in the Winlock area are Group B water systems, with systems that serve fewer than 15 full-time residential connections and fewer than 25 non-residents. Water systems in the Winlock area are summarized in Table 1-1.

TABLE 1-1

Small Water Systems in the Vicinity of Winlock

ID Number	System Name	Type (1)	Serves	Location
88381Q	Timberlane Mobile Home Park	A-Comm	17 Residences	380 Minkler Road, approx. 1.5 mile ENE of Winlock
06991C	Lewis County Forest Products, LLC	A-NTNC	1 Residence, 2 Non-residences	154 Hale Road E, approx. 2.75 mile N of Winlock
239538	Evaline School	A-NTNC	1 Non-residence	111 Schoolhouse Road, approx. 3 miles N of Winlock
565552	Winlock High School	A-NTNC	School	241 Military Road, approx. 2.1 mile E of Winlock
012680	Bearse Water Works	B	2 Residences	416 SR 505, approx. 1.4 mile ESE of Winlock
023119	Lewis Co Area 3 Shop	B	1 Non-residence	111 Pleasant Valley Road., approx. 3.5 mile N of Winlock

[2] Water systems located in Sections 8, 9, 10, 15, 16, 17, 20, 21, 22, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36, T12N R2W are included.

TABLE 1-1 - (continued)

Small Water Systems in the Vicinity of Winlock

ID Number	System Name	Type (1)	Serves	Location
04589L	Tella Lane	B	6 Residences	State Highway 603 immediately N of Winlock
04773H	Shiloh Road	B	4 Residences	Shiloh Road approx. 1 mile E of Winlock
047741	Forest Acres 1	B	4 Residences	Bethany Lane east of Hawkins Road approx. 2.5 miles N of Winlock
04775J	Forest Acres 2	B	4 Residences	Bethany Lane east of Hawkins Road approx. 2.5 miles N of Winlock
06046H	Sward 278	A	10 Residences	Rayburn Road approx. 3.75 miles NNE of Winlock
06131T	Jack Bay	B	13 Residences	615 SR 505, approx. 2.5 mile E of Winlock
06226	Skye Village Shell	ATNC	1 Non-residence	West of I-5 Exit 63
06519X	Jake's Fireworks	B	2 Non-residence	739 Nevil Road., approx. 1 mile E of Winlock
06522K	Fisher Water System	B	3 Residences	Winter Road., approx. 1 mile S of Winlock
06696K	Antrim - 378	B	6 Residences	Antrim Road, approx. 2.75 mile NNE of Winlock
06707W	Weyer, Mark	B	2 Residences	Weyers Lane, approx. 2.75 mile NNE of Winlock
07844K	Whispering Firs 1	B	5 Residences	South Hawkins Road, approx. 1.6 mile NNE of Winlock
078453	Whispering Firs 2	B	6 Residences	South Hawkins Road, approx. 1.6 mile NNE of Winlock
07846L	Whispering Firs 3	B	5 Residences	South Hawkins Road, approx. 1.6 mile NNE of Winlock
31225H	Harkins Road H20 System	B	3 Residences	142 Harkins Road, approx. 1.4 mile ESE of Winlock
34198X	Hope Grange	B	1 Non-residence	155 Antrim Rd, approx. 2.8 mile N of Winlock
66606E	Shook Duplexes	B	2 Residences	SR 505, approx. 1.8 mile E of Winlock

TABLE 1-1 - (continued)

Small Water Systems in the Vicinity of Winlock

ID Number	System Name	Type (1)	Serves	Location
AA8613	Jack Bell	B	6 Residences	380 State Route 505, Approx. 1.35 mile ESE of Winlock
AA904F	Bay II	B	9 Residences	615 SR 505, approx. 2.5 mile E of Winlock
AA928C	Winlock Seventh Day Adventist	B	2 Non-residences	2660 State Route 603, approx. 1.1 miles N of Winlock
AD022E	Good Quarry	B	1 Non-residence	699 Tennessee Road., approx. 3.2 mile NNW of Winlock

(1) Water system types are A-Comm (Group A Community Water System), A-TNC (Group A Transient Non-Community Water System), A-NTNC (Group A Non-Transient Non-Community Water System) and Group B (Group B Water System).

It is reasonable to assume that all water systems in the City limits and within the City's urban growth area are likely to eventually be replaced with City of Winlock water supply. It is also possible that other water systems near the City's urban growth area may eventually request City water service. It should also be noted that if and when the City eliminates any small water system by providing City water service, the water rights of the eliminated system may be incorporated into the City's water rights pursuant to RCW 90-44-105 through a water rights change process.

EXISTING SYSTEM

A description of the facilities currently owned and operated by the City of Winlock is provided in the following sections. Figure 1-3 shows the City's existing facilities.

SOURCES OF SUPPLY

Currently, the source of supply is five groundwater wells all located east of downtown. Wells Eureka 2 and Ash Street Well are currently inactive. Well 603 is adjacent to the City's reservoirs and pumps directly into the reservoirs. The remaining wells pump directly into the water distribution system. Description of the City's wells follows.

S-01 Eureka 1

Well Eureka 1 is an 8-inch, 55-foot-deep well, with Ecology ID Tag No. AFM908, located just north of the intersection of Nevil Road and State Route 505. No well construction log is available for this well. An Ecology Water Well Report for an Existing Well was completed for this well by Gary Lacey of City of Winlock, and dated August 15, 2003. The report indicates that the well is 55 feet deep, and that it is

unknown if the well has a perforated casing or a screen, and that it has a surface seal to an unknown depth. The report further indicates that, at the time, the well was equipped with a 10 hp Fairbanks-Morse vertical line-shaft turbine pump

A Ground Water Contamination Susceptibility Assessment Survey Form included in the 2004 WSP indicates the well was drilled in 1932.

The report titled *Geology and Ground-Water Resources of West-Central Lewis County, Washington,* by J. M. Weigle and B. L. Foxworthy, referenced elsewhere in this chapter under the heading GEOLOGY, references this well as Well 12/2W-28R1, and calls it Winlock Well 1. That report states that the well was drilled in 1932 by C. King. The report indicates that the well encountered clay for the first 25 feet, then encountered gravel, cemented; pebbles hard, and cleaner toward the bottom for an unspecified distance, then encountered gravel and very course sand, clean, gray, water bearing at 55 feet, and shale at 55+ feet. The report further indicates that the well casing is perforated, although the depth, size and number of perforations are not indicated.

A well abandonment log obtained from Ecology indicates that Schneider Equipment abandoned a well for the City of Winlock, identified as Eureka 1, in the SE 1/4 of the SE 1/4 of Section 28, T 12N R 2W, on June 9, 1989, by pumping it with 39 sacks of cement grout, and capping it with a steel plate. Since Well Eureka 1 is still an active well for the City of Winlock, we presume that the well identification on the abandonment log is mistaken.

The current WFI Form reports this well as having a capacity of 210 gpm. The 2004 WSP indicates this well as having an observed capacity of 210 gpm and a recommended capacity of 250 gpm, based on a November 2003 report by Robinson & Noble, Inc., so presumably a somewhat larger pump could be installed in this well.

S-02 Eureka 2

Well Eureka 2 is indicated on the WFI Form as inactive as of April 1, 1990. An abandonment log obtained from Ecology indicates that Schneider Equipment abandoned a well for the City of Winlock, identified as Eureka 2, in the NE 1/4 of the SE 1/4 of Section 28, T 12N R 2W, on June 6, 1989, by pumping it with 51 sacks of cement grout, and capping it with a steel plate. Therefore, it is assumed that this well is no longer available for any kind of service.

S-03 Ash Street

Ash Street Well is indicated on the WFI Form as inactive as of May 16, 2007, but is marked as a permanent source. There are three well abandonment reports on file at Ecology in the name of the City of Winlock, all by Schneider Equipment, and all in May and June of 1989. Two of the abandonment logs are in the NE 1/4 of the SE 1/4, and one is in the SE 1/4 of the SE 1/4, all in Section 28, T 12N R 2W. One of the

SEE INSET

N

0 1,200 2,400 Feet

CARDINAL GLASS RESERVOIR

INSET

Freedom Dr
Hawkins Rd
Sargent Rd
Wandering Ln
Moonlit Ln
Otter-Fox Ln
Hawkins Rd S
Highway 603
Evergreen Ln
Troutman Dr
Limmer Rd
Nelson Rd
Antrim Rd
Vineyard Ln
Texas Ln
Hawkins Rd
Weyers Ln
Bethany Ln
Tingle Rd
Garden Ln
Creek Rd
Image Way
Byham Rd
Rhoades Rd
King Rd
Russell Rd
Shannon Lewis Ln
NW Washington St
W Walnut St
E Walnut St
Nevil Rd
Cedar Ct
Jones Rd
Shiloh Rd
Kakela Rd
Cemetery Rd
Miller St
State Route 505
Winlock Vader Rd
Hining Rd
Ferrier Rd
Buckskin Dr
Harkins Rd
Pacific Ct
SW Kerron Ave
SW Mayer Ave
SW Front St
SE Front St
SE 1st St
SE 2nd St
SE Rice St
SE Canyon St
SE Church St
SE Ash St
SE Cowlitz Rd
NW Mill Ave
NW Kerron Ave
NE Front St
NE 1st St
NE 2nd St
Jarez St
Ave

PRV STATION #4
PRV STATION #13
CARDINAL GLASS BOOSTER PUMP STATION AND PRV STATION #12
603 WELL
603 RESERVOIRS
603 BOOSTER PUMP STATION
PRV STATION #3
PRV STATION #1
BAITCHEL WELLS 1 AND 2
PRV STATION #10
PRV STATION #2

Legend

- LESS THAN 2-INCH
- 2-INCH WATER LINE
- 3-INCH WATER LINE
- 4-INCH WATER LINE
- 6-INCH WATER LINE
- 8-INCH WATER LINE
- 10-INCH WATER LINE
- 12-INCH WATER LINE
- CITY LIMITS
- UGA
- PRV STATION
- WELL
- RESERVOIR
- BOOSTER PUMP STATION

CITY OF WINLOCK

FIGURE 1-3
EXISTING FACILITIES

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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abandonment logs is not identified with a well name. That log is indicated as being in the NE 1/4 of the SE 1/4, of Section 28. However, Ash Street is located in Section 33, so it is not clear that any of these abandonment logs relate to the Ash Street Well. However, it is apparent that the City no longer considers the Ash Street Well to be a viable source.

S-05 Well 603

Well 603 (so named because what is now Washington State Highway 505, which passes near the well, was Washington State Highway 603 at the time the well was drilled) is an 8-inch, 166-foot-deep well drilled by Brank Drilling in 1980 with Ecology ID Tag No. AFM907, located by the City water towers on St Helens Way, north of State Route 505, east of downtown Winlock. The well casing is perforated between 101 and 155 feet in depth. The current WFI from indicates that Well 603 has a capacity of 200 gpm. The 2004 WSP indicates that Well 603 had an observed capacity of 200 gpm and a recommended capacity of 75 gpm, based on a November 2003 report by Robinson & Noble, Inc. We presume that this means that Well 603 can produce 200 gpm for only a limited time period, but should be able to sustain 75 gpm for an extended period.

S-07 Baichtel 1

Well Baichtel 1 is a 10-inch, 151-foot-deep well drilled by Williams Drilling in 1973 with Ecology ID Tag No. AFM906, located north of Cemetery Road approximately 1/4 mile west of State Route 505, east of downtown Winlock. The well is screened between 112 and 136 feet depth with 50-slot and 100 slot stainless steel screen. The 2004 WSP indicates that Well Baichtel 1 had an observed capacity of 50 gpm and a recommended capacity of 50 gpm, based on a November 2003 report by Robinson & Noble, Inc. However, Winlock staff report that Baichtel Well 1 has been disconnected from the system and is available only on an emergency basis.

S-08 Eureka 3

Well Eureka 3 is an 8-inch, 150-foot-deep well drilled by K & M Drilling in 1957 with Ecology ID Tag No. AFM904, located east of NE 2nd Street, near downtown Winlock. The well casing is perforated between 114 and 122 feet depth. The current WFI from indicates that Well Eureka 3 has a capacity of 50 gpm. The 2004 WSP indicates that Well Baichtel 3 had an observed capacity of 75 gpm and a recommended capacity of 60 gpm, based on a November 2003 report by Robinson & Noble, Inc., but a water right limit of 50 gpm.

S-09 Baichtel 2

Well Baichtel 2 is a 10-inch, 238-foot-deep well drilled by Williams Drilling in 2001 with Ecology ID Tag No. AET197, located north of Cemetery Road approximately 1/4 mile west of State Route 505, east of downtown Winlock, near Well Baichtel 1. The well is screened between 178 and 218 feet depth with 8.625-inch, 60-slot Schedule 40

screen. The well log indicates blank screen, meaning non-slotted, between 138 and 178 feet and between 218 and 238 feet. The 2004 WSP indicates that Well Baichtel 2 had an observed capacity of 125 gpm and a recommended capacity of 90 gpm, based on a November 2003 report by Robinson & Noble, Inc. Winlock staff report that Baichtel Well 2 has a current capacity of 29 gpm.

A summary of existing sources is provided in Table 1-2. A further analysis of Winlock's sources is included in Chapter 3.

TABLE 1-2

Existing Water Sources

Source Name	DOH Source ID No.	DOE Well ID Tag No.	Open Interval, Feet	Total Depth, Feet	Installed Pumping Capacity, gpm	Recommended Pumping Capacity, gpm [1]	Date Drilled	Applicable Water Rights
Eureka 1	S-01	AFM908	Unknown	55	210	250	1932[2]	G2-25856
Eureka 2	S-02	None	18 – 60	260	Inactive	-	1932[3]	-
Ash Street	S-03	None	45 – 60	62	Inactive	-	1932[4]	5333, G2-25856
Well 603	S-05	AFM907	101 – 155	166	200	75	1980	5333, G2-25856
Baichtel 1	S-07	AFM906	112 – 136	151	0	50	1973	5333, G2-26206
Eureka 3	S-08	AFM904	114 – 122	150	50	60 [5]	1957	3286A
Baichtel 2	S-09	AET197	178 – 218	238	29	90	2001	5333
Total Installed Capacity					**489**	**525**		

(1) Recommended pumping capacity is based on a report by Robinson & Noble, Inc. contained in the 2004 WSP.

(2) Information on Eureka Well 1 is taken from *Geology and Ground-Water Resources of West-Central Lewis County, Washington,* by J. M. Weigle and B. L. Foxworthy, where it is identified as Well 12/2W-28R1.

(3) Information on Eureka Well 2 is taken from *Geology and Ground-Water Resources of West-Central Lewis County, Washington,* by J. M. Weigle and B. L. Foxworthy, where it is identified as Well 12/2W-28J1. A well abandonment log for Eureka Well 2 is dated June 1989. The WFI Form indicates the well was inactivated as of April 1, 1990.

(4) Information on Ash Street Well is taken from *Geology and Ground-Water Resources of West-Central Lewis County, Washington,* by J. M. Weigle and B. L. Foxworthy, where it is identified as Well 12/2W-33B1. The WFI form indicates the Ash Street well was inactivated as of May 16, 2007. No construction well log nor abandonment well log have been located for this well.

(5) The 2004 WSP indicates that Eureka Well 3 could sustain a flow of 60 gpm, but the water right limits it to 50 gpm.

Well logs for all of the above wells are included in Appendix B.

TREATMENT

The City provides disinfection at all wells as a proactive measure to protect the distribution system from contamination. Chlorination equipment consists of a chlorine feed tank and a chemical metering pump that feeds sodium hypochlorite into the water discharge line at each well when the well runs. The chlorination goal is a residual of 0.3 mg/L at the entry to the distribution system. A chlorine residual analyzer and chart recorder are installed at the 603 Well site to monitor chlorine residual as water leaves the reservoirs.

WATER RIGHTS

The City's current water rights certificates are listed in Table 1-3. Copies of the water rights can be found in Appendix C. Water right 3286A is the City's oldest active water right. This right was issued for the well currently referred to as Eureka 3 with the withdrawal limits of 50 gpm and 80 ac-ft/yr.

Water right 5333 is the second oldest active right. It was issued for 175 gpm and 224 ac-ft/yr, 80 ac-ft/yr of which was non-additive to the existing water right 3286A, limiting total rights at the time to 224 ac-ft/yr. A superseding certificate was issued for this right in April 2008 adding Well 603, Ash Street Well, Baichtel Well 1 and Baichtel Well 2 to the right.

Water right G2-25856 is the City's third oldest active right. It was issued for 350 gpm and 224 ac-ft/yr and included points of withdrawal concurrent with the locations of Eureka Well 1, Ash Street Well, and Well 603. The report of examination also acknowledges five water right claims (Nos. 082540, 082541, 082542, 082543, and 082544) and incorporates them into this right. The right includes a statement that all water rights for the City shall not exceed 448 ac-ft/yr. Prior to this right, the City had 224 ac-ft/yr, so the issuance of an additional 224 ac-ft/yr is not limited by the total limit of 448 ac-ft/yr. It is thought that this limit is stated to make it clear that the claims had been addressed by issuance of this right.

Water right G2-26206 is the most recent active water right. This right was originally submitted by Junior F. Baichtel as an additional right on an existing well, then was assigned to the City of Winlock. The right is for 200 gpm and 34 ac-ft/yr, with no other withdrawal rate limits expressed.

Water rights CG2-GWC1385 and G2-23928 have been acquired more recently by the City and were assigned to the City through action of the Lewis County Water Conservancy Board with concurrence by the Department of Ecology. These rights are for a new well yet to be drilled on a parcel on the north side of State Route 505 approximately 2,200 feet east of Kakela Road. Right CG2-GWC1385 is for a total of 100 gpm and 30 ac-ft/yr. However, the right is split between Parcel 015625002000 (City of Winlock) and Parcel 015627000000 (Ellen Mower). 40 gpm and 23.5 ac-ft/yr

are assigned to City of Winlock. The remainder is assigned to Ellen Mower. Water right G2-23928 is indicated as being in the SW 1/4 of the NE 1/4 of Section 34, whereas the parcel where the City intends to drill the new well is located in the SE 1/4 of the NE 1/4 of Section 34. The location of the point of withdrawal for Water right G2-23928 will need to be changed.

TABLE 1-3

City of Winlock Water Rights

Water Right Number	Instan-taneous Quantity, gpm	Annual Quantity, acre-feet (1)	Priority Date	Points of Withdrawal	Location
CG2-GWC1385	40(2)	23.5(2)	3/25/1952	New Well	T12N, R2W, Sec. 34, SE 1/4 NE 1/4
3286A	50	80	8/5/1957	Eureka Well 3	Block 4 of Eureka Addition to Town of Winlock T12N, R2W, Sec. 28
5333	175	224: (144 Additive 80 Non-Additive)	4/29/1963	Well 603	1,200′ W & 600′ N of S 1/4 Corner Section 27, T 12N R 2W
				Ash St Well	900′ S & 1,775′ W of NE Corner Section 33, T 12N R 2W
				Baichtel 1	500′ S and 700′ E of NW Corner Sect 34, T 12N R 2W
				Baichtel 2	490′ S and 700′ E of NW Corner Sect 34, T 12N R 2W
G2-23928	100	23.4	8/19/1975	New Well	T12N, R2W, Sec. 34, SW 1/4 NE 1/4
G2-25856	350	224	3/16/1981	Eureka 1	1,200′ N & 1,010′ W from SE Corner Section 28 T12N, R2W
				Ash St Well	900′ S & 1,775′ W of NE Corner Section 33, T 12N R 2W
				Well 603	1,200′ W & 600′ N of S 1/4 Corner Section 27, T 12N R 2W
G2-26206	200	34	7/30/1982	Baichtel 1	500′ S and 700′ E of NW Corner Sect 34, T 12N R 2W
Total	915	528.9			

(1) One acre-foot is the volume of water to cover an area of one acre to a depth of 1 foot, approximately 325,851 gallons.

(2) Right CG2-GWC1385 is for a total of 100 gpm and 30 ac-ft/yr. However, the right is split between Parcel 015625002000 (City of Winlock) and Parcel 015627000000 (Ellen Mower). 40 gpm and 23.5 ac-ft/yr are assigned to City of Winlock

STORAGE

The City operates two reservoirs, both located at the Well 603 site. Both reservoirs are cast-in-place concrete, 26 feet in diameter by 75 feet tall, with a nominal capacity of

298,000 gallons each. The ground elevation at the reservoir site, based on reservoir plan sheets, is 459 feet, making the top of wall at an elevation of 534 feet. The reservoir overflows are 6 inches below the top of the reservoir walls, making the reservoir overflow elevation 533.5 feet, and volume to overflow 296,000 gallons per reservoir.

A third reservoir is located at the Cardinal Glass site. This reservoir is owned by Cardinal Glass, but by agreement with the City of Winlock, up to 120,000 gallons of the 500,000-gallon capacity of the Cardinal Glass reservoir is available for use by the City. Water is pumped to the Cardinal Glass facility, and pressure reducing valves connect from the Cardinal Glass transmission main to the City's 603 Reservoir Gravity Pressure Zone, such that if the pressure in the gravity pressure zone should drop sufficiently, the pressure reducing valves would open partially to allow flow from the Cardinal Glass water transmission line back to the gravity pressure zone. A summary of the City's water storage facilities is presented in Table 1-4. Further evaluation of effective reservoir capacity is included in Chapter 3.

TABLE 1-4

Storage Facilities

Name	Nominal Capacity, gallons (1)	Location	Diameter, feet	Height, feet	Overflow Elevation, ft. MSL (2)	Date Constructed
603 Reservoir 1	298,000	Well 603 Site	26	75	533.5	1988
603 Reservoir 2	298,000	Well 603 Site	26	75	533.5	1988
Cardinal Glass Reservoir	120,000 (3)	Cardinal Glass	50	40	629.75 (4)	2006
Total	696,000					

(1) Nominal capacity is the size of the reservoir used for reference purposes, and is approximately the total volume of the reservoir from floor to top of wall. The effective storage capacity of the reservoirs is discussed in Chapter 3.
(2) MSL refers to elevation above Mean Sea Level.
(3) Reservoir 3, the Cardinal Glass Reservoir is actually 500,000 gallons. By contract with Cardinal Glass, up to 120,000 of the Cardinal Glass reservoir is available for use by the City as needed.
(4) Plans for the Cardinal Glass Reservoir provided by Cardinal Glass indicate a maximum water elevation of 629.75 feet. It is assumed that maximum water elevation refers to the reservoir overflow elevation.

TRANSMISSION AND DISTRIBUTION SYSTEM

The Winlock water system operates on five pressure zones. The lowest elevation is at the south end of downtown Winlock is about 260 feet MSL. In the City's future service areas to the east and north, elevations vary between 450 and 480 ft. MSL. The Cardinal Glass facility is at an elevation of approximately 470 feet.

Pipe Inventory

The distribution system consists of a variety of pipe materials and sizes, including Asbestos Cement (AC), Polyethylene (PE), High Density Polyethylene (HDPE), Polyvinyl Chloride (PVC), Cast Iron (CI), Ductile Iron (DI), Galvanized, Steel and Other, and sizes from less than 2-inch to 14-inch. A summary of pipe by size and material, estimated from system CAD drawings, is shown in Table 1-5. The largest pipe size component by length is 10-inch pipe at 29.1 percent, largely driven by the long 10-inch pipeline extension to Cardinal Glass. The second largest component is 8-inch pipe at 27.3 percent. By material, the largest portion of the system is comprised of PVC pipe at 47.5 percent, followed by HDPE and PE at 18.7 percent, again largely driven by the 10-inch HDPE pipeline to Cardinal Glass. The total estimated pipe length is 96,125 feet, which is 18.2 miles of water main.

TABLE 1-5

Existing Water Mains

Pipe Size, inches	DI and CI, feet	AC, feet	PVC, feet	PE and HDPE, feet	Galvanized, Steel and Other, feet	Totals, feet	Percents
<2	0	0	44	5,022	740	5,806	6.0%
2	663	0	5,982	0	4,681	11,326	11.8%
4	4,076	2,199	46	0	3,300	9,621	10.0%
6	7,601	1,283	6,129	0	0	15,013	15.6%
8	4,763	0	21,486	0	0	26,250	27.3%
10	3,194	0	11,946	12,845	0	27,985	29.1%
14	0	0	0	124	0	124	0.1%
Totals, feet	20,297	3,482	45,634	17,991	8,721	96,125	100.0%
Percents	21.1%	3.6%	47.5%	18.7%	9.1%	100.0%	

Pressure Zones

The Winlock water system has five different pressure zones, controlled by reservoir levels, booster pump systems and pressure reducing valves. The pressure zones, reservoirs, booster pump stations and pressure reducing stations are shown in Figure 1-4. No information is available regarding the original design settings for the PRV stations, and current operations staff have never adjusted the stations. PRV pressure settings in this Water System Plan were taken from the settings indicated in the hydraulic model data in the appendix of the 2008 Water System Plan.

603 Reservoir Gravity Pressure Zone (Zone 1)

Zone 1 is fed by the 603 Well, Eureka Wells 1 and 3, and Baichtel Wells 1 and 2 via a solenoid controlled valve at the 603 Booster Pump Station. Pressure in the 603 Gravity

SEE INSET

N

0 1,200 2,400 Feet

CARDINAL GLASS RESERVOIR

INSET

PRV STATION #4

PRV STATION #13

CARDINAL GLASS BOOSTER PUMP STATION AND PRV STATION #12

603 WELL

603 RESERVOIRS

603 BOOSTER PUMP STATION

PRV STATION #3

PRV STATION #1

BAITCHEL WELLS 1 AND 2

PRV STATION #10

PRV STATION #2

Freedom Dr
Hawkins Rd
Highway 603
Hawkins Rd S
Wandering Ln
Moonlit Ln
Otter-Fox Ln
Evergreen Ln
Sargent Rd
Troutman Dr
Limmer Rd
Nelson Rd
Texas Ln
Antrim Rd
Vineyard Ln
Hawkins Rd
Weyers Ln
Bethany Ln
Tingle Rd
Garden Ln
Image Way
Creek Rd
Byham Rd
Rhoades Rd
King Rd
Russell Rd
NW Mill Ave
NW Kerron Ave
NE Front St
NE 1st St
NE 2nd St
NE Jaber St
Shannon Lewis Ln
NW Washington St
W Walnut St
E Walnut St
Nevil Rd
Cedar Ct
Jones Rd
SW Kerron Ave
SE Canyon St
SE Cowlitz Rd
SE Church St
SE Ash St
SW Mayer Ave
SW Front St
SE Front St
SE 1st St
SE Rice St
SE 2nd St
Winlock Vader Rd
Hining Rd
Ferrier Rd
Shiloh Rd
Kakela Rd
Cemetery Rd
Park Rd
Miller St
State Route 505
Buckskin Dr
Harkins Rd

Legend

PRESSURE ZONES:
- ZONE 1 - 603 GRAVITY
- ZONE 2 - EAST SIDE BOOSTED
- ZONE 3 - SOUTHEAST REDUCED
- ZONE 4 - DOWNTOWN REDUCED
- ZONE 5 - NORTH SIDE

PRESSURE ZONE IDENTIFICATION:
- 603 RESERVOIR GRAVITY ZONE (ZONE 1)
- SOUTHEAST BOOSTED PRESSURE ZONE (ZONE 2)
- SOUTHEAST REDUCED PRESSURE ZONE (ZONE 3)
- DOWNTOWN REDUCED PRESSURE ZONE (ZONE 4)
- CARDINAL GLASS PRESSURE ZONE (ZONE 5)

- PRV STATION
- WELL
- RESERVOIR
- BOOSTER PUMP STATION
- CITY LIMITS
- UGA

CITY OF WINLOCK

FIGURE 1-4
PRESSURE ZONES

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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Zone is controlled by the water level in the 603 Reservoirs. The overflow elevation of the 603 reservoirs is 533.5 feet. The maximum water level is approximately 6 inches below the overflow. Therefore the hydraulic gradeline for Zone 1 is estimated at 533 feet, although the actual hydraulic gradeline varies as the water level in the 603 Reservoirs varies. Zone 1 serves portions of the east service area, north parts of downtown, and all of the west side of the City. Zone 1 is also served via PRV 12, located at the Cardinal Glass Booster Pump Station near Well Eureka 1, and by PRV 13, located at the intersection of Jabez Street and 2nd Street, which both feed back from the Cardinal Glass Reservoir Gravity Pressure Zone (Zone 5).

Southeast Boosted Pressure Zone (Zone 2)

Zone 2 serves the area around the 603 Reservoir Site, and along Cemetery Road east of town. Zone 2 is pressurized by the 603 Booster Pump Station, located at the 603 Reservoir Site, and pumps from Zone 1. The pump controller is set to maintain an output pressure of 65 psi. The elevation of the 603 Reservoir Site is estimated at 459 feet. With a pump output pressure of 65 psi the Hydraulic Grade Line (HGL) for Zone 2 is estimated at 609 feet. Baichtel Wells 1 and 2 also pump into Zone 2. There is a solenoid activated valve at the 603 Booster Pump Station that opens when either Baichtel well is running and if the 603 Booster Pump Station is not running.

Southeast Reduced Pressure Zone (Zone 3)

Zone 3 is fed by PRV-10, located on SE Cowlitz Road. This zone serves the eastern side of the south town area. PRV 10 is located at an estimated elevation of 416 feet and has a reported output setting of 50 psi, giving it an HGL of 531 feet. PRV 10 feeds into the Zone 3 from Zone 2. PRV-2 feeds out of Zone 3 into the Downtown Reduced Pressure Zone (Zone 4).

Downtown Reduced Pressure Zone (Zone 4)

Zone 4 is fed by four pressure reducing stations; PRV-1, located on 1st Street just south of Walnut Street, PRV-2, located on First Street just north of Campbell Street, PRV-3 located on Benton Avenue between Walnut Street and Washington Street, and PRV 4 located on Griffith Street just west of First Street.

PRV-1 is a 6-inch PRV located at an estimated elevation of 315 feet with an output setting of 50 psi, giving it an estimated outlet HGL of 430 feet. PRV-2 is a 6-inch PRV located at an estimated elevation of 275 feet with an output pressure setting of 57 psi, giving it an estimated outlet HGL of 406 feet. PRV-3 is a 6-inch PRV located at an estimated elevation of 299 feet with an output pressure of 54 psi, giving it an estimated outlet HGL of 424 feet. PRV-4 is a 6-inch PRV located at an estimated elevation of 336 feet with an output pressure setting of 37 psi, giving it an estimated outlet HGL of 421 feet.

PRVs 1, 3, and 4 feed Zone 4 from Zone 1. PRV-2 feeds Zone 4 from Zone 3. Given this arrangement, Zone 4 would be fed primarily by PRV-1, with PRV-3 opening only if PRV-1 is unable to meet demand and the pressure in the zone drops by about 2.6 psi, PRV 4 opening if the pressure drops by another 1.3 psi, and PRV 2 opening if the pressure drops by another 6.5 psi. The HGL for the Zone 4 is determined by the PRV with the highest HGL serving the zone, which is PRV 1 at 430 feet.

Cardinal Glass Reservoir Gravity Pressure Zone (Zone 5)

Zone 5 is fed by a booster pump station located at the Eureka 1 Well site, which pumps through a 10-inch pipeline approximately 3.8 miles north to the Cardinal Glass Reservoir located at the Cardinal Float Glass facility on Avery Road. The high water level elevation of the Cardinal Glass Reservoir is indicated as 629.75 feet on the reservoir plans provided by Cardinal Glass. Assuming that the "high water level elevation" means the reservoir overflow elevation¸ it is estimated that the Zone 5 Booster Pump-off elevation is 629.25 feet, the lead pump-on elevation is 628.75 feet, and the lag pump-on elevation is 628.25 feet. Based on that elevation, Zone 5 is designated as a 628-foot pressure zone. This zone serves portions of the northeast downtown area, Winolequa Park, and the Cardinal Glass facility. The 10-inch pipe line passes through Winolequa Park then follows the Hawkins Road right-of-way to Antrim Road. At Antrim Road the pipeline jogs approximately 300 feet east, then continues north across a private easement to the Cardinal Glass Property. There are currently no water services on this 10-inch line between Winolequa Park and Cardinal Glass, although there is a potential for existing homes on private wells, future homes, and existing, small, privately owned water systems to seek water from this pipeline in the future.

There are two pressure reducing valves that feed back from Zone 5 to Zone 1. One, PRV-12 is located at the Zone 5 booster pump station near Eureka 1 Well. The other, PRV-13, is located at the intersection of Second Street and Jabez Street.

Table 1-6 summarizes the Winlock Pressure Zones.

TABLE 1-6

Summary of Pressure Zones

Pressure Zone Name	Pressure Zone HGL, feet	Pressure Zone Fed By	Pressure Zone Feeds To
Zone 1 (603 Reservoir Gravity Zone)	533	• Well Eureka 1 • Well Eureka 3 • Well 603 • 603 Reservoir • Zone 5 via PRV 12 • Zone 5 via PRV 13	• Zone 2 via Zone 2 Pump Station • Zone 4 via PRV 1 • Zone 4 via PRV 3 • Zone 4 via PRV 4 • Zone 5 via Zone 5 Pump Station
Zone 2 (Southeast Boosted Pressure Zone)	609	• Zone 1 via Zone 2 Pump Station	• Zone 3 via PRV 10
Zone 3 (Southeast Reduced Pressure Zone)	531	• Zone 2 via PRV 10	• Zone 4 via PRV 2
Zone 4 (Downtown Reduced Pressure Zone)	430	• Zone 1 via PRV 1 • Zone 1 via PRV 3 • Zone 1 via PRV 4 • Zone 3 via PRV 2	None
Zone 5 (Cardinal Glass Reservoir Gravity Pressure Zone)	628	• Zone 1 via Zone 5 Pump Station • Cardinal Glass Reservoir	• Zone 1 via PRV 12 • Zone 1 via PRV 13

Pump Stations

The Winlock Water System includes two booster pump stations: The Zone 2 Pump Station and the Zone 5 Pump Station.

Zone 2 Pump Station

The Zone 2 Pump Station, also known as the 603 Pump Station because it is located at the 603 Well site, consists of a pre-packaged pump skid with four 7.5 hp pumps controlled by variable frequency drives (VFDs), and two 40-hp centrifugal pumps. The pump controller selects the number of pumps based on flow rate and the VFD varies the pump speeds to maintain a constant discharge pressure. The four-pump VFD pumping system can produce up to 350 gpm while maintaining a constant discharge pressure. The controller is set to maintain an output pressure of 65 psi. The 40 hp centrifugal pumps have a capacity of 1,000 gpm each.

Zone 5 Pump Station

The Zone 5 Pump Station, also known as the Cardinal Glass Pump Station because it pumps to the Cardinal Glass Reservoir, consists of two 20 hp centrifugal pumps. Each pump is individually capable of pumping up to 250 gpm to the Cardinal Glass Reservoir. Due to increased head losses at higher flow rates in the 3.8 mile pipeline, the pumps operating together can pump up to 400 gpm to the Cardinal Glass Reservoir.

Pressure Reducing Valves

All Pressure Reducing Valves are described above under the subject line Pressure Zones. No information is available regarding the original design settings for the PRV stations, and current operations staff have never adjusted the stations. PRV pressure settings in Table 1-7 were taken from the settings indicated in the hydraulic model data in the appendix of the 2008 Water System Plan. Table 1-7 summarizes Pressure Reducing Valves.

TABLE 1-7

Pressure Reducing Valves

PRV	Location	Elevation, feet	Outlet Setting (1), psi	Outlet HGL, feet	Feeds From	Feeds to
PRV 1	First Street south of Walnut Street	315	50	430	Zone 1	Zone 4
PRV 2	First Street north of Campbell Street	275	57	406	Zone 3	Zone 4
PRV 3	Benton Avenue between Walnut Street and Washington Street	299	54	424	Zone 1	Zone 4
PRV 4	Griffith Street west of 1st Street	336	37	421	Zone 1	Zone 4
PRV 10	Cowlitz Road	416	50	531	Zone 2	Zone 3
PRV 12	Cardinal Glass Booster Pump Station	380	40	472	Zone 5	Zone 1
PRV 13	Jabez Street and 2nd Street	420	21	468	Zone 5	Zone 1

(1) PRV pressure settings in this Table 1-7 were taken from the settings indicated in the hydraulic model data in the appendix of the 2008 Water System Plan.

BACKUP POWER

There is a 100 KW diesel powered generator and automatic transfer switch at the 603 Well, Reservoir and Booster Pump Station site. This generator was sized to meet the

power demands of the site. This backup power system guarantees that Zone 2 will have reliable service even during power outages. All other portions of the City are served either by gravity storage or by pressure reducers from a zone served by gravity storage, and therefore do not need backup power supply.

RELATED PLANNING DOCUMENTS

The following documents were consulted in the preparation of this WSP:

State of Washington, Department of Conservation, Division of Water Resources, Water Supply Bulletin No. 17, Geology and Water Resources of West-Central Lewis County, Washington, 1962

This document describes the geology and water resources of the Winlock area, including maps and geologic cross sections.

Gibbs & Olson, Inc., City of Winlock Water System Plan Update, August 2004

This document is the most recent complete water system plan prepared for the City of Winlock.

Gibbs & Olson, Inc., City of Winlock Water System Plan Amendment, June 2005

This Water System Plan Amendment amends and revises the 2004 Water System Plan to incorporate the Cardinal Float Glass manufacturing facility into the water system plan.

Gibbs & Olson, Inc., City of Winlock Water System Plan Update, August 2008

This document, despite its title, is actually a Water System Plan Amendment. This document amends and revises the 2004 Water System Plan to include the completed Cardinal Float Glass manufacturing facility into the water system plan, and expand the water service area to the east of the City.

Skillings Connolly, Inc., City of Winlock Comprehensive Plan Update and EIS Addendum, August 2006

This document, known as the Comprehensive Plan, or the Comp Plan, updates the City's UGA boundaries, growth projections and resource needs.

SERVICE AREA

Washington State Drinking Water Regulations, WAC 246-290, define two types of service areas as follows:

> WAC 246-290-010 (218): **"Retail service area"** means the specific area defined by the municipal water supplier where the municipal water supplier has a duty to provide service to all new service connections as set forth in RCW 43.20.260
>
> WAC 246-290-010 (232): **"Service area"** means the specific area a water system currently serves and areas where future water service is planned. A wholesale system may include areas where it provides wholesale water to other public water systems in its service area. A water system in a CWSSA includes its future service area in its service area as "future service area" as defined under Chapters 70.116 RCW and 246-293 WAC.

While the regulations define "Retail service area" and "Service area" as above, the regulations do not currently define "Wholesale service area." The regulations define "Wholesale system" as follows:

> WAC 246-290-010 (305) **"Wholesale system"** means a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

The City of Winlock Water System is not a "Wholesale system" because it does not provide water wholesale to any other purveyor.

RETAIL SERVICE AREA

The City's Retail Service Area includes all properties that are either currently served by City of Winlock water or have water mains immediately adjacent to the property such that the property is capable of being served without the necessity of water main extensions. The City's Retail Service Area is shown in Figure 1-5. The Retail Service Area encompasses approximately 1,112 acres, including a discontiguous area of approximately 104 acres at the Cardinal Float Glass manufacturing facility. The Retail Service Area is primarily single family residential. The primary commercial area is a central commercial area centered within a couple blocks of the BNSF Rail tracks, and the Cardinal Float Glass facility outside City limits to the north.

Municipal water suppliers have a duty to provide service to all new connections within their retail service area when the circumstances meet the following four threshold factors:

1. The municipal water supplier has sufficient capacity to serve water in a safe and reliable manner.

2. The service request is consistent with adopted local plans and development regulations.

3. The municipal water supplier has sufficient water rights to provide service.

4. The municipal water supplier can provide service in a timely and reasonable manner.

SERVICE AREA

The City of Winlock considers all the Winlock Urban Growth Area (UGA) to be Service Area, plus properties on either side of the 10-inch Cardinal Glass water transmission line. Based on the mapping, the Service Area encompasses approximately 1,851 acres. The City of Winlock does not wholesale water to any other water purveyor. The City's Retail Service Area, City limits, UGA, and Service Area boundaries are shown in Figure 1-5.

SERVICE AREA CHARACTERISTICS

The City of Winlock lies in the canyon of upper Olequa Creek and surrounding area. Olequa Creek runs through the middle of Winlock, then flows south southwest past Vader to the Cowlitz River approximately 8.5 miles south of Winlock. The land surface rises in all directions from downtown Winlock except for south along Olequa Creek. Once out of the Olequa Creek canyon, the surrounding terrain is relatively flat to gently rolling. A relatively flat area called Grand Prairie lies east of Winlock. Approximately 2 miles to the west of Winlock the terrain turns relatively hilly.

A significant feature of the town is the Burlington Northern Railroad right of way, which runs north and south and bisects the City of Winlock and the Winlock water system, creating distinct east and west sides of town. This right of way is the main north-south railroad line on the West Coast, with two parallel tracks through the entire area. Freight and passenger trains pass through Winlock regularly. Two roads, Fir Street and Walnut Street, connect the east and west sides Winlock. Water mains connect the east and west sides of the City at Campbell Street, Walnut Street, Griffith Street, and Myrtle Street

EXISTING LAND USE

Land use for the City of Winlock Water Service Area is shown in Figure 1-6. Land use categories by area are shown in Table 1-8. The largest land use category is Single Residential at 29.5 percent of the total area. Undeveloped/Vacant land is the second largest land use area at 24 percent of the total. Mining/Forestry is third at 19 percent and Agriculture is fourth at 18 percent of the total area. Undeveloped Land, Mining/Forestry,

and Agriculture, which combined account for 61 percent of the land area in the Winlock Water Service Area, are all land uses that have a potential to be developed into other uses such as residential or commercial.

TABLE 1-8

Existing Land Usage

Land Use	Area, Acres	Percent
Agriculture	521.39	18.0%
Commercial Industrial	88.99	3.1%
Commercial Retail	37.76	1.3%
Mining/Forestry	550.32	19.0%
Multi-Residential	32.72	1.1%
Public/Quasi-Public	96.69	3.3%
Single Residential	854.13	29.5%
Transportation/Utilities(1)	10.45	0.4%
Undeveloped/Vacant	693.73	24.0%
Water	3.68	0.1%
Unknown	2.90	0.1%
Total(2)	2,892.76	100.00%

(1) Transportation/Utilities land use includes railroad right-of-way, but does not include City streets, County roads, or highway rights-of-way.

(2) The total acreage does not add up to the total Water Service Area because roads are not included in the land use area.

ZONING AND FUTURE LAND USE

City and County zoning designations are shown in Figure 1-7. Table 1-9 is total land area by zoning category. The largest zoning category by area is City Light Industrial at 20.5 percent of the total service area, followed by City Low-Density Residential LDR 10 at 16.2 percent, then County RDD-10 at 15 percent, and City Medium Density Residential at 9.7 percent of the Water Service area. Combined Commercial, Industrial and County UGA (the Cardinal Glass facility) zoning areas account for 30.1 percent of the UGA, while combined Residential zonings account for 57.2 percent of the total UGA area. Mixed Use and Parks and Recreation zoning account for the remaining 12.7 percent of the land area.

N

0 2,500 5,000 Feet

Wilson Rd
Markum Ln
Becker Dr
Johnson Rd
Lentz Rd N
Lien Dr
Lentz Rd
Rayburn Rd
Avery Rd W
Pleasant Valley Rd
Schoolhouse Rd
Barney Ln
Conrad Rd
Camren Dr
Quary Ln
Highway 603
Hale Rd W
Highland Rd
Hale Rd E
Antrim Rd
Meier Rd W
Dorning Rd
Bethany Ln
Tingle Rd
Silver Thistle Rd
Chilkoot Dr
Fisher Rd
Freedom Dr
Hawkins Rd
Pilots Pastures Rd
Tennessee Rd
Hawkins Rd S
Sargent Rd
Park Rd
Bremgartner Rd
Marttala Rd
Fries Rd
Nelson Rd
Troutman Dr
Limmer Rd
Creek Rd
Hemphill Rd
Minkler Rd
Roppert Rd
Rarey Rd
Florence Pl
Byham Rd
Rhoades Rd
Hart Rd
King Rd
Kenai Dr
Shannon Lewis Ln
NW Kerron Ave
NE 1st St
Frost Rd
Mines Rd
Nevil Rd
Kakelak Rd
Cedar Ct
Jones Rd
SE Cowlitz Rd
Shiloh Rd
N Military Rd
Gunnell Rd
Cemetery Rd
SW Front St
SE 1st St
Campground Ln
Russell Rd
Bowers Rd
State Route 505
Kyle Ln
Morton Rd
Harkins Rd
Hining Rd
Buckskin Dr
Winlock-Vader Rd
Winter Rd
Roe Rd
Alexander Rd
Trinity Ln
S Military Rd
Roth Rd
Ferrier Rd
Walter Rd
Wepsala Rd
Nikula Rd
Knowles Rd
Camus Rd

Legend

- LESS THAN 2-INCH
- 2-INCH WATER LINE
- 3-INCH WATER LINE
- 4-INCH WATER LINE
- 6-INCH WATER LINE
- 8-INCH WATER LINE
- 10-INCH WATER LINE
- 12-INCH WATER LINE
- EXISTING RETAIL WATER SERVICE AREA
- FUTURE RETAIL WATER SERVICE AREA
- CITY LIMITS
- UGA

CITY OF WINLOCK

FIGURE 1-5
EXISTING AND FUTURE
RETAIL SERVICE AREA BOUNDARIES

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Document Path: M:\Winlock\15254 Water System Plan\Figures\FIG 1-5 RWSA.mxd

N

0 2,500 5,000 Feet

Wilson Rd
Johnson Rd
Becker Dr
Markum Ln
Lentz Rd N
Lien Dr
Lentz Rd
Rayburn Rd
Avery Rd W
Pleasant Valley Rd
Schoolhouse Rd
Barney Ln
Quary Ln
Hale Rd W
Highland Rd
Hale Rd E
Highway 603
Conrad Rd
Camren Dr
Antrim Rd
Meier Rd W
Dorning Rd
Bethany Ln
Tingle Rd
Chilkoot Dr
Silver Thistle Rd
Fisher Rd
Freedom Dr
Hawkins Rd
Pilots Pastures Rd
Sargent Rd
Park Rd
Bremgartner Rd
Tennessee Rd
Hawkins Rd S
Troutman Dr
Limmer Rd
Marttala Rd
Nelson Rd
Fries Rd
Creek Rd
Hemphill Rd
Minkler Rd
Roppert Rd
Rarey Rd
Florence Pl
Byham Rd
Rhoades Rd
King Rd
Hart Rd
Kenai Dr
Frost Rd
Nevil Rd
Mines Rd
Jones Rd
Gunnell Rd
Russell Rd
Shannon Lewis Ln
NW Kerron Ave
NE 1st St
SW 1st St
SE 1st St
SW Front St
Cowlitz Rd
Cedar Cr
Kakela Rd
Shiloh Rd
Cemetery Rd
Bay Rd
N Military Rd
Campground Ln
State Route 505
Kyle Ln
Morton Rd
Harkins Rd
Buckskin Dr
Hining Rd
Winlock Vader Rd
Winter Rd
Roe Rd
Alexander Rd
Trinity Ln
Walter Rd
Roth Rd
S Military Rd
Knowles Rd
Camus Rd
Ferrier Rd
Wepsala Rd
Nikula Rd

Legend

LAND USE DESCRIPTION:

- AGRICULTURE
- COMMERCIAL INDUSTRIAL
- COMMERCIAL RETAIL
- MINING/FORESTRY
- MULTI-RESIDENTIAL
- PUBLIC/QUASI-PUBLIC
- SINGLE-RESIDENTIAL
- TRANSPORTATION/UTILITIES
- UNDEVELOPED/VACANT
- WATER
- UNKNOWN

- EXISTING WATER SERVICE AREA
- FUTURE WATER SERVICE AREA AND RETAIL WATER SERVICE AREA
- CITY LIMITS
- UGA

CITY OF WINLOCK

FIGURE 1-6
LAND USE MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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N

0 2,500 5,000 Feet

Wilson Rd
Johnson Rd
Becker Dr
Markum Ln
Lentz Rd N
Lien Dr
Lentz Rd
Rayburn Rd
Avery Rd W
Pleasant Valley Rd
Schoolhouse Rd
Barney Ln
Quary Ln
Hale Rd W
Highland Rd
Hale Rd E
Highway 603
Conrad Rd
Camren Dr
Antrim Rd
Meier Rd W
Dorning Rd
Bethany Ln
Tingle Rd
Chilkoot Dr
Silver Thistle Rd
Fisher Rd
Freedom Dr
Hawkins Rd
Pilots Pastures Rd
Tennessee Rd
Hawkins Rd S
Sargent Rd
Park Rd
Bremgartner Rd
Marttala Rd
Fries Rd
Nelson Rd
Troutman Dr
Limmer Rd
Creek Rd
Hemphill Rd
Minkler Rd
Roppert Rd
Rarey Rd
Florence Pl
Hart Rd
Byham Rd
King Rd
Rhoades Rd
Kenai Dr
Frost Rd
Nevil Rd
Shannon Lewis Ln
NW Kerron Ave
NE 1st St
SE Cowlitz Rd
Cedar Ct
Kakela Rd
Shiloh Rd
Mines Rd
Jones Rd
Gunnell Rd
SW Front St
SE 1st St
Cemetery Rd
Bayne Rd
State Route 505
N Military Rd
Campground Ln
Russell Rd
Hining Rd
Winlock Vader Rd
Buckskin Dr
Harkins Rd
Kyle Ln
Morton Rd
Roe Rd
Winter Rd
Alexander Rd
Trinity Ln
Roth Rd
S Military Rd
Ferrier Rd
Walter Rd
Wepsala Rd
Nikula Rd
Knowles Rd
Camus Rd

Legend

CITY ZONING:

- COMMERCIAL DISTRICT - C1
- COMMERCIAL DISTRICT - C2
- LOW-DENSITY RESIDENTIAL - LDR 10
- LOW-DENSITY RESIDENTIAL - LDR 6
- LIGHT INDUSTRIAL - LI
- MEDIUM DENSITY RESIDENTIAL - MDR
- MIXED-USE DISTRICT - MX
- PARKS AND RECRETIONAL - PF

COUNTY ZONING:

- RDD-5
- RDD-10
- UGA - County
- EXISTING RETAIL WATER SERVICE AREA
- FUTURE RETAIL WATER SERVICE AREA
- CITY LIMITS
- UGA

CITY OF WINLOCK

FIGURE 1-7
ZONING MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Document Path: M:\Winlock\15254 Water System Plan\Figures\FIG 1-7 ZONING.mxd

TABLE 1-9

Existing Zoning

Zoning	Area, Acres	Percent
City Zoning		
Commercial C-1	77.17	2.6%
Commercial C-2	106.58	3.6%
Low Density Residential LDR 10	478.84	16.2%
Low Density Residential LDR 6	255.81	8.6%
Light Industrial	606.87	20.5%
Medium Density Residential	288.40	9.7%
Mixed Use	274.19	9.3%
Parks and Recreation	101.66	3.4%
Subtotal, City	2,189.52	73.9%
County Zoning		
RDD-5	225.59	7.6%
RDD-10	445.93	15.0%
UGA - County	103.03	3.5%
Subtotal, County	774.55	26.1%
Total	2,964.07	100.0%

(1) Zoning areas include railroad, City, county and State rights of way.

SERVICE AREA POLICIES

ANNEXATION

New water customers outside City limits are not required to annex as a condition of service. Property outside of the UGA can be served if the service is consistent with the Lewis County Countywide Planning Policies and the Rural Zoning of the area.

CROSS-CONNECTION CONTROL

A Cross-Connection Control Program is required by regulation (WAC 246-290-490) to reduce the potential for system contamination through backflow from potential contaminant sources. The Cross-Connection Control Program is addressed in Chapter 6 of this WSP.

DIRECT CONNECTION POLICY

New development requires direct connection to the water system through individual service connections (Ord. 455, Section 13).

PRIVATE OR PUBLIC WELLS

No new water systems or private wells will be allowed within the City limits unless approved by the City Council. Approval would need to be based on extreme circumstances since the existing water distribution system is readily available to most properties within the City limits. Customers with existing wells (used for irrigation or other purposes) shall have an approved backflow prevention device at the meter consistent with the City's Cross-Connection Control Program.

DESIGN AND PERFORMANCE STANDARDS

Recommendations of this plan will follow the DOH Water System Design Manual. Distribution improvements are to be designed in accordance with the policies and standards identified in Section VII.

FORMATION OF LOCAL IMPROVEMENT DISTRICT

The City will allow an applicant to propose formation of an LID to pay for system upgrades. The initial costs for an LID feasibility study is borne by the applicant or rolled into LID costs, but in no case is the cost the responsibility of the City. The City will provide an initial construction cost estimate for the proposed project and other technical assistance as needed. Once LID formation is shown to be feasible, the City will take the lead roll to ensure proper formation of an LID.

LATE-COMER AGREEMENTS

The City will allow the use of Late-Comer Agreements to help recover up to 50 percent of the water main extension which directly front other properties. All costs for the agreement and construction across the subject property shall be borne by the Applicant/property owner. All agreements will be case specific and subject to City Attorney review and approval. Late-comer agreements may be denied if projected future administrative costs exceed the potential benefit to water system customers.

INDIVIDUAL BOOSTER PUMPS

Individual booster pumps are allowed for existing properties along existing distribution mains, where the main has a normal operating pressure not lower than 30 psi at Peak Hourly Demand and not lower than 20 psi at Maximum Day Demand plus the required fire flow. In this case, the property owner shall be responsible for all costs of the booster pump system and shall be required to install a backflow prevention device on the private side of the service meter. The backflow device must then be tested on an annual basis in accordance with the City's Cross-Connection Control Program. Where operating pressure is below the pressures stated above, WAC 246-290-230(8) requires the City to own and operate individual booster pumps on an interim basis until such a time that

operating pressures can be brought into compliance. Properties within new developments can utilize individual booster pumps if the new distribution main along the frontage of the property is designed to provide the pressures stated above. The backflow prevention requirements apply to these cases as well.

OVERSIZING

The Developer/property owner requiring an extension is required to fund the design and construction of extensions to meet minimum water main size and or the water main size established in the Capital Improvement Program (if applicable). The City will pay for oversizing of water mains if specifically requested by the City in order to meet future planning goals for an area. The City contribution shall be for the cost difference in materials plus 50 percent of the difference in material costs to account for additional labor and materials.

REMOTE SYSTEMS

Decisions regarding this issue will be made on a case-by-case basis by staff and City Council. If the City decides to own and operate a remote system, the system will need to be designed and constructed to meet both DOH and City Standards. Construction costs specific to the system 'will be the responsibility of the Developer or property owner. Operation and maintenance cost recovery will initially be based on projected costs, but not less than the actual costs incurred.

SURCHARGE FOR OUTSIDE CUSTOMERS

The City's current rate structure includes a higher water rate for customers outside the corporate limits of the City. The surcharge is based on the additional costs associated with service to outside areas.

UNDERSIZED MAIN REPLACEMENT

If a City owned water main is identified as deficient (through modeling or flow tests), the City assumes responsibility for upsizing the main to the minimum size of a looped 6-inch or 8-inch dead end main. The prioritization of undersized main replacement projects (when applicable) shall be identified in the WSP Capital Improvement Program (CIP) and shall be based upon overall benefit to customers as well as level of inadequacy of the flow condition. Basic regulatory compliance shall be a higher priority than meeting minimum fire flow goals. Should the City not be able to replace an undersized main in a time frame to meet service conditions for proposed development, the development Applicant can upgrade the main, but at no cost to the City.

WATER WHEELING

Water wheeling is the practice of selling or buying water to or from a water system by using the piping network of a third water system. There is no potential for water wheeling in the Winlock area.

WHOLESALING OF WATER

Routine wholesale of water to existing water systems is not anticipated due to the relative proximity of other water systems. In general, wholesaling to new multi-unit development or new water districts is in conflict with the City's direct connection policy and therefore will not be implemented. The City does not have any large industrial customers that would warrant wholesale agreements. The establishment of wholesale contracts for large industrial customers (if needed) will be considered by the City and will be case specific. Stipulations in any wholesale agreement shall guarantee that rates and charges for wholesale service will result in full cost recovery on services, including consideration for depreciation of existing plant and contributed capital facilities.

COMPLAINTS

Policy for Dealing with Complaints

Complaints are forwarded to the Water/Sewer Superintendent for investigation. The Water/Sewer Superintendent or designated subordinate makes contact with the complainant, when necessary, investigates the complaint, resolves the complaint when possible, or recommends a solution to the Water/Sewer Superintendent. The Water/Sewer Superintendent is responsible for resolving the complaint, contacting the complainant regarding the resolution of the complaint, and recording the resolution of the complaint in the complaint log. Complaints unresolved by the Water/Sewer Superintendent may be appealed to the City Council.

Complaint Record Keeping

Telephone complaints are logged by City staff and forwarded to the Water/Sewer Superintendent. The telephone logs are maintained in the Water/Sewer Superintendent's office. Written complaints are received by the Water/Sewer Superintendent. The Water/Sewer Superintendent maintains a complaint and resolution file.

CHAPTER 2

BASIC PLANNING DATA

OBJECTIVE

The objective of this chapter is to present basic planning data and water demand forecasts needed to assess the current and future capabilities of the water system to provide service. This chapter provides historic, existing and projected population, service connections, and water use data, and develops the water demand associated with the planning element known as an Equivalent Residential Unit (ERU). The chapter also includes projected land use and water demands for 10- and 20-year planning periods.

The water use data and water demand forecasts found in this chapter comprise two of the three elements required for the development of a water use efficiency (conservation) program. The third required element is implementation of the water use efficiency program and its component parts, which is addressed in Chapter 4.

HISTORIC AND PROJECTED POPULATION

Figure 2-1 shows Lewis County and Winlock postcensal and intercensal population estimates as acquired from the Washington State Office of Financial Management (OFM). The solid red line in Figure 2-1 is Lewis County population, and the solid blue line is City of Winlock. On this scale it is clear that the City of Winlock population is small relative to the whole of Lewis County, but it is difficult to see any detail in the City of Winlock growth history. The dashed blue line is the City of Winlock population history at the expanded scale on the right hand side of the chart. On this scale it is clear that the City of Winlock population has increased fairly steadily since 1990, although it has not increased by much since 2001.

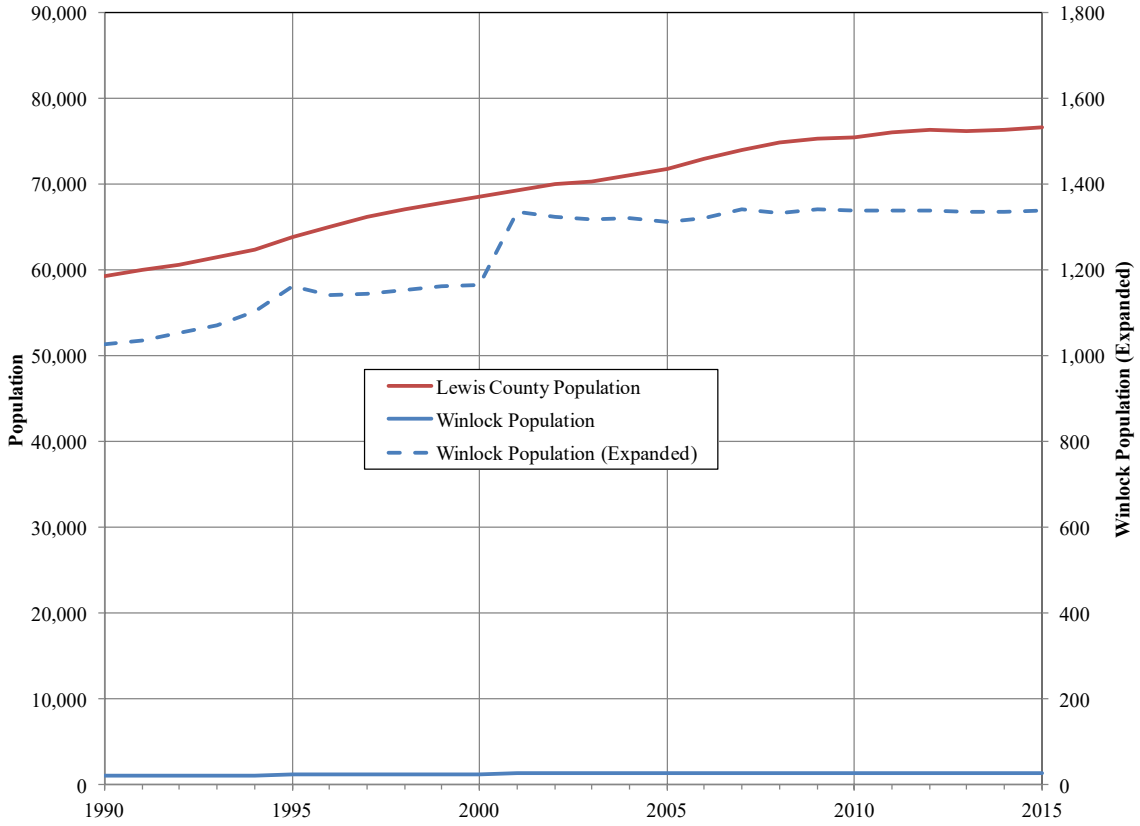

FIGURE 2-1

OFM Estimated In-City Population

Table 2-2 shows residential population for the years 2001 through 2015. The third column in Table 2-1, labeled "Annual Growth Rate" is the percent increase from the previous year. The overall population increase from 1,337 in 2001 to 1,340 in 2015 represents an average annual growth rate of 0.02 percent. Since 2001 the population has fluctuated up and down, with a high of 1,343 in 2009 to a low of 1,312 in 2005, and an average of 1,332, but by 2015 the population is estimated to be just three more than in 2001, which is an average annual growth rate of just 0.02 percent. From 1990 to 2015 the City's population increased from 1,027 to 1,340, an average annual growth rate of 1.07 percent.

TABLE 2-1

OFM Estimated In-City Population

Year	OFM Estimated Population	Annual Growth Rate
2001	1,337	-
2002	1,325	-0.90%
2003	1,319	-0.45%
2004	1,320	0.08%
2005	1,312	-0.61%
2006	1,320	0.61%
2007	1,341	1.59%
2008	1,334	-0.52%
2009	1,343	0.67%
2010	1,339	-0.30%
2011	1,340	0.07%
2012	1,340	0.00%
2013	1,335	-0.37%
2014	1,335	0.00%
2015	1,340	0.37%
Overall Growth Rate, 2001 - 2015		0.02%

GMA ALLOCATED POPULATION

The Lewis County Growth Management Plan dated December 27, 2010, has adopted a 2030 population allocation of 4,550 for the City of Winlock. Given the population of 1,339 in 2010, the population of 4,550 by 2030 represented a 6.31 percent annual growth rate at that time for the City of Winlock. Given the 2015 population of 1,340, the population of 4,550 by 2030 now represents an 8.49 percent annual growth rate for Winlock.

Historic City of Winlock population and projected population growth rate to reach the GMA Allocation of 4,550 by 2030 are shown in Figure 2-2. It can be seen that the City's growth rate would have to increase significantly to reach the GMA goal for 2030. Based on recent population history it does not appear likely that the City of Winlock will reach the population allocation of 4,550 by 2030. However, with the addition of the Cardinal Glass plant and expansion of the City's UGA to Interstate 5, it is possible that the City's growth rate may increase in coming years.

For consistency with growth management planning, a population and facilities growth rate of 8.49 percent will be used. However, the reader should be aware that system facilities may not be needed as soon as indicated by the projections if growth does not occur as projected.

FIGURE 2-2

Historic and Projected Growth Rates to Reach GMA Allocation

TOTAL SERVICE CONNECTIONS

During 2015, the City served a total of 560 active service connections including 433 active residential connections, 61 active commercial connections including Cardinal Glass, 17 duplex connections, 13 manufactured home connections, 6 church connections, 7 City park connections, 6 apartment connections, 6 industrial connections, 6 school connections, 2 mobile home park connections, and 3 hydrant rentals. Table 2-2 summarizes the City's active service connections.

TABLE 2-2

City of Winlock Active Service Connections in 2015

Customer Description	Active Service Connections	Percent of Total
Residential	433	77.32%
Commercial other than Cardinal Glass	58	10.36%
Cardinal Glass (Commercial)	3	0.54%
Duplex - 4-Plex	17	3.04%
Manufactured Homes	13	2.32%
Churches	6	1.07%
City Parks	7	1.25%
Apartment Buildings	6	1.07%
Industrial	6	1.07%
Schools	6	1.07%
Mobile Home Parks	2	0.36%
Hydrant Rental	3	0.54%
Total Active Connections	560	100.00%

WATER PRODUCTION

MONTHLY PRODUCTION BY SOURCE

Monthly water production by source, taken directly from source meter read records, is shown in Figure 2-3. It can be seen that Well 603 is the primary contributor to City water supply, Eureka Well 1 is the second most major contributor, and Wells Baichtel 2 and Eureka 3 make relatively minor contributions to overall production. The seasonality of water production is also evident from the chart. The highest production period from the data was July 2009 at a monthly total of 15.048 million gallons (MG). The second highest production month was July 2015 at a monthly total of 14.088 MG.

The data shows a clear increase in water production between 2007 and 2009. This increase is related to the Cardinal Glass facility construction and commencement of operation. Since 2009, production declined during 2010 and 2011, increased again in 2012, then declined during 2013 through 2015.

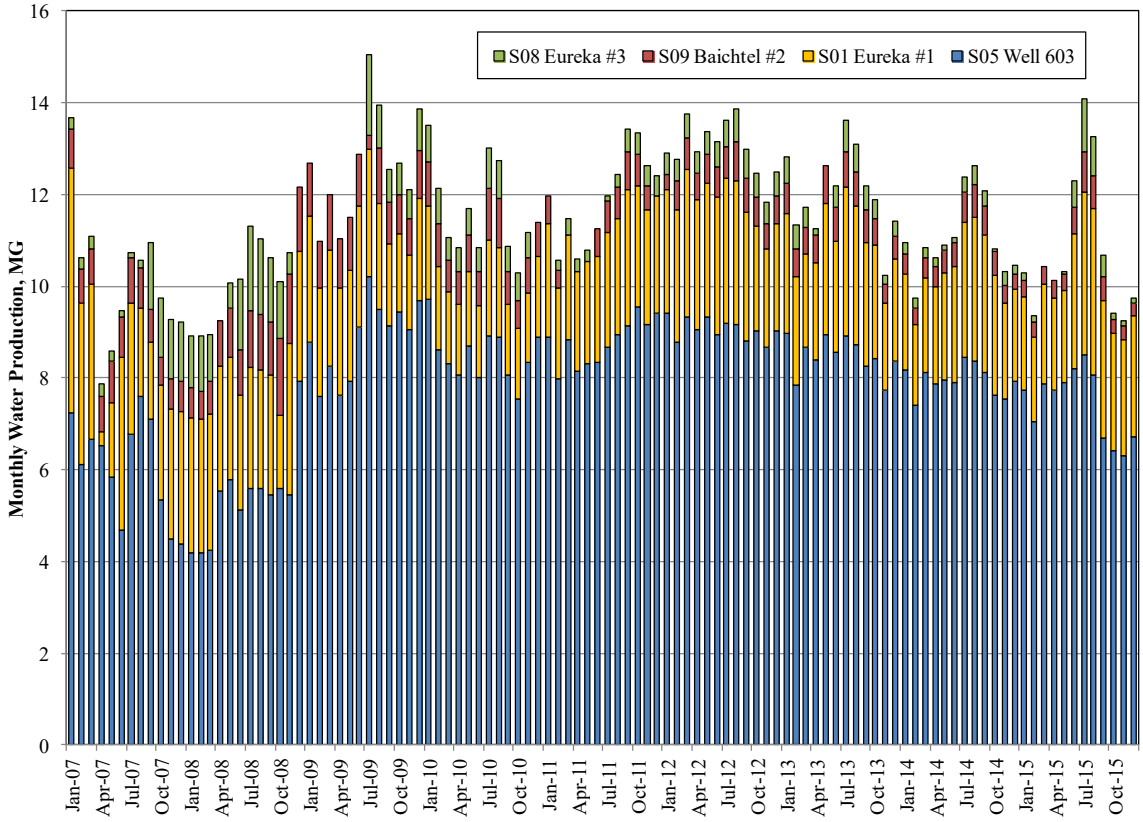

FIGURE 2-3

Monthly Water Production by Source

TOTAL ANNUAL PRODUCTION

Annual water production is summarized in Table 2-3. The highest production year was 2010, and the second highest production year was 2013. The lowest production year was 2011, and the second lowest production year was 2012.

TABLE 2-3

Annual Water Production Records

Year	S01 Eureka 1		S05 Well 603		S08 Eureka 3		S09 Baichtel 2		Totals	
	MG	Ac Ft	MG	Ac Ft	MG	Ac Ft	MG	Ac Ft	MG	Ac Ft
2007	32.50	99.75	72.79	223.38	7.03	21.59	9.46	29.03	121.79	373.75
2008	32.28	99.05	64.68	198.50	11.98	36.78	13.20	40.51	122.14	374.84
2009	27.45	84.24	106.28	326.15	5.65	17.33	11.86	36.41	151.24	464.13
2010	20.57	63.12	102.04	313.13	7.08	21.74	9.85	30.22	139.53	428.21
2011	29.18	89.56	105.31	323.19	3.35	10.29	4.99	15.32	142.84	438.36
2012	33.43	102.60	108.70	333.60	6.34	19.47	7.60	23.33	156.08	478.99
2013	29.97	91.96	101.80	312.42	4.88	14.98	7.72	23.68	144.37	443.04
2014	28.59	87.75	95.49	293.04	2.72	8.33	5.96	18.29	132.75	407.40
2015	30.90	94.84	89.18	273.67	3.78	11.61	5.36	16.45	129.22	396.57
Minimum	20.57	63.12	64.68	198.50	2.72	8.33	4.99	15.32	121.79	373.75
Maximum	33.43	102.60	108.70	333.60	11.98	36.78	13.20	40.51	156.08	478.99
Average	29.43	90.32	94.03	288.56	5.87	18.01	8.44	25.92	137.77	422.81
Percent	21%		68%		4%		6%		100%	

(1) MG is million gallons produced for the indicated year.
(2) Ac-Ft is Acre-feet produced for the indicated year. One ac-ft is approximately 325,851 gallons.

MAXIMUM DAY PRODUCTION

Daily well production records were reviewed for January 2014 through December 2015. The highest ten production days for that period are shown in Table 2-4.

TABLE 2-4

Highest Water Production Days

Rank	Date	Maximum Day Production, gpd	Annual Average, gpd	Maximum Day to Average Day Ratio
1	9/3/2014	516,242	355,138	1.45
2	8/12/2014	489,757	355,138	1.38
3	2/8/2015	487,823	355,138	1.37
4	8/8/2014	485,572	355,138	1.37
5	9/7/2014	483,039	355,138	1.36
6	7/17/2014	473,107	355,138	1.33
7	11/27/2014	468,851	355,138	1.32
8	2/9/2014	467,754	355,138	1.32
9	8/9/2014	467,279	355,138	1.32
10	3/3/2014	465,450	355,138	1.31

The highest ratio of maximum day production to average day production is 1.45. This is a relatively low maximum day to average day ratio. Such a low maximum day to average

day ratio is probably due to two factors. (1) There is a large amount of distribution system leakage that is assumed to be relatively constant year-round, and (2) the Cardinal Float Glass Plant has a continuous, year-round, high demand relative to the demand of the remainder of the City. A more realistic peaking factor for residential demands was developed by accounting for items (1) and (2) above in the following manner:

Evaluation of 2015 meter readings shows the 433 active single family residential (SFR) connections have an average day demand (ADD) of 94,313 gpd. Cardinal Glass has an ADD of 116,265 gpd. Distribution system leakage (DSL) has an ADD of 103,691 gpd and all "Other" connections (and accounted for unmetered water use) has an ADD of 39,767 gpd.

Table 2-4 shows the highest Maximum Day Production (MDP) was 516,242 gpd on 9/3/14. Subtracting the constant ADD values for Cardinal Glass and DSL from the MDP of 516,242 gpd provides an estimated Maximum Day Demand (MDD) for single family residential connections and "other" connections (SFRO) of 296,286 gpd.

Dividing the estimated 296,286 gpd MDD for SFRO by the 94,313 gpd ADD for SFR provides a MDD to ADD ratio of 3.14 which is a more realistic value for a residential peaking factor. For planning purposes, **the maximum day to average day ratio is estimated at 3.14.**

WATER USE

WATER SALES BY CUSTOMER CLASS

The City of Winlock reads water service meters and bills for water service on a bi-monthly schedule. Billing periods are January – February, March – April, May – June, July – August, September – October, and November – December. Bimonthly water sales by customer class are shown in Figure 2-4 for the period of May 2014 through June 2015. Water billing categories include Residential, Commercial, Public Parks, School, Apartments, Duplex – 4-Plex, Mobile Home Parks, Manufactured Homes, Industrial, and Church. By far the majority of the water use is Commercial, which is dominated by the Cardinal Float Glass Plant. Cardinal Float Glass is included in the Commercial water use billing category, but is charted as a separate category in Figure 2-4 so that the impact of the Cardinal Float Glass Plant on City water demand can be clearly seen.

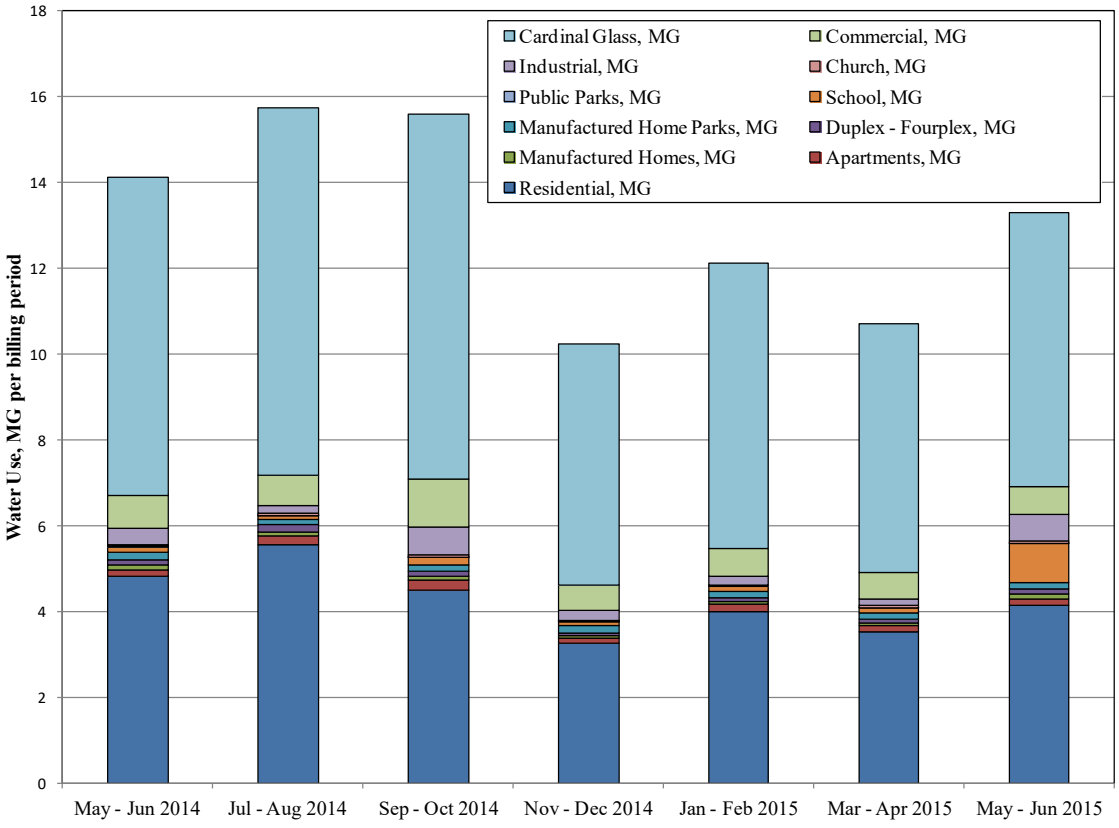

FIGURE 2-4

Water Use by Customer Class

Annual water usage and percent by customer class are shown in Table 2-5 for 2014 and 2015. Over half of the water usage in 2014 and nearly half of the water usage in 2015 was by Cardinal Glass.

TABLE 2-5

Annual Water Usage by Customer Class

Billing Category	2014 Total Usage		2015 Total Usage	
	MG	Percent	MG	Percent
Residential	28.376	34.15%	34.424	37.67%
Cardinal Glass	43.634	52.51%	42.437	46.44%
Commercial other than Cardinal Glass	3.656	4.40%	3.672	4.02%
Industrial	2.191	2.64%	3.651	4.00%
Apartment Buildings	1.010	1.22%	1.105	1.21%
Mobile Home Parks	0.973	1.17%	0.877	0.96%
Duplex – 4-Plex	0.747	0.90%	0.782	0.86%
Schools	0.713	0.86%	2.300	2.52%
Manufactured Homes	0.465	0.56%	0.539	0.59%
Hydrant Rental	0.434	0.52%	0.007	0.01%
Churches	0.320	0.38%	0.259	0.28%
City Parks	0.138	0.17%	0.115	0.13%
Fire Fighting	0.000	0.00%	0.409	0.45%
Other Unbilled and Unmetered Usage	0.444	0.53%	0.799	0.87%
Totals	83.101	100.00%	91.376	100.00%

Average Residential Water Use Rate

Total annual residential water use and average number of active residential connections for 2014 and 2015 are shown in Table 2-6. Prior to 2014 the City has records of total annual water production and sales, but does not have records of sales or numbers of active connections by customer class. Therefore, the only information we have on water use per residential connection is the usage and connections data from 2014 and 2015.

Table 2-6 summarizes average day residential water use. Note that the number of residential service connections in Table 2-6 is the annual average number of active residential service connections, which is not the same as the year-end service connections shown in the Water Facilities Inventory. Average number of connections is used in Table 2-9 because it better relates to the total year water use. Average day residential water use was 171 gallons per connection per day in 2014, and 218 gallons per connection per day in 2015, with an average of 195 gallons per connection per day. **The average use rate of 195 gallons per connection per day is the current equivalent residential unit (ERU) value for the City of Winlock for this data period.**

TABLE 2-6

Average Single-Family Residential Water Use

Year	Residential Use, MG	Average Active Residential Connections	Average Day Water Use, gpd per Connection
2014	28.376	454	171
2015	34.424	433	218
		Average	195

MAXIMUM DAY DEMAND PER ERU

As discussed above under the heading, *Maximum Day Production*, the estimated maximum day to average day ratio for the City of Winlock is 3.14. With an average day demand per ERU of 195 gpd per residential connection, the **maximum day demand is estimated at 613 gpd per ERU.**

PEAK HOUR DEMAND

Peak Hour Demand (PHD) is a value that applies to the system as a whole, not to any individual service, and is estimated using Equation 5-3 from the Water System Design Manual. This formula estimates peak hour system demands, *not including fire flow*:

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

Where

PHD = Peak Hour Demand, gallons per minute
C = Coefficient from Water System Design Manual Table 5-1
N = Number of ERUs served
F = Factor from Water System Design Manual Table 5-1
MDD = Maximum Day Demand per ERU, gpd

For a system with more than 500 service connections, C and F are: 1.6 and 225, respectively. As derived above, MDD for the City of Winlock is 613 gpd per ERU. Inserting these numbers into the above equation yields the following:

$$PHD = (613/1440)[(1.6)(N)+225]+18$$

This equation simplifies to the following:

$$\mathbf{PHD = 0.68 \times N + 114}$$

Water system demand factors are summarized in Table 2-7.

TABLE 2-7

Summary of Water Demand Factors

Demand Factor	Value
Average Day Demand per ERU, gpd	195
Maximum Day Demand per ERU, gpd	613
Maximum Day to Average Day Factor	3.14
SFRO Peak Hour Demand, gpm	PHD = 0.68 x N + 114

DISTRIBUTION SYSTEM LEAKAGE

The difference between metered water production and accounted-for water is *Distribution System Leakage* (DSL). Distribution System Leakage was previously referred to as "Lost and Unaccounted-for Water," a term that acknowledges the uncertainty regarding the cause for the difference between metered water production and total accounted-for water. Lost and unaccounted-for water includes water leakage, unmetered water use that is not accurately estimated or recorded, metering errors due to inaccurate water service meters, accounting errors, and water taken from the system without authorization (water theft). By the Municipal Water Supply Efficiency Requirements Act of 2003, Washington State Legislature defined the difference between metered water production and metered and otherwise accounted-for water use as *Distribution System Leakage*. For consistency with State statute, we will use the term *Distribution System Leakage*¸ or DSL, for the remainder of this document.

Bi-monthly DSL is depicted in Figure 2-5. The blue bars represent water sales and the gold bars represent DSL. The overall height of each blue and gold and bar stack represents water production for each billing period. From this chart it appears that DSL has increased and subsequently decreased over the data period.

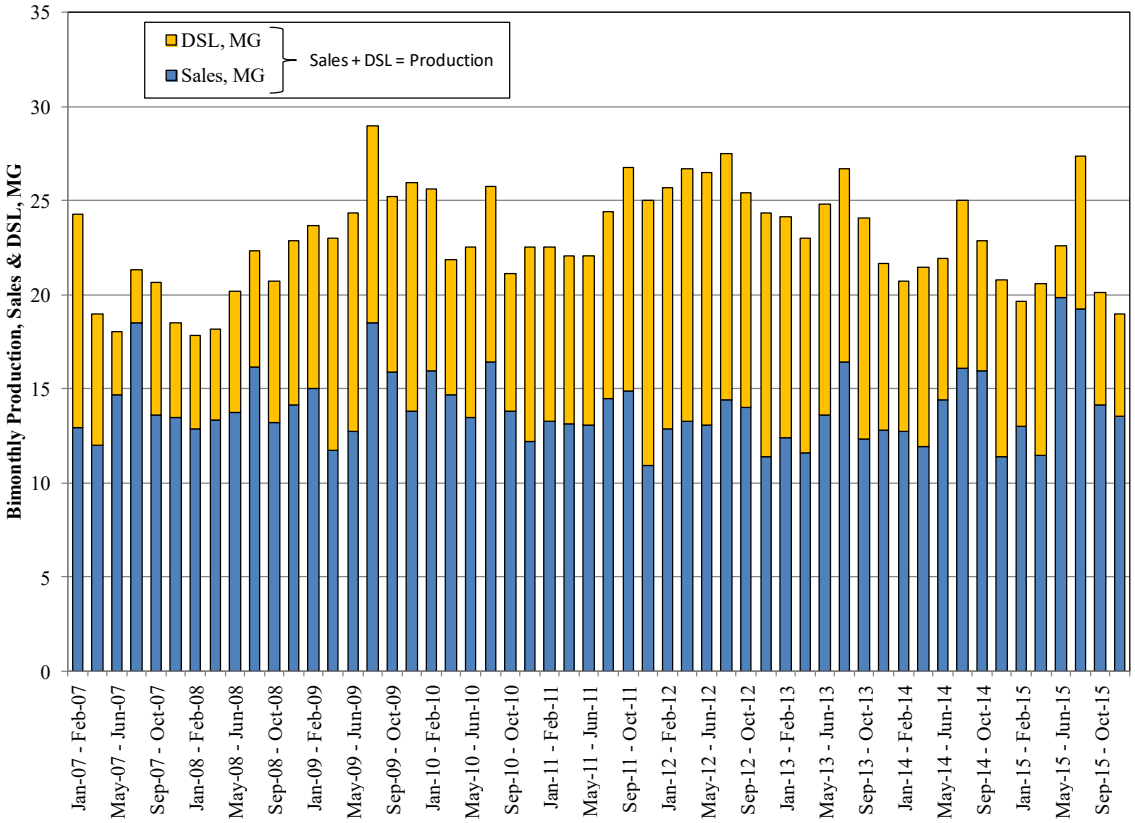

FIGURE 2-5

Bimonthly Water Production, Sales and DSL

Annual DSL is summarized in Table 2-8. DSL has varied over the data period from a low of 36.613 MG per year in 2007 to a high of 77.002 MG per year in 2012. Percent DSL varied from a low of 29.3 percent in 2015 to a high of 49.3 percent in 2012. The 3-year average percent DSL is has varied from 35.1 percent for 2007 through 2009, to a high of 46.3 percent for 2011 through 2013. The most recent three-year DSL 2013 through 2015, is 37.6 percent.

TABLE 2-8

Annual Distribution System Leakage

Year	Production, MG	Sales, MG	DSL, MG	Annual Percent DSL	3-Year Percent DSL
2007	121.786	85.173	36.613	30.1%	-
2008	122.142	83.482	38.660	31.7%	-
2009	151.237	87.641	63.596	42.1%	35.1%
2010	139.532	86.612	52.920	37.9%	37.6%
2011	142.841	79.768	63.072	44.2%	41.4%
2012	156.080	79.078	77.002	49.3%	44.0%
2013	144.365	79.088	65.277	45.2%	46.3%
2014	132.753	83.101	49.652	37.4%	44.3%
2015	129.223	91.376	37.847	29.3%	37.6%

EQUIVALENT RESIDENTIAL UNITS

As described above under the heading *Average Residential Water Use Rate*, the value of an ERU for City of Winlock for the current planning period is 195 gallons per day. For single-family residential water connections, each active meter represents one ERU served, regardless of actual water use for a given year. (As shown in Table 2-6 the residential water use for 2015 averaged 218 gpd per connection.) For the purpose of this plan commercial demands and DSL demands do not peak so ADD is equal to MDD for commercial demands and DSL. Because source capacity is determined by MDD, the ERU values for non single family residential connections is determined by dividing the average daily water use by the MDD per ERU value of 613 gpd. Thereby, the 2015 average daily usage of 10,061 gpd for the 58 commercial connections represent 16 ERUs, while the average daily usage of 116,265 gpd for the three Cardinal Glass connections represent 190 ERUs.

The total of metered water use represents 682 ERUs, the total of unmetered water use represents 5 ERUs for a total of 687 usage ERUs. Unmetered water use data was provided by the City and is estimated to average 3,309 gpd. These uses were typically attributed to main flushing and fire fighting. DSL in 2015 represents 169 ERUs. The total of all metered water use, unmetered water use, and DSL for the year 2015 represents 856 ERUs. The 2015 average day water use was 354,036 gpd and the average number of active connections was 560. Units served and ERUs represented by the water use are shown in Table 2-9.

TABLE 2-9

Equivalent Residential Connections for 2015 Water Use

Customer Class	2015 Average Daily Water Use, gallons	2015 Average Number of Active Services	2015 Average Gallons per Service per Day	2015 ERUs
Metered Water Use				
Residential(1)	94,313	433	218	433
Cardinal Glass	116,265	3	38,755	190
Commercial other than Cardinal Glass	10,061	58	173	16
Industrial	10,002	6	1,667	16
All Other non SFR connections	16,395	60	273	27
Subtotal, Metered Water Use	**247,036**	**560**	**441**	**682**
Estimated Unmetered Water Use				
Fire Fighting	1,121	0	NA	2
Other Unbilled and Unmetered Usage	2,188	0	NA	3
Subtotal, Unmetered Water Use	**3,309**	**0**	**NA**	**5**
Total Usage	**250,345**	**560**	**447**	**687**
Estimated Non-Use				
DSL	103,691	0	NA	169
Totals	**354,036**	**560**	**632**	**856**

(1) Single Family Residential services are always one ERU per service, regardless of individual usage rates or changes in usage rate from year to year. The average day residential usage for 2015 was 218 gpd per connection, which is more than the ERU value of 195 gpd per ERU. However, residential services are counted as one ERU each regardless of actual usage rates for any given year.

FUTURE SYSTEM DEMANDS

As shown in Figure 2-1 and Table 2-1, the City of Winlock's population has not increased significantly in the past 14 years. Between 2001 and 2015 the City's population increased by just three, which is an average annual growth rate of 0.02 percent. However, with the inclusion of the large area between the current City limits and Interstate 5 in their urban growth area, the City anticipates increased growth in the future. The Lewis County Growth Management Plan allocates a population of 4,550 to Winlock by the year 2030. Given the 2015 population of 1,340, an increase to 4,550 by 2030 represents an average annual growth rate of 8.49 percent. Figure 2-2 shows graphically how this 8.49 percent annual growth rate compares with historic Winlock populations reports. For the City to adequately plan to accommodate a population of 4,550 by 2030, this water system plan will project an 8.49 percent annual growth rate and evaluate facilities that will be needed to accommodate that growth. If actual growth is

different from this growth projection, then facilities needed to accommodate the growth may need to be rescheduled accordingly in later water system plan updates.

PROJECTED ERUS AND SOURCE REQUIREMENT

To estimate future system demands, it is assumed that the 190 Cardinal Glass ERUs and the 169 DSL ERUs will remain constant while all remaining 497 ERUs will increase at the system growth rate of 8.49 percent. Based on projected ERUs, water system demands are estimated using the water demand factors from Table 2-7 in the following manner:

SFR PHD is calculated using the PHD formula. The PHD for Cardinal Glass and DSL is calculated by dividing their ADD by 1440 because Cardinal Glass PHD is met from Cardinal's own 380,000 gallons of storage and DSL does not peak during high demand events. The PHD for all other non SFR ERUs is calculated by dividing their MDD by 1440. Projected ERUs and system demands are shown in Table 2-10.

TABLE 2-10

Projected ERUs and System Demands

Year	Projected ERUs (1)	Average Day Demand, gpd (2)	Maximum Day Demand, gpd (3)	Peak Hour Demand, gpm (4)	Annual Demand, ac-ft/yr (5)
2017	910	327,000	558,000	621	367
2018	957	337,000	586,000	651	377
2019	1,008	346,000	618,000	683	388
2020	1,063	357,000	651,000	719	400
2021	1,123	369,000	688,000	757	413
2022	1,187	381,000	728,000	799	427
2023	1,258	395,000	771,000	844	443
2024	1,334	410,000	818,000	893	459
2025	1,417	426,000	868,000	946	477
2026	1,507	444,000	923,000	1,004	497
2027	1,604	463,000	983,000	1,067	518
2028	1,710	483,000	1,048,000	1,134	541
2029	1,824	506,000	1,118,000	1,208	566
2030	1,949	530,000	1,194,000	1,288	594

TABLE 2-10 - (continued)

Projected ERUs and System Demands

Year	Projected ERUs (1)	Average Day Demand, gpd (2)	Maximum Day Demand, gpd (3)	Peak Hour Demand, gpm (4)	Annual Demand, ac-ft/yr (5)
2031	2,084	556,000	1,277,000	1,375	623
2032	2,230	585,000	1,367,000	1,469	655
2033	2,389	616,000	1,464,000	1,571	690
2034	2,561	649,000	1,570,000	1,682	727
2035	2,748	686,000	1,685,000	1,802	768
2036	2,951	725,000	1,809,000	1,932	813

(1) ERUs are projected forward from the total ERUs shown in Table 2-9. The 190 Cardinal Glass ERUs and the 169 DSL ERUs are held constant, while the remaining 497 ERUs are increased at the system growth rate of 8.49 percent, which is based on meeting the City's Comprehensive Plan goal of a population of 4,550 by the year 2030.

(2) Average day demand is calculated by adding the sum of the 2015 Cardinal Glass ADD and DSL ADD to the product of all other ERUs times the Average Day Demand value of 195 gpd per ERU from Table 2-7, rounded to the nearest 1,000 gallons.

(3) Maximum day demand is the Maximum Day Demand is calculated by adding the sum of the 2015 Cardinal Glass ADD and DSL ADD to the product of all other ERUs times the value of 613 gpd per ERU from Table 2-7, rounded to the nearest 1,000 gallons.

(4) PHD is calculated using the PHD formula for all SFR ERUs and adding that value to (Cardinal Glass ADD/1440 + DSL ADD/1440 + MDD of all non SFR ERUs/1440) since Cardinal Glass PHD is met from Cardinal Glass's own 380,000 gallons of storage DSL does not peak during high system demand events and non SFR ERUs would not typically peak beyond MDD levels.. The resultant PHD value is rounded to the nearest one gpm.

(5) Annual demand in Acre-Feet per Year is average day demand times 365 days per year and divided by 325,851 gallons per acre-foot.

EFFECTS OF WATER CONSERVATION

It is anticipated that the value of an ERU and the amount of DSL will change as the system grows. With promotion of water conservation, the water usage represented by an ERU may go down, and with active leak detection and distribution system replacement DSL is likely to go down. These factors will be more thoroughly discussed in Chapter 4 of this Plan. However, for projection of water system needs it is safer not to assume that water usage per ERU or DSL will decrease.

WATER RATES AND RATE IMPACTS ON WATER DEMAND

The City of Winlock's water rate includes a base fee of $18.40 per month which covers up to 300 cubic feet (2,244 gallons), and an overage charge of $1.00 for every 100 cubic feet (748 gallons) over the base amount of 300 cubic feet. This rate structure provides limited incentive to conserve. At the average use rate of 195 gpd per ERU, the average usage would be 5,850 gallons, which is 782 cubic feet per month. The overage of 482 cubic feet per month would cost an additional $4.82 per month on top of the base rate

of $18.40, for a monthly bill of $23.22 per month. A month of maximum day demand of 283 gpd per ERU would be 8,490 gallons per month, which is 1,135 cubic feet. For this usage, the overage would be 835 gallons at a cost of $8.35 and a total bill of $26.75. The additional $3.53 per month difference between average day demand and maximum day demand provides limited incentive for conservation.

CHAPTER 3

WATER SYSTEM ANALYSIS

OBJECTIVE

The objective of this chapter is to determine if system improvements are necessary to meet water quality standards and to meet projected demands. This chapter includes the following elements:

- System Design Standards
- Water Quality Analysis
- System Facilities Analysis
- Water System Capacity Limits
- Summary of System Needs and Concerns

SYSTEM DESIGN STANDARDS

The Standards for planning and design for the Winlock water system are based on commonly accepted standards including the following:

WAC 246-290, Group A Public Water Systems, Washington State Board of Health (March 2012)

This is the primary drinking water regulation used by DOH. It sets basic standards to assess capacity, water quality, and system reliability.

Water System Design Manual, Washington State Department of Health (December 2009)

These Standards serve as guidance for the preparation of plans and specifications for Group A public water systems in compliance with WAC 246-290.

Standard Specifications for Road, Bridge and Municipal Construction, Washington State Department of Transportation, American Public Works Association (Current Edition)

These Standards include detailed specifications for materials and workmanship of a wide variety of public works projects, including installation of public water supply facilities and restoration or facilities impacted by water main construction and repair.

City of Winlock Public Works Standards

These Standards include detailed specifications for materials and workmanship for installation of water main extensions, including piping installation details, thrust

blocking, in-line valves, fire hydrants, air release valves, service connections of various types, backflow preventions devices, and blow offs. A copy of these Standards is contained in Appendix D.

WATER QUALITY STANDARDS

The Winlock water system is a public water supply system regulated by the Washington State Department of Health Drinking Water Regulations, WAC 246-290, as well as sections of Code of Federal Regulations (CFR) Title 40, Parts 141 and 143, adopted by reference in WAC 246-290. Winlock has a groundwater supply, so only ground water supply regulations apply.

SYSTEM CAPACITY STANDARDS

General Design Standards

Winlock uses the DOH Water System Design Manual as a guide for establishing water system capacity standards. Table 3-1 lists the recommended standards from the DOH Manual and the Winlock Water Department's policies regarding each standard for general facility design.

TABLE 3-1

General Facilities Requirements

Standard	DOH Water System Design Manual (December 2009)	Winlock Water System Standard
Average Day and Maximum Day Demand	Average day demand should be determined from previous metered water production and consumption data. Maximum day demand is estimated at approximately 2.0 times the average day production requirement if metered data is not available.	Average day consumption per a Single Family Resident (SFR) ERU is **195 gpd.** The maximum day to average day factor is 3.14, and the maximum day consumption per SFR ERU is **613 gpd**, as developed in Chapter 2 of this Plan.
Peak Hour Demand	Peak hour demand for SFR ERUs is determined using the following equation: PHD = (MDD/1440)((C)(N) + F) + 18 C = Coefficient from DOH Water System Design Manual Table 5-1 N = Number of connections, ERUs F = Factor from DOH Water System Design Manual Table 5-1	Peak hour demand per SFR ERU is determined by applying the DOH Water System Design Manual Formula where MDD = 283, C=1.6 and F = 225, which simplifies to the equation: **PHD = 0.68*N+114**

TABLE 3-1 - (continued)

General Facilities Requirements

Standard	DOH Water System Design Manual (December 2009)	Winlock Water System Standard
Minimum System Pressure	The system must be designed to maintain a minimum of 30 psi in the distribution system under peak hour demand and 20 psi under fire flow conditions during MDD.	The System will meet or exceed the DOH required minimums.
Maximum System Pressure	Regulations do not address maximum system pressure. The Water System Design Manual, Chapter 8, part 8.1.7, recommends that pressures should not exceed 100 psi.	The City's goal is to maintain distribution system pressures below 100 psi.
Minimum Pipe Sizes	The diameter of a transmission line shall be determined by hydraulic analysis. The minimum size distribution system line shall not be less than 6-inches in diameter, except for dead end lines not providing fire flow and only as justified by a hydraulic analysis.	Same as DOH Water System Design Manual, Chapter 8, except that dead end lines greater than 50 feet in length that do provide fire flow shall be a minimum of 8-inches in diameter.
Valve Spacing	Sufficient valving should be placed to keep a minimum number of customers out of service when water is turned off for maintenance or repair.	Valves every 1,000 feet, two gate valves at every tee and three at every cross unless otherwise directed by the Water and Sewer Superintendent. Valves on each end of a water main in an easement.
Source Reliability	18 hours of source pumping to meet maximum day demand. Source capacity to replenish fire storage capacity within 72 hours while meeting maximum day demand. Redundancy in all critical pumping systems. Backup power supply for all critical pumping systems.	Same as DOH Standard.

Fire Suppressions Standards

The International Fire Code sets minimum building standards based on fire flows available, but does not specifically set fire flow standards for water systems. Lewis County's building and fire code ordinances adopt International Fire Code, but do not adopt a minimum fire flow standard to be applied to water utilities. WAC 246-293-601, et seq., sets state minimum fire flow standards for water systems with 1,000 or more service connections, or located within a critical water supply service area. The Winlock Water System currently has fewer than 1,000 service connections and is not located in a critical water supply service area, so this regulation does not apply now, but will apply when the City exceeds 1,000 services. The City's design and construction standards

(Appendix D) indicate minimum fire flow standards in Section 4.02 C, as summarized in Table 3-2

TABLE 3-2

Fire Flow Standards

Land Use Designation	Minimum Standard (1)		Winlock Fire Flow Standard		
	Flow, gpm	Duration, minutes	Flow, gpm	Duration, minutes	Maximum Hydrant Spacing, feet (2)
Residential	500	30	500	30	600
Multifamily	750	60	750	60	600
Commercial	750	60	750	60	600
Industrial	1,000	60	1,000	60	600

(1) Minimum Standard established by WAC 246-293-640, applicable to water systems with 1,000 or more connections or in a Critical Water Supply Service Area. This standard is currently not applicable to the City of Winlock, but it will become applicable when the City reaches 1,000 service connections.

(2) Winlock Water Design and Construction Standards Section 4.05 B 2 states that fire hydrants shall have an average nominal spacing of 600 feet, in no cases shall be greater than 700 feet, and no building shall be greater than 350 feet from a fire hydrant. The Standard further states that fire hydrant location shall be determined by the City in conjunction with Lewis County Fire District No. 15, and closer spacing may be required.

Storage Standards

The nominal volume of a water reservoir is generally the name given to a reservoir based on an approximation of the gross volume the reservoir, which is the amount of water the reservoir could hold if filled all the way to the top of the reservoir wall. However, practically speaking, a reservoir cannot be filled to the top of the wall and a reservoir also often cannot, under normal operational conditions, be drained completely while meeting system demand. Therefore, there is a need to determine how much of a reservoir volume is *effective* storage and how much effective storage a water system needs.

The DOH Water System Design Manual identifies the following components of reservoir storage volume:

- Operational Storage
- Equalizing Storage
- Standby Storage
- Fire Suppression Storage
- Dead Storage

A reservoir's effective storage volume is the gross volume less operational storage and dead storage. This volume must be large enough to accommodate the requirements for equalizing storage, standby storage and fire suppression storage.

Operational Storage

Operational storage is the amount of water that flows in and out of a reservoir during normal system control cycling. Reservoirs typically operate with a maximum water level at which all source pumps are turned off, and a minimum level at which all source pumps are turned on. The amount of water that flows into and out of the reservoir between these two levels depends upon the operational control levels and the dimensions of the system's reservoirs.

Equalizing Storage

Equalizing storage is the amount of water needed to meet peak system demand for a period of time that the system demand exceeds the system source capacity. The DOH Water System Design Manual recommends that this volume be estimated as PHD minus source capacity for 150 minutes, but not less than zero.

Standby Storage

Standby Storage is water held in reserve for emergency situations, such as temporary loss of a water source. The DOH Water System Design Manual recommends that this volume be estimated as two days of average day demand for the water system, less the amount of water that can be produced by the water system in 1 day with the largest source of supply out of service, but not less than 200 gallons per ERU.

Fire Suppression Storage

Fire Suppression Storage is the maximum fire flow rate standard times the maximum fire flow duration standard for the water system. For example, 1,000 gallons per minute sustained for 60 minutes would be a fire suppression storage standard of 60,000 gallons.

Dead Storage

Dead storage is the volume of the reservoir that either cannot be utilized for storage because it is above the maximum operational water level of the reservoir, or cannot be withdrawn from the reservoir at the required rates while maintaining the minimum required system pressure or other required operating parameter, such as chlorine contact time. The amount of dead storage existing in a system depends on storage system dimensions, elevations, pumping systems, outlet design, and possibly other requirements such as disinfectant contact time.

Effective Storage

The amount of effective storage a water system needs will be referred to as the Effective Storage Requirement. The Effective Storage Requirement is based on equalizing, standby, and fire suppression storage, and will depend on whether or not "Nested

Storage" is allowed. "Nested Storage," pursuant to WAC 246-290-010, means one component of storage is contained within the component of another. WAC 246-290-235 states, "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive." Therefore, the Effective Storage Requirement will be either the sum of equalizing, standby and fire suppression, if nesting of standby and fire suppression storage is *not* allowed, or it will be the sum of equalizing storage plus the greater of either standby or fire suppression storage if nesting of standby and fire storage *is* allowed.

For the Winlock water system, no local ordinance or authority has required fire storage to be additive, so nesting of standby and fire storage is allowed. Table 3-3 summarizes the total effective storage requirements as they apply to the Winlock water system.

TABLE 3-3

Effective Storage Requirement

If Nesting Is Not Allowed by Local Fire Authority	If Nesting Is Allowed by Local Fire Authority	Standard Applicable to City of Winlock
The sum of: Equalizing Storage, plus Standby Storage, plus Fire Suppression Storage	The sum of: Equalizing Storage, plus The Greater of Standby Storage, or Fire Suppression Storage	The City of Winlock standard is based on nesting of standby and fire suppression storage.

Figure 3-1 illustrates an elevation view of a typical reservoir indicating dead storage, operational storage and effective storage volumes.

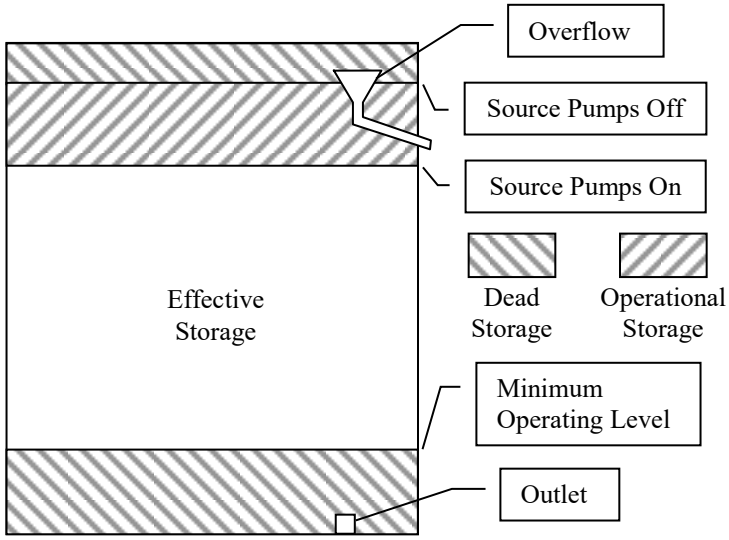

FIGURE 3-1

Typical Storage Reservoir Effective Capacity

WATER QUALITY ANALYSIS

The following sections evaluate the record of water quality for the City of Winlock. Water quality analysis is divided into the categories of Source Water Quality, Delivered Water Quality, Water Quality Reporting, and Water Quality Complaints. Water quality standards that apply to the water distribution system, including coliform, lead and copper, disinfectant byproducts, and asbestos, are discussed under the heading of Delivered Water Quality. A review of water quality monitoring requirements relative to water quality monitoring completed is included under the heading Water Quality Reporting, and a review of water quality problems and complaints is included under the heading Water Quality Complaints.

SOURCE WATER QUALITY

As described in Chapter 1, Winlock has five active wells and two inactive wells. The wells are all chlorinated to protect the distribution system from contamination.

Inorganic Chemical and Physical Water Quality

General IOC Tests

Inorganic chemical and physical (IOC) water quality monitoring results are summarized in Table 3-4. Samples reported as less than a specified value have a less-than sign (<) placed before the specified value. Numbers without the less-than sign represent detected

values. The Maximum Contaminant Level (MCL) for each inorganic chemical and physical water quality parameter for which there is an MCL, or other regulatory or advisory level as footnoted, is listed in the right hand column. Baichtel 1 Well is not included in this table because it is not currently an active well and has not been sampled since 2003.

TABLE 3-4

Inorganic Chemical Sampling Results

Source	S-01, Eureka 1		S-05. Well 603		S-08, Eureka 3		S-09, Baichtel 2		
Sample Date	**4/27/2007 (1)**	**5/13/2010 (1)**	**10/11/2007 (2)**	**10/6/2016 (2)**	**7/8/2004 (1)**	**4/27/2007 (1)**	**10/11/2007 (2)**	**10/6/2016 (2)**	**MCL (3)**
Primary Contaminants (4)									
Antimony, mg/L (5)	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001	<0.003	0.006
Arsenic, mg/L	<0.002	<0.0104	<0.002	<0.001	<0.002	<0.002	<0.002	<0.001	0.0104
Barium, mg/L	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.1	2
Beryllium, mg/L	<0.001	<0.001	<0.001	<0.0003	<0.001	<0.001	<0.001	<0.0003	0.004
Cadmium, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005
Chromium, mg/L	<0.001	<0.001	<0.001	<0.007	<0.001	<0.001	0.001	<0.007	0.1
Copper, mg/L	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.02	1.3 (6)
Cyanide, mg/L	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.2
Fluoride, mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	4 (7)
Lead, mg/L	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.015 (6)
Mercury, mg/L	<0.0005	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	0.002
Nickel, mg/L	<0.001	<0.001	<0.001	<0.005	0.001	<0.001	0.003	<0.005	0.1
Nitrate-N, mg/L	0.8	0.8	0.9	1.4	0.7	0.6	0.2	0.3	10
Nitrite-N, mg/L	<0.1	NA (8)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1
Selenium, mg/L	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.002	0.05
Sodium, mg/L	9.5	8.72	7.9	8	9.1	8.6	9.8	8	20 (9)
Thallium, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	250
Total Nitrate/Nitrite, mg/L	0.8	0.8	0.9	1.4	0.7	0.6	0.2	<0.5	10
Turbidity, NTU (10)	<0.2	0.3	<0.2	<0.1	5.8	0.3	<0.2	<0.1	1 (11)

Source	S-01, Eureka 1		S-05. Well 603		S-08, Eureka 3		S-09, Baichtel 2		
Sample Date	**4/27/2007 (1)**	**5/13/2010 (1)**	**10/11/2007 (2)**	**10/6/2016 (2)**	**7/8/2004 (1)**	**4/27/2007 (1)**	**10/11/2007 (2)**	**10/6/2016 (2)**	**MCL (3)**
Secondary Contaminants (12)									
Chloride, mg/L	3	5.1	2.8	3	2.7	2.6	2	3	250
Color, CU (13)	<5	<5	<5	<5	<5	<5	<5	<5	15
Conductivity, µmhos/cm (14)	153	122	109	100	111	13.6	129	114	700
Fluoride, mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2 (7)
Hardness, mg/L	50.6	45.7	31.9	36	44.4	44.6	38.8	42	(15)
Iron, mg/L	<0.02	<0.02	<0.02	<0.1	0.24	<0.02	<0.02	<0.1	0.3
Manganese, mg/L	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.01	0.05
Silver, mg/L	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.01	0.1
Sulfate, mg/L	NA (8)	1.7	0.4	<1	0.6	NA (8)	0.8	<1	250
Zinc, mg/L	0.03	<0.01	0.02	<0.2	0.03	<0.01	0.14	<0.2	5
Additional Analyses (16)									
Orthophosphate, mg/L	0.1	NA (8)	0.09	NA (8)	NA (8)	0.12	0.1	NA (8)	None
Total Dissolved Solids, mg/L	122	206	92	NA (8)	NA (8)	73	100	NA (8)	500

(1) Sample is indicated as taken prior to treatment.
(2) Sample is indicated as taken after treatment.
(3) MCL is Maximum Contaminant Level
(4) Primary Contaminants are contaminants that are determined to have an impact on public health if exceeding the MCL.
(5) mg/L indicates milligrams per liter. One mg/L is equivalent to one part per million (ppm).
(6) The standards for Lead and Copper are distribution system action levels based on 90th percentile distribution sample values.
(7) Fluoride has both a primary and a secondary MCL. Concentrations above the secondary MCL cause aesthetic problems, while concentrations above the primary MCL are a public health concern.
(8) NA signifies that the parameter was not analyzed or not reported in the lab report.
(9) Sodium does not actually have an MCL, but EPA has established a level of 20 mg/L as a level of concern for individuals on low sodium diet.
(10) NTU is Nephelometric Turbidity Unit, a measure of the turbidity, or cloudiness, of the water.
(11) The turbidity MCL applies only to surface water sources.
(12) Secondary Contaminants are contaminants that are determined not to have an impact on public health but have other impacts such as causing stains tastes, or odors if exceeding the MCL.
(13) CU is Color Unit, a standardized measure of the amount of color in the water.
(14) A µmho is a micro-mho, or 1 millionth of a mho, a unit of electrical conductance.
(15) There is no MCL or health advisory for hardness. Water with less than 60 mg/L of hardness (as calcium carbonate) is generally considered to be soft water. Water with 61 to 120 mg/L of hardness is generally considered to be moderately hard water. Water with 121 to 180 mg/L of hardness is generally considered to be hard water. Water with greater than 181 mg/L of hardness is generally considered to be very hard water.
(16) Additional Analyses are tests that are not required by regulation but are taken for investigative purposes.

Annual Nitrate Tests

Additional IOC samples include annual nitrate samples. These samples are required in years when complete inorganic chemical samples are not required. Table 3-5 summarizes all nitrate monitoring results. All nitrate test results are well below the MCL of 10 mg/L.

TABLE 3-5

Nitrate Monitoring Results (1)

Date	Eureka 1	Well 603	Eureka 3	Baichtel 2
1/14/2004			0.7	<0.2
9/15/2004		0.9		
7/26/2005			0.7	
9/13/2005		0.7		0.7
10/31/2005				<0.1
4/24/2006	0.8			
8/1/2006			0.7	
9/27/2006		1.0		
12/27/2006				0.2
4/27/2007		1.0		
5/28/2008	0.7	1.1	0.5	0.1
5/22/2009	1.0	1.2	0.8	0.4
5/13/2010		0.9	0.6	0.2
12/15/2010	1.0			
5/5/2011		1.2	0.7	0.3
12/15/2011	1.0			
5/10/2012		1.1	0.7	0.3
10/4/2012	0.8			
5/23/2013		1.2	0.7	0.3
10/17/2013	1.0			
5/29/2014		1.2	0.7	0.3
10/23/2014	1.0			0.3
5/28/2015		1.3	0.7	0.3
10/6/2016	1.0			
5/4/2017			0.8	

(1) All sample results are mg/L. The MCL for Nitrate is 10 mg/L. Samples were also analyzed for Nitrite, and all results for Nitrite were <0.1 mg/L

Radionuclides

Results of all radionuclide testing since 2006 are shown in Table 3-6. All radionuclide samples are well below their respective standards.

TABLE 3-6

Test Results for Radionuclides

Source	Date	Gross Beta, pCi/L[(1)]	Gross Alpha, pCi/L[(1)]	Radium 228, pCi/L[(1)]
Eureka 1	4/24/2006		<3.00	<1.00
	8/1/2006		<3.00	<1.00
	5/13/2010		<3.00	<1.00
	5/12/2016		<3.00	<1.00
Well 603	10/13/2003		<0.001	
	4/25/2005			0.17
	9/13/2005			0.83
	8/4/2009	0.45	0.06	1.1
	8/13/2015		<3.00	<1.00
Baichtel 1	10/13/2003		0.3	
	5/3/2005			0.8
	11/15/2005			<1.00
	9/3/2015			<1.00
Eureka 3	10/13/2003		0.2	
	6/6/2005			0.22
	12/28/2005			0.66
	8/4/2009	0.39	<3.00	0.87
	8/13/2015		<3.00	<1.00
Baichtel 2	12/4/2001		ND	
	7/26/2005			1.01
	12/28/2005			<1.00
	5/5/2011		<3.00	
	6/14/2012			<1.00
	5/28/2015			<1.00
	9/3/2015			<1.00
	8/11/2016		<3.00	
MCL		[(2)]	15	5 [(2)]

(1) pCi/L is picocuries per liter.
(2) The MCL for Gross Beta is a concentration causing 4 millirems of total body or organ exposure based on drinking 2 liters of water per day.
(3) The MCL for Radium 226 and Radium 228 is a combined total of 5 pCi/L.

Volatile Organic Chemicals

Volatile Organic Chemical (VOC) samples since 2003 were collected on the dates indicated in Table 3-7. Multiple samples in a year are indicated by multiple X's. Well 603 in 2003, Well Baechtel 1 in 2004 and Well Eureka 1 in 2006 each had four VOC samples. Also, there is a Source 3 sample from 2003, which is Ash Street Well, but is not listed below because Ash Street Well is no longer operating. No VOCs were detected in any of the source VOC samples.

TABLE 3-7

VOC Sampling History

Source	2003	2004	2006	2007	2009	2010	2011	2013	2014	2015	2016	2017
Eureka 1			XX XX		X					X		
Well 603	XX XX	X		X	X			X	X			
Baichtel 1		X										
Eureka 3	X		X				X					X
Baichtel 2		XX XX		X		X					X	

Synthetic Organic Chemicals

Synthetic Organic Chemical (SOC) samples since 2000 were collected for general herbicide (HERB1) and general pesticide (PEST1) and general insecticide (INSECT1) analyses in the years indicated in Table 3-8. Multiple samples in a year are indicated by multiple X's. No SOCs were detected in any of the source SOC samples. There were also Source 3 samples in 2000, 2001, and 2003, which is Ash Street Well, but are not listed below because Ash Street Well is no longer operating.

TABLE 3-8

SOC Sampling History

Source	Analyses	2000	2001	2004	2006	2007	2009	2013
Eureka 1	HERB1				XXXX		X	
	PEST1				XXXX		X	
	INSECT1				XXXX		X	
Well 603	HERB1	X						X
	PEST1	X						
	INSECT1	X	XXX			X		
Baichtel 1	HERB1	X						
	PEST1	X						
	INSECT1	X						
Eureka 3	HERB1	X	X					X
	PEST1	X	X					
	INSECT1	X	X					
Baichtel 2	HERB1			XXXX				X
	PEST1			XXXX				
	INSECT1			XXXX				

DELIVERED WATER QUALITY

Delivered water quality applies to a number of water quality monitoring requirements of the water distribution system. Monitoring of delivered water quality is necessary because some water quality parameters have been demonstrated to change in the distribution system, or even in the plumbing of buildings. The following sections summarize delivered water quality monitoring by Winlock.

Coliform Bacteria Monitoring

The Federal coliform monitoring and response rules were changed as of April 1, 2016 by the Revised Total Coliform Rule (RTCR). However, all sampling and compliance records reviewed for this report were based on the Total Coliform Rule (TCR), which was in place prior to April 1, 2016. The Washington State Drinking Water Regulations regarding coliform sampling and MCLs are contained in WAC 246-290-300(3) and WAC 246-290-310(2). These rules were updated in December 2016 and now reflect the RTCR.

Total Coliform Rule (prior to April 1, 2016)

Prior to December 2016, WAC 246-290-300(3) set distribution system coliform monitoring requirements, and WAC 246-290-310(2) set coliform bacteria maximum contaminant levels based on the TCR. In general, under the TCR, a coliform MCL violation occured when two or more coliform samples in one sampling period had

detectable coliform bacteria (or for systems that take 40 or more samples per month, if 5 percent or more samples had detectable coliform bacteria). An Acute MCL occured when there is a coliform MCL violation and any of the coliform positive samples were positive for Fecal Coliform or E. Coli. A Non-Acute MCL occurred when there was a coliform MCL violation and none of the coliform positive samples were positive for Fecal Coliform or E. Coli.

The number of coliform samples required per monitoring period is based on the population served by that water system during the monitoring period, and was not changed by the RTCR. Each monitoring period is a calendar month. As the population grows, the required number of samples will increase. Over the data period, the City of Winlock has been required to take two distribution system coliform samples per month.

The coliform monitoring record for Winlock since 1998 was reviewed for this report and is summarized in Table 3-9.

TABLE 3-9

Summary of Positive Coliform Sampling Results

Date	Coliform Type	Number of Positive Samples	MCL
11/23/1998	Total	2	Non-Acute
11/25/1998	Total	2	
11/6/2014	Total	1	None

Revised Total Coliform Rule

The Revised Total Coliform Rule (RTCR) was promulgated by the USEPA in February 2013 with minor corrections in February 2014, and went into effect in April 2016. WAC 246-290 was revised to include the RTCR in December 2016. Some key provisions of RTCR include the following:

- Eliminates the total coliform maximum contaminant level (MCL), maintains the existing E. coli MCL, and defines coliform treatment technique violations.
- Sets new requirements for Level 1 and 2 assessments, and corrective action when monitoring results show that the system is contaminated.
- Sets new seasonal system requirements for start-up procedures if the system depressurizes during the off-season.
- Changes to reporting and recordkeeping requirements.

- Changes to public notification and consumer confidence reporting requirements.

- Technical edits for clarity.

Three DOH publications addressing the RTCR are included in Appendix E, including a copy of the November 2015 DOH publication H2Ops with a feature article on the RTCR, and publication titled, "Summary of Draft Rule Changes, Group A—Revised Total Coliform Rule, Chapter 246-290 WAC," also dated November 2015, and DOH Publication 331-556 "Revised Total Coliform Rule," dated December 2015.

Under the RTCR the data in Table 3-8 do not reflect coliform MCL violations.

Disinfectant Byproduct Monitoring

Disinfectant Byproduct (DBP) stage 2 water quality standards are based on a Locational Running Annual Average (LRAA) for total trihalomethanes (TTHMs) and 5 species of haloacetic acids (HAA5). The MCL for TTHMs is 80 µg/L[1] and the MCL of HAA5 is 60 µg/L. If the LRAA at any sampling site exceeds one of these limits, that exceedance would constitute a DBP MCL violation. Exceedance of a DBP MCL triggers a public notification requirement, and continued DBP MCL violations will trigger a requirement to provide treatment to reduce DBPs.

The City of Winlock has a total of twenty DBP water quality samples on record on the DOH water quality database, including ten pairs of samples for TTHM and HAA5. TTHM and HAA5 samples were taken on March 8, 2006 at the public works shop and the wastewater treatment plant, on September 23, 2010 at the public works shop and the wastewater treatment plant, on September 26, 2013 at the public works shop, 812 Miller Street, 1209 SW Mayer Street, and at Cardinal Glass, on September 11, 2014 at Cardinal Glass, and on September 10, 2015 at cardinal Glass. The only DBP detection in these samples was 5.6 µg/L TTHM in the sample from 812 Miller Street on September 26, 2013. This detection is less than one tenth of the standard. All other samples were below the detection limit.

According to the DOH Water Quality Monitoring Schedule for 2017, the City of Winlock is on a reduced sampling schedule due to low sample test results, and is required to take one sample each for TTHM and HAA5 in September 2017 at the Cardinal Glass location.

Asbestos

Asbestos fibers are measured as millions of fibers per liter greater than 10 micrometers in length (MFL>10 µm). The MCL is 7 MFL>10 µm. WAC 246-290-300(2)(b)(v) requires distribution system monitoring for asbestos in accordance with Federal regulation

[1] µg/L is micro-grams per liter. One µg/L is essentially the same as one part per billion.

40 CFR 141.23(b). The Federal regulation requires one sample during the first 3 years of each 9-year sampling cycle, unless the state grants a waiver to asbestos sampling based on a demonstrated lack of vulnerability to asbestos in both the source water and the distribution system. If an asbestos sample is required, it is to be taken under conditions where asbestos contamination is most likely to appear.

There are no asbestos samples on the DOH water quality database for Winlock. According to the DOH Water Quality Monitoring Schedule for 2017, the City of Winlock has a waiver from asbestos monitoring for nine years.

Lead and Copper Monitoring

Lead and copper monitoring is to determine if lead or copper are leaching out of customer service lines at a rate that produces concentrations that are a health concern. The rule requires that 90 percent of the representative samples do not exceed the action levels for lead or copper. If more than the allowable number of samples exceed the action level for either lead or copper, then the water system owner must take action to reduce the corrosivity of the water, or take other actions such as water service line replacement, to reduce the level of lead and copper at the tap. The action level for lead is 0.015 mg/L and the action level for copper is 1.3 mg/L.

Lead and copper sample results for Winlock were reviewed from 2003 to the present. Rounds of ten samples each were collected in 2003, 2006, 2010 2013 and 2016. The highest level of lead in all samples was 0.042 mg/L in December 2006, and the highest 90^{th} percentile value for lead was 0.010 mg/L in October 2013. The highest level of copper was 1.12 mg/L in December 2006, and the highest 90^{th} percentile value for copper was 0.701 mg/L in December 2003. No samples exceeded the copper action level, even at the highest levels found. Two samples exceeded the lead action level at the highest level found, but no samples exceeded the lead action level at the 90^{th} percentile level.

Table 3-10 summarizes Winlock's lead and copper monitoring results. The data shows that Winlock is in compliance with the lead and copper standards. According to the DOH Water Quality Monitoring Schedule for 2017, the City of Winlock is required to take their next round of lead and copper samples in July 2019.

TABLE 3-10

Lead and Copper Monitoring Results

	Lead, mg/L		Copper, mg/L	
Date	**Highest Level**	**90th Percentile**	**Highest Level**	**90th Percentile**
12/23/2003	<0.002	<0.002	0.835	0.701
12/27/2006	0.042	0.007	1.120	0.506
11/3/2010	0.003	0.001	0.280	0.240
10/17/2013	0.020	0.010	0.680	0.530
7/3/2016	0.004	0.002	0.560	0.230
Action Level		0.015		1.3

WATER QUALITY REPORTING

Winlock has obtained several water quality monitoring waivers, which affect the monitoring requirements. Table 3-11 summarizes Winlock's monitoring requirements as shown on the Water Quality Monitoring Report for the Year 2017 (Copy included in Appendix E).

TABLE 3-11

System Monitoring Requirements and Waivers for 2015

Monitoring Parameter	Sampling Requirement	Sampling Location
Coliform	Two per month	Distribution system
Lead and Copper	One set of 10 samples in June 2016	Distribution system
Nitrate	One per year per source (1)	All sources
Inorganic Contaminants	All sources on 9-year waivers. Next due date varies based on previous sample date.	Eureka 1: 5/2019 Well 603: 10/2025 Eureka 3: 4/2016 Baichtel 2: 10/2025
Volatile Organic Contaminants	All sources on 6-year waivers. Next due date varies based on previous sample date.	Eureka 1: 8/2021 Well 603: 9/2020 Eureka 3: 6/2023 Baichtel 2: 5/2022
Herbicides, SOC 515.2	Well 603 on standard 3-year samples. Other wells on 9-year waivers. Next due date varies based on previous sample date.	Eureka 1: 8/2018 Well 603: 6/2016 Eureka 3: 4/2021 Baichtel 2: 5/2022

TABLE 3-11 - (continued)

System Monitoring Requirements and Waivers for 2015

Monitoring Parameter	Sampling Requirement	Sampling Location
General Pesticides, SOC 525.2	All sources on 3-year waivers	None Scheduled
Soil fumigants, SOC 504	All sources on 3-year waivers	None Scheduled
Gross alpha	Baichtel 2 Well on quarterly samples for 2015. All other sources on standard 6-year schedule.	Eureka 1: 5/2022 Well 603: 8/2021 Eureka 3: 8/2021 Baichtel 2: 8/2022
Radium 228	All sources on standard 6-year schedule.	Eureka 1: 5/2022 Well 603: 8/2021 Eureka 3: 8/2021 Baichtel 2: 8/2022

(1) In years when complete inorganic chemical samples are required, a separate nitrate test is not required because nitrate is part of the complete inorganic chemical test.

WATER QUALITY COMPLAINTS

Winlock handles water quality complaints pursuant to their policy for dealing with complaints as described in Chapter 1. The most common water quality complaints are regarding water taste. In response to water complaints, the water operator will generally check out the validity of the complaint by an on-site investigation and flush water mains if appropriate.

The City also receives complaints about low water pressure and water leaks. Low pressures have generally been associated with plugged faucet screens and have been corrected by cleaning or replacing the faucet screen. Leaks have generally been service line breaks, usually on the customer's side of the meter, and have been corrected by repair of the service lines.

SYSTEM FACILITIES ANALYSIS

The following sections evaluate the existing water system facilities in terms of their capacities, physical conditions, and performance capabilities. Facilities are evaluated relative to existing and projected requirements based on growth and demand projections from Chapter 2.

SOURCES

The Winlock wells are described in Chapter 1. Eureka 1 Well (DOH Source No. S-01) is the City's oldest and highest capacity active well. This well is reported to product 210 gpm, and was estimated by Robinson Noble Hydrogeologists to be capable of up to

250 gpm. The current pump capacity is limited to 210 gpm and needs to be throttled back during times of drought. In terms of total production, Eureka 1 Well is the City's second most productive well. Between January 2007 and May 2015, Eureka 1 Well produced 21 percent of the City's total water production.

Eureka 2 Well (DOH Source No. S-02), Ash Street Well (DOH Source No. S-03), and Baichtel 1 Well (DOH Source No. S-07) are all inactive.

Well 603 (DOH Source S-05) is the City's second highest capacity well with a reported capacity of 200 gpm, although Robinson Noble Hydrogeologists recommended that Well 603 be reduced to 75 gpm to avoid overdrawing the well. The full 200 gpm capacity of the well pump has been used for several years without any issues of excessive draw down during drought conditions. Well 603 has been the City's largest producer in terms of total monthly and total annual production. Between January 2007 and May 2015, Well 603 produced 68 percent of the City's total water production, and between January 2009 and May 2015 Well 603 produced 72 percent of the City's total water production.

Eureka 3 Well (DOH Source No. S-08) is reported as having a capacity of 50 gpm and was estimated by Robinson & Noble Hydrogeologists to be capable of 60 gpm. A higher capacity pump could be added in the future to gain an additional 10 gpm, if necessary. Between January 2007 and May 2015, Eureka 3 Well produced 3 percent of the City's total water production.

Baichtel 2 Well (DOH Source No. S-09) is reported as having a capacity of 29 gpm and was estimated by Robinson & Noble Hydrogeologists to be capable of 90 gpm. We suspect this well may have been fitted with a smaller capacity pump. The City may elect to perform additional capacity testing and re-equip the well with a higher capacity well pump in the future, if necessary. Between January 2007 and May 2015, Baichtel 2 Well produced 5 percent of the City's total water production.

Well 603 pumps directly into the 603 Reservoirs 1 and 2, which feed Zone 1 by gravity. The Baichtel Wells pump into Zone 2, which feed into the 603 Reservoirs via a solenoid valve located at the Zone 2 Pump station. The Eureka Wells pump into Zone 1, with water in excess of demand going to the 603 Reservoirs. So all wells pump either directly or indirectly to the 603 Reservoirs, and all wells are controlled by the water level in the 603 Reservoirs

Water Rights

Current and Historic Withdrawals

The Winlock water rights are summarized in Table 1-3. Winlock has a total water right capacity of 915 gpm and 528.9 ac-ft/yr. Installed source capacities of all wells are summarized in Table 1-2. Winlock has a combined installed pump capacity of 489 gpm,

which is well within the limits of Winlock's instantaneous water rights. From Table 2-3 it can be seen that Winlock's maximum annual usage since 2007 has not exceeded 478.99 ac-ft/yr. **Therefore, Winlock's current instantaneous and annual usage rates are well within their water rights limits**.

Projected Withdrawals

Projected withdrawal rate requirements are compared to current water rights in Table 3-12. Recommended Source Capacity is the source capacity necessary to meet the maximum day demand from Table 2-10 in 22 hours per day of source production. Annual Water Demand projections come directly from Table 2-10. Table 3-12 shows that Winlock has adequate instantaneous water rights through the year 2034, and adequate annual rights to meet projected growth through 2023. If growth and water usage develop as predicted, Winlock will need an additional 84 gpm and 489 ac-ft/yr of water right available by the year 2036. **Winlock will need additional instantaneous and annual water rights to meet projected demands.**

TABLE 3-12

Projected Water Rights Status

Year	Recommended Source Capacity, gpm[(1)]	Instantaneous Water Rights Surplus/(Deficit), gpm[(2)]	Projected Annual Water Demand, ac-ft/yr[(3)]	Annual Water Rights Surplus/(Deficit), ac-ft/yr[(4)]
2017	423	492	367	162
2018	444	471	377	152
2019	468	447	388	141
2020	493	422	400	129
2021	521	394	413	116
2022	551	364	427	102
2023	584	331	443	86
2024	619	296	459	70
2025	658	257	477	52
2026	700	215	497	32
2027	745	170	518	11
2028	794	121	541	(13)
2029	847	68	566	(38)
2030	905	10	594	(65)
2031	968	(53)	623	(94)
2032	1,036	(121)	655	(126)

TABLE 3-12 - (continued)

Projected Water Rights Status

Year	Recommended Source Capacity, gpm[1]	Instantaneous Water Rights Surplus/(Deficit), gpm[2]	Projected Annual Water Demand, ac-ft/yr[3]	Annual Water Rights Surplus/(Deficit), ac-ft/yr[4]
2033	1,109	(194)	690	(161)
2034	1,189	(274)	727	(199)
2035	1,276	(361)	768	(239)
2036	1,370	(455)	813	(284)

(1) Recommended source capacity is the minimum source capacity necessary to meet projected Maximum Day Demand, from Table 2-10, in 22 hours of pumping.
(2) Instantaneous Water Rights Surplus/(Deficit) is the total available instantaneous water rights of 915 gpm from Table 1-3, less the Recommended Source Capacity.
(3) Projected Annual Water Demand is Annual Demand from Table 2-10.
(4) Annual Water Rights Surplus is the total available annual water rights of 528.9 ac-ft/yr from Table 1-3, less the Projected Annual Water Demand from Table 2-10.

Source Capacity Analysis

The source capacity of the Winlock water system is compared to projected water system demands in this section. The existing wells have a combined withdrawal capacity of 489 gpm. Table 3-13 compares existing Winlock source capacity to projected water system demands. Based on projected demands at current water usage rates, Winlock will need 4 gpm of additional source capacity by 2020, and will need 881 gpm of additional source capacity by 2036 to meet maximum day demand within 22 hours per day of pumping. At 489 gpm, the existing sources can produce up to 704,160 gallons in 24 hours, which meets projected maximum day demand through 2021. However, due to uncertainties of water demand projections and variability of annual water demands, and to provide a reasonable margin of safety for the system capacity to meet demands, it is recommended that the City plan to develop additional source capacity before 2020.

TABLE 3-13

Projected Water Demands and Source Capacity

Year	Existing Reliable Source Capacity, gpm	Recommended Source Capacity, gpm (1)	Rec. Source Capacity Surplus/(Deficit), gpm	Required Source Capacity, gpm(2)	Req. Source Capacity Surplus (deficit), gpm
2017	489	423	66	387	102
2018	489	444	45	407	82
2019	489	468	21	429	60
2020	489	493	(4)	452	37
2021	489	521	(32)	478	11
2022	489	551	(62)	505	(16)
2023	489	584	(95)	535	(46)
2024	489	619	(130)	568	(79)
2025	489	658	(169)	603	(114)
2026	489	700	(211)	641	(152)
2027	489	745	(256)	683	(194)
2028	489	794	(305)	728	(239)
2029	489	847	(358)	777	(288)
2030	489	905	(416)	829	(340)
2031	489	968	(479)	887	(398)
2032	489	1,036	(547)	949	(460)
2033	489	1,109	(620)	1017	(528)
2034	489	1,189	(700)	1090	(601)
2035	489	1,276	(787)	1170	(681)
2036	489	1,370	(881)	1256	(767)

(1) Recommended source capacity is the minimum source capacity necessary to meet projected Maximum Day Demand, from Table 2-10, in 22 hours of pumping.

(2) Required source capacity is the minimum source capacity necessary to meet projected Maximum Day Demand, from Table 2-10, in 24 hours of pumping.

WATER TREATMENT

The only water treatment provided by the City of Winlock is chlorination at each well. The existing chlorination equipment is adequate for the existing water sources. As new water sources are developed additional chlorination facilities will need to be provided with each new source.

STORAGE

The existing system has three reservoirs. The two 603 Reservoirs are cast in place concrete, 26 feet in diameter by 75 feet tall, with overflows at 74.5 feet and outlets at ground level.

The Cardinal Glass Reservoir is an elevated tank with a bulb 50 feet in diameter by 45 feet tall with an overflow height of 149.75 feet above ground. The ground elevation at the Cardinal Glass Reservoir site is 480 feet, and the bottom of the tank is at an elevation of approximately 587.75 feet.

The Cardinal Glass Reservoir has separate outlets for City and Cardinal Glass water use. The Cardinal Glass outlet is at an elevation of 589.75 feet and the City outlet is at an elevation of 620.15 feet. This arrangement generally limits the City's use of water from the Cardinal Glass Reservoir to 120,000 gallons. However, there is a normally closed valve near the base of the Cardinal Glass Reservoir connecting between the reservoir inlet and outlet piping that could be opened in an emergency situation to provide additional water to the City. That valve, however, is owned by Cardinal Glass and could only be opened with their approval.

The City of Winlock is contractually obligated to provide Cardinal Glass a maximum flow rate of 125 gpm. The Zone 5 pump station serving Cardinal Glass has a combined pumping capacity of 400 gpm so the reservoir should remain full except during fire flow conditions.

General Condition

The two 603 Reservoirs were constructed in 1988 and were last cleaned and inspected in September 2012. The inspection found the 603 Reservoirs to be in good condition. The Cardinal Glass Reservoir was constructed in 2005 and is inspected annually. The Cardinal Glass Reservoir is owned and operated by Cardinal Glass, who is responsible for the inspection.

Storage Capacity Analysis

Existing Effective Storage

As described earlier in this chapter, the effective storage capacity is that capacity of a reservoir that is reliably available in the reservoir and capable of being withdrawn from the reservoir at the rates and pressures required for the water use purposes. Details regarding dimensions and capacities of the City's reservoirs are presented in Table 3-14. Based on the operational dimensions and water levels in Table 3-14 it is estimated that the total effective storage capacity for the City of Winlock reservoirs is 380,000 gallons.

TABLE 3-14

Reservoir Dimension and Capacity Details

Parameter	603 Reservoirs (Each)		Cardinal Glass Reservoir	
Nominal Capacity, Gallons	298,000		500,000	
Diameter, feet	26		50(1)	
Gallons per foot of water depth	3,972		14,616	
Wall Height, feet	75		45.00	
Gross Capacity, gallons	298,000		500,000	
Total Gross Volume, gallons (2)	1,096,000			
Elevations, feet	Above Sea Level	Above Base	Above Sea Level	Above Base
Top of Wall	535.0	75.0	632.75	152.75
Overflow	534.5	74.5	629.75	149.75
High Level Alarm	534.0	74.0	629.50	149.50
All Source Pumps Off	533.8	73.8	629.25	149.25
603 and Eureka 1 Wells On	533.3	73.3		
Baichtel 2 Well On	533.2	73.2		
Eureka 3 Well On	533.1	73.1		
Lead Source Pump On			629.00	149.00
Lag Source Pump On			628.75	148.75
Low Level Alarm	520.0	60.0	626.00	146.00
Minimum Operating Level	500.0	40.0	620.65	140.65
Outlet (3)	460.5	0.5	620.15	140.15
Floor	460.0	0.0	587.75	107.75
Ground (4)	460.0	0.0	480	0.00
Pump Cycle Volume, gallons(5)	5,600		7,300	
Effective Storage Depth, feet(6)	33.1		8.10	
Effective Storage Volume, gallons	131,000		118,000	
Total Effective Storage Volume, gallons(2)	380,000			

(1) The Cardinal Glass Reservoir has an ovoid vertical cross section with a maximum diameter of 50 feet. However, the diameter becomes smaller toward the base and top of the reservoir. Also there is a 42-inch diameter center access column that reduces the usable volume of the reservoir.

(2) Total Gross Volume and Total Effective Storage Volume are two times the volume for 603 Reservoirs (Each) plus the volume for the Cardinal Glass Reservoir, because there are two identical 603 Reservoirs.

(3) The Cardinal Glass Reservoir has separate outlets for the City and for Cardinal Glass. The Cardinal Glass outlet is approximately two feet above the reservoir floor, while the City outlet is approximately 32.4 feet above the reservoir floor.

(4) The Cardinal Glass Reservoir is elevated with the bottom of the reservoir bulb approximately 108 feet above ground level.

(5) The pump cycle volume for each 603 Reservoir is 2,800 gallons, for a total pump cycle volume of 5,600 gallons.

(6) Effective Storage Depth equals pump-on elevation minus minimum operating level.

Effective Storage Standards

Storage Standards for the City of Winlock are based on recommendations of the Department of Health Water System Design Manual. The Design Manual recommends an effective storage standard, where nesting is allowed, based on the sum of the following:

- Equalizing Storage, plus the greater of:
    - Standby Storage, or
    - Fire Suppression Storage

Equalizing Storage

Equalizing storage is used to meet peak hour demands that exceed the installed system source capacity. The volume of equalizing storage recommended depends on peak hour system demands, the length of time the peak hour demands persist, the source production rate, and the mode of system operation. Sufficient equalizing storage must be provided in combination with available water sources and pumping facilities such that peak system demands can be satisfied.

The Water System Design Manual recommends that equalizing storage be calculated using the following equation, but in no case should it be less than zero:

$$V_{ES} = (Q_{PH} - Q_S) \times 150 \text{ minutes}$$

Where

V_{ES} = Equalizing storage component, gallons
Q_{PH} = Peak hourly demand, gpm
Q_S = Total source of supply capacity, excluding emergency sources, gpm

Q_{PH} is the Peak Hour Demand from Table 2-10. Q_S is the installed well source capacity of 489 gpm, or the recommended source capacity from Table 3-13, whichever is greater. This assumes that Winlock will add water source capacity as necessary such that it will always have at least the recommended source capacity. Recommended equalizing storage capacities for years 2017 through 2036, based on the DOH Water System Design Manual, are shown in Table 3-15.

Standby Storage

Standby storage is provided in order to meet demands in the event of a system failure such as a power outage, an interruption of supply, or break in a major transmission line. The amount of emergency storage should be based on the reliability of supply and

pumping equipment, standby power sources, and the anticipated length of time the system could be out of service.

The Water System Design Manual recommends that standby storage be calculated using the larger of the following two equations:

$$V_{SB} = 2(ADD)*(N)-T_m*(Q_S-Q_L)$$

Or

$$V_{SB} = 200 \text{ gallons x } N$$

Whichever is greater, where

V_{SB} = Total standby storage component, gallons
ADD = Average daily demand per ERU, gpd per ERU
N = Number of ERUs for the design year
Q_S = Total source of supply capacity, excluding emergency sources, gpm
Q_L = Capacity of the largest single source serving the system, gpm
T_m = Maximum time remaining sources will be allowed to pump per day, minutes.

The recommended standby storage capacity for Winlock is calculated according to the above formulas based on all ERUs except the Cardinal Glass ERUs, because Cardinal Glass has its own separate standby storage. The resultant standby storage calculations are summarized in Table 3-15. Number of ERUs are from Table 2-10 minus the Cardinal Glass ERUs. Q_S minus Q_L is the total source capacity of 489 gpm from Table 1-2, or the recommended source capacity from Table 3-13, whichever is greater, minus the largest source capacity of 210 gpm. T_m is 24 hours per day of source pumping. Recommended standby storage capacity for years 2017 through 2036, based on the DOH Water System Design Manual, are shown in Table 3-15, rounded to the nearest 1,000 gallons. In this case, the recommended standby storage capacity is always the limit of 200 gallons per ERU.

Fire Suppression Storage

Fire suppression storage is provided to ensure that water for fighting fires is available when necessary. Fire suppression storage also reduces the impact of fire fighting on distribution system water pressure. The amount of water required for firefighting purposes is specified in terms of rate of flow in gallons per minute (gpm) and an associated duration. Fire flows must be provided at a residual water system pressure of at least 20 pounds per square inch (psi) at all water service connections.

Fire suppression storage is calculated using the following equation:

$$V_{FSS} = FF * T_m$$

Where

V_{FSS} = Volume of fire suppression storage component, gallons
FF = Fire flow rate, gpm
T_m = fire flow duration, minutes

Winlock's maximum fire flow standard is 1,000 gpm for 60 minutes. The associated fire suppression storage for this fire flow standard is 60,000 gallons. The fire suppression storage volume of 60,000 gallons is shown in Table 3-15.

Total Recommended Effective Storage

The total recommended effective storage capacities are summarized in Table 3-15 together with Existing Effective Storage as calculated in Table 3-14, and the projected storage surplus or deficit. Table 3-15 shows that **Winlock needs additional storage to meet the storage recommendations of the DOH Water System Design Manual through 2036.**

TABLE 3-15

Projected Effective Storage Capacity Recommendations

Year	Recommended Effective Storage, gallons				Existing Effective Storage, gallons (4)	Storage Surplus/ (Deficit), gallons
	Equalizing(1)	Standby (2)	Fire Suppression	Total (3)		
2017	20,000	144,000	60,000	164,000	380,000	216,000
2018	24,000	153,000	60,000	178,000	380,000	202,000
2019	29,000	164,000	60,000	193,000	380,000	187,000
2020	34,000	175,000	60,000	208,000	380,000	172,000
2021	35,000	187,000	60,000	222,000	380,000	158,000
2022	37,000	199,000	60,000	237,000	380,000	143,000
2023	39,000	214,000	60,000	253,000	380,000	127,000
2024	41,000	229,000	60,000	270,000	380,000	110,000
2025	43,000	245,000	60,000	289,000	380,000	91,000
2026	46,000	263,000	60,000	309,000	380,000	71,000
2027	48,000	283,000	60,000	331,000	380,000	49,000
2028	51,000	304,000	60,000	355,000	380,000	25,000
2029	54,000	327,000	60,000	381,000	380,000	(1,000)

TABLE 3-15 - (continued)

Projected Effective Storage Capacity Recommendations

Year	Recommended Effective Storage, gallons				Existing Effective Storage, gallons (4)	Storage Surplus/ (Deficit), gallons
	Equalizing(1)	Standby (2)	Fire Suppression	Total (3)		
2030	57,000	352,000	60,000	409,000	380,000	(29,000)
2031	61,000	379,000	60,000	440,000	380,000	(60,000)
2032	65,000	408,000	60,000	473,000	380,000	(93,000)
2033	69,000	440,000	60,000	509,000	380,000	(129,000)
2034	74,000	474,000	60,000	548,000	380,000	(168,000)
2035	79,000	512,000	60,000	590,000	380,000	(210,000)
2036	84,000	552,000	60,000	636,000	380,000	(256,000)

(1) Equalizing Storage is peak hour demand from Table 2-10, minus the existing source capacity of 489 gpm, or recommended source capacity, whichever is greater, times 150 minutes, but no less than zero.

(2) Standby Storage is two days of average day demand from Table 2-10 less the ADD for Cardinal Glass (because Cardinal Glass has its own standby storage), minus 24 hours of pumping at the existing source capacity of 489 gpm from Table 1-2, or the recommended source capacity from Table 3-13, whichever is greater, minus the largest source capacity of 210 gpm; or it is 200 gallons times the projected number of ERUs less Cardinal Glass ERUs, whichever is greater. In this case 200 gallons times total ERUs minus Cardinal Glass ERUs is always the greater number.

(3) Total Recommended Storage is the sum of equalizing, plus the greater of either standby or fire suppression storage.

(4) Existing Effective Storage Capacity is from Table 3-14.

PUMP STATIONS

The City of Winlock has two pump stations, the Zone 2 Pump Station and the Zone 5 Pump Station: The Zone 2 Pump Station is at the 603 Well and Reservoir site, and pumps from Zone 1 to Zone 2. The Zone 5 Pump Station is at the Eureka 1 well site, and pumps from Zone 1 to Zone 5.

Zone 2 Pump Station

The Zone 2 Pump Station was constructed in 2006, and consists of a pre-packaged pump skid with four 7.5-hp pumps controlled by variable frequency drives (VFDs), and two 40-hp centrifugal pumps. The system is relatively new and in good condition. The four 7.5-hp VFD pumps are capable of producing up to 350 gpm at 65 psi and the two 40 hp centrifugal pumps are capable of 1,000 gpm each under fire flow conditions. There is no elevated storage for Zone 2, so this pump station must meet peak hour and fire flow demands for the Zone 2. This pumping system is relatively new and in good condition. Since most of the projected growth in Winlock is likely to be in Zone 2, additional pumping capacity may eventually be required for this zone.

Zone 5 Pump Station

The Zone 5 Pump Station was constructed in 2006 and consists of two 20-hp end suction centrifugal pumps with a combined capacity of 400 gpm. This zone has the elevated Cardinal Glass Reservoir located at the Cardinal Glass facility, so the Zone 5 Pump Station need only meet maximum day demand for the Zone 5. Peak hour demand can draw from the Cardinal Glass Reservoir. In addition to serving Cardinal Glass and a portion of the northeast area of the City, this pump station will also serve any water connections that may be made to the water transmission main between the City and Cardinal Glass in the future. This pumping system is relatively new and in good condition.

CONTROL SYSTEM

The water level in the 603 Reservoirs is monitored by a pressure transducer. Output from the pressure transducer is routed to the Programmable Logic Controller (PLC) in the Zone 2 Pump Station building located adjacent to the 603 Well and Reservoirs. A readout of the water level is available at the Zone 2 Pump Station PLC. The Zone 2 Pump Station PLC has adjustable settings for starting and stopping system wells based on the water level in the 603 Reservoirs. Current control settings are summarized in Table 3-16.

TABLE 3-16

Well Control Settings

Well	Well On Level		Well Off Level	
	Above Sea Level	Above Base	Above Sea Level	Above Base
Well 603	533.3	73.3	533.8	73.8
Eureka 1	533.3	73.3	533.5	73.5
Baichtel 2	533.2	73.2	533.4	73.4
Eureka 3	533.1	73.1	533.4	73.4
Baichtel 1	520.0	60.0	528.0	68.0

Well start signals are transmitted to the various wells by different means. The Well 603 motor starter is hard wired to the Zone 2 Pump Station PLC. The Baichtel Wells and Eureka 1 Well receive signals from the Zone 2 Pump Station PLC via radio. Eureka 3 Well is hard wired to Eureka 1 Well.

The water level in the Cardinal Glass Reservoir is determined by a pressure transducer at the Cardinal Glass Reservoir site and the level is transmitted by radio to the Zone 2 Pump Station PLC. The lead pump-on level is 149 feet above the reservoir base (629 feet above sea level), the lag pump on level is 148.75 feet above the reservoir base (628.75 feet above sea level), and both pumps turn off at 149.25 feet above the reservoir

base (629.25 feet above sea level). The Zone 5 Pump Station pumps are turned on and off via radio signal from the Zone 2 Pump Station site to the Zone 5 Pump Station.

DISTRIBUTION SYSTEM

The water distribution system includes all the piping distributing water from the source and storage facilities to the water customers. The following sections evaluate the general condition and the hydraulic capacity of the water distribution system.

General Description and Condition

Water Mains

The Winlock water distribution system is described in general terms in Chapter 1 under the heading *Transmission and Distribution System*. The water distribution system has water mains of various ages, materials and sizes. Some older portions of the water system still contain 4 inch and smaller asbestos concrete (AC) pipe and galvanized iron (GI) pipe installed in the 1950s or earlier. More recent water mains have been polyvinyl chloride (PVC), ductile iron (DI), and high density polyethylene (HDPE) pipes ranging in size from 6 inch to 10 inch.

Life expectancy of distribution mains can vary significantly depending on the water main materials used, local soil conditions, and the construction practices used during water main installation. For planning purposes, it is estimated that the life expectancy of the AC and galvanized iron pipe installed at Winlock is approximately 50 years.

Water mains are generally the most expensive part of a water system. Water main replacement costs in 2016 dollars can be expected to range from approximately $0.5 to $1.0 million per mile of water main or more. Based on Table 1-5, replacement of the entire distribution system could be expected to cost between $10 and $20 million. Since the Winlock water mains were installed over a period of time, the mains can also be expected to require replacement over a similar time span.

In reality not all water mains reach the end of their useful life in the same time span, and the process of system replacement and renewal can usually be spread out over a longer period than the original installation period. To replace the entire distribution system over a 50-year time period, $1/50^{th}$ of the system would be replaced annually. This would represent an average of approximately 1,922 feet of water main replacement per year at an average estimated annual cost of approximately $180,000 to $360,000 per year in 2016 dollars. As the system grows, the amount of water main to replace per year will also eventually increase. Water main replacement would be prioritized based on experience regarding the areas of the system that have the most problems with existing water mains, both in terms of water main failures and in terms of water main capacity. At this time, the areas with the highest priority for water main replacement are the

remaining areas of existing 2-inch and 4-inch galvanized iron water main, including the following:

- 3/4-inch GI on SE Gruber Avenue west of SE First Street
- 3/4-inch GI on SE Rice Street west and east of SE First Street
- 3/4-inch GI on SE Alder Street west and east of SE First Street
- 1-inch GI on SE Maple Street east of SE First Street
- 1-inch GI on SE Korpi Street south SE Ash Street
- 2-inch GI on SE Canyon Street from SE Front Street to SE Second Street, and on SE Second Street south of SE Canyon Street.
- 3/4-inch, 2-inch and 4-inch GI on SE Shannon Street, SE Front Street and private easements south of SE Shannon Street.
- 3/4-inch, 1-inch and 2-inch GI on NW Walnut Street, NW Washington Street, and NW Dexter Avenue, west of NW Benton Avenue.
- 1-1/4-inch GI on SW Arden Avenue between Walnut Street and Fir Street.
- 1-1/4-inch GI on NW Kerron Avenue between Walnut Street and Fir Street.
- 3-inch GI on NE Cedar Street and NE Front Street west of NE First Street
- 4-inch GI on NE Griffith west of NE First Street
- 3/4-inch GI in the undeveloped section of NE North Street north of NE Griffith Street
- 1-inch GI on NE Soland Court, north of NE Jebez Street
- 2-inch GI on NW Lilac Street east and west of NW Kerron Avenue, and NW Mill Street north and south of NW Lilac Street.
- 2-inch GI on NW Laurel Avenue west of NW Kerron Avenue
- 2-inch GI in a parking lot west of NW Kerron Avenue and south of NW Laurel Avenue
- 1-1/2-inch GI on NW Dexter Avenue north of NW Byham Road.
- 2-inch GI on NW Grant Avenue and NW Columbia Street south of NW King Road

Another issue that the City has with water mains is the lack of a water main on Front Street between Walnut Street and Campbell Street. Many of the parcels on Front Street are served from water meters on First Street and water service lines that cross the parcels on First Street and serve the parcels on Front Street from the back side. This is a problem because in order for owners of lots on Front Street to repair or replace their water service lines they must do construction work on the lot on First Street. In many cases there is no easement or other legal right for the owner of the lot on Front Street to access their service line on the neighbor's property. A water main on Front Street would be needed to remedy this problem.

Pressure Reducing Stations

The City has seven pressure reducing stations, six of which are in below grade vaults. These stations all need to be tested regularly to make sure that are working properly. The vaults for PRVs 1, 2, 3 and 4 are limited in accessibility and subject to flooding. These PRV stations are going to need to be reconstructed to improve accessibility for maintenance purposes and to eliminate flooding problems. PRVs 10 and 13 are also in vaults, but are newer, are in better condition, and have better accessibility, but have not been serviced in several years. PRV 12 is located in the Zone 5 Pump Station Building and is relatively easily accessible, but at the time when the system was being flow tested it was isolated by a closed valve. This valve should be tested, adjusted if necessary and the valve should be opened so that it can operate as designed.

Hydraulic Capacity Analysis – Modeling

The development of a computer hydraulic model, which can accurately and realistically simulate the performance of a water system in response to a variety of conditions and scenarios, has become an increasingly important element in the planning, design, and analysis of municipal water systems. The Washington State Department of Health's WAC 246-290 requires hydraulic modeling as a component of water system plans.

Hydraulic Modeling Software

The City's water system has been analyzed using MWHSoft's H2ONet hydraulic modeling software, which operates in an AutoCAD computer-aided design and drafting environment. The H2ONet model was created from the City's water system base map.

The H2ONet model is configured with a graphical user interface. All water system elements, including pipes, control valves, pumps, and reservoirs were assigned a unique graphical representation within the model. Each element was assigned a number of attributes specific to its function in the actual water system. Typical element attributes include spatial coordinates, elevation, water demand, pipe lengths and diameters, pipe friction coefficients and critical water levels for reservoirs. For mechanical components (pumps and valves) pump curves and operation parameters were specified. With attributes of each system element as the model input, the H2ONet software produces the model output in the form of flows and pressures throughout the simulated water system.

Model Assumptions

Prior to the calibration of the hydraulic model, the basic layout of the water system was recreated within the model. The lengths, diameters, and connection points of system piping are assigned using an updated base map of the water system. The locations of the wells and reservoirs were found on water system base maps, while the critical elevations of the reservoirs were taken from previous reports and topographic maps. A map of the water system model, including pipe and node identifications, is shown Appendix F.

Tables of pipe and node attributes are also included in Appendix F. The assumptions regarding the modeling of all sources of supply and system demands are included in the following sections.

Source

The water wells are modeled as fixed head reservoirs with an outlet flow control valve with a setting corresponding to the well's nominal output.

System Demands

A key element in the hydraulic modeling process is the distribution of demands throughout the water system. Total demand on the system is based on the projected demands from Table 2-10, Projected Water Demands. Existing and future demands were evenly distributed to each node, excluding nodes surrounding booster pump stations and valves.

The following demand scenarios were set up to model future demands on the system.

- 2016 Average Daily Demands: These demands were used while calibrating the model.
- 2022 Maximum Day Demands: These demands were used to evaluate the system's ability to provide fire flow during the projected 2022 maximum day demand at the DOH requirement of 20 psi.
- 2022 Peak Hour Demands: These demands were used to verify the system is able to meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi.
- 2036 Maximum Day Demands: These demands were used to evaluate the system's ability to provide fire flow during the projected 2036 maximum day demand at the DOH requirement of 20 psi.
- 2036 Peak Hour Demands: These demands were used to verify the system is able to meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi.

Model Calibration

The calibration of a hydraulic model provides a measure of assurance that the model is an accurate and realistic representation of the actual system. The hydraulic model of the City's water system was calibrated using data obtained from fire hydrant flow tests at various locations throughout the water system.

Calibration Flow Tests

Five fire hydrant tests were conducted, with the assistance of City personnel, on April 7, 2016. During these tests, static and residual pressures were recorded as City staff opened hydrants and recorded the flow rate. Field results were used to attempt to calibrate the hydraulic model through verification and adjustment of pipe type, size, roughness coefficients, and nodal elevations.

The testing locations include multiple points within the system. A description of each testing location is presented in Table 3-17.

TABLE 3-17

Hydrant Testing Locations

Test Number	Pressure Hydrant Location	Flow Hydrant Location
1	Cemetery Road approximately 680 feet west of State Route 505	Cemetery Road at Bay Road
2	NE Second Street approximately 110 feet south of Jabez Street	NE Second Street approximately 680 feet south of Jabez Street
3	Byham Road., approximately 940 feet east of flow hydrant	West end of water main on Byham Rd., approximately 900 feet north of King Road
4	SE First Street approximately 70 feet north of SE Gruber Street	SE First Street approximately 70 feet north of SE Campbell Street
5	SW Campbell Street approximately 160 feet east of SW Mayer Street	SW Mayer Street approximately 410 feet south of SW Campbell Street

All wells and the Zone 5 booster pump station were turned off during the flow testing. Reservoir water levels and the status of the 603 Booster pumps were recorded during testing. A summary of the recorded reservoir levels and source flow rates is presented in Table 3-18. The system conditions at the time of testing were replicated in the hydraulic model during the calibration process.

TABLE 3-18

System Conditions During Hydrant Tests [(1)]

Test No.	603 Reservoir Level, feet	CFG Reservoir Level, feet	603 Booster Pumps Status	Static Pressure, psi	Flow Pressure, psi	Pitot Pressure, psi	Flow, gpm
1	73.1	145.8	One high flow pump on	64	30	55	1,244
2	73.0	145.8	Low flow pumps cycling	85	40	42	1,087
3	73.0	145.7	Low flow pumps running	70	25	20	750
4	73.0	145.6	All four low flow pumps on	105	35	30	919
5	72.9	145.5	Low flow pumps cycling	105	17	14	628

Calibration Results

Using the system conditions for each hydrant test, the hydraulic model was used to generate static pressure and residual pressure at the measured hydrant flow rate. The total system demand at the time of the hydrant tests was estimated to be the average day demand for 2016. Model output was generated at points in the model equivalent to the locations of the hydrant tests.

Model output for static pressure was generated by running the model at 2016 average day demands. Model output for residual pressure was generated at each hydrant test location by placing an added nodal demand equal to the measured hydrant flow rate and recording the resulting pressure at the pressure hydrant.

The system pressures and pipe flow rates determined in the hydraulic analysis are dependent on the elevations established in the model for each node and the friction loss characteristics established for each pipe. The friction factors for the pipes also compensate for system pressure losses through valves and pipe fittings. The friction factors for the pipes in the modeled system are adjusted throughout the calibration process, with the goal for the model output to best approximate the measured values and be within the DOH specified limits of plus or minus 5 psi. Hazen-Williams C-factors between 90 and 200 were used throughout the system. Larger friction factors represent lower pipe friction, and smaller frictions factors represent higher pipe friction. These friction factors are typical values for most pipes of this age and materials.

The model output was produced for data comparisons under two system conditions, static pressure and hydrant flow residual pressure, corresponding to conditions of background

system demand, and background system demand plus hydrant flow, respectively, with background flow modeled as average day demand distributed evenly throughout the system. The field values measured in the static and hydrant flow tests are compared to the model output values in Table 3-19.

TABLE 3-19

Calibration Results

Test No.	Flow, gpm	Static Pressure, psi			Residual Pressure, psi		
		Field	Model	Difference	Field	Model	Difference
1	1,244	64	68	-4	30	44	-14
2	1,087	85	88	-3	40	39	1
3	750	70	74	-4	25	25	0
4	919	105	109	-4	35	5	30
5	628	105	93	12	17	19	-2

The DOH Design Manual, Table 8-1 recommends that, for long-range planning purposes, hydraulic models be within 5 psi of measured pressure readings. One out of the five calibration tests exceeded 5-psi difference for static pressure and two out of five exceeded 5-psi difference for residual pressure.

Calibration Issues

Initial calibration attempts showed even larger difference between the model and field results for some of the hydrant tests. For test 2 (Jabez Street) raising the friction factors for the HDPE pipes coming down from the Cardinal Glass Reservoir to 200 corrected the residual differences in the model to within 1 psi of the field results. The water main between the test location and the Cardinal Glass Reservoir is all HDPE pipe, which is known for low flow resistance, so the high friction factor for this pipe is justified. For test 3 (Byham Road) it was discovered after the testing was completed that the water main on Fir Street at the Olequa Creek Bridge was shut off during the testing due to structural problems with the bridge. Therefore, for calibration purposes, the corresponding line in the model was closed. With that line close in the model, the modeling results agree well with the field test results. The City intends to re-activate the water main after the bridge is replaced. Therefore, the corresponding pipe is opened in the model for future system planning analysis.

Tests 4 and 5 had the most problems during calibration. For test 4 (SW First Street), the static pressure difference between the model and field tests is within the acceptable 5 psi range, however the residual pressure predicted by the model is much lower than what was seen in the field. It is suspected that PRV 10, which serves this zone, may have opened wide due to the dropping downstream pressure, but then when the booster pump serving this zone began to raise the pressure, the PRV may have temporarily stuck open and not throttled as it should to prevent over-pressurization downstream of the PRV station.

For test 5 (Campbell St and Mayer St) the field test resulted in a much higher static pressure and a much lower flowing pressure than expected. With all PRVs operating properly, the model predicted a static pressure of 68 psi, while the observed static pressure, as shown in Table 3-19, was 105 psi. The model predicted a residual pressure of 24 psi with the PRV stations operating correctly, while the field test found only 17 psi. Based on this we suspect that one or more PRV stations serving this zone may not be opening and closing properly. To simulate this in the model, we closed PRV No. 1 and added a 2-inch bypass around the PRV in the model. This simulation brought the results much closer to what was observed in the field testing. From these results it seems reasonable that one or more PRV stations feeding the lower zones may not be functioning correctly and should be serviced.

Hydrant elevations were checked against the Lewis County topographic mapping, provided by the County, with 2-foot contours. The elevations in the model are consistent with elevations on the County maps. The size and connectivity of the water mains in the area were also reviewed. The water mains as shown in the model are consistent with water main information provided by the City of Winlock based on records available. The model as set up is consistent with elevation and pipe size and materials records available. Until the existing PRV stations have all been serviced and adjusted, it may not be possible to completely calibrate the hydraulic model. However, the model is still useful for evaluating system hydraulic needs and recommending distribution system piping improvements.

Model Input

Model input assumptions have significant impacts on peak hour and fire flow results. Table 3-20 provides the reservoir levels modeled for each scenario.

During peak hour scenarios, all sources are assumed to be operating and all reservoir levels are assumed to have been depleted of operational and equalizing storage to simulate critical design conditions. During fire flow scenarios, the wells are assumed not to be operating, again to simulate critical design conditions. These assumed model conditions are conservative because they place higher demands on the reservoirs and transmission system than if the wells were operating.

During fire flow scenarios, operational, equalizing, and fire suppression storage is removed from both reservoirs.

TABLE 3-20

Reservoir Levels During Model Scenarios

Year	603 Reservoir 1			603 Reservoir 2			Cardinal Glass Reservoir		
	2016	2022	2036	2016	2022	2036	2016	2022	2036
Reservoir Height (feet)	74.5	74.5	74.5	74.5	74.5	74.5	9.6	9.6	9.6
Peak Hour Scenario Height (feet)	73.9	73.9	72.9	73.9	73.9	72.9	9.0	9.0	8.0
Fire Flow Scenario Height (feet)	71.3	71.3	70.2	71.3	71.3	70.2	6.4	6.4	5.3

Peak Hour Demand Modeling Results

Pursuant to WAC 246-290-230 (5), a water system must maintain a minimum pressure of 30 psi in the distribution system under peak hour demand conditions. The City's existing distribution system has been modeled under 2022 and 2036 peak hour demand conditions and the deficiencies are provided in Table 3-21. Results for all model nodes are included in Appendix F. A map showing the location of the deficiencies is shown in Figure 3-2.

TABLE 3-21

System Pressures Below 30 psi During Peak Hour Demand Conditions

Node ID	2036 Pressure (psi)	Location	Details
J-3051	-18	SE Alder Street	At the end of a 3/4″ line and an increase in elevation
J-3052	-5	SE Rice Street	At the end of a 3/4″ line and an increase in elevation
J-3042	-3	Shannon Street and SE First Street	At the end of a 3/4″ line
J-4711	5	NW Benton Avenue (near Winlock Miller Elementary)	At the end of a 3/4″ line
J-3028	18	SW Mayer Street and SW Locust Street	At the end of a 3/4″ line
J-2009	24	NW Benton Avenue (near Winlock Miller Elementary)	At the end of a 3/4″ line
J-3049	26	SE Front Street and SE Front Street	At the end of a 3/4″ line

As shown in Table 3-21, the deficiencies are the result of small pipes and elevation changes. Projects to correct these deficiencies are included in the capital improvement plan.

Fire Flow Modeling Results

Pursuant to WAC 246-290-230 (6) a water system must be designed to provide adequate fire flow under maximum day demand conditions, while maintaining a minimum system pressure of 20 psi. These conditions can be met at each hydrant throughout the system as modeled.

Fire flow demands were assigned in accordance with the City's requirement for differing residential, commercial, and residential fire flows. To model these differing requirements, hydrants were assigned fire flow demands within the model depending upon which zoning they were located in; 500 gpm in single family residential areas, 750 gpm in multi-family and commercial areas, and 1,000 gpm in industrial areas. As mentioned earlier, differing amounts of storage were removed for each flow scenario and are in Table 3-20. A full fire flow node report is available in Appendix F. Fire Flow deficiencies are shown in Table 3-22 and on Figure 3-3.

TABLE 3-22

Fire Flow Deficiencies

Node ID	Required Fire Flow (gpm)	2022 Available Fire Flow (gpm)	2036 Available Fire Flow (gpm)	Location and Details
J-4708	750	16	16	Kerron Avenue and NW Fir Street
J-3059	750	469	451	SE Front Street and Shannon Street
J-3025	750	554	532	SW Mayer Street and SW Locust Street
J-4693	750	575	548	NE First Street and Griffith Street
J-4712	750	659	631	SW Campbell Street and W Front Street
J10	750	657	631	Wastewater Treatment Plant (SW Mayer Street)
J-3022	750	657	631	Hining Road
J-2025	750	(1)	685	NW King Road and NW Grant Avenue
J-1009	750	743	713	E Walnut Street (just east of SE First Street)
J-2031	750	(1)	722	Byham Road between Tennessee Road and Columbia Road.
J-2030	750	(1)	722	Byham Road and Tennessee Road

(1) Available fire flow at this hydrant was adequate during this modeling scenario.

N

0 0.1 0.2 0.4 0.6 0.8

Miles

Schoolhouse Rd
Barney Ln
Quary Ln
Hale Rd W
Highland Rd
Hale Rd E
Highway 603
Conradi Rd
Antrim Rd
Vineyard Ln
Iris Ln
Dorning Rd
Weyers Ln
Bethany Ln
Tingle Rd
Chilkoot Dr
Fisher Rd
Silver Thistle Rd
Freedom Dr
Hawkins Rd
Hawkins Rd S
Wandering Ln
Sargent Rd
Tennessee Rd
Marttala Rd
Nelson Rd
Troutman Dr
Limmer Rd
Fries Rd
Texas Ln
Creek Rd
Hemphill Rd
Minkler Rd
Roppert Rd
Timberline Ln
Rhoades Rd
Pyham Rd
King Rd
Kenai Dr
Nevil Rd
Mines Rd
Jones Rd
Shiloh Rd
Russell Rd
Winlock Vader Rd
Hining Rd
Ferrier Rd
Cowlitz Rd
Makela Rd
State Route 505
Kyle Ln
Morton Rd
Harkins Rd
Walnut St
Ice St
Front St
Alder St
Cedar St
Jabez Ct
NW Kerron Ave
NW Benton Ave
NW Alder Ave
NW Maple Ave
SW Kerron Ave
SW Maple Ave
SW Front St
SE Front St
SE 2nd St
NE 1st St
NE 2nd St
Shannon Lewis Ln

J-2009
J-4711
J-3042
J-3049
J-3028
J-3051
J-3052

Legend

PRESSURE ZONE:

- 603 GRAVITY
- DOWNTOWN REDUCED
- EAST SIDE BOOSTED
- NORTH SIDE
- SOUTHEAST REDUCED
- WATER LINES
- EXISTING RETAIL WATER SERVICE AREA
- FUTURE RETAIL WATER SERVICE AREA
- CITY LIMITS
- UGA

- Well
- Booster Pumps
- Reservoir
- PRV

Pressure

- <20 psi
- 20-29 psi
- 30-39 psi
- >40 psi

CITY OF WINLOCK

FIGURE 3-2
2036 Peak Hour Deficiencies

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Document Path: M:\Winlock\15254 Water System Plan\Figures\2036 Peak Hour Deficiencies.mxd

N

0.2 0.1 0 0.2 0.4 0.6 0.8 Miles

Schoolhouse Rd
Barney Ln
Quary Ln
Conradi Rd
Highway 603
Hale Rd W
Highland Rd
Hale Rd E
Antrim Rd
Vineyard Ln
Iris Ln
Dorning Rd
Weyers Ln
Bethany Ln
Tingle Rd
Chilkoot Dr
Fisher Rd
Silver Thistle Rd
Freedom Dr
Hawkins Rd
Hawkins Rd S
Wandering Ln
Sargent Rd
Tennessee Rd
Marttala Rd
Nelson Rd
Troutman Dr
Limmer Rd
Creek Rd
Hemphill Rd
Fries Rd
Texas Ln
Minkler Rd
Roppert Rd
Timberline Ln
Rhoades Rd
Byham Rd
King Rd
Kenai Dr
Nevil Rd
Mines Rd
Shannon Lewis Ln
NW Mill Ave
NW Kerron Ave
NW Center Ave
NW Alder Ave
NE 1st Ave
NE 2nd St
Walnut St
Jones Rd
SW Kerron Ave
SW Maple Ave
SW Front St
SE Front St
SE 1st St
SE 2nd St
SE Cowlitz Rd
Rice St
Shiloh Rd
Cemetery Rd
Kakela Rd
Bay Rd
Artler St
State Route 505
Russell Rd
Winlock Vader Rd
Hiring Rd
Ferrier Rd
Harkins Rd
Kyle Ln
Morton Rd

J-2031
J-2030
J-4693
J-2025
J-2023
J-4708
J-3059
J-1009
J-3025
J-4712
J10
J-3022

Legend

- WATER LINES
- EXISTING RETAIL WATER SERVICE AREA
- FUTURE RETAIL WATER SERVICE AREA
- CITY LIMITS
- UGA
- Well
- PRV
- Reservoir
- Booster Pumps

Available Fire Flow

- <500 gpm
- 500-749 gpm
- 750-999 gpm
- >1,000 gpm

Required Fire Flow

- 500 gpm
- 750 gpm
- 1000 gpm

CITY OF WINLOCK

FIGURE 3-3
2036 Fire Flow Deficiencies

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Document Path: M:\Winlock\15254 Water System Plan\Figures\2036 Fire Flow Available.mxd

Distribution Improvements

In order to correct the peak hour and fire flow deficiencies shown in Tables 3-21 and 3-22, a number of improvement projects are suggested. The City plans on replacing galvanized iron pipes within the system, which corrects many of the peak hour pressure deficiencies as well as a few of the fire flow deficiencies. When all the projects listed below were added to the hydraulic model, the system showed no deficiencies.

- **Campbell** - Replace approximately 420 linear feet of 4-inch cast iron pipe with 6-inch PVC water main on SW Campbell Street from SW Lane Street to SE First Street.
- **Mayer** – Replace approximately 1,200 linear feet of 4-inch cast iron pipe with 6-inch PVC water main beginning on SW Mayer Street at SW Locust Street and extending north to SW Canyon Loop.
- **First Street –** Replace approximately 500 linear feet of 6-inch cast iron pipe with 8-inch PVC water main on NE First Street from Fir to Griffith.
- **Walnut –** Connect fire hydrant near the Cedar Village Apartments to the 10″ line on the north side of E Walnut Street.
- **Galvanized Iron Replacement Program –** The City plans to replace all galvanized pipe within the water system. This is an estimated 7,000 feet of pipe (or about 1.4 miles).
- **PRV 13 –** In order to improve fire flows in the northwest portion of the City, it is suggested that the setting on PRV 13 be adjusted to around 32 psi.

Capital improvements will be discussed in more detail in Chapter 8 of this Plan.

WATER SYSTEM CAPACITY LIMITS

There are several factors that could limit water system capacity, including source capacity, instantaneous water rights capacity, annual water rights capacity, and storage capacity.

SOURCE CAPACITY LIMIT

From Table 3-13 it can be seen that the existing installed source pumping capacity exceeds the recommended capacity to meet estimated maximum day demand within 22 hours (1,320 minutes) of pumping through the year 2019. In 22 hours per day at 489 gpm the system sources can produce 645,480 gallons per day. After 2019, at the projected growth rate, additional source capacity will be needed to meet projected maximum day demands if water production is limited to 22 hours per day.

However, the system would not actually be short of water based on the projected 2019 demands, because the 22-hours per day pumping standard is not a real system limit, but is

rather an operating goal and reliability standard. If the wells were to run 24 hours (1,440 minutes) per day at 489 gpm, the system could produce 704,160 gpd. From Table 2-10, this would satisfy the projected system demand through 2021. The drilling of SR 505 well has been completed and should be equipped by the 2020/2021 time frame.

To get the ERU limit based on 24 hours per day of source capacity, we take the estimated maximum day water demand per ERU and divide that into production capacity in 24 hours per day of production. From Table 2-7, the maximum day demand is 613 gpd per ERU. Therefore, the source capacity limit to ERUs is calculated as follows:

$$\text{Source Capacity Connections Limit} = \frac{704{,}160 \text{ gpd}}{613 \text{ gpd per ERU}} = 1{,}149 \text{ ERUs}$$

INSTANTANEOUS WATER RIGHT CAPACITY LIMIT

From Table 1-3, Winlock currently has 815 gpm of instantaneous water rights and will have 915 gpm once their new water right is used by the newly drilled SR 505 well. The instantaneous water rights limit can be calculated as follows:

$$\text{Instantaneous Water Rights Connections Limit} = \frac{815 \text{ gpm} \times 1{,}440 \text{ min/day}}{613 \text{ gpd per ERU}} = 1{,}914 \text{ ERUs}$$

ANNUAL WATER RIGHT CAPACITY LIMIT

From Table 1-3, Winlock currently has 505.5 ac-ft/yr of annual water rights and will have 528.9 ac-ft/yr once their new water right is used by the newly drilled SR 505 well. The Average Day Demand from Table 2-7 is 195 gpd per ERU. The limit on ERUs due to the annual water right limit can be calculated as follows:

$$\text{Annual Water Rights Connections Limit} = \frac{505.5 \text{ ac-ft/yr} \times 325{,}851 \text{ gal/ac-ft}}{195 \text{ gpd per ERU} \times 365 \text{ days/year}} = 2{,}314 \text{ ERUs}$$

STORAGE CAPACITY LIMIT

Table 3-15 projects that installed storage capacity will become a limiting factor in 2029. To find the number of ERUs supportable by existing storage it is necessary to calculate storage requirements for various numbers of ERUs until the required storage exceeds the existing effective storage. Table 3-21 shows storage requirements for 1,820 ERUs and for 1,821 ERUs. The existing effective storage capacity is adequate for 1,820 ERUs, but it is 92 gallons deficient for 1,821 ERUs. Therefore, the existing storage is adequate for 1,820 ERUs.

TABLE 3-23

Storage Requirement Limit

ERUs	Required Effective Storage, gallons				Existing Effective Storage, gallons (4)	Storage Surplus/ (Deficit), gallons
	Equalizing (1)	Standby (2)	Fire Suppression	Total (3)		
1,820	53,790	326,000	60,000	379,790	380,000	210
1,821	53,892	326,200	60,000	380,092	380,000	(92)

(1) Equalizing Storage is peak hour demand for all ERUs except Cardinal Glass and DSL, plus MDD for Cardinal Glass and DSL ERUs, minus the existing source capacity of 489 gpm, or recommended source capacity for the number of ERUs, whichever is greater, times 150 minutes, but no less than zero.

(2) Standby Storage is two days of average day demand from Table 2-10 less the ADD for Cardinal Glass (because Cardinal Glass has its own standby storage), minus 24 hours of pumping at the existing source capacity of 489 gpm from Table 1-2, or the recommended source capacity from Table 3-13, whichever is greater, minus the largest source capacity of 210 gpm, or it is 200 gallons times the projected number of ERUs less Cardinal Glass ERUs, whichever is greater. In this case 200 gallons times total ERUs minus Cardinal Glass ERUs is always the greater number.

(3) Total Recommended Storage is the sum of equalizing, plus the greater of either standby or fire suppression storage.

(4) Existing Effective Storage Capacity is from Table 3-14.

The water system capacity limits derived above are summarized in Table 3-24. The most limiting factor is source capacity, which limits the system to 1,149 ERUs. This is an additional 293 ERUs above the 856 ERUs represented by 2015 water use data, as shown in Table 2-9. Once the City's new water rights (CG2 – GWC 1385) are perfected, the system could expand to the annual water rights limit of 2,421 ERUs, or an additional 1,565 ERUs. When the new well is installed to perfect the new water rights, the system could expand to the installed source capacity limit of 1,242 ERUs, or an additional 386 ERUs. With this additional installed source capacity, the system could expand to the instantaneous water rights capacity limit of 2,149 ERUs, or an additional 1,293 ERUs.

TABLE 3-24

Water System Capacity Limits

Limiting Factor	System Capacity, ERUs	Existing Demand, ERUs	Available ERUs
Installed Source Capacity	1,149	856	293
Storage Capacity	1,820	856	964
Instantaneous Water Rights	1,914	856	1,058
Annual Water Rights	2,314	856	1,458

SUMMARY OF SYSTEM NEEDS AND CONCERNS

From the foregoing discussions, the following are the identified water system deficiencies. No attempt is made here to prioritize the deficiencies. Improvements to correct identified system deficiencies will be prioritized in Chapter 8, Capital Improvements.

SOURCE

The Winlock water system will need additional source capacity by 2020, based on 22 hours per day of source pumping, if growth occurs as projected. By the year 2036 this analysis projects that the City will require an additional 881 gpm of source capacity.

WATER RIGHTS

This analysis indicates that the City of Winlock will need additional instantaneous water rights by the year 2030, and additional annual water rights by the year 2033. By the year 2036, at the projected growth rate, this analysis indicates that the City will need an additional 66 gpm and 307.5 ac-ft/yr of water rights.

WATER STORAGE

The storage facilities are in good condition, but at the projected growth rate, assuming that source capacity is added pursuant to Table 3-13, the existing effective storage capacity is only adequate through the year 2028. At the projected growth rate, the system will need an additional 256,000 gallons of effective storage capacity by the year 2036. It is anticipated that additional storage will be developed in the UGA growth area east of the city center.

CONTROL SYSTEM

No control system deficiencies have been identified. It is not known at this time how expandable the existing PLC system is to accommodate inputs from future reservoirs and outputs to future wells. This will need to be evaluated in the future as additional wells and reservoirs are added to the system.

WATER DISTRIBUTION SYSTEM

Galvanized Iron Water Main Replacement

An estimated 5,100 feet of small diameter galvanized iron water main needs to be replaced to reduce distribution system leakage.

Leak Detection and Repair

After the galvanized iron water mains have been replaced, DSL should be monitored for a year to determine if further leak detection and repair is needed. If DSL remains in excess of 20 percent after galvanized water main replacement, then annual leak detection and repair will be required.

Fire Flow Deficiencies

Areas identified as deficient in fire flow capacity also need water mains to be upgraded. Specific areas for these improvements are outlined under the heading, "Distribution Improvements" above.

Pressure Reducing Stations

All of the pressure reducing stations need to be checked to make sure they are adjusted and operating properly. Pressure reducing stations that are subject to flooding need to be modified so that PRVs are not ever submerged.

PUMP SYSTEMS

No pump system deficiencies have been identified. The pump systems are both relatively new, in good condition, and sized to meet future growth needs, although as the systems expands to the east additional pump stations may be needed.

BACKUP POWER SUPPLY

The existing 100 KW generator backup power supply was installed with the 2006 SE Upper Zone Improvements project and is in good condition. This generator is capable of powering Well 603 and the Zone 2 Pump System. There is not backup power supply available for the other wells or the Zone 5 Pump Station, but those areas are served by gravity storage either directly or through pressure reducing stations. Therefore, no backup power supply is needed for the other system facilities.

CHAPTER 4

WATER USE EFFICIENCY PROGRAM

OBJECTIVE

The objectives of this chapter are to identify the conservation and water use efficiency requirements pertaining to the City of Winlock Water System, evaluate past conservation efforts, and describe City of Winlock Water System's water use efficiency plan for the next 6 years.

WATER USE EFFICIENCY PLANNING REQUIREMENTS

In 1989, the Washington Legislature passed the Water Use Efficiency Act (43.20.230 RCW), which directed DOH to develop procedures and guidelines relating to water use efficiency. In response to this mandate, Ecology, the Washington Water Utilities Council, and DOH jointly published a document titled *Conservation Planning Requirements* (1994). In 2003, the Municipal Water Supply – Efficiency Requirements Act (Municipal Water Law) was passed. This legislation amended RCW 90.03 to require additional conservation measures. The Municipal Water Law applies to all Municipal Water Suppliers. Among other things, the Municipal Water law directed DOH to develop the Water Use Efficiency Rule (WUE Rule), which was adopted January 22, 2007. In addition, DOH has developed a WUE Rule guidance document titled "Water Use Efficiency Guidebook" (WUE Guidebook) originally dated July 2007, and revised January 2011 (DOH Publication No. 331-375). The WUE Guidebook supersedes and replaces the 1994 Conservation Planning Requirements. Therefore, the WUE Rule and the WUE Guidebook now provide all the currently effective water use efficiency planning requirements.

WATER USE EFFICIENCY RULE

The WUE Rule consists of a series of amendments to existing sections and addition of new sections to WAC 246-290, the Group A Public Water System Regulations, and sets additional requirements for public water purveyors. The WUE Rule is comprised of four sections:

1. Planning requirements
2. Metering requirements
3. Distribution leakage standard
4. Goal setting and performance reporting requirements

The WUE Guidebook is intended to provide guidance and clarification on the requirements of the WUE Rule, and not to establish any additional requirements. The requirements of the WUE Rule are discussed in the following sections.

PLANNING REQUIREMENTS

The Planning Requirements of the WUE Rule include the following:

- Estimation of the amount of water saved through implementation of the system's WUE program over the past 10 years.
- Description of the water system's WUE goals.
- Select WUE measures.
- For each WUE measure selected, either:
    - Include a plan to implement the measure, or
    - Evaluate selected water use efficiency measures to show that they are not cost effective.

These WUE Rule planning requirements are addressed in the following sections:

ESTIMATION OF WATER SAVED

From Figure 2-5 it can be seen that both production and DSL increased from 2007 through 2012, then both production and DSL decreased from 2012 through 2015. During this time period, the Cardinal Glass Plant was using a significant portion of the City's water supply, as shown in Figure 2-4. Water use data by customer class and numbers of connections by customer class is not available prior to May-June 2014. Figure 2-4 does indicate a reduction in water use between May-June 2014 and May-June 2015. Residential water use declined from 4.82 MG in May-June 2014 to 4.14 MG in May-June 2015, and Cardinal Glass water use declined from 7.43 MG in May-June 2014 to 6.40 MG in May-June 2015. These two water billing categories represent a water use reduction of 1.72 MG between May-June 2014 and May-June 2015. Other water use categories increased between the same two data points, such that the total decrease between May-June 2014 and May-June 2015 was 0.84 MG. However, without more data it is not possible to say if this represents a trend or just a year to year fluctuation for one billing period.

It is clear from both Figure 2-5 and Table 2-8 that DSL has declined significantly since 2012, which can be attributed to Winlock's efforts to find and repair water distribution system leaks. If we use 2012 as a baseline, it can be seen that DSL declined by 11.75 MG between 2012 and 2013, by 27.35 MG between 2012 and 2014, and by

39.15 MG between 2012 and 2015, for a total savings of 78.23 MG in DSL reduction between 2012 and 2015.

WATER USE EFFICIENCY GOALS

The WUE Rule requires that the "governing body of the public water system shall establish water use efficiency goals within 1 year of the effective date of this rule." The effective date of the rule was January 22, 2007, so the WUE Goals were to be adopted by the City of Winlock by January 22, 2008. The WUE Rule further requires that WUE Goals must "be set in a public forum that provides opportunity for consumers and the public to participate and comment on the water use efficiency goals," and further requires that the goals must include a measurable outcome in terms of water production or consumption, address water supply and forecasted demand characteristics, and include an implementation schedule for meeting the goals.

Previous WUE Goals

Previous Water System Plan

The WUE Goals adopted by City of Winlock in their 2008 Water System Plan were as follows:

1. A 6-year goal of reducing the ADD from 216 gpd per ERU to 194 gpd per ERU.

2. Hold DSL at 20 percent for the main system and 10 percent for the East UGA.

As shown in Table 2-7, the current value for an ERU in Winlock is 195 gpd per ERU, which is close to the first goal from the 2008 Water System Plan. However, from Table 2-8 it is apparent that the DSL goal has not been met. We are not aware of a means to evaluate DSL by system area in the Winlock water system, however if the main system DSL was 20 percent and the East UGA DSL was 10 percent, then the overall DSL would be between 10 and 20 percent. But DSL was 49.3 percent in 2012 and declined to 29.3 percent in 2015. So while Winlock has been successful in reducing DSL over the past few years, increases in DSL between 2007 and 2012 prevented Winlock from achieving the second goal from the 2008 Water System Plan.

Previous WUE Reports

In the City's WUE reports the WUE goals have been different from the goals as stated in the 2008 Water System Plan. The 2009 Annual WUE report indicated that the following goal was adopted on July 1, 2009:

> "Reduce water usage by ten gallons per day. Limit outside usage for outside use by ten gallons per day. Repair leaks to home plumbing."

The 2010 WUE report indicated that the following goal was adopted on July 1, 2010:

> "Customer Education on water usage such as the use of low flow shower heads. Watering Lawns-gardens and outside water usage during the summer months to be done evenings. Leak Detection done to locate leaks and repair. Water meter maintenance done after meters are read for billing. Noting repairs to be made and repairing any problems."

The 2011 through 2014 WUE reports indicated that the following goals were adopted on July 1, 2010:

> "Customer education on water usage such as the use of low flow shower heads, watering lawns and gardens in early morning or early evening. Noting problems and needed repairs while reading meters for billing."

The WUE Goals as stated in the 2009 WUE report are similar to the goals as stated in the 2008 Water System Plan in that they involve reducing water use by customers and repairing leaks, but they are unclear as stated. Is the stated goal to reduce water usage by ten gallons per day for the entire system, or per customer, and by when? And there is no way to determine whether outside water use has been limited because there are no separate outside water use meters. Repairing leaks is a good activity, but it is not a goal unless the number of leaks to be repaired and a completion date are stated. Customer education as a goal would require that a method be used to determine whether or not customers have become adequately educated.

A review of the City Council records do not indicate that any new WUE goals were adopted on or about July 1 2009 or July 1, 2010, so it is assumed that the goals as stated on the WUE reports do not reflect revised WUE goals for the City, but rather reflect the best effort of the water system operator at the time to state the WUE goals as he understood them when he filled out the annual WUE report.

Current WUE Goals

With this Water System Plan update, the City revises its water use efficiency goals as follows:

Supply Side Goals

As shown in Figure 2-5 and Table 2-8 the City has had a DSL of nearly 50 percent in 2012 and almost 30 percent in 2015, and as shown in Table 2-9, DSL accounts for 169 ERUs. The level of DSL is likely to limit the City's ability to acquire any more

water rights until the DSL level can be reduced significantly. Therefore, the supply side goal of the City of Winlock is as follows:

- Reduce DSL to 10 percent or less of total water production by the end of 2022 and maintain that level for the remainder of the 10 year planning period and beyond.

Demand Side Goals

As shown in Figure 2-4 and in Table 2-5, Cardinal Glass is the single largest water use category for the City, and as such, a small percentage reduction in Cardinal Glass water use could amount to a significant reduction for the City. However, the City is contractually obligated to provide Cardinal Glass with up to 154 ac-ft/yr at a rate of up to 125 gpm. Cardinal Glass's water use was 133 ac-ft in 2014 and 130 ac-ft in 2015. Since the City is contractually obligated to provide up to 154 ac-ft/yr, the City is not in a position to request Cardinal Glass to reduce their water use at this time.

Also, as discussed above, the City has reduced average residential water use to 195 GPD per ERU, which is very nearly the goal of the 2008 Water System Plan. Therefore, further reduction of average day water use may not be realistic.

On July 12, 2016, the City held a public forum on WUE goals and set the following demand side goal:

- Reduce summer time residential water usage by 10 gpd per ERU by 2022 and maintain that level for the remainder of the 10 year planning period and beyond.

For purposes of evaluating progress toward meeting this goal, summer time water use will be based on the average residential water usage in the July-August billing cycle. This average will be determined annually and compared to the 2016 average to determine progress toward meeting this goal.

SELECTED WATER USE EFFICIENCY MEASURES

The WUE Rule requires that water systems with from 500 to 999 service connections must implement or evaluate a minimum of four water use efficiency measures. The WUE Guidebook further states that water use efficiency measures that are required in other portions of the WUE Rule cannot be counted as measures to be selected under this requirement. Measures required in other portions of the WUE Rule include the following:

- Installation of source and service meters if meters are not already present;

- Regular calibration of meters;

- Development and implementation of a water loss control program if DSL exceeds 10 percent; and

- Education of consumers about water use efficiency practices once per year.

Measures that the WUE Guidebook suggests can count toward satisfying the required number of water use efficiency measures include the following:

- Implementation of a conservation rate structure.

- Implementation of a water reclamation program.

- Customer assistance in repair of leaks in customer service lines and in homes.

- Additional consumer education, such as student education and consumer education at fairs.

- Bills showing water consumption history.

Note that implementation of measures by customer class count as separate measures for each customer class for which they are implemented.

The City of Winlock has adopted the following WUE Measures:

Measures to Meet Supply-Side Goal

Measures that the City intends to implement to meet the supply-side goal of "Reduce DSL to 10 percent or less of total water production by the end of 2022," include the following:

- Galvanized Pipe Replacement.
- Annual Leak Detection and Repair.
- Improve Water Use Accounting.
- Water Meter Replacement.

Measures to Meet Demand-Side Goal

Measures that the City intends to implement to meet the demand-side goal of "Reduce residential water use to an average of 190 gpd per ERU by the end of 2022," include the following:

- Bills showing water consumption history.
- Customer assistance in repair of leaks in customer service lines and in homes.

Required Number of WUE Measures

As listed above, Winlock will implement four supply-side WUE measures and two demand-side WUE measures. The supply side measures are all related to reducing DSL, and as such constitute the City's water loss control program. Therefore, as noted above, these measures are mandatory and do not count toward meeting the minimum number of WUE Measures.

The demand side measures apply to all of the City's twelve customer classes as shown in Table 2-2. Since each action counts as one measure for each customer class to which it applies, the two WUE measures identified above constitute 24 measures toward meeting the minimum WUE Rule requirement. Therefore, the proposed measures listed above constitute more than the minimum of four measures required by the WUE Rule based the current system size, and meets this requirement of the WUE Rule.

IMPLEMENT OR EVALUATE WATER USE EFFICIENCY MEASURES

Winlock intends to implement more than the minimum required number of WUE Measures. Therefore, no evaluation of the cost effectiveness of conservation measures is required.

METERING REQUIREMENTS

The WUE Rule requires all sources and customer service connections be metered by January 22, 2007. Winlock currently meters all service connections and all water sources.

DISTRIBUTION SYSTEM LEAKAGE STANDARD

The WUE Rule set a DSL standard of ten percent or less of finished water production. DSL is defined as the sum of all water metered into the distribution system over a 3-year time period, less the sum of all metered water uses, and known or credibly estimated unmetered uses, out of the distribution system over the same time period. Known or credibly estimated unmetered uses may include uses such as construction, fire fighting, and water main flushing.

As shown in Table 2-8, the 3-year rolling average DSL for Winlock has ranged from 35.1 percent to 46.3 percent, with the most recent 3-year average at 37.6 percent. This DSL rate is in excess of the ten percent standard specified in the WUE Rule. Therefore, the City of Winlock is required to implement a Water Loss Control Program.

WATER LOSS CONTROL ACTION PLAN

The City of Winlock intends to implement a Water Loss Control Action Plan consisting of the Supply side WUE measures outlined above. These measures include the following:

- Galvanized Pipe Replacement: As shown in Table 1-5 the City has an estimated 5,106 feet of 2-inch and 4-inch galvanized water pipe. It is strongly suspected that these galvanized pipes are contributing significantly to the City's excessive DSL rate.

- Annual Leak Detection and Repair: The City will contract annually with a professional leak detection service to locate water main leaks and will repair all water main leaks that are located.

- Improve Water Use Accounting: The City will continue to improve their system for water use accounting, including tracking non-billed and non-metered water use on a regular basis and regularly comparing water production records with water use records.

- Water Meter Replacement: The City will routinely replace water meters 1-inch or smaller in size that have been in service for over 10 years, and will regularly test and replace as necessary all larger meters.

GOAL SETTING AND PERFORMANCE REPORTING

Pursuant to the WUE Rule, the City of Winlock must set water use efficiency goals and report progress annually. The City of Winlock's water use efficiency goals have been addressed in preceding sections of this chapter. The annual report must include the following:

- Total source production

- DSL in percentage and volume

- Goal description, schedule, and progress toward meeting goals

The City of Winlock has submitted annual WUE reports, including all of the above data, annually since reporting was required in 2008.

GOAL SETTING

The WUE Rule requires that water conservation goals must include a measurable outcome, address water supply or demand characteristics, and include an implementation

schedule. The goal setting process must be held through a public forum and be re-evaluated every 10 years. The WUE Rule required that the first water use efficiency goals were to be set by January 22, 2008 for municipal water suppliers with 1,000 or more service connections, and by January 22, 2009 for municipal water suppliers with fewer than 1,000 service connections.

The City has authorized submittal of this Water System Plan, including these WUE Goals, and will adopt these WUE goals in a public forum together with adoption of this Water System Plan after the initial review by DOH.

WATER USE DATA REPORTING

The WUE Rule requires annual reporting of water use data. The first annual reports were due July 1, 2008, for municipal water suppliers with 1,000 or more service connections, and by July 1, 2009, for municipal water suppliers with fewer than 1,000 service connections, and annually by July 1 each year thereafter. Table 4-1 summarizes the water use data collection requirements.

TABLE 4-1

Summary of Water Use Data Collection

Data Type	Unit of Measure	Collection Frequency	Comments
Water Production	Gallons	Monthly	Total by month and by year.
Interties	Gallons	Monthly	Winlock has no interties.
Water Sold	Gallons	Billing Period	Total sold by customer class for each billing period. (City billing periods are bi-monthly.)
Estimated Unmetered Water Use	Gallons	Billing Period	Estimate and record unmetered water uses for each billing period.
Estimated Identified and Corrected Water System Leaks	Gallons	Billing Period	When leaks are discovered and repaired, the leakage rate and duration are estimated and the resultant leakage volume for the billing period is estimated and recorded.
Accounted-for Water	Gallons	Billing Period	The sum of Water Sold, Estimated Unmetered Water Use, and Estimated Identified and Corrected Water System Leaks.
DSL	Gallons	Billing Period	The difference between monthly Water Production and monthly Accounted-for Water.
Percent DSL	Percent	Billing Period	DSL divided by Water Production times 100 percent. Calculate for each billing period, for each year and for a 3-year running average. If 3-year running average exceeds 10 percent, further actions are required to reduce DSL.

The City of Winlock has been submitting annual water use efficiency reports to DOH and distributing water use efficiency information to customers annually in conjunction with water bills and annual consumer confidence reports. The City will be providing flyers/handouts with water bills this summer summarizing most of the information outlined in Table 4-1. The flyer will also provide a link to the City's website where the CCR, the WUE report and DSL data can be viewed. Those customers without access to a computer will be invited to call City Hall and request a hard copy of that information be mailed to them free of charge.

WATER USE EFFICIENCY PROGRAM DEVELOPMENT AND LEVEL OF IMPLEMENTATION

The following sections describe the City of Winlock's water use efficiency goals, conservation measures, and the resulting water use projections.

REGIONAL CONSERVATION PROGRAMS

The effects of a customer conservation program extend beyond the water service area. For example, Seattle Public Utilities heavily promoted water conservation to its customers in 2001 and communities throughout Puget Sound experienced a decrease in consumption. As the WUE Rule takes effect, neighboring water systems will likely increase their conservation efforts, thus increasing awareness of the need to conserve. The City of Winlock may also be affected by regional water use efficiency promotion efforts.

TARGET WATER SAVINGS PROJECTIONS

In this section we estimate the projected water savings that may be realized by meeting the WUE Goals. The revised WUE Goals, as stated above, are to reduce DSL to 10 percent or less, and to reduce average day water usage from 195 gpd per ERU to 190 gpd per ERU, by the year 2022. Table 4-2 shows how much water savings would be realized by meeting the WUE Goals. Based on this theoretical comparison, the water system would reduce water use by a total of 79.4 acre feet (70,883 gallons) over 20 years.

It should also be noted that this water demand reduction could postpone the need to develop additional source capacity by 2024 as shown in Table 3-13, could postpone the need for additional water rights by 2024 as shown in Table 3-12, and could postpone the need for additional water storage capacity by 2022 as shown in Table 3-15.

TABLE 4-2

Projected Savings with WUE Measures

Year	Total ADD From Table 2-10 gpd	ADD From Table 2-10 without DSL gpd(1)	DSL ADD decreasing due to WUE Goals gpd(2)	Total ADD with DSL Reduction from WUE Goals gpd(3)	ADD Reduction due to WUE Goals gpd(4)	Projected Value of Additional ERUs from WUE Goals(5)	Annual savings w/WUE Goals ac-ft/yr(6)
2017	327,426	223,735	103,691	327,426	0	0	0.00
2018	336,550	232,859	103,691	336,550	0	0	0.00
2019	346,449	242,758	77,768	320,527	25,923	134	29.04
2020	357,189	253,498	58,326	311,824	45,365	235	50.82
2021	368,840	265,149	43,745	308,893	59,946	312	67.15
2022	381,480	277,789	32,808	310,597	70,883	371	79.40
2023	395,193	291,502	32,808	324,310	70,883	373	79.40
2024	410,071	306,380	32,808	339,188	70,883	373	79.40
2025	426,212	322,521	32,808	355,329	70,883	373	79.40
2026	443,723	340,032	32,808	372,840	70,883	373	79.40
2027	462,720	359,029	32,808	391,837	70,883	373	79.40
2028	483,331	379,640	32,808	412,448	70,883	373	79.40
2029	505,692	402,001	32,808	434,809	70,883	373	79.40
2030	529,951	426,260	32,808	459,068	70,883	373	79.40
2031	556,269	452,578	32,808	485,386	70,883	373	79.40
2032	584,822	481,131	32,808	513,939	70,883	373	79.40
2033	615,799	512,108	32,808	544,916	70,883	373	79.40
2034	649,406	545,715	32,808	578,523	70,883	373	79.40
2035	685,867	582,176	32,808	614,984	70,883	373	79.40
2036	725,423	621,732	32,808	654,540	70,883	373	79.40
Total Savings Projected 20-year savings with WUE Goals							**1,218**

(1) ADD from Table 2-10 with 2015 DSL ADD of 103,691 gallons subtracted out.

(2) DSL ADD value is decreased from 30 percent to 10 percent from 2019 to 2022 to meet WUE Goal.

(3) New total ADD value as a result of DSL ADD Reduction described above in (2).

(4) Difference of total ADD from Table 2-10 and new total ADD described above in (3).

(5) DSL ADD reduction divided by and ERU value of 194 in the year 2019, 193 in 2020, 192 in 2021, 191 in 2022 , 190 in 2023 and every year thereafter to show additional ERUs gained by WUE goals.

(6) DSL ADD reduction converted to ac-ft/yr to show annual savings from WUE goals.

SOURCE OF SUPPLY ANALYSIS

OPTIMIZING USE OF CURRENT SUPPLIES

Winlock has increased the efficiency of its water system in the past by replacing problem water mains, finding and repairing water system leaks, by promoting water conservation amongst their customers, and by improved water accounting. The City plans to continue these efforts to further optimize current water supply. Winlock may be able to delay the expenses of additional source capacity, additional treatment capacity, and additional storage capacity by implementing water conservation measures.

ENHANCED CONSERVATION MEASURES

As technology for water leak detection and repair advances, and as more water efficient building fixtures and appliances become the standard, water conservation will be enhanced by implementation of standard building codes and replacement of aging fixtures and appliances with newer, more water efficient units.

WATER RIGHT CHANGES

Based on Table 3-12 the City of Winlock will need additional annual water rights by the year 2024 and additional instantaneous rights by 2032 if demands develop as projected. By reducing water demands it should be possible to make existing water rights last beyond these dates. Also, Ecology has indicated that they would not consider additional water rights for the City of Winlock until the City can significantly reduce their DSL rate.

ARTIFICIAL RECHARGE

At this time there are no plans for any kind of artificial recharge of the aquifers in the Winlock area. Winlock has a sewer system, but the cost to treat to reuse standards, construct water reuse piping, pumping and storage facilities, and the permitting process involved in implementing a groundwater recharge system are beyond the capabilities of the City of Winlock.

WATER RECLAMATION

The WUE Rule requires that water utilities with more than 1,000 service connections include an evaluation of water reclamation and reuse opportunities in their water system plans. Since the City of Winlock has fewer than 1,000 service connections it is not required that Winlock provide an evaluation of water reclamation and reuse opportunities.

WATER SUPPLY CHARACTERISTICS

The WUE Guidebook indicates that a Water Use Efficiency Program should include a description of the water system source characteristics. The source characteristics for the City of Winlock water system are thoroughly described in Chapters 1 and 3 of this Plan.

CHAPTER 5

SOURCE PROTECTION PROGRAM

A wellhead protection program has been prepared by Evergreen Rural Water of Washington. A copy of the wellhead protection program report is included in Appendix G.

CHAPTER 6

OPERATION & MAINTENANCE PROGRAM

INTRODUCTION

The objective of this chapter is to provide an evaluation of Winlock's operation and maintenance (O&M) program and its ability to assure satisfactory management of the water system operations in accordance with WAC 246-290. Winlock's Operation and Maintenance Manual and specific component related documentation are maintained by Winlock for use by operations personnel. Information presented in the complete O&M Manual is considered sensitive information and is not intended for general distribution to the public.

The O&M Program includes the following elements:

- Water System Management and Personnel
- Operator Certification
- System Operation and Control
- Water Quality Monitoring
- Preventive Maintenance
- Emergency Response Program
- Cross-Connection Control Program
- Customer Complaint Response Program
- O&M Improvements

WATER SYSTEM MANAGEMENT AND PERSONNEL

The City of Winlock is governed by a Mayor and a City Council. Water system staff include Water Superintendent Rodney Cecil, and operator Marty Martin.

OPERATOR CERTIFICATION

Certification Requirements

Department of Health (DOH) regulations (WAC 246-292-050) require all Group A water systems to have at least one certified Water Distribution Manager (WDM). The WDM must further be certified at a level equal to or higher than the water system's classification rating as described in Table 6-1 and in accordance with WAC 246-292-040.

TABLE 6-1

Water System Group Classification

Classification	Population Served
Group 1	Less than 1,500
Group 2	1,501 to 15,000
Group 3	15,501 to 50,000
Group 4	Greater than 50,000

Winlock serves fewer than 1,500 people on a full time basis, and therefore is required to have a WDM Level I. Additionally, Winlock is required to have a Cross-Connection Control (CCC) Program and must ensure that a Cross-Connection Specialist (CCS) is responsible for overseeing the program and for periodic inspections of premises for cross connections. Finally, Winlock must ensure that a Backflow Assembly Tester (BAT) is responsible for inspecting, testing, and monitoring backflow prevention assemblies in accordance with WAC 246-290-490. Winlock can have a CCS on staff or have an outside CCS specialist review their CCC program and do cross connection inspections. Winlock can also have a BAT on staff to perform the backflow assembly tests or can allow the customers to have their device tested by an independent certified BAT.

Winlock Water Operations Staff Certifications

Table 6-2 lists the City's maintenance personnel, positions and certifications. Winlock has two employees with WDM 2 and CCS certification. The City of Winlock does not have a certified BAT. The City contracts with DJ Plumbing to provide backflow assembly testing. Water customers who are required by the City to maintain backflow prevention assemblies are also required to hire their own independent BAT to provide testing and certification of backflow prevention assemblies.

TABLE 6-2

Winlock Water System Personnel Certifications

Staff	Position	Operator No.	Certifications
Mr. Rodney Cecil	Water Superintendent	012964	WDM 2, CCS
Mr. Marty Martin	Water System Operator	011311	WDM 2, CCS

PROFESSIONAL GROWTH REQUIREMENTS

In order to promote and maintain expertise for the various grades of operator certification, Washington State regulations require all certified operators meet professional growth requirements by completing no less than three continuing education units (CEUs) every 3 years. Programs sponsored by both Washington Environmental Training Resource Center (WETRC) and the American Water Works Association

(AWWA) Pacific Northwest Subsection are the most popular sources of CEUs for certified operators in Washington State. The professional growth requirement may also be met by advancement, by examination, or by certification in a different classification.

The Winlock Water Superintendent maintains the status of staff CEUs. Resources to obtain training are provided by Winlock as necessary to maintain these credits.

SYSTEM OPERATION AND CONTROL

MAJOR SYSTEM COMPONENTS

Descriptions of major system components are included in Chapter 1, and further discussed Chapter 3. The locations of the major system components are shown on Figure 1-3, the system facilities map. A description of the normal operation of each facility is given in the following sections.

Source of Supply

The City obtains its water from five wells (Eureka 1, Eureka 3, Well 603, Baichtel 1, and Baichtel 2) all located within City limits. Two additional wells, Eureka 2 and Ash Street Well are inactive. Wells Eureka 1, Eureka 3, and Well 603 all pump into the Zone 1. Baichtel Wells 1 and 2 pump into Zone 2. These wells are turned on and off by a Programmable Logic Controller (PLC), based on water levels in the 603 Reservoirs as determined by a pressure transducer. Well on and off levels are adjustable by the operator from the PLC interface screen. All water pumped from these wells in excess of system demand goes to the 603 Reservoirs. A solenoid valve allows water from Zone 2 to go to the 603 Reservoirs if the Baichtel Wells are producing more than Zone 2 is demanding. The wells need to be checked regularly to record source meter reads, well output rate, facility cleanliness, and security.

Treatment

The only treatment provided by the City of Winlock is chlorination using sodium hypochlorite. Sodium hypochlorite feed solution is mixed in a feed tank and fed into the distribution system at each source using a metering pump. The chlorination facilities require regular checking to make sure that the feed pumps are operating properly, testing of chlorine residual, adjusting dose as needed, record keeping of the amount of chlorine used, filling of the feed tanks, and keeping the equipment clean.

Reservoirs

As described in Chapter 1, the City owns and operates two reservoirs and has a contractual right to a portion of the capacity of a third reservoir. The two 603 Reservoirs are cast-in-place concrete reservoirs, 26 feet in diameter and 75 feet in height with overflow elevations of 533.5 feet, and an effective capacity of 113,000 gallons each, as

shown in Table 3-14. The Cardinal Glass Reservoir is an elevated welded steel reservoir, with an overflow at 629.75 feet and a capacity of 500,000 gallons, of which, by contract with Cardinal Glass, the City has a right to use up to 120,000 gallons.

Water reservoirs provide water storage to meet maximum water system demands and emergency situations, and provide system pressure based on the elevation of the water in the reservoir. Water level in the reservoirs is used to turn wells on and off, and the reservoirs provide a place for water to go when source output exceeds system demand.

Reservoirs require minimal maintenance. The reservoirs should be inspected regularly for signs of intrusion. The water level indicator on the reservoirs should be checked to make sure it is sliding freely on the gage board. The vents on the tops of the reservoirs should be inspected every 6 months to a year to make sure that the vent screen is intact so that insects, birds and bats cannot enter the reservoirs, and are unobstructed so that air can move freely into and out of the reservoirs.

System Control

The main control system is a PLC located at the Zone 2 Pump Station building. Communication between the Zone 2 Pump Station building and the Baichtel Wells, the Eureka Wells and the Cardinal Glass Reservoir is by radio. Water levels from both the 603 Reservoirs and the Cardinal Glass Reservoir are determined by pressure transducers and transmitted to the PLC at the Zone 2 Pump Station building. Control levels for starting and stopping wells and pumps are adjustable by the operator at the Zone 2 Pump Station PLC. Well control settings are shown in Table 3-16. Zone 5 Pump Station control settings are summarized in the second paragraph following Table 3-16.

The Baichtel Wells pump into the Zone 2. If the output of the Baichtel Wells exceeds the demand of the Zone 2, a solenoid valve at the Zone 2 Pump Station opens and allows excess flow into the 603 Reservoirs. While the solenoid valve is open, pressure is maintained in Zone 2 by partially closed butterfly valves on the solenoid valve bypass line.

Distribution System

As shown in Table 1-5, the City maintains approximately 18.2 miles of water main, which interconnect the wells and storage with consumer service connections. As shown in Table 1-5, approximately 27.8 percent of the pipe is 4-inch diameter or smaller. An estimated 5.3 percent of the pipe is galvanized iron. It is suspected that the galvanized iron water mains are responsible for a large portion of the City's distribution system leakage, and the City is planning to replace the galvanized iron water mains as soon as funds are available to do so. Standard construction specifications for water main extensions are included in Appendix D.

Tasks associated with maintaining the distribution system include water main flushing, hydrant and valve exercising, checking PRV station pressures and adjusting as necessary, and cleaning PRV pilot valves and lines. Most of the PRV stations are in below grade vaults, some of which are subject to flooding and may require regular pumping out.

Required water main flushing frequency is location dependent. Water mains that have significant regular flow do not require flushing as frequently as dead end water mains and water mains in areas with little flow. Water main flushing may be triggered by inadequate chlorine residual in routine samples and by water taste, odor and color complaints. When flushing water main in one area, it is possible that increased flow may stir up sediments in water mains in other areas leading to dirty water complaints. Therefore it is important to review the water main flushing plan and possibly close some key valves prior to flushing to avoid creating additional problems.

Pressure Reducing Stations

The Winlock water distribution system has five pressure zones and seven pressure reducing valve (PRV) stations. Three of the PRV stations, (PRV stations 1, 3 and 4) reduce pressure from the 603 Reservoir Gravity Zone (Zone 1) to the Downtown Reduced Pressure Zone (Zone 4). One PRV station (PRV station 10) reduces pressure from the Southeast Boosted Pressure Zone (Zone 2) to the Southeast Reduced Pressure Zone (Zone 3). One PRV station (PRV station 2) reduces pressure from Zone 3 to Zone 4. Two PRV stations (PRV stations 12 and 13) reduce pressure from the Cardinal Glass Pressure Zone (Zone 5) to Zone 1.

No information is available regarding the original design settings for these PRV stations, and PRV settings are not explicitly stated in the 2008 Water System Plan. PRV settings used in this Water System Plan are based on PRV settings indicated in the hydraulic analysis printouts in the appendix of the 2008 Water System Plan which are shown on Table 1-7. Based on system flow testing performed for the purpose of calibrating the system hydraulic model, it appears that one or more of the PRV stations were not operating correctly at the time. Some of the PRV station vaults were observed to be filled with water, either from groundwater seeping into the vaults or from leakage unable to drain from the vaults. In late 2016 and early 2017 the City began rebuilding and adjusting PRV stations. It is assumed that all of the remaining PRV stations are in need of maintenance or replacement, and adjusting. It is recommended that PRV stations be routinely checked for output pressure annually and adjusted as necessary. Pressure control line strainers need to be cleaned annually or more frequently as needed.

WATER QUALITY MONITORING

Winlock receives an annual statement from DOH that indicates what water quality tests are required and when they are required. The monitoring requirements for 2016 are provided in Appendix E. An analysis of Winlock's most current water quality test results can be found in Chapter 3. Winlock is also required to publish a Consumer Confidence

Report (CCR) every year to provide customers with water quality data and to explain to its customers any challenges the water system may have. A copy of the most recent CCR can be found in Appendix H.

PREVENTIVE MAINTENANCE

The most cost-effective method for maintaining a water system is to provide a planned Preventive Maintenance (PM) program. A planned PM program can provide the optimum level of maintenance activities for the least total maintenance cost. Routine maintenance procedures for each system component follow.

Reservoirs

Improperly maintained reservoirs can cause contamination in public water systems. This is a result of contaminants entering the reservoir through cracks or openings at the vent, overflow or drain screens. Deteriorating hatch covers and vandalism can also compromise reservoir water quality. Poorly designed and maintained reservoirs can hamper the emergency operation of a water system. If reservoir drains are not functioning properly, it may be difficult to purge a contaminant from the system. Written documentation of reservoir maintenance must be completed with each inspection and repair, and a copy of the report retained on file.

Periodic Maintenance

The existing 603 Reservoirs were constructed in 1988. These reservoirs are Cast-In-Place concrete and do not require painting. The 603 Reservoirs were last inspected in September 2012 by LiquiVision Technology Diving Services, and found to be in good condition.

The Cardinal Glass Reservoir was constructed in 2006. The Cardinal Glass Reservoir O&M Manual says that the reservoir will be cleaned and inspected every 12 years, so the first cleaning and inspection is due in 2018. The Cardinal Glass Reservoir is owned by Cardinal Glass, who is responsible for the cleaning and inspection.

Periodic maintenance of the reservoirs will include the following. Vent screens and the integrity of the access hatch and other openings into the reservoir will be inspected quarterly. Any opening that may allow the entry of insects or small animals will either be sealed or screened accordingly.

Distribution System Valve Maintenance

Good preventative maintenance dictates that all valves be exercised regularly. The City currently exercises valves in the system as time permits. Records should be kept of valve maintenance. A sample valve maintenance form is in included in Appendix I. Valves that do not close tightly should be removed, repaired or replaced. An important aspect of

distribution system valve maintenance and record keeping is to ensure distribution valves are completely open. A partially closed valve can seriously reduce peak day operation and fire flow supply.

PRV Station Maintenance

PRV stations require regular maintenance. PRV pilot lines can become plugged with silt and prevent proper operation. Valve guides can become worn and stick, preventing free movement of the main valve disk. Valve membranes can tear, effectively rendering the valve inoperable. Valve pilot lines should be flushed, pilot strainers cleaned, and valve pressure settings checked and adjusted as needed at least annually. The entire valve should be rebuilt or replaced every five to ten years.

Hydrant Maintenance

Fire hydrants in the system are flushed periodically. The extent of flushing is usually determined by customer complaints of "dirty water" and after any construction in the immediate area of the hydrant. Hydrants should be inspected regularly and repaired if necessary. It is important to maintain good records of hydrant maintenance. A sample hydrant maintenance form is included in Appendix I. The following recommended procedure for testing fire hydrants has been adapted from the American Water Works Association (AWWA), 1989:

<u>Maintenance Procedure</u>

- Check appearance of hydrants for visible damage or leaks. Check for residue stains on the hydrant.
- Remove an outlet-nozzle cap and sound for leakage.
- Check for presence of water or ice in the hydrant body with a plumb bob.
- Replace the outlet-nozzle cap. Open the hydrant a few turns and allow air to vent. Tighten the cap.
- Open the hydrant fully.
- Check for leakage at flanges and around outlet nozzles, packing, and seals.
- Partially close the hydrant so the drains open and water flows through under pressure for about 10 seconds, flushing the drain outlets.
- Close the hydrant completely.
- Remove an outlet-nozzle cap and attach a fire hose or some other deflector
- Open the hydrant and flush.
- Close the hydrant and check operation of the drain valve.
- Check the main valve for leakage.
- Remove all outlet-nozzle caps, clean and lubricate the threads.
- Check chains and cables for free action.
- Replace caps and tighten.
- Check lubrication of operating nut threads.

- Locate and exercise auxiliary valve. Leave open.

Water Main Flushing

The entire water system will be systematically flushed every 2 years. This may be accomplished by using directional flushing procedures to flush about 4 percent of the total system, or about 2,000 lineal feet each month with scouring velocities.

Flushing Procedures

Before initiating a comprehensive flushing program, staff will review distribution maps and preplan each month's flushing. The following procedures are adapted from guidance provided by the AWWA, 1986:

Determine the initial clean source of flushing water, sections of mains to be flushed at a given time, the valves to be used in each case, and the order in which the sections will be flushed. Start at or near one of the interties and work outward so as not to disturb sediments in unflushed portions of the system. If possible, schedule work so that each zone can be completed by the end of the day or so that a natural stopping point is reached. If this is not done, fire protection may be severely restricted. Ensure that all flushing water used comes from areas previously cleaned or from mains large enough to resist sediments being stirred up by the flow. Keep the length of main being flushed as short as possible, especially on small pipe. This will minimize pressure losses in the system and the length of time each customer may be delivered dirty water.
Assure that an adequate amount of flushing water at sufficiently high pressure is available and that it can be disposed of safely. Use a rate of flow required to produce a velocity of 2.5 fps in pipes as follows:

Pipe Diameter, inches	2	3	4	6	8	10	12
Flow Rate for 2.5 fps, gpm	25	56	98	221	392	612	882

Hydrant pressure or pitot gauges are useful in determining flushing rates.
Do not flush a large main supplied by a single smaller main; the volume available is usually inadequate for flushing.

Prior to flushing, notify the following parties:

Fire department and water utility billing office
Other utilities, such as gas, electric, and telephone companies, who may have underground facilities in the area
Those customers who may be inconvenienced by reduced pressure or dirty water, including:

Food service establishments
Hospitals, nursing homes, and other health facilities

Customers with special medical needs, such as home dialysis

Isolate the section to be flushed from the system. Close valves slowly to prevent water hammer.

Open the fire hydrant or blowoff valve slowly until the desired flow rate is obtained. When flushing from a dry-barrel fire hydrant, use the gate valve upstream of the hydrant for throttling purposes. Open the hydrant valve fully to prevent water from escaping into the ground through the fire hydrant barrel drain.

Direct flushing water away from traffic, pedestrians, and private land. Ensure that flushing water drains to an appropriate storm sewer or watercourse without causing excessive flooding of streets, underground utility vaults, or private property; the utility may be held responsible for any accidents or damage related to the released water.

Prevent heavily contaminated water from discharging to sensitive natural watercourses. Check with the local sewer department for conditions of disposal to the sanitary sewer. If sewer disposal is unavailable, flushing into a tanker truck may be necessary.
If water contains chlorine, dechlorinate waters discharging to sensitive natural streams. Following are the steps of dechlorination:

- Estimate the rate of flushing. This may be estimated from previous hydrant flow tests or flushing data. If no data if available, open flushing valve just long enough to take a pitot gauge measurement. Calculate the flushing rate using a formula from the AWWA Guidance Manual.

- Determine the chlorine residual in the main using a suitable field test kit.

- Prepare a dechlorinating agent solution to be pumped into the flushing discharge using a positive displacement chemical feed pump.

- Simultaneously flush main and pump dechlorinating agent into the discharge.

- Check system pressure at a nearby hose bib. If pressure is less than 20 psi, throttle the flow through the hydrant. When possible, check system pressures in higher or remote areas of the pressure zone to ensure that pressures do not drop below 20 psi. This may necessitate a two-man crew with radios.

- Record the date, time, location, pressure zone, size and length of main; and estimate the flushing flow rate and velocity, and time required to clear. Take samples noting the waters odor, color, turbidity, and the presence of any visible objects or organisms.

- When the flushing water is clear, close the hydrant or blowoff valves slowly.

- Keep records of which valves are opened and closed. If, at the end of a day's work, valves normally open are left closed, alert the fire department.

- Proceed to the next section to be flushed and repeat these procedures.

Dead-End Waterlines

The City currently flushes dead-end mains on an as-needed basis. Dead-end waterlines are susceptible to water quality problems and should be flushed regularly to remove stagnant water and debris, which may have been deposited.

Pump Stations

The City's pumping stations were constructed in 2006 and minimal service has been required to date. A detailed operation and maintenance manual is available. The Zone 2 Pump Station is a variable speed pump system that pumps into a closed zone and is controlled by the pump station output pressure and flow rate. Routine maintenance includes keeping records of water meter totalizer and flow rate readings for each pump, pump output pressure, periodic running of the 40-hp pumps to assure they are working properly, and keeping the facilities clean.

Wells

Routine maintenance for the wells includes keeping records of water meter totalizer and flow rate readings for each well, discharge pressures, periodic sounding of the static and pumping water levels in each well, and keeping the facilities clean. Water quality samples must be taken at each well as required by the Washington State Department of Health. Summaries of the total monthly production of each well should be maintained. Records should be maintained of the original well construction, any modifications to the well construction, all equipment installed in each well and all service performed on the equipment.

Meters

Accurate water metering is an essential financial and conservation-oriented component of water system infrastructure. A substantial amount of revenue may be lost through inaccurate metering of residential, commercial, and industrial accounts. Without accurate master or source meter readings, the water utility cannot assess productivity of sources or determine distribution system leakage rates.

The City of Winlock has several master water meters, one at each well, and also pump station meters at each pump station. These meters must be checked regularly to ensure

accurate source data. It is also recommended that, in addition to flow meter data, the City keep run time data on all pumps. Flow meter reads in gallons should be regularly divided by run time meter reads in minutes to check the actual gallons per minute each pump is producing. These values should be fairly consistent for each pump. If the numbers change significantly for any pump that may signal problems with the pump or with the flow meter.

The current City practice is to replace faulty service meters whenever poor or inaccurate meter readings are observed by the City meter readers and/or administrative staff. An inventory of all service meters, their size, type, and location is currently available. The age of each meter should be included in the inventory so that routine testing, repair and replacement can be prioritized.

PREVENTIVE MAINTENANCE SCHEDULE

A general schedule for routine preventative maintenance is summarized in Table 6-3.

TABLE 6-3

General Preventive Maintenance Schedule

Preventive Maintenance Tasks and Frequency	
Daily • On-call 24 hours per day. • Respond to customer inquiries. • Respond to service requests. • Monitor chlorine residuals. • Monitor for leaks in the system. • Visit well sites to record meter readings and ensure proper operation of disinfection facility and wells. • Monitor water level in the reservoir.	Yearly • Inspect all backflow prevention devices. • Flush distribution system and repair leaks. • Inspect wellhead protection area for contaminant sources. • Inspect and exercise hydrants and valves. • Inspect, clean, and adjust pressure reducing valves.
Monthly • Collect routine coliform samples. • Inspect reservoir hatches, vents, and screens.	Every 10 to 15 Years • Clean reservoirs (as needed). • Rebuild pressure reducing valves.

EMERGENCY RESPONSE PROGRAM

Water utilities have the responsibility to provide an adequate quantity and quality of water in a reliable manner at all times. To do this, utilities must reduce or eliminate the effects of natural disasters, accidents, and intentional acts.

WATER SYSTEM PERSONNEL EMERGENCY CALL-UP LIST

An important element of an emergency response program is to maintain a list of emergency contacts. Table 6-4 provides phone numbers for emergency contacts including response agencies, governments, and material suppliers.

TABLE 6-4

Emergency Phone List

Agency/Group	Contact	Phone Number
Fire/Police	Emergency	911
Police	Business	(360) 864-6041
Fire District No. 15	Business	(360) 785-4221
Puget Sound Energy	Emergency	(888) 225-5773
	Business	(425) 452-1234
Lewis County PUD	Management	(360) 740-2412
	Engineering	(360) 740-2405
	Operations	(360) 740-2403
Burlington Northern & Santa Fe Railroad	Emergencies	(800) 832-5452
	Business	(206)-625-6135
Washington State Department of Ecology	Emergency Spill Response	(360) 407-6300
Lewis County	Emergency Management	(360) 740-1151
	Public Works	(360) 740-1123
	Environmental Health	(360) 740-1146
Lewis County Roads	24-Hour Road Hazards	(360) 740-1105
	Central Shop	(360) 740-1123
Lewis County Testing Lab	Coliform Testing	(360) 740-1222
Statewide One Call Before You Dig	Utility Locations	(800) 424-5555
Water System Equipment and Supplies	H.D. Fowler, Inc.	(360) 459-7300
Winlock City Hall	General Information	(360) 785-3811
Winlock Water and Sewer Superintendent, Rodney Cecil	Office	(360) 785-4565
	Cellular Phone	(360) 520-3966
Washington State Dept. of Health, Division of Drinking Water, SW Regional Office	24-Hour Emergency	(877) 481-4901
	Coliform Program	(360) 236-3030
	Regional Engineer	(360) 236-3030
	General Information	(360) 236-3030
Gray & Osborne, Inc., Consulting Engineers	Olympia Number	(360) 292-7481
	Seattle Number	(206) 284-0860

EMERGENCY PROCEDURES

Although is not possible to anticipate all potential disasters affecting the City's water system, formulating procedures to manage and remedy several common emergencies is appropriate. Following is a summary of standard response procedures to typical emergency situations.

Contamination of Water Supply

Bacterial contamination of the water supply can occur from such items as main breaks, reservoir intrusion, flooding or pollution from an isolated source. Table 6-5 provides the appropriate action that will be taken in the event of the contamination of the water supply.

TABLE 6-5

Water Contamination Response

Distribution System Contamination
Notify customers of contamination.
Contact the Washington Stated Dept. of Health Coliform Program Manager or Regional Engineer.
Consider installation of emergency chlorination equipment if appropriate.
Perform coliform, chemical and free chlorine residual analysis at various locations within the system, including the reservoirs and the system extremities.
Flush and Disinfect distribution lines as dictated by the nature of the contamination.
Reservoir Contamination
If possible, isolate reservoir from system.
Re-sample to confirm contamination.
Check distribution system for presence of contamination
Inspect vent screens, hatches, and piping to identify source of contamination
If reservoir water is contaminated and therefore considered unsuitable for consumption, drain and clean reservoir.
Disinfect reservoir if bacteriological standards are exceeded. Follow AWWA Standards. A 50-ppm chlorine solution in a 100,000 gallon reservoir can be obtained by adding 95 gallons of 5.25 percent chlorine bleach.

Bacteriological Presence Detection Procedure

Notification procedures for notifying system customers, the local health department, and DOH of water quality emergencies are an important component of an emergency response program. Many public water systems will occasionally detect positive coliform samples, mainly as a result of minor contamination in distribution mains or sample taps, or improper bacteriological sampling procedures. However, the persistent detection of coliforms in the water supply, particularly E. Coli or Fecal Coliform bacteria, may

require issuing a public boil water notice to ensure the health and safety of the water customers. Emergencies such as floods, earthquakes, and other disasters can affect water quality as a result of damage to water system facilities, thereby warranting a boil water order in advance of supply. A suggested boil water notification is included in Appendix J. WAC 246-290-320 requires water utilities to follow specific procedures in the event coliform bacteria are detected in the water system.

Power Failure

Various types of weather can cause loss of power, such as wind, lightning, freezing rain, and snowstorms. Additionally, power can be lost through traffic accidents and power company equipment failure. During a City-wide power outage, standby storage is designed to provide water reserves for two days of average demand. In addition, the City has a backup power supply capable of running the Zone 2 Pump Station, and the 603 Well. City personnel check reservoir levels visually on a reader board at the reservoirs. *Lewis County PUD will be contacted at (800) 562-5612* to determine the estimated length of the power outage. Then customers will be notified of the emergency. Water use curtailment will be requested through radio, television, newspaper and/or police loudspeaker, if necessary.

Severe Earthquake

A severe earthquake could result in transmission line breaks, distribution system breaks and structural damage to the reservoirs, wells and to vaults which house critical valving and meters. Also severe earthquakes tend to be followed by aftershocks that can exacerbate damage caused by initial earthquake. Table 6-6 addresses the possible emergency events and response actions that will be taken in the event of an earthquake.

TABLE 6-6

Earthquake Emergency Response Actions

System Component	Action
Transmission and distribution lines (The nature of the emergency would depend on the area of the City's transmission system in which the break occurred.)	• Close valves to isolate breaks in water mains. • Check reservoir levels. • Notify water customers of emergency and request customers to conserve water. • Shut down source pumps if appropriate. • Isolate break, check the base water system section maps for valve locations. • Repair break. • Disinfect isolated section.
Reservoirs: May be leaking or structurally damaged.	• Observe structures for visual signs of structural damage, leakage, cracks, etc. Typical damage is to hold down saddles or straps at base of reservoir wall. Also check storm drainage system in the vicinity for significant flows. • If non-observable leakage is suspected, isolate one reservoir at a time and monitor water level for at least 24 hours. • If structural damage is apparent, drain reservoir and inspect the interior.
Pumping station, critical valving and meters	• All meter and valve vaults will be inspected following a major earthquake to check for joint leakage caused by earth movements.
Supply facilities	• Inspect all supply facilities, for leakage or other structural damage.

Severe Snowstorm

Heavy snowfall may bring motor vehicle traffic to a standstill. Employees may not be able to reach the problem area. Water supply will not be interrupted. Table 6-7 addresses the possible emergency events and response actions that will be taken in the event of a severe snowstorm.

TABLE 6-7

Severe Snowstorm Emergency Response Actions

System Component	Action
Distribution System: Transportation to monitor system and make repairs will be limited.	Contact Lewis County Public Works, Roads Division, to expedite plowing to any problem area. Have chains and snow gear ready for maintenance equipment and vehicles. Valve locations will be made available for maintenance personnel and kept current.
Reservoirs: No immediate effect. Snow may prevent access.	Clear snow from roads and walkways.

High Water and Flooding

Heavy snow melt and/or rains cause the water level to rise and reach a flood level. Table 6-8 addresses the possible emergency events and response actions that will be taken in the event of high water or flooding.

TABLE 6-8

High Water/Flooding Emergency Response Actions

System Component	Action
Distribution system	Test for coliform bacteria
Reservoirs: No effect. Reservoirs are above flood level	No action is necessary

CROSS-CONNECTION CONTROL PROGRAM

A Cross-Connection Control Program is a required element of an operations program under WAC 246-290-490. The purpose of a cross connection program is to protect public health from the potential for water contamination through back-flow, back-pressure or back-siphonage through a cross-connection with a non-potable liquid.

PROGRAM ELEMENTS

WAC 246-290-490 (3) establishes the minimum requirements for a cross-connections control program. The regulation identifies ten elements that must be addressed. These elements are addressed in the following sections:

Element 1: Instrument of Legal Authority to Implement Program.

The City's Cross-Connection Control Ordinance was enacted as Ordinance 753 in 1996. A copy of Ordinance 753 is located in Appendix K.

Element 2: Procedures and Schedules for Evaluating Service Connections.

New construction must be inspected, particularly as plumbing is being installed, to assure that there are not cross connections installed during construction. In addition, facilities must be inspected when permits are requested for new or changes in existing business activities.

Element 3: Procedures and Schedules for Eliminating and Controlling Cross Connections.

If during inspection a cross-connection or potential cross-connection is noted, the Owner must be notified that the cross-connection has been identified in the inspection process, and that the cross-connection must be eliminated to Winlock's satisfaction, or a backflow preventer must be installed and approved by the City. No water service connection will be allowed until the cross-connection concern has been addressed.

Element 4: Qualified Personnel to Implement Program.

Both Rodney Cecil and Marty Martin, as shown in Table 6-2, are certified Cross-Connection Control Specialists (CCSs). Winlock does not have a certified Backflow Assembly Tester (BAT). Owners of cross connection control devices are required to hire a certified backflow assembly tester at their own expense and submit a satisfactory test report to the City on an annual basis. The City uses DJs Plumbing to test City-owned backflow prevention devices.

Element 5: Ensure that Approved Backflow Operating Correctly.

Winlock's cross connection control ordinance requires that all installed backflow prevention assemblies be tested annually by a certified BAT. Current City staff have been unable to locate any records of backflow devices left from previous City staff. To date cross connection control devices have been identified at Cardinal Glass, the elementary school, and the wastewater treatment plant. These backflow prevention devices have been tested annually. In addition, staff think there is probably a backflow prevention device at the Cedar Crest doctors office, but it has not yet been located, and no testing reports have been received for it.

Element 6: Ensure that Backflow Preventers Are Tested Properly.

Winlock requires that all BATs doing business with Winlock maintain current certifications in their areas of specialty. Winlock requires copies of current certificates and requires updates of these certificates when they expire.

Element 7: Procedures for Responding to Backflow Incidents.

It is not always immediately evident when a backflow incident has occurred. If routine testing, or customer complaints lead to detection of a contaminant in the water distribution system, it may not be determined immediately that the contaminant entered the distribution system by way of a cross connection or backflow event. If a contaminant is detected in the distribution system, Winlock customers will be immediately notified that the water may not be fit to drink and advised not to drink the water until the nature and degree of threat of the contaminant can be determined.

Then even if it is concluded that the contaminant must have entered the distribution system through a cross-connection, the location and nature of the cross-connection may or may not ever be determined. When a cross connection event is identified, Winlock staff will inspect the facility to determine if the cross connection can be eliminated. If there is no acceptable means to eliminate the cross-connection, then Winlock staff will shut off the water service to the customer with the cross-connection, and notify the customer that a backflow preventer must be installed to the satisfaction of the City before service will be restored. The customer will be required to pay a service restoration fee before service will be restored.

Element 8: Consumer Education.

Winlock provides customer education material regarding cross-connection control in annual consumer confidence reports.

Element 9: Cross-Connection Control Record Keeping.

The Winlock Water Department maintains records of installed cross-connection control devices, records of the testing of these devices, records of certified BATs, and records of inspection reports by the CCS and BATs.

Element 10: Additional Requirements if Reclaimed Water is Used.

Reclaimed water is not used, nor is there any plan to use reclaimed water at Winlock. Therefore, Element 10 is not applicable to Winlock.

PRIORITY SERVICE LIST

There are three categories of business establishments that may pose a hazard to the water system. Category one services pose the highest degree of hazard and include the following facilities:

Printers
Medical laboratories
Chemical companies
Radiator shops
Battery, fertilizer, and paint manufacturers
Pest control businesses
Janitorial companies

Category two services are considered less hazardous and include the following:

Doctor, dentist, and veterinarians' offices
Blood banks
Drug rehabilitation centers
Car washes
Photo labs
Commercial laundries
Nursing homes and hospitals

The least hazardous service category includes the following types of businesses:

Food processing facilities
Dairy establishments
Beverage and candy manufacturers
Massage and health spas
Motels and schools with pool, spa, or sauna facilities

NEW AND EXISTING CROSS-CONNECTION DEVICES

Ordinance 753 requires that new and existing cross-connection devices will be catalogued and checked initially. It is the responsibility of the customer to ensure proper testing of the devices on an annual basis thereafter. Backflow prevention devices are required on all new cross-connections. A condition for new service is an evaluation by the City's certified cross-connection control specialist to determine what type of backflow device is needed. This review is coordinated with the City building inspector.

CUSTOMER COMPLAINT RESPONSE

Winlock rarely receives complaints about water service, but when complaints are received, they are taken seriously. Complaints are logged in at Winlock City Hall and a water system operator is sent to investigate the complaint. Depending on the findings of the complaint investigator, appropriate actions are taken to resolve the complaint. If a customer feels that their complaint is not being addressed properly, all customers of the water system have access to City Council at regularly scheduled meetings to be heard regarding their complaints.

O&M IMPROVEMENTS

This section reviews operations and maintenance activities, schedules and needs as identified in the first part of this chapter and identifies possible operations or system changes that could improve or streamline operations.

WATER SYSTEM MANAGEMENT AND PERSONNEL

The scope of this Plan does not include a comprehensive evaluation of the staffing needs and adequacy of staffing. The City has recently experienced a major turnover of management staff. The current staff are in the process of learning how the system operates. Manuals for the various pieces of equipment are available, but an overall narrative of the interrelationship of various system facilities has been lacking. For example, mapping of pressure zones as shown in Figure 1-4, pressure zone hydraulic gradelines as shown in Table 1-6, and pressure reducing valve settings as shown in Table 1-7, were not readily available prior to inclusion in this Water System Plan.

OPERATOR CERTIFICATION

Winlock currently has adequate operator certification. From Table 6-2 it can be seen that Winlock currently has two staff persons with WDM 2 certification. In the event that Mr. Cecil should leave Winlock, or if something should happen to Mr. Cecil such that he would be incapable of providing operations leadership, Marty Martin has a WDM 2 certification, which is adequate to manage the water system. Therefore, Winlock has adequate certified staff to assure continued reliable system operation.

SYSTEM OPERATION AND CONTROL

The operation and control system is relatively new and functions well. There is no identified need for improvement in the operations and control system at this time. Operations staff are still in the process of learning some of the details about how the system operates. Information provided in this water system plan should help the operators with their understanding of the system and improve system operations.

Pressure reducing stations need to be tested and adjusted as needed. PRV stations that are subject to flooding need either maintenance or improvements to prevent flooding.

WATER QUALITY MONITORING

The City has been staying up to date on all water quality monitoring. There is no identified need for improvement in the Water Quality Monitoring system at this time.

PREVENTIVE MAINTENANCE

Much needed system maintenance has been deferred due to staff turnovers and the need for new staff to learn the system. The current staff is working to catch up with deferred maintenance.

EMERGENCY RESPONSE PROGRAM

No deficiencies in Emergency Response Program have been identified.

CROSS-CONNECTION CONTROL PROGRAM

Cross-Connection Control Program has taken a back seat to other issues as new staff have learned how to operate and manage this water system. Backflow prevention assembly units need to be located and a list created, and backflow prevention assembly testing and a system for tracking and enforcing the testing of backflow assemblies need to be instituted. The City is currently working on this issue and intends to have all backflow assemblies located and listed and a tracking system in place by the end of 2017.

CUSTOMER COMPLAINT RESPONSE PROGRAM

No deficiencies in the Customer Complaint Response Program have been identified.

SUMMARY OF O&M IMPROVEMENTS

- City water operations staff still need to get familiar with some aspects of the water system.

- Pressure reducing stations need to be tested and repaired and/or adjusted if necessary to assure they are operating properly. This work is in progress as of May 2017.

- Some pressure reducing stations are flooded during rainy weather. The stations need to be dewatered and proper drainage restored. It is not known at this time if drainage can be restored by maintenance activities or if the pressure reducing stations will need to be rebuilt to prevent flooding. This work is in progress as of May 2017.

- While some backflow prevention devices have been located and testing reports are on file, there remain an unknown number of backflow prevention devices that need to be located, added to the City's list, and backflow assembly testing instituted. Inspections of commercial and industrial water services need to be completed to determine if there are any that need but do not have backflow prevention devices.

CHAPTER 7

DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

OBJECTIVE

The objective of this chapter is to document Winlock's design and construction standards to allow Winlock to retain DOH approval to utilize the alternative review process for construction of new and replacement of existing water distribution facilities. Through this process, a purveyor needs no further approval from DOH for distribution project reports, construction documents, or installation of distribution mains.

This chapter includes the following elements:

- System Standards, Policies and Procedures
- Project Review Procedures
- Policies and Requirements for Outside Parties
- Design Standards
- Construction Standards
- Construction Inspection Procedures

SYSTEM STANDARDS, POLICIES AND PROCEDURES

The City of Winlock has developed a comprehensive document titled *City of Winlock Public Works Standard*. The document is divided into five chapters as follows:

- Chapter 1: General Considerations
- Chapter 2: Transportation
- Chapter 3: Storm Drainage and Erosion Control
- Chapter 4: Water
- Chapter 5: Sanitary Sewer

Copies of Chapters 1 and 4 of the Public Works Standard are included in Appendix D of this Plan.

PROJECT REVIEW PROCEDURES

PERMIT APPLICATION

All applications for line extension must be submitted in writing to the City at least 90 days in advance of the proposed commencement date of construction. No

construction will be authorized until such time as the City has approved the construction drawings. Each line extension application shall be accompanied by:

- A plot plan showing the location of all lots and details relating to the proposed construction. Written proof of right-of-way and/or easement dedications shall be submitted with the plot plan unless waived by the City.

- Construction drawings showing: locations, sizes, and types of all mains, valves, hydrants, and fittings and exact distances from property lines, typical sections, topography, and profiles (where required for plan interpretation) and miscellaneous typical details.

- An estimate of the cost of construction.

- A completed environmental checklist, when required by the City, on a form provided by the City.

- An agreement by the applicant to pay the City's cost and fees incurred in the course of reviewing and processing the line extension application, enforcing obligations of the line extension applicant and otherwise incurred as a result of the line extension application.

- Late-Comer agreement proposal (if applicable).

APPLICATION REVIEW

Each application for a line extension shall be reviewed initially to ascertain whether the proposed line extension application is complete. Complete applications shall be reviewed by the City Utilities Superintendent and the City Legal Counsel in order to determine whether the proposed project will meet City construction standards and will not impair the City's ability to provide full water service to its other customers, and by the City's SEPA official, who shall determine if the proposed project complies with the City's SEPA guidelines.

Applications will then be forwarded to the City Council with recommendations. The Council will then consider the recommendations, make the necessary environmental determinations, and either order the issuance of the Applicant's line extension permit or reject the application. The issuance of a line extension permit may be made contingent upon any reasonable conditions.

APPROVAL OF PLANS

Proposed extensions of utility lines shall be constructed and installed in accordance with plans prepared by a licensed civil engineer and such plans must be approved by the City

Engineer. All such extensions must be installed in accordance with the requirements of the City. Construction and all other matters shall require approval by the City prior to construction.

POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

EXTENSIONS – WHERE TO BE CONSTRUCTED

All extensions to the existing water mains, Water Service Connections and Customer Service Lines not located upon the premises to be served shall be constructed only upon public street or alleys or parcels where the City has recorded easements for such utility purposes. Proof that the applicant has secured required easements shall be delivered to the City prior to commencing construction.

PERFORMANCE BOND

The Developer shall furnish to the City a surety bond in a form, and with a surety license to do business as a surety by the State of Washington and approved by the City and in an amount acceptable to the City, which bond shall guarantee the faithful performance of the work on the line extension, payment of all individuals or entities, including state and municipal entities and agencies, who are empowered to create a lien upon the line extension for nonpayment of obligations to those individuals or entities and the replacement of all defective material and workmanship within 1 year after acceptance of the line extension by the City. In some cases, a 2-year bond may be required because of County rules on road restoration.

AGREEMENT

The Developer shall sign an agreement, on a form issued by the City, to indemnify, defend and hold harmless the City from any and all liability for damages arising from acts done during or in the preparation for construction of the line extension.

PROOF OF INSURANCE

The Developer shall submit proof of the Applicant's comprehensive general and automobile liability and property damage insurance, before commencing work, in limits of $5,000,000 bodily injury including death, and $1,000,000 property damage protecting against all claims for personal injury or collapse or explosion damage, arising during or in preparation for construction of line extension.

COSTS AND INSPECTION DEPOSIT

Persons obtaining extensions of City water mains shall pay the City's engineering costs incurred in reviewing the plans, consultations regarding the City's requirement, inspection of the work and administration of the extension of the utility system. An

inspection and engineering fee deposit shall be paid to the City at the time application for the extension is made. The deposit shall be as calculated by the City Utility Superintendent.

Before the City will accept the completed extension, the Applicant shall pay all City costs that exceed the engineering and inspection fee deposit, and if the City's actual costs are less than the deposit, the differences shall be refunded to the Applicant.

LINE EXTENSION CONSTRUCTION

Upon receipt of the City's line extension permit, the Applicant may commence construction of the proposed line extension. In addition to being subject to any conditions placed upon the line extension permit, construction of the line extension shall be subject to the following conditions:

- The Applicant shall be responsible for paying all costs of the line extension.
- The Applicant shall procure and pay for all permits, licenses, easements, environmental notices, reports, impact statements and for the review thereof, shoreline permits, railroad and highway crossing permits and other permits or exemptions necessary for construction of the line extension.
- All taps of a line to an existing City main shall be made by City crews or under direct supervision of the City personnel, with material supplied by the owner, contractor or the City. Payment must be made in advance for this work and for any material required, if done by the City, unless prior financial arrangements have been made with the City.
- All trenches shall be inspected for proper bedding and pipe installation prior to back filling. No exceptions will be allowed.
- A hydrostatic test shall be made by the applicant under the supervision of the City.
- The City will obtain water samples after the line has been sanitized by the contractor and send them to an appropriate health department agency for testing.
- The procedures and acceptance criteria used for sanitizing the line, pressure testing the line and water testing shall conform to State and City Standards.

EXTENSION TO BE COMPLETED WITHIN 1 YEAR

The extension shall be complete and offered for acceptance within 1 year of the date for approval of the application. If the extension is not completed and offered for acceptance within 1 year from the date of approval, the Applicant's rights shall cease and they shall make new or amended application and pay the additional administrative, legal, engineering, and inspection costs.

CITY COSTS TO BE BORNE BY DEVELOPER

Any costs reasonably incurred by the City for legal services, accounting services and other services incident to the receipt, study and approval or rejection of this application shall be borne by the Developer, and the Developer agrees to pay such costs within 30 days of billing by the City. If legal proceedings are instituted to enforce any provision of this agreement, the applicant will pay a reasonable attorney's fee to the City.

DESIGN STANDARDS, PERFORMANCE STANDARDS AND SIZING CRITERIA

The City has adopted the *Standard Specifications for Road, Bridge, and Municipal Construction* by the Washington State Department of Transportation and the American Public Works Association as a standard specification and modified it as required to meet City requirements. This section is a summary of the standards used by the City for its water system. Also presented in the City's Standard Drawings and Specifications are standard detail drawing for components such as hydrants, valves, and pipe installations located in Appendix D.

WATER MAINS

Main Sizing. Water mains shall be sized to provide adequate domestic and fire flows at the required residual pressure. Fire flow minimum requirements are as specified in the City of Winlock Water System Design Standards.

The City shall be consulted as to the size of the water main. In general, the minimum size main, which will be allowed to serve the development is 6-inch diameter, if looped, or 8-inch diameter if non-looped, unless otherwise approved. Larger size mains are required in specific areas outlined in the Water System Plan. Nothing shall preclude the City from requiring the installation of a larger sized main in areas not addressed in the Plan, if the City determines that a larger size is needed to meet fire protection requirements or for future service.

Dead-end mains shall not be permitted unless specifically approved, and the distribution system to a development shall be interconnected so that pressures throughout the system will tend to become equalized under varying rates and locations of demand. If a dead-end main is approved by the City, the main shall be extended to the farthest

boundary of the development and a valved 2-inch diameter minimum blowoff shall be provided. It is not the intent to set arbitrary standards with regard to pipe sizes and layout; therefore, in special situations where it can be shown that domestic supply requirements and fire protection requirements can be met at existing and anticipated future pressures, the City will consider each design on its individual merits.

For commercial, multi-family, and industrial application the minimum main size shall be an 6-inch-diameter loop and 8-inch-diameter dead-ends are as required based on fire flow demands.

FIRE FLOW

The City's fire flow standards were adopted as part of the City's Design Standards by the Winlock City Council by City Ordinance Number 924 on August 27, 2007. A copy Ordinance 924 is included in Appendix K. The fire flow standards appear in part 4.02 Item C of the Design Standards in Appendix D. The minimum fire flow standards are as follows:

- Single-Family Residential: 500 gpm sustainable for 30 minutes at a minimum of 20 psi.
- Multi-Family Residential and Commercial: 750 gpm sustainable for 60 minutes at a minimum of 20 psi.
- Industrial: 1,000 gpm for 60 minutes at a minimum of 20 psi.

SYSTEM PRESSURES

Domestic – Minimum 30 psi at peak hour demand; Maximum 100 psi. The City recommends that customers install Pressure Reducing Valves (PRV) on private lines where necessary. The Uniform Plumbing Code requires PRVs for pressures above 80 psi.

Fire Flow Pressure Minimum is 20 psi during fire flow conditions.

Normal operating pressures of not less than 40 psi, nor more than 100 psi should be maintained at service connections to the distribution system, except that during periods of peak domestic and fire demand, the pressure shall be not less than 20 psi.

CONSTRUCTION STANDARDS (MATERIALS AND METHODS)

Specifications and standard drawings for water main extensions were prepared by the City in 2007. Copies of the Standard Specifications are included in Appendix D.

CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

ACCEPTANCE OF LINE EXTENSION

Upon certification of completion of the line extension construction by the Developer's engineer, and acceptance by the City public works director, the Applicant shall convey and transfer to the City on forms approved by the City including but not limited to warranty bill of sale, the line extension and all easements, permits, and rights necessary to run, operate and maintain the line extension.

The line extension shall not be accepted by the City until:

- Receipts of all material used, labor utilized and the cost thereof are provided the City along with receipts indicating the payment of those costs.

- "As Built" drawings are provided to the City.

- The posting of surety for maintenance for a term of 1 year.

Upon acceptance of the line extension, the City will assume ownership of the line extension and the responsibility for its operation and maintenance.

CHAPTER 8

IMPROVEMENT PROGRAM

OBJECTIVE

The objective of this chapter is to present the City of Winlock Improvement Program, which is composed of projects identified in the previous chapters. These improvements are assessed and prioritized for implementation over 10- and 20-year planning periods. The Improvement Program has been developed in conjunction with the City's financial capabilities and recommendations presented in Chapter 9, Financial Program.

The chapter includes capital improvement projects for source of supply, storage, distribution and other identified capital improvements, and non-capital improvements, including operational and administrative measures necessary to comply with regulatory requirements. The chapter provides a cost analysis, identifies the preferred alternatives for each project, and recommends a schedule for the improvements. Detailed cost estimates are included in Appendix L.

CAPITAL IMPROVEMENTS

This section addresses Capital Improvements, or improvements to physical facilities. Improvements to operations, management or planning are addressed in the following section titled *Non-Capital Improvements*.

DISTRIBUTION SYSTEM IMPROVEMENTS

Distribution system improvements are recommended for a variety of different purposes, including leakage reduction, fire flow improvement, service improvement, and expansion of service to growth areas. Water main improvements are sorted into these categories in the following sections. In addition, improvements to existing pressure reducing stations are included under Distribution System Improvements.

Leakage Reduction

As shown in Table 2-8 the Winlock water system has been leaking in the range of 30 percent to 46 percent of water production between 2007 and 2015. It is not known for certain where the leakage is occurring, however as shown in Table 1-5 the system has approximately 9 percent galvanized and steel pipe, which has a high potential to corrode through and leak. Therefore, replacement of galvanized pipe is a high priority in order to reduce system leakage. Galvanized water main replacement is identified as project D-01. Locations, lengths and sizes of galvanized water mains are listed in Table 8-1.

TABLE 8-1

Galvanized Water Mains

No.	Location	Length, feet	Existing diameter, inches
1	Gruber Street between First Street and Front Street	165	3/4
2	Rice Street between First Street and Front Street	150	3/4
3	Rice Street between First Street and Rose Street	400	3/4
4	Alder Street between First Street and Rose Street	350	3/4
5	Alder Street between First Street and Front Street	175	3/4
6	Maple Street east of First Street	250	1
7	Third Street (easement) between Ash Street and Maple Street	275	1
8	Canyon Street between First Street and Second Street and Second Street between Canyon Street and Ash Street	500	2
9	Canyon Street between First Street and Front Street	150	2
10	Front Street south of Shannon Street	600	2
11	Shannon Street between First Street and Front Street	200	3/4
12	Cedar Street between First Street and Front Street	100	3
13	Griffith Street between First Street and Front Street	150	4
14	North Street between First Street and Front Street	150	3/4
15	Soland Court	300	1
16	Lilac Avenue East of Kerron Avenue	200	2
17	Lilac Avenue between Kerron Avenue and Mill Avenue	250	2
18	Mill Avenue between Myrtle Street and Laurel Street	450	2
19	Laurel Avenue between Kerron Avenue and Mill Avenue	200	2
20	Private Driveway off Kerron Avenue south of Laurel	200	2
20a	Kerron Avenue between Fir Street and Walnut Avenue	850	1-1/4
22	Walnut Avenue between Benton Avenue and Dexter Avenue	500	2
23	Washington Avenue between Benton Avenue and Dexter Avenue	450	2
24	Dexter Avenue between Walnut Avenue and Clark Avenue	500	3/4
25	Walnut Avenue between Dexter Avenue and Shannon Lewis Lane	200	2
25a	Columbia Avenue and Grant Avenue between Shannon Lewis Lane and King Road	500	2
Total Length		**8,215**	

The City of Winlock has received approval for CDBG grant funds in the amount of $750,000 to replace galvanized water pipes. As can be seen in Table 8-1, most of the galvanized pipe is very small diameter. When the pipe is replaced, most of the pipe will be upsized. However, many of these pipes serve only one or two houses at locations where further extension of the water line is not possible. Replacement pipes are anticipated to range from 1-inch pipe to 8-inch pipe.

A preliminary estimate of the cost of replacing all of the galvanized water main is $1,353,000. Therefore, the $750,000 CDBG grant is estimated to be enough to replace approximately 55 percent of the galvanized water main. The City will prioritize galvanized water main replacement based on the areas that appear to be in the worst condition. Portions of the remaining 45 percent of the galvanized water main will be gradually replaced by City staff through leak detection and repair budget. The remainder will be replaced when additional funds become available. Galvanized water main replacement is identified as water system improvement project D-01A at an estimated cost of $750,000, and project D-01B at an estimated cost of $603,000.

Also, to further reduce system leakage, the City will perform annual leak detection and repair water system leaks as they are located. This is further discussed under the heading Water Loss Control Action Plan.

It should also be noted that all of the locations that had substandard pressure at peak hour demand conditions based on hydraulic modeling were on small diameter galvanized water mains. Replacing the small diameter galvanized water mains will also improve peak hour demand pressures.

Fire Flow Improvement

Water main improvements are identified in Chapter 3 to improve fire flow capacity, based on water system modeling. Table 8-2 lists water main projects to enhance fire flow capabilities.

TABLE 8-2

Water Main Improvement to Meet Fire Flow Standards

Project Number	Description	Length, feet	Existing Size and Material	Proposed Size	Estimated Cost
D-02	SW Campbell Street from SW Lane Street to SE First Street	420	4-inch Cast Iron	6-inch	$125,000
D-03	SW Mayer Street from SW Locust Street to SW Canyon Loop	1,200	4-inch Cast Iron	6-inch	$234,000

TABLE 8-2 - (continued)

Water Main Improvement to Meet Fire Flow Standards

Project Number	Description	Length, feet	Existing Size and Material	Proposed Size	Estimated Cost
D-04	NE First Street from Fir Street to Griffith Street	500	6-inch Cast Iron	8-inch	$125,000
D-05	Connect fire hydrant near the Cedar Village Apartments to 10″ main on north side of E Walnut Street	50	6-inch Cast Iron	6-inch PVC	$19,000
Totals			2,170		**$503,000**

Water Service Improvements

As discussed in Chapter 3, there is currently no water main on South Front Street. Lots on South Front Street tap the water main on South First Street, and many of the service lines cross the lots on the west side of South First Street to serve the lots on South Front Street. This is a significant problem for owners of lots on South Front Street when they need to repair or replace their service lines. To alleviate this problem, and to improve flow capacity to the south portion of the service area, it is proposed that a water main be installed on South Front Street from Walnut Street to Campbell Street. This improvement is summarized in Table 8-3.

TABLE 8-3

Other Water Main Improvements

Project Number	Description	Length, feet	Proposed Size	Estimated Cost
D-06	Front Street from Walnut Street to Campbell Street	3,500	6-inch	$598,000

Expansion of Service to Growth Areas

As shown in Figure 1-4, the City of Winlock has a substantial Urban Growth Area east of town along State Route 505, and Military Road, known as the East UGA. This area which includes Winlock Middle School and Winlock High School, which are currently served by their own separate water system. There are also numerous private wells and several other small water systems in the area.

It is not known at this time how this area will develop, either in terms of where future roads will be or the sequence in which it will develop. Extensions from the existing

system may gradually extend east along State Route 505 then North along Military Road, or a separate system may develop along Military Road, then eventually extend west and merge with the existing City water system. Therefore, plans for serving this area are only conceptual in nature at this time. It is anticipated that there will be additional source and additional storage facilities developed in this area. Source and storage improvements are discussed in later sections of this chapter.

Preliminary plans for serving this area were included in the City's 2008 water system plan. Similar plans are carried forward in this Plan. Water main extensions to serve this area are broken into logical phases, although actual development may or may not follow these phases or these water main alignments. A list of water main improvements to serve the East UGA are shown in Table 8-4.

TABLE 8-4

Water Main Improvements to Serve East UGA

Project Number	Description	Length, feet	Proposed Size	Estimated Cost (1)
D-07	New water main east along SR 505 from existing main at Roundtree Boulevard to Military Road	5,560	12-inch	$947,000
D-08	New water main north along Military Road from SR 505 to near north property line of parcel 015352002007	2,240	12-inch	$398,000
D-09	New water main north along Military Road from north end of project D-08, to approximate alignment of Nevil Road	2,320	12-inch	$408,000
D-10	New water main north along Military Road from north end of project D-09 to near existing private drive on parcel 015354001000	1,870	8-inch	$279,000
D-11	New water main north along Military Road from north end of project D-10 to UGA boundary	1,400	8-inch	$212,000

TABLE 8-4 - (continued)

Water Main Improvements to Serve East UGA

Project Number	Description	Length, feet	Proposed Size	Estimated Cost (1)
D-12	New water main east along SR 505 from east end of project D-07 at Military Road to Knowles Road	1,790	8-inch	$257,000
D-13	New water main north along potential extension of Knowles Road from Military Road following east property lines of parcels 015623002000, 015623001000, 015352002011, 015352002012, and 015352002013 to the north boundary of parcel 015352002013	2,470	8-inch	$318,000
D-14	New water main north along potential extension of Knowles Road, from north end of project D-13, following east property lines of parcels 015352002014, 015352002015, and 015352002016, and continuing approximately along the same alignment across parcels 015351000000 and 015350001000 to the north boundary of parcel 015350001000	2,200	8-inch	$283,000
D-15	New water main north along potential extension of Knowles Road, from north end of project D-14, partially across parcel 015354001000, roughly paralleling Interstate 5	1,600	8-inch	$210,000
D-16	New water main north along potential extension of Knowles Road, from north end of project D-15 to the north boundary of parcel 015354001000 and the UGA	1,600	8-inch	$208,000

TABLE 8-4 - (continued)

Water Main Improvements to Serve East UGA

Project Number	Description	Length, feet	Proposed Size	Estimated Cost (1)
D-17	New water main roughly along the north sides of parcels 015352002007, 015352002008, 015353002001, and 015352002013, connecting from the north end of project D-08 on Military Road to the north end of project D-13 on the potential future alignment of Knowles Road	2,680	8-inch	$339,000
D-18	New water main roughly along the north sides of parcels 015350002000 and 015350001000, connecting from the north end of project D-09 on Military Road to the north end of project D-14 on the potential future alignment of Knowles Road	2,560	12-inch	$398,000
D-19	New water main west along Nevil Road from the north end of project D-09 on Military Road to the UGA Boundary	1,050	8-inch	$143,000
D-20	New water main across parcel 015354001000, connecting from the north end of project D-10 on Military Road to the north end of project D-15 on the potential future alignment of Knowles Road	2,150	8-inch	$275,000
D-21	New water main roughly along the north border of parcel 015354001000 and the UGA, connecting from the north end of project D-11 on Military Road to the north end of project D-16 on the potential future alignment of Knowles Road	1,960	8-inch	$253,000
Totals		**33,450**		**$4,928,000**

(1) Cost estimates for future water mains do not include water service connections because it is not known how many water service connections would be served by each waterline.

Improvements to Existing Pressure Reducing Stations

As stated in Chapter 3, the City's older pressure reducing stations are in poor condition and in need of improvement. Pressure reducing stations 2 and 3 were observed to be filled with water at the time when hydrant testing was performed. Pressure reducing

stations 1, 2, 3, and 4 are all poorly accessible and lack valves and pressure gages needed to adjust the stations. Pressure reducing stations 10, 12 and 13 are newer and have better access. Pressure reducing station improvements are listed in Table 8-5.

TABLE 8-5

Pressure Reducing Station Improvements

Project Number	Description	Main Valve Size	Bypass Valve Size	Estimated Cost
PRV-01	Replace PRV Station 1	6″ PRV	2″ PRV	$105,000
PRV-02	Replace PRV Station 2	6″ PRV	2″ PRV	$105,000
PRV-03	Replace PRV Station 3	4″ PRV	1-1/2″ PRV	$95,000
PRV-04	Replace PRV Station 4	4″ PRV	1-1/2″ PRV	$95,000
Total				**$400,000**

SOURCE IMPROVEMENTS

As shown in Table 3-12, the City is projected to need additional source capacity by 2024, and if growth occurs as projected it is anticipated that the City will need approximately 600 gpm of additional source capacity by 2036. It is anticipated that two well with capacities of 300 gpm each will be developed in the City's East UGA. The City currently owns property, parcel no. 015625002002, on State Route 505 approximately 2,200 feet east of Kakela Road., on which they intend to develop one or more new wells. Also the City's 2008 water system plan indicated a site for a new well north of State Route 505 and east of Military Road on Parcel No. 015350001000. There is currently no agreement with the property owner for this use of the property, other nearby properties may also be considered for a future well site. It is estimated that developing a site, drilling and testing a new well, and equipping a new well with a pump, piping, power supply, and controls will cost approximately $326,000 per well. Table 8-6 lists proposed source improvements.

TABLE 8-6

Source Improvements

Project Number	Description	Approximate Capacity	Estimated Cost
S-01	New Well at SR 505 site, Parcel No. 015625002002	300 gpm	$326,000
S-02	New Well at East UGA site	300 gpm	$326,000
Total			**$652,000**

STORAGE IMPROVEMENTS

As shown in Table 3-15, the City is projected to need additional storage by 2025, and if growth occurs as projected it is anticipated that the City will need approximately 460,000 gallons of additional effective storage capacity by 2036. The City's 2008 water system plan indicated a site for two new reservoirs north of State Route 505 and east of Military Road on Parcel No. 015350001000, the same parcel mentioned above for a future well site. There is currently no agreement with the property owner for this use of the property, other nearby properties may also be considered for a future reservoir site. To provide for operational flexibility and to allow for phasing of improvements, it is anticipated that two reservoirs, each with an effective capacity of 230,000 gallons or more, would be constructed at the site.

There is no high ground in the project area that would allow for a reservoir to provide pressure based on elevation. Therefore, it is anticipated that a booster pump station will be required to pump from this reservoir to the water distribution system. The booster pump station will need to meet maximum day demand plus fire flow. Table 2-10 shows a projected maximum day demand of 1,319,000 for the year 2036. A minimum pump capacity of 916 gpm is required to meet that projected maximum day demand, and an additional 1,000 gpm is required to meet fire flow. Therefore the booster pump station will need to be capable of delivering approximately 2,000 gpm. Source improvements are summarized in Table 8-7.

TABLE 8-7

Water Storage Improvements

Project Number	Description	Minimum Effective Capacity	Estimated Cost
R-01	First new Reservoir at East UGA site	230,000 gallons	$529,000
P-01	Pumping Station for East UGA Reservoirs	2,000 gpm	$634,000
R-02	Second new Reservoir at East UGA site	230,000 gallons	$529,000
Total			**$1,692,000**

Locations of the identified capital improvements are shown in Figures 8-1 and 8-2.

WATER LOSS CONTROL ACTION PLAN

As discussed in Chapter 4, the City must implement a Water Loss Control Action Plan, which will consist of the following elements:

- Galvanized Water Main Replacement
- Annual Leak Detection and Repair
- Improve Water Use Accounting
- Water Meter Replacement

Galvanized Water Main Replacement

Galvanized water main replacement is addressed as project D-01 above, at an estimated total cost of $1,353,000. The City has obtained a CDBG grant for galvanized water main replacement totaling $750,000. The estimated remaining $603,000 will need to be obtained from other sources, possibly including other grants, loans, capital reserves, and/or water revenues. It is also anticipated that leak detection and repair will entail galvanized water main replacement. Financing options will be discussed in Chapter 9.

Annual Leak Detection and Repair

Leak detection surveys and subsequent repairs can generally be completed for under $10,000, depending on the method and extent of the survey and the leaks identified. However, until leaks are located and the number, size and nature of the leaks are determined, the actual cost of leak repair cannot be known. It is hoped that project D-01, galvanized water main replacement, will result in repair of many of the system leaks. To find any additional water system leaks, the City will commit an additional $10,000 per year to leak detection and repair after the galvanized water main replacement project is completed and a year has passed during which the remaining leakage rate can be assessed. Leak Detection and Repair is identified as project WLC-01.

Improve Water Use Accounting

To improve water use accounting, the City has purchased new water billing software. In addition the City will review water production and water usage records on a regular basis to assure that records are as complete and accurate as possible. No capital project is associated with this item.

Water Meter Replacement

It is generally recommended that water meters be replaced on approximately a 10-year cycle to assure water meter accuracy. As shown in Table 2-2, the City has approximately 560 water services. To replace these meters on a ten-year cycle, an average of approximately 56 water meters will need to be replaced per year. At an estimated cost $75 per meter (including parts and labor), the City would need to budget approximately $4,200 per year for the replacement of 56 water meters. As the system grows, the number of water meters that will need to be replaced annually will also eventually increase. For budgeting purposes a budget of $5,000 per year is recommended for water meter replacement. Water Meter Replacement program is identified as project WLC-02.

Water Loss Control Action Plan capital improvements are summarized in Table 8-8.

SEE INSET

INSET
SCALE: 1"=2,600'

N

0 1,300 2,600 Feet

Legend

SYSTEM FACILITIES

- WELL
- PRV
- RESERVOIR
- BOOSTER PUMP
- WATER LINES
- EXISTING RETAIL WATER SERVICE AREA
- FUTURE WATER SERVICE AREA AND RETAIL WATER SERVICE AREA

CAPITAL IMPROVMENTS

- REPLACE GI PIPE - PROJECT D-01
- CAPITAL IMPROVEMENTS
- PRV 01, 02, 03 & 04
- CITY LIMITS
- UGA

CITY OF WINLOCK

FIGURE 8-1
CAPITAL IMPROVEMENTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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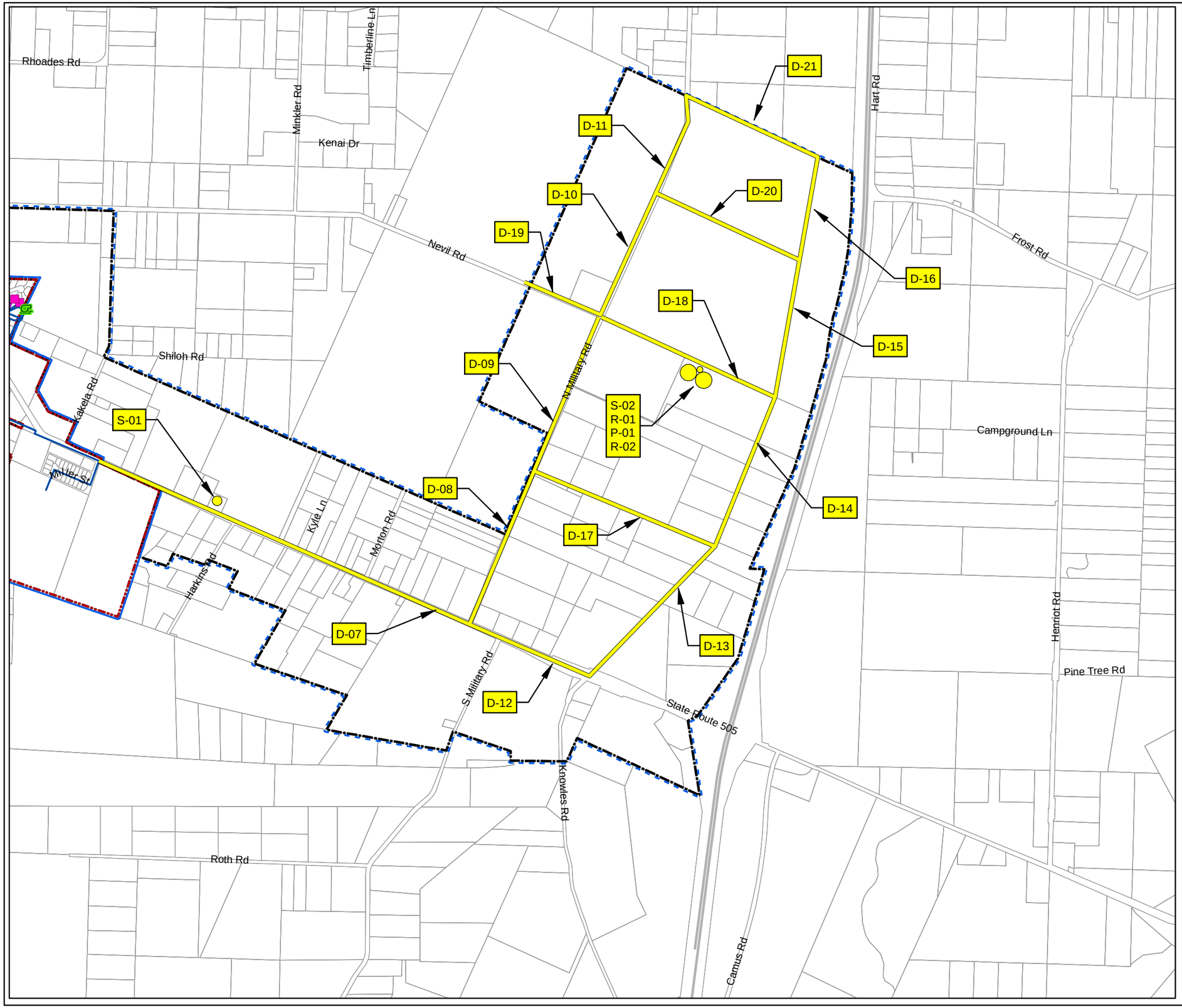

Legend

SYSTEM FACILITIES

- WELL
- PRV
- RESERVOIR
- BOOSTER PUMP
- WATER LINES
- EXISTING WATER SERVICE AREA
- FUTURE WATER SERVICE AREA AND RETAIL WATER SERVICE AREA

CAPITAL IMPROVMENTS

- REPLACE GI PIPE - PROJECT D-01
- CAPITAL IMPROVEMENTS
- CITY LIMITS
- UGA

CITY OF WINLOCK

FIGURE 8-2
CAPITAL IMPROVEMENTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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TABLE 8-8

Water Loss Control Action Plan Improvements

Project Number	Description	Estimated Cost
WLC-01	Annual Leak Detection and Repair	$10,000 per year
WLC-02	Water Meter Replacement	$5,000 per year

CAPITAL IMPROVEMENT SCHEDULES

TEN-YEAR CAPITAL IMPROVEMENTS

An overall capital improvement schedule for the ten-year planning horizon is summarized in Table 8-9. The total estimated cost of all recommended capital improvements for the 10-year planning horizon is $1,206,000. The City has obtained a $750,000 grant for galvanized water main replacement, and Cardinal Glass is contractually committed to provide the City with a new well, estimated at $326,000, so the City's estimated cost for the remaining ten-year capital improvements is $130,000.

From Table 2-9, in 2015 Winlock served an average of 560 active services. The cost of the ten-year recommended capital improvements, less the improvements funded by other parties, is $130,000. This constitutes $232.14 per active connection. Distributed evenly over the ten-year planning period, the monthly cost per connection for these improvements would be $1.93 per connection per month. Note that this would be for the identified capital improvements, and does not include operations and maintenance costs, or emergency and contingency funds.

TABLE 8-9

Ten-Year Capital Improvement Schedule

Project Number	Project Title	Purpose	Estimated Cost	Financing Source	Year
D-01A	Replace approx. 4,550 feet of Galvanized Pipe	Meet peak hour demands and reduce leakage	$750,000	CDBG	2018
WLC-01	Leak Detection and Repair	DSL reduction	$10,000	Water Sales Revenues	Annual beginning in 2019
WLC-02	Water Meter Replacement	DSL Reduction and Revenue Enhancement	$5,000	Water Sales Revenues	Annual

TABLE 8-9 – (continued)

Ten-Year Capital Improvement Schedule

Project Number	Project Title	Purpose	Estimated Cost	Financing Source	Year
S-01	New Well at SR 505 Site	Future Source Capacity Needs	$326,000	Cardinal Glass	2022
Total 10-year Capital Improvements (1)			**$1,206,000**		

(1) Project WLC-01 is $10,000 annually from 2019 through 2026 for a total of $80,000 over the 10-year planning period. Project WLC-02 is $5,000 annually for a total of $50,000 over the 10-year planning period.

TWENTY-YEAR CAPITAL IMPROVEMENTS

Twenty-year capital improvements are improvements that either will be completed beyond the 10-year planning horizon of this Water System Plan, or are improvements that will be completed by Developers at no direct cost to the City, and independently from City's improvement schedule.

Twenty-year capital improvements are summarized in Table 8-10. All 20-year capital improvements total to $8,505,000, of which it is estimated that $4,928,000 are Developer funded, and $2,018,000 are funded by water access charges, and $1,559,000 are funded by water rates and fees, or other funding sources not yet identified. These estimated costs are also based on recent bid prices for similar public works projects, and do not necessarily represent the Developer's cost for completing these projects. It should also be noted that the distribution system improvements D-07 through D-21 are only the major trunk lines into the development areas. Developers will incur additional water supply development costs to install more distribution lines in the development areas.

TABLE 8-10

Twenty-Year Capital Improvement Schedule

Project Number	Project Title	Purpose	Estimated Cost	Financing Source
D-01B	Replace approx. 3,665 feet of Galvanized Water Main	Meet peak hour demands and reduce leakage	$603,000	Water Sales Revenues
D-02	Water Main on SW Campbell Street	Meet fire flow standards	$125,000	Water Sales Revenues
D-03	Water Main on SW Mayer Street	Meet fire flow standards	$234,000	Water Sales Revenues

TABLE 8-10 – (continued)

Twenty-Year Capital Improvement Schedule

Project Number	Project Title	Purpose	Estimated Cost	Financing Source
D-04	Water Main on NE First Street	Meet fire flow standards	$125,000	Water Sales Revenues
D-05	Hydrant reconnection on E Walnut Street	Meet fire flow standards	$19,000	Water Sales Revenues
D-06	Water Main on S Front Street	Improve service along South Front Street	$598,000	Water Sales Revenues
PRV-01	Replace PRV Station 1	Improve performance and maintainability of pressure reducing stations	$105,000	Water Sales Revenues
PRV-02	Replace PRV Station 2	Improve performance and maintainability of pressure reducing stations	$105,000	Water Sales Revenues
PRV-03	Replace PRV Station 3	Improve performance and maintainability of pressure reducing stations	$95,000	Water Sales Revenues
PRV-04	Replace PRV Station 4	Improve performance and maintainability of pressure reducing stations	$95,000	Water Sales Revenues
Subtotal, Funded by Water Sales Revenues			$2,104,000	
S-02	New well in East UGA	Serve Future Growth	$326,000	Water Access Charges
R-01	New reservoir in East UGA	Serve Future Growth	$529,000	Water Access Charges
P-01	New pump station in East UGA	Serve Future Growth	$634,000	Water Access Charges

TABLE 8-10 - (continued)

Twenty-Year Capital Improvement Schedule

Project Number	Project Title	Purpose	Estimated Cost	Financing Source
R-02	New reservoir in East UGA	Serve Future Growth	$529,000	Water Access Charges
Subtotal, Funded by Access Charges			$2,018,000	
D-07	New water main on SR 505 from Roundtree Blvd. to Military Road	Serve East UGA	$947,000	Developer Funded
D-08	New water main north along Military Road from SR 505.	Serve East UGA	$398,000	Developer Funded
D-09	New water main north along Military Rd. from north end of project D-08, to Nevil Rd.	Serve East UGA	$408,000	Developer Funded
D-10	New water main north along Military Rd. from north end of project D-09.	Serve East UGA	$279,000	Developer Funded
D-11	New water main north along Military Rd. from north end of project D-10 to UGA boundary.	Serve East UGA	$212,000	Developer Funded
D-12	New Water Main east along SR 505 from Military Rd. to Knowles Rd.	Serve East UGA	$257,000	Developer Funded
D-13	New water main north from SR 505 along potential extension of Knowles Rd.	Serve East UGA	$318,000	Developer Funded

TABLE 8-10 - (continued)

Twenty-Year Capital Improvement Schedule

Project Number	Project Title	Purpose	Estimated Cost	Financing Source
D-14	New water main north along potential extension of Knowles Rd., from north end of project D-13.	Serve East UGA	$283,000	Developer Funded
D-15	New water main north along potential extension of Knowles Rd., from north end of project D-14.	Serve East UGA	$210,000	Developer Funded
D-16	New water main north along potential extension of Knowles Rd., from north end of project D-15 to the north boundary of the UGA.	Serve East UGA	$208,000	Developer Funded
D-17	New water main connecting from the north end of project D-08 to the north end of project D-13.	Serve East UGA	$339,000	Developer Funded
D-18	New water main connecting from the north end of project D-09 to the north end of project D-14.	Serve East UGA	$398,000	Developer Funded

TABLE 8-10 - (continued)

Twenty-Year Capital Improvement Schedule

Project Number	Project Title	Purpose	Estimated Cost	Financing Source
D-19	New water main on Nevil Rd. connecting from the north end of project D-09 on Military Rd., west to the UGA Boundary.	Serve East UGA	$143,000	Developer Funded
D-20	New water main connecting from the north end of project D-10 to the north end of project D-15.	Serve East UGA	$275,000	Developer Funded
D-21	New water main connecting from the north end of project D-11 to the north end of project D-16 along the north UGA Boundary.	Serve East UGA	$253,000	Developer Funded
Subtotal, Funded by Developers			$4,928,000	
Total 20-Year Capital Improvements			**$9,050,000**	

NON-CAPITAL IMPROVEMENTS

There are system needs identified in earlier chapters of this Plan that are not capital facilities improvements, but are needed to meet regulatory requirements for water resources, water conservation, and source protection. These improvements are summarized below.

WATER RIGHTS

WR-1: Acquisition of Additional Water Rights

As shown in Table 3-12, at the projected growth rate and historic use rate, the City will be running out of annual water right by 2024 and will be running out of instantaneous water right by 2032 if growth actually occurs at the GMA projected rate. Cardinal Glass has a contractual commitment to transmit additional water rights to the City, which will help to meet some of this projected demand. However, the City will need to obtain additional water rights to serve within its current Urban Growth Area.

Some of these additional water rights may be acquired by consolidating existing water rights as the City extends service to their water service area. However, in light of the time and effort that has been required to obtain water right for other nearby water systems, the City would be well advised to continue the pursuit of additional water rights. Due to unknowns of the water right acquisition and transfer process, the cost of obtaining additional water rights is highly uncertain. One thing that has become clear is that the cost of studies and analyses to support a proposed water right transfer can be significant. Also, with water rights in the Cowlitz River Basin becoming ever more scarce, the selling price for existing, documented, valid, transferable water rights is likely to increase.

For planning purposes, it is estimated that the City should plan to spend $50,000 or more for water rights acquisition, in or about the year 2022.

WATER USE EFFICIENCY MEASURES

C-1: Program Promotion

Water Use Efficiency program promotion, as required by the Water Use Efficiency Rule discussed in Chapter 4, is an ongoing effort for Winlock. Regular distribution of water conservation guidelines and publication of articles promoting conservation through Winlock's annual Consumer Confidence Reports will continue. The estimated cost for program promotion, including printing, handling, and postage costs, is estimated at $1,000 per year.

PLANNING MEASURES

P-1: Update Water System Plan

The water system plan will be due for update again in another 10 years. Assuming that professional services costs will continue to increase, the Winlock system will become more complex as it grows, and planning requirements will continue to become more comprehensive, planning costs are expected to increase. For planning purposes at this time, it is recommended that the City budget $50,000 for the next water system plan update.

SUMMARY OF NON-CAPITAL IMPROVEMENTS

Non-Capital Improvements identified above are summarized in Table 8-11, below.

TABLE 8-11

Ten-Year Non-Capital Improvement Schedule

No.	Project Title	Description	Cost Estimate	Financing Source	Year
WR-1	Water Rights Acquisition	Ongoing Efforts to Acquire Additional Water Rights	$50,000	Rates and Fees	2022
WUE-1	Water Use Efficiency Program Promotion	Distribute Water Use Efficiency Program Promotion Literature	$1,000	Rates and Fees	Annually
P-1	Water System Plan	Update Water System Plan	$50,000	Rates and Fees	2026
Total 10-Year Non-Capital Improvements (1)			**$110,000**		

(1) Project WUE-1 is estimated at $1,000 per year over ten years for a total of $10,000.

The City's historic revenues, operating expenses, capital reserves, existing rates, and rate adjustments that may be necessary to support these recommended capital and non-capital improvements are discussed in Chapter 9.

CHAPTER 9

FINANCIAL PROGRAM

OBJECTIVE

The objective of this chapter is to analyze the City's total costs of providing water service, review the current rate structure to ensure that the current or proposed adjusted rates are adequate to cover the costs of operation and maintenance, and ascertain the City's financial capability to implement the ten-year Capital Improvement Plan outlined in Chapter 8.

PAST AND PRESENT FINANCIAL STATUS

This section reviews historic revenues and expenses, recent rate changes and current City of Winlock rates.

WATER RATES

Winlock City Code Section 13.03.010 states that the water utility rate shall be set in the current published City of Winlock Rate Schedule. The City's current water rate schedule is shown in Table 9-1. Monthly base rate varies from $18.40 to $20.00 per month based on meter size, for water service inside City limits. Water service outside City limits is set at a base rate of $50.00 per month. The usage rate is constant at $1.00 per 100 CF for all customer classes and for all usage volumes, with the first 300 CF per month covered by the base rate.

TABLE 9-1

Winlock Water Rates for 2016

Service Location	Base Rate per Month	Base Usage, CF	Usage Rate Over Base, per 100 CF
Inside City, 1″ or Smaller	$18.40	300	$1.00
Inside City, 1″ to less than 2″	$19.00	300	$1.00
Inside City, 2″	$20.00	300	$1.00
Outside City	$50.00	300	$1.00

The City also charges a fire line fee for customers that maintain a separate fire line to their building. These rates range from $9.00 per month for a 2-inch or smaller fire line, to $83 per month for a 12-inch fire line, plus a fire line usage rage of $0.175 per 100 cubic feet. Fire lines outside City limits range from $11.00 for a 2-inch or smaller

fire line to $125 for a 12-inch fire line. The usage rate remains the same at $0.175 per 100 cubic feet.

NEW WATER SERVICE FEES

The City's rate schedule includes a New Water Service fee of $3,000 per residential unit inside City limits and $4,000 per residential unit outside City limits. These fees are summarized in Table 9-2.

TABLE 9-2

New Water Service Access Charges

Inside City Access Charge	Outside City Access Charge
$3,000	$4,000

In addition, City Code part 13.03.090 reads as follows:

> In addition to the forgoing rates and charges for water service, property owner shall pay the cost of installing pipes, meter boxes, pertinent meters, connections, valves, and appurtenances including materials and labor plus a 20 percent administrative fee.

So the New Water Service fee pays for access to the water system, but the actual cost of connecting is in addition to the New Water Service fee.

COMPARISON OF RATES

To assess the reasonableness of the City's water rates, water rates for several utilities in the general vicinity of the City of Winlock were evaluated. Table 9-3 summarizes water rates for typical single-family residential services for these communities. The rates in Table 9-3 represent single-family residential usage only. Other rates differ from system to system, but are roughly proportional to single-family residential rates. An amount of 793 CF is used to represent a typical single family average monthly water use rate. (1 month at the ERU use rate of 195 gallons per connection per day is approximately 793 CF.) The City of Winlock currently has the lowest rates of any of the systems evaluated, and is less than half of the average rate.

TABLE 9-3

Comparison of Water Rates with Nearby Water Utilities

Utility	Base Rate	Base Usage Amount, CF	Unit Rate per 100 CF over Base Amount	Utility Tax	Surcharge	Monthly Cost for 793 CF	Percent of Average
Winlock	**$18.40**	**300**	**$1.00**	**6%**		**$24.73**	**46.5%**
Chehalis	$17.92	0	$2.66			$39.01	73.4%
Mossyrock	$19.66	300	$3.29		$5	$40.88	76.9%
Toledo(1)	$26.93	535	$2.24	9%	$5	$40.67	76.5%
Centralia	$19.61	0	$2.91			$42.69	80.3%
Napavine	$20.00	0	$4.00	5%		$54.31	102.1%
Onalaska	$32.28	200	Varies			$54.47	102.4%
Morton(2)	$50.15	535	$2.51			$56.64	106.5%
Castle Rock	$31.40	0	$4.30			$65.50	123.2%
Vader	$43.50	0	$4.86			$82.06	154.3%
Boistfort	$74.00	0	$1.25			$83.91	157.8%

(1) Toledo's rate is $53.85 for 8,000 gallons every two months. Usage over 8,000 gallons per two months is charged $3.00 per 1,000 gallons. 8,000 gallons every two months is 534.722 CF per month, and $3.00 per 1,000 gallons is $2.24 per 100 CF.

(2) Morton's rate is $50.15 for the first 4,000 gallons per month, and $3.36 for every 1,000 gallons above 4,000 gallons. 4,000 gallons is 534.722 CF, and $3.36 per 1,000 gallons is $2.51 per 100 CF.

HISTORIC REVENUES AND EXPENDITURES

In this section we review the City's records of water system revenues and expenditures, and estimate historic water utility cash flow. The intent is to use this information in the following section to project future cash flow.

Water/Sewer Operating 401 Fund

The City of Winlock operates a combined Water and Sewer fund under the fund designation 401. The City has been more diligent in the last few years documenting what portions of the 401 fund is used for their water system and wastewater system. Water and sewer revenues and expenditures are now more clearly tracked in the 401 fund. Revenues and Expenditures that were not clearly designated as either water or sewer were apportioned between water and sewer in the same proportion as those funds that are clearly water or sewer. Only the portion of the 401 fund apportioned to water is shown in the following tables, with one exception: "Transfers Out." Table 9-5 (Summary of Historical Water Utility Expenditures) include transfers to the 407 Bond Redemption Fund that are used to pay a sewer improvement bond. This was done to provide more

balanced water and sewer rates and so the 401 fund does not appear to have substantial excess water funds available while the sewer portion of the 401 fund appear to be highly in debt. In simple terms water revenues have been subsidizing sewer improvements over the past several years in the amount of approximately $200,000 per year.

Prior to 2016 the City's water rates were higher than the sewer rates and water revenues were subsidizing sewer system expenses. The City began correcting this situation in 2016 by lowering water rates and increasing sewer rates. In addition to the 2016 water and sewer rate modification approximately $296,000 was transferred into the 401 fund during the four year period from 2012 to 2015 to cover water and sewer repairs and operations. These additional funds came from five other accounts to cover a $250,000 shortfall on the sewer side and a $46,000 shortfall on the water side over those four years.

The seven accounts that provide money to the 401 fund (for both water and sewer improvements) are shown below. The five funds with asterisks were used to transfer money into Fund 401 from 2012 to 2015 to cover shortfalls in water and sewer expenses:

1. *Miller Trust Fund Donation: This is not a City of Winlock fund, it is a trust fund donation account set up by a former Winlock resident for funding improvements needed for City infrastructure.

2. *Timber Fund: This is part of the City's general fund from money obtained from harvesting timber. $103,000 was transferred into the 401 fund in 2012 and another $20,000 was transferred into the 401 Fund in 2013 to pay for work required at the City's Wastewater Treatment Facility.

3. Bond Redemption Fund 407: This fund is used to pay off the loans and bonds related to the water and sewer utilities. Money is transferred from Fund 401 to 407 when payments are due.

4. *Bond Reserve Fund 408: This fund has monies set aside per the water and sewer bond and loan agreements. When funding agencies determined this reserve fund could be reduced by $18,000 in 2014 that amount was transferred into Fund 401.

5. *Water/Sewer Capital Improvement Fund 410: Revenues from the sale of new connections and money collected for restoring abandoned connections back to active status are put into this fund. This fund was used for both capital improvements and emergency repairs up until 2016 when the City created a new Water/Sewer Reserve Fund 404 to cover emergency repairs and maintenance costs. Fund 410 is now used only for capital improvements.

6. Water Projects Fund 416: This fund holds the money reimbursed from funding agencies for eligible work performed on grant and loan water projects. This money is then distributed out to contractors or transferred into Fund 401 to repay funds expended from that fund for eligible work.

7. *Sewer Projects Fund 417: This fund holds the money reimbursed from funding agencies for eligible work performed on grant and loan sewer projects. This money is then distributed out to contractors or transferred into Fund 401 to repay funds expended from that fund for eligible work.

The three accounts that provided additional funds to the water portion of the 401 fund were from the Miller Trust Fund Donation, the bond reserve fund 408 and the Water/Sewer Capital Improvement Fund 410. These fund transfers into the water portion of the 401 Fund are shown in Table 9-4.

Historic Revenues

Historic water related revenues are summarized in Table 9-4. Annual Water Fund revenues show a fairly steady increase over the data period, despite decreases between 2011 and 2013. As stated above, there are three sources that were used to transfer additional money into the water utility portion of the 401 fund to pay for water system repairs and improvements between 2012 and 2015. These are the Miller Trust Fund Donation, Bond Reserve Fund 408 and water/sewer Capital Improvement Fund 410. Revenues to Fund 410 came from the sale of new connections and fees charged to restore abandoned connections back to an active account. This fund was used for capital improvements and emergencies up until 2016 when the City created a new water/sewer reserve Fund 404 to cover emergency repair costs and maintenance. The 410 Fund is now used only for capital improvements.

Total revenues increased annually by 14.7 percent between 2008 and 2009 and decreased by 10.1 percent between 2012 and 2013. Total revenues increased by 35.9 percent between 2008 and 2015, an average annual revenue increase of 4.5 percent per year. Counting transfers into the water operating fund, total water fund credits increased by 42.9 percent between 2008 and 2015, and average annual rate of increase 5.2 percent per year. The percent of Total Revenue from Water Sales varied from a high of 98.6 percent in 2011 to a low of 94.7 percent in 2008. Over the 8 year data period, 96.3 percent of the water portion of the 401 Fund Total Revenues were from Water Sales. The percent of total credits from Water Sales varied from a high of 98.6 percent in 2011 to a low of 93.8 percent in 2012, due to a transfer in of $9,779 from the water and sewer capital improvements fund 410 in 2012. Over the eight year data period, 90.4 percent of the water portion of the 401 Fund credits were from Water Sales.

TABLE 9-4

Summary of Historical Water Utility Revenues

Item	2008	2009	2010	2011	2012	2013	2014	2015
Water Sales	$243,588	$281,524	$306,460	$336,194	$328,210	$294,693	$333,092	$337,559
Hydrant/Fire Maintenance Fee	$3,600	$3,600	$3,600	$0	$7,200	$3,600	$3,600	$3,600
Late Charges	$5,561	$5,226	$4,064	$4,262	$4,147	$3,749	$4,332	$4,480
Water Related Retail Sales	$0	$0	$0	$0	$102	$0	$0	$0
Water Hook-Up For Right-of-Way	$0	$0	$0	$0	$0	$0	$0	$0
Water Debt Service Cost	$0	$0	$0	$0	$0	$0	$0	$0
Utility Charges	$240	$528	$360	$464	$208	$124	$789	$2,839
Miller Trust Fund Donation	$0	$0	$0	$0	$0	$0	$3,984	$0
FEMA Share Snow Event	$0	$3,113	$0	$0	$271	$1,233	$0	$0
Investment Interest	$1,378	$382	$46	$63	$31	$20	$16	$39
Miscellaneous	$703	$0	$236	$0	$0	$0	$18	$0
New Meter Install Parts/Labor	$1,931	$179	$5,374	$0	$0	$0	$100	$0
Donations for Water Line Repairs	$0	$0	$0	$0	$0	$744	$100	$0
AWC WC Retro Program Ref.	$137	$72	$0	$121	$61	$33	$0	$0
Training Travel Reimbursement	$0	$0	$0	$0	$9	$0	$0	$0
Surplus Property	$0	$222	$0	$0	$0	$799	$367	$751
Refunds - Non Expenditure	$0	$0	$0	$0	$0	$797	$308	$274
Total Revenues	**$257,138**	**$294,847**	**$320,140**	**$341,104**	**$340,239**	**$305,792**	**$346,706**	**$349,542**
Transfer from Bond Reserve 408 Fund	$0	$0	$0	$0	$0	$0	$6,583	$0
Transfer from WS Cap Imp 410 fund	$0	$0	$0	$0	$9,779	$2,115	$6,949	$17,783
Total Transfers In	**$0**	**$0**	**$0**	**$0**	**$9,779**	**$2,115**	**$13,532**	**$17,783**
Total Credits	**$257,138**	**$294,846**	**$320,140**	**$341,104**	**$350,018**	**$307,907**	**$360,238**	**$367,325**

Historic Expenditures

Historic Expenditures are summarized in Table 9-5. Note that, unlike revenues, expenditures are not dominated so much by any single item. The single largest item is Wages and Benefits, which accounts for an average of 52.2 percent of the total operating cost. Electricity is the second highest cost at 11.3 percent of average operating cost, Excise Tax is a close third at 11.1 percent, Insurance is fourth at 6.2 percent, and Repairs and Maintenance is fifth at 4.4 percent of total operating cost. The remaining 14.8 percent of the operating expenses are distributed amongst the remaining 27 items in Table 9-5.

The highest annual expenditures for the data period were in 2015 at $176,839. The increase in expenditures was driven by several items, including increase in wages and benefit paid, increase in Office and Operating Supplies, increase in Repairs and Maintenance, and increase in Equipment Purchases. Annual increases in total expenditures varied from 10.4 percent between 2008 and 2009, to a 1.2 percent decrease in annual expenses between 2010 and 2011. The total increase in annual expenditures between 2008 and 2015 was 32.8 percent, which is an average annual increase of 4.7 percent.

TABLE 9-5

Summary of Historical Water Utility Expenditures

Item	2008	2009	2010	2011	2012	2013	2014	2015
Wages and Benefits	$78,362	$80,916	$71,644	$73,494	$77,013	$78,987	$80,171	$86,855
AWC Retro	$0	$119	$100	$117	$120	$99	$111	$118
FICA on Disability	$0	$0	$0	$43	$310	$0	$0	$0
Office and Operating Supplies	$2,744	$3,894	$2,965	$2,359	$3,746	$4,397	$4,915	$6,418
Motor Fuel	$1,240	$937	$1,132	$1,264	$1,430	$1,619	$1,787	$1,262
Advertising	$142	$280	$101	$75	$531	$0	$100	$0
Attorney Fees	$2,262	$2,262	$2,262	$2,318	$2,295	$2,262	$2,303	$2,625
Auditor	$3,315	$3,000	$3,162	$2,588	$1,461	$0	$3,644	$0
Fire Ext Maintenance	$25	$41	$41	$56	$95	$91	$0	$232
Lab Water Samples Metal	$974	$2,652	$2,369	$1,413	$1,999	$1,103	$233	$1,130
Lab Water Samples	$777	$0	$0	$2,486	$4,394	$1,522	$1,652	$984
Cell Phones	$255	$307	$561	$385	$452	$487	$493	$508
Postage	$991	$687	$962	$1,115	$1,104	$1,065	$980	$1,102
Telephone	$1,347	$1,547	$1,619	$1,799	$1,709	$1,726	$1,859	$2,164
Travel	$1,881	$105	$722	$711	$1,458	$379	$0	$59
State Water Permit	$891	$891	$891	$891	$953	$2,210	$1,316	$1,316
Rents & Leases	$277	$252	$298	$288	$264	$295	$57	$61
Insurance	$4,162	$6,528	$8,698	$9,280	$9,530	$15,253	$11,784	$9,793
Electric	$9,944	$16,730	$18,030	$17,274	$19,547	$17,480	$18,210	$18,762
Natural Gas	$196	$198	$173	$185	$149	$261	$279	$95
City Hall Water Sewer	$111	$123	$206	$201	$225	$316	$411	$328
Garbage	$262	$235	$253	$228	$227	$490	$706	$531
Repairs and Maint.	$5,563	$5,870	$3,237	$2,300	$6,696	$2,942	$12,085	$14,220
Vehicle Repairs and Maint.	$49	$455	$157	$119	$216	$687	$680	$391
Copy Machine Maint.	$0	$0	$0	$0	$0	$33	$83	$84
First Street Waterline Project	$0	$0	$0	$0	$0	$401	$663	$0
Training	$0	$0	$0	$0	$0	$370	$569	$608
B&O and Excise Tax	$10,982	$12,046	$21,062	$17,928	$16,787	$17,710	$14,819	$21,868
Underground Locates	$0	$0	$47	$57	$51	$81	$81	$76
Rent	$1,250	$1,250	$1,250	$1,250	$1,250	$1,250	$1,250	$1,250
Equipment Purchases	$0	$0	$0	$0	$0	$0	$3,984	$3,828
Reimbursable Non Expenditure	$0	$0	$0	$0	$0	$1,248	$421	$171
Total Water Expenditures	**$128,002**	**$141,325**	**$141,943**	**$140,224**	**$154,013**	**$154,765**	**$165,645**	**$176,836**
To 407 Bond Redemption Fund	$23,093	$109,134	$205,130	$194,780	$187,063	$189,070	$193,448	$204,874
Total Transfers Out	**$23,093**	**$109,134**	**$205,130**	**$194,780**	**$187,063**	**$189,070**	**$193,448**	**$204,874**
Total 401 Fund Water Debits	**$151,095**	**$250,459**	**$347,074**	**$335,005**	**$341,075**	**$343,835**	**$359,093**	**$381,710**

Historic Cash Flow

Based on the revenues and expenditures in Tables 9-4 and 9-5, the allocated water portion of the Winlock 401 Fund cash flow is summarized in Table 9-6. The total portion

of reserves in the 401 Fund that is designated for Water operations has increased from $15,997 at the beginning of 2008 to $105,370 at the end of 2015. The total reserve in the 401 Fund, including the sewer system operations portion, is summarized in Table 9-7 and has increased from $14,029 in the beginning of 2008 to $134,582 at the end of 2015.

TABLE 9-6

Summary of Historical Water Utility Cash Flow

Item	2008	2009	2010	2011	2012	2013	2014	2015
Beginning Balance	$15,997	$122,041	$166,429	$139,496	$145,595	$154,538	$118,609	$119,755
Total Revenue	$257,139	$294,847	$320,140	$341,104	$340,239	$305,792	$346,706	$349,542
Total Expenditures	$128,002	$141,325	$141,943	$140,224	$154,013	$154,765	$165,645	$176,836
Net Revenue	$129,137	$153,522	$178,197	$200,880	$186,227	$151,027	$181,061	$172,706
Transfers In	$0	$0	$0	$0	$9,779	$2,115	$13,533	$17,783
Transfers Out	$23,093	$109,134	$205,130	$194,780	$187,063	$189,070	$193,448	$204,874
Net Transfers	-$23,093	-$109,134	-$205,130	-$194,780	-$177,284	-$186,955	-$179,916	-$187,091
Ending Balance	$122,041	$166,429	$139,496	$145,595	$154,538	$118,609	$119,755	$105,370

Other Funds

Other funds potentially available for water system improvements include the 407 Bond Redemption Fund, the 408 Bond Reserve Fund, the 410 Water-Sewer Capital Improvement Fund, and the 416 Water Project Fund. The cash flows in these funds are summarized in Table 9-7.

TABLE 9-7

Summary of Other Water-Sewer Utility Fund Cash Flow

Item	2008	2009	2010	2011	2012	2013	2014	2015
401 Sewer Fund								
Beginning Balance	$14,029	$18,584	-$35,023	-$62,182	-$76,042	$46,480	$98,739	$100,907
Total Revenue	$225,496	$335,331	$528,344	$583,426	$744,174	$656,582	$624,710	$640,994
Total Expenditures	$220,941	$388,937	$555,503	$597,286	$621,652	$604,323	$622,542	$627,772
Ending Balance	$18,584	-$35,023	-$62,182	-$76,042	$46,480	$98,739	$100,907	$114,129
407 Bond Redemption Fund								
Beginning Balance	$39,633	$4,594	$29,707	$48,261	$51,092	$14,868	-$15,275	$81,607
Total Revenue	$147,764	$420,670	$618,525	$602,202	$562,549	$568,029	$694,456	$583,824
Total Expenditures	$182,803	$395,558	$599,971	$599,372	$598,772	$598,173	$597,573	$596,424
Ending Balance	$4,594	$29,707	$48,261	$51,092	$14,868	-$15,275	$81,607	$69,007
408 Bond Reserve Fund								
Beginning Balance	$86,046	$86,046	$86,046	$86,046	$155,586	$225,036	$282,911	$123,064
Total Revenue	$0	$0	$0	$69,540	$69,450	$57,875	$57,875	$11,518
Total Expenditures	$0	$0	$0	$0	$0	$0	$217,722	$0
Ending Balance	$86,046	$86,046	$86,046	$155,586	$225,036	$282,911	$123,064	$134,582

TABLE 9-7 – (continued)

Summary of Other Water-Sewer Utility Fund Cash Flow

Item	2008	2009	2010	2011	2012	2013	2014	2015
410 Water Sewer Capital Improvement Fund								
Beginning Balance	$103,307	$117,801	$28,755	$5,289	$8,657	$5,936	$1,406	$70,349
Total Revenue	$61,828	$9,919	$1,449	$3,369	$38,392	$1,956	$92,589	$7,147
Total Expenditures	$47,334	$98,966	$24,915	$0	$41,113	$6,486	$23,646	$48,815
Ending Balance	$117,801	$28,755	$5,289	$8,657	$5,936	$1,406	$70,349	$28,681
416 Water Project Fund								
Beginning Balance	$0	$0	$0	$0	$0	$0	$0	$0
Total Revenue	$0	$0	$0	$0	$0	$0	$0	$38,548
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$15,739
Ending Balance	$0	$0	$0	$0	$0	$0	$0	$22,809
Total Ending Balance, Other Funds	$227,025	$109,484	$77,414	$139,293	$292,320	$367,781	$375,927	$369,208
Total Ending Balance, All Funds (1)	$349,067	$275,914	$216,909	$284,888	$446,858	$486,390	$495,682	$474,578

(1) Includes ending balances from Water Fund from Table 9-6.

PROJECTED FUTURE FINANCIAL STATUS

In this section we estimate future water utility cash flow, assuming rates remain as currently set and scheduled, assuming growth occurs as projected, and assuming expenses increase based on currently anticipated inflation rates. First we look at projected revenues, expenditures and cash flow without the capital improvements identified in Chapter 8, and then we evaluate any additional required revenue to fund the capital improvements.

PROJECTIONS WITHOUT CAPITAL IMPROVEMENTS

The following sections project revenue, expenditures and cash flow without capital improvements.

Projected Revenues

Projected revenues are partially dependent on system growth. Revenues from water system connection fees increase while the water system customer base is increasing and revenues from water sales increase as a result of the increased customer base. While it is prudent to plan for system demands that may occur if the GMA growth rate actually occurs, it is also prudent not to plan on that growth rate for future revenue. System demands in previous chapters have been projected forward at an annual growth rate of 8.49 percent based on GMA planning goals, but historically the City's growth rate has been much lower than this. On page 2-2 it is stated that the City growth rate from 1990 through 2015 averaged 1.07 percent per year, and the City's growth rate since 2001 has

been just 0.02 percent per year. For budget planning purposes we will use the historical average annual growth of 1.07 percent to project increases in water revenues.

Revenues may also increase due to increases in water rates. In this case, the City of Winlock has no scheduled rate increases, so there are no projected revenue increases due to water rate increases in the revenue projection. In fact the City's water rates were decreased in 2016 from a base rate of $32.85 per month to a base rate of $18.40 per month, while the base volume remained at 300 cubic feet per month, and the unit rate remained the same at $1.00 per 100 cubic feet for all usage in excess of 300 cubic feet per month. Based on average day usage, the average monthly bill reduced from $40.05 per month to $24.73 per month, a decrease of 38.25 percent from previous water sales revenue for the same amount of water use. Therefore, projected water sales revenue is decreased by 38.25 percent from 2015 water sales data, then projected forward at the historic annual growth rate of 1.07 percent.

Water sales were updated with actual data from 2016 through 2019. Water Sales and Hydrant/Fire Maintenance Fee were then increased at the historical growth rate of 1.07 percent per year starting with the values for 2019. All other revenues start at the average for 2008 through 2015 from Table 9-4, and also increase at the historic growth rate. Intergovernmental Revenues, which have been essentially grants and loans, are not included in Projected Revenues without Capital Improvements. Anticipated grants and loans will be addressed separately in a later section of this chapter together with capital improvements. All projected revenues are rounded to the nearest $100. Ten-Year projected revenues are shown in Table 9-8.

TABLE 9-8

Projected Revenues with System Growth Factors

Item	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Water Sales [1]	$269,500	$259,700	$256,400	$245,900	$248,300	$250,700	$253,100	$255,500	$257,900	$260,300	$262,700	$265,100
Hydrant/Fire Maintenance Fee [2]	$3,600	$3,700	$3,700	$3,800	$3,800	$3,800	$3,900	$3,900	$4,000	$4,000	$4,000	$4,100
Late Charges [3]	$4,500	$4,600	$4,600	$4,700	$4,700	$4,800	$4,800	$4,900	$4,900	$5,000	$5,000	$5,100
Utility Charges [3]	$700	$700	$700	$700	$700	$700	$700	$800	$800	$800	$800	$800
Investment Interest [3]	$200	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
Miscellaneous [3]	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
New Meter Install Parts/Labor [3]	$1,100	$1,100	$1,100	$1,100	$1,100	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200
Donations for Waterline Repairs [3]	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
AWC WC Retro Program Ref. [3]	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Surplus Property [3]	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
Refunds - Non Expenditure [3]	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200
Totals	$280,400	$270,900	$267,600	$257,300	$259,700	$262,300	$264,800	$267,400	$269,900	$272,400	$274,800	$277,400

(1) Projected forward based on the 2015 value adjusted downward by 38.25 percent due to a rate change in 2016, and the historical annual growth rate of 1.07 percent, rounded to the nearest $100. Values for 2016 through 2019 are based on actual sales data.

(2) Projected forward based on the 2015 value and the historical annual growth rate of 1.07 percent, rounded to the nearest $100.

(3) Projected forward based on the 2008 – 2015 average and the annual system growth rate of 8.49 percent, rounded to the nearest $100.

Projected Expenditures

Utility Costs and Other Financing Uses in Table 9-9 are projected forward from either the 2015 value or from the average of 2008 through 2015 values from Table 9-5 at an assumed annual inflation rate of 1.5 percent, and/or the historic system growth rate of 1.07 percent, as indicated in the table footnotes, and rounded to the nearest $100. Projected expenditures without Capital Improvements are shown in Table 9-9.

TABLE 9-9

Projected Expenditures without Capital Improvements

Item	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Wages and Benefits [1]	$90,400	$94,200	$98,100	$102,100	$106,300	$110,700	$115,300	$120,000	$125,000	$130,100	$135,500
AWC Retro [2]	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Office and Operating Supplies [2]	$6,500	$6,600	$6,700	$6,800	$6,900	$7,000	$7,100	$7,200	$7,300	$7,400	$7,600
Motor Fuel [3]	$1,400	$1,400	$1,400	$1,400	$1,400	$1,500	$1,500	$1,500	$1,500	$1,500	$1,600
Advertising [3]	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200
Attorney Fees [2]	$2,700	$2,700	$2,700	$2,800	$2,800	$2,900	$2,900	$3,000	$3,000	$3,000	$3,100
Auditor [3]	$2,200	$2,200	$2,200	$2,300	$2,300	$2,300	$2,400	$2,400	$2,500	$2,500	$2,500
Fire Ext Maintenance [3]	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Lab Water Samples Metal [3]	$1,500	$1,500	$1,600	$1,600	$1,600	$1,600	$1,600	$1,700	$1,700	$1,700	$1,700
Lab Water Samples [3]	$1,500	$1,500	$1,500	$1,600	$1,600	$1,600	$1,600	$1,700	$1,700	$1,700	$1,700
Cell Phones [3]	$400	$400	$500	$500	$500	$500	$500	$500	$500	$500	$500
Postage [1]	$1,100	$1,200	$1,200	$1,300	$1,300	$1,400	$1,500	$1,500	$1,600	$1,700	$1,700
Telephone [2]	$2,200	$2,200	$2,300	$2,300	$2,300	$2,400	$2,400	$2,400	$2,500	$2,500	$2,500
Travel [3]	$700	$700	$700	$700	$700	$700	$700	$700	$800	$800	$800
State Water Permit [2]	$1,300	$1,400	$1,400	$1,400	$1,400	$1,400	$1,500	$1,500	$1,500	$1,500	$1,500
Rents & Leases [3]	$200	$200	$200	$200	$200	$200	$200	$300	$300	$300	$300
Insurance [2]	$9,900	$10,100	$10,200	$10,400	$10,500	$10,700	$10,900	$11,000	$11,200	$11,400	$11,500
Electric [1]	$19,500	$20,300	$21,200	$22,100	$23,000	$23,900	$24,900	$25,900	$27,000	$28,100	$29,300
Natural Gas [3]	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200
City Hall Water Sewer [2]	$300	$300	$300	$300	$400	$400	$400	$400	$400	$400	$400
Garbage [2]	$500	$500	$600	$600	$600	$600	$600	$600	$600	$600	$600
Repairs and Maintenance [1]	$14,800	$15,400	$16,100	$16,700	$17,400	$18,100	$18,900	$19,600	$20,500	$21,300	$22,200
Vehicle Repairs and Maintenance [2]	$400	$400	$400	$400	$400	$400	$400	$400	$400	$500	$500
Copy Machine Maintenance [2]	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Training [2]	$600	$600	$600	$600	$700	$700	$700	$700	$700	$700	$700

TABLE 9-9 – (continued)

Projected Expenditures without Capital Improvements

Item	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
B&O and Excise Tax [(2)]	$22,200	$22,500	$22,900	$23,200	$23,600	$23,900	$24,300	$24,600	$25,000	$25,400	$25,800
Underground Locates [(2)]	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Rent [(2)]	$1,300	$1,300	$1,300	$1,300	$1,300	$1,400	$1,400	$1,400	$1,400	$1,500	$1,500
Equipment Purchases [(2)]	$3,900	$3,900	$4,000	$4,100	$4,100	$4,200	$4,200	$4,300	$4,400	$4,400	$4,500
Reimbursable Non Expenditure [(2)]	$3,900	$3,900	$4,000	$4,100	$4,100	$4,200	$4,200	$4,300	$4,400	$4,400	$4,500
Payment to 91-04 Bond Fund [(2)]	$15,804	$15,804	$15,804	$15,804	$15,804	$15,804	$15,804	$15,804	$15,804	$15,804	$15,804
Total Water Expenditures	**$206,004**	**$212,004**	**$218,704**	**$225,404**	**$232,004**	**$239,304**	**$246,704**	**$254,204**	**$262,504**	**$270,504**	**$279,104**

(1) Projected forward based on the 2008 value, an assumed annual inflation factor of 1.5 percent, and the historic annual growth rate of 1.07 percent, rounded to the nearest $100

(2) Projected forward based on the 2015 value and an assumed annual inflation factor of 1.5 percent, rounded to the nearest $100.

(3) Projected forward based on the 2008 – 2015 average and an assumed annual inflation factor of 1.5 percent, rounded to the nearest $100.

Projected Cash Flow

Based on the preceding revenue and expenditure projections, and the previously estimated 2015 ending funds balance, projected cash flow without Capital Improvements is estimated in Table 9-10. Water funds are projected to increase to approximately $410,730 by 2025, then decrease to approximately $406,426 by 2026, as increasing expenses overtake revenues without rate increases, even without any capital improvements.

TABLE 9-10

Projected Ten-Year Cash Flow without Capital Improvements

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Beginning Balance	$105,370	$179,766	$238,662	$287,558	$319,454	$347,150	$370,146	$388,242	$401,438	$408,834	$410,730
Total Revenue	$280,400	$270,900	$267,600	$257,300	$259,700	$262,300	$264,800	$267,400	$269,900	$272,400	$274,800
Total Expenditures	$206,004	$212,004	$218,704	$225,404	$232,004	$239,304	$246,704	$254,204	$262,504	$270,504	$279,104
Net Revenue	$74,396	$58,896	$48,896	$31,896	$27,696	$22,996	$18,096	$13,196	$7,396	$1,896	($4,304)
Ending Balance	$179,766	$238,662	$287,558	$319,454	$347,150	$370,146	$388,242	$401,438	$408,834	$410,730	$406,426

PROJECTED CAPITAL IMPROVEMENTS COSTS

From Tables 8-9 and 8-11, the estimated total cost of the ten-year Capital and Non-Capital Improvement Schedule is $1,316,000, of which $1,076,000 is paid for by outside sources, including CDBG ($750,000) and Cardinal Glass ($326,000). This leaves an estimated $240,000 to be paid from City funds. Table 9-10 shows total projected revenue exceeding expenses through 2025, and expenses exceeding revenue thereafter, if no adjustments are made to rates. To pay the City's share of capital and non-capital improvements and maintain a capital reserve, the revenues will need to be enhanced by 2026. Revenue enhancements could include accelerated growth, rate increases, grants, loans, and other contributions from outside parties. However the City has little control over growth rate, and future grants, loans, and contributions from outside parties are uncertain. Therefore, it will be assumed that the additional funds will need to come from a future rate increase.

From Table 9-3 it can be seen that the City of Winlock water rates are significantly lower than the water rates of other nearby utilities. The City has recently reduced water rates because historically water revenues were subsidizing sewer utility operations, so the City raised sewer rates and lowered water rates. Water rates were lowered to make the sewer rates more palatable to the rate payers, so raising water rates at this time is politically unpopular. Therefore, any recommended water rate increases will need to wait at least a few years.

Table 9-11 shows that all ten-year capital and non-capital improvements can be completed with an estimated ending capital reserve of over $160,000 without any rate increases.

TABLE 9-11

Cash Flow with Financing of Selected Capital Improvements

Project No.	Year	Estimated Cost	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Capital Improvements												
D-01	2017	$750,000	$750,000									
WLC-01	Annual beginning in 2019	$10,000			$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
WLC-02	Annual	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
S-01	2022	$326,000						$326,000				
Total 6-Year CIP		$1,206,000	$755,000	$5,000	$15,000	$15,000	$15,000	$341,000	$15,000	$15,000	$15,000	$15,000
Non-Capital Improvements												
WR-1	2024	$50,000						$50,000				
WUE-01	Annual	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
P-1	2026	$50,000										$50,000
Total 6-Year Non-CIP		$110,000	$1,000	$1,000	$1,000	$1,000	$1,000	$51,000	$1,000	$1,000	$1,000	$51,000
Total CIP plus Non-CIP		$1,316,000	$756,000	$6,000	$16,000	$16,000	$16,000	$392,000	$16,000	$16,000	$16,000	$66,000
Beginning Balance			$179,766	$232,662	$275,558	$291,454	$303,150	$310,146	$262,242	$259,438	$250,834	$236,730
Net Revenue from Table 9-10			$58,896	$48,896	$31,896	$27,696	$22,996	$18,096	$13,196	$7,396	$1,896	($4,304)
Annual Improvements			$756,000	$6,000	$16,000	$16,000	$16,000	$392,000	$16,000	$16,000	$16,000	$66,000
Annual Rate Increase			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cumulative Rate Increase			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Average Monthly Bill with Rate Increase			$24.73	$24.73	$24.73	$24.73	$24.73	$24.73	$24.73	$24.73	$24.73	$24.73
Additional Revenue from Annual Rate Increases			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Additional Revenue from Other Sources			$750,000					$326,000				
Ending Balance			$232,662	$275,558	$291,454	$303,150	$310,146	$262,242	$259,438	$250,834	$236,730	$166,426
1/8 of Annual Operating Expenses			$26,501	$27,338	$28,176	$29,001	$29,913	$30,838	$31,776	$32,813	$33,813	$34,888

(1) Beginning balance for 2017 comes directly from Table 9-10. The beginning balances for the following years diverge from those in Table 9-10 due to projected Capital Improvements and additional revenue from projected rate increases.

(2) $750,000 in 2017 is from a CDBG Block Grant for Galvanized Water Main Replacement, and $356,000 in 2022 is from Cardinal Glass per service agreement contract with the City.

(3) One eighth of annual operating expenses are displayed here for comparison to ending fund balance for purposes of Financial Viability evaluation, which is addressed later in this chapter.

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FINANCIAL VIABILITY

According to the Department of Health, the financial health of a utility may be judged by employing the following four financial viability tests:

(1) Revenues minus Expenses ≥ 0
(2) Operating Cash Reserve ≥ 1/8 x Annual Operating Expenses
(3) Emergency Reserves ≥ Cost of the Most Vulnerable Facility
(4) Rates ≤ 1.5 percent of Median Household Income (MHI)

(1) The first Financial Viability test is that revenues minus operating expenses must be greater than or equal to zero. From Table 9-6 it can be seen that revenues exceeded expenses every year from 2008 through 2015. Table 9-10 shows that the City's revenues will continue to exceed operating costs through 2026, after which additional revenue will be required to maintain capital reserves.

(2) The second Financial Viability test is that operating cash reserves must be greater than one eighth of annual operating expenses. According to the DOH Financial Viability Manual, operating expenses do not include debt or capital costs. From Table 9-11, it can be seen by comparing the second to the bottom line, "Ending Balance," with the bottom line, "1/8 of Annual Operating Expenses," the City can implement the capital improvement program and maintain an operating cash reserve above 1/8 of annual operating expenses throughout the planning period.

(3) The third Financial Viability test requires the water utility to have an emergency reserve equal to the cost of replacing the system's most vulnerable facility. The City's insurance covers the replacement of above-ground facilities. Therefore, the most vulnerable facility that the utility would have to fund would be repairing a major water main break. From Table 9-11, with the proposed capital improvements, the capital reserves ending balance drop as low as $166,426 in 2026. The cost for a major water main repair is generally below $20,000. Therefore, the utility has the resources available to replace the system's most vulnerable facility.

(4) The fourth Financial Viability test is that water utility rates should not exceed 1.5 percent of Median Household Income (MHI) for utility service area. According to City-Data.com, the estimated 2015 annual MHI for the City of Winlock was $45,407 per year. One and one half percent of the estimated 2015 MHI is $56.76 per month. The City water rates are shown in Table 9-1, typical water bills are shown in Table 9-3. The average monthly bill for Winlock is estimated at $24.73 per month, which is more than $32 below the recommended maximum of 1.5 percent of 2014 MHI. Therefore, the City's current rates meet the fourth financial viability test.

RATE STRUCTURE ANALYSIS

The City's current rate structure includes both a Base Rate that is based on customer class, and a Unit Rate that is based on usage. From Table 9-3, a typical monthly residential water bill for the City of Winlock consists of $18.40 from the Base Rate, and $6.33 from Unit Rate, or 26 percent of the average water bill based on Unit Rate. This dependence on Unit Rate provides an incentive for water users to conserve. Over-reliance on Unit Rate could also present a risk of the water utility becoming under-funded if water customers reduce their water usage by too much. To date, this has not been a problem for the City of Winlock. According to 2015 Utility Rate Data maintained by the Association of Washington Cities, of the 55 water agencies reporting utility rates, the average base charge was $25.01 per month and the average commodity charge was $2.67 per hundred cubic feet. The City's Base Rate of $18.40 per month is below average and the City's Unit Rate of $1.00 per hundred cubic feet is also below average. The City's rate structure appears to be working well for the City and no changes to the rate structure are recommended in this plan.

CONCLUSIONS AND RECOMMENDATIONS

Based on our review of the City's water utility finances and planned capital improvements, the rate structure is sufficient to fund operations and planned capital improvements until 2026, provided that the City received the 750,000 CDBG grant for galvanized water main replacement, and $326,000 from Cardinal Glass for a new well in 2022. If grants and/or low interest loans are available, the City may be able to complete some of the 20-year capital improvements within the ten-year planning horizon. The City will evaluate a rate increase in 2025 to ensure revenues continue to meet or exceed expenses.

LIST OF APPENDICES

APPENDIX A

WATER FACILITIES INVENTORY FORMS

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 09/18/2014
Printed: 6/12/2015
WFI Printed For: On-Demand
Submission Reason: Source 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
97500 C	WINLOCK CITY	LEWIS	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS
RODNEY G. CECIL [SUPT.]
PO BOX 777
WINLOCK, WA 98596

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS
WINLOCK, CITY OF
RODNEY G. CECIL
PO BOX 777
WINLOCK, WA 98596

8. Owner Number 006696
TITLE: SUPT.

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS 323 NE FIRST ST.
CITY WINLOCK STATE WA ZIP 98596

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 520-5589	Owner Daytime Phone: (360) 785-4565
Primary Contact Mobile/Cell Phone:	Owner Mobile/Cell Phone: (360) 520-3966
Primary Contact Evening Phone:	Owner Evening Phone: (xxx) xxx-xxxx
Fax: | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed SMA NAME: _____ SMA Number:
- [ ] Managed Only
- [ ] Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
[ ] Association	[ ] County	[ ] Investor	[ ] Special District	
[x] City / Town	[ ] Federal	[ ] Private	[ ] State	596,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
97500 C	WINLOCK CITY	LEWIS	A	Comm

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANEANT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	EUREKA #1 AFM908		X										X			Y		X					55	210	NE SE	28	12N	02W
S02	InAct 04/01/1990 EUREKA #2		X											X				X					160	33	NE SE	28	12N	02W
S03	InAct 05/16/2007 ASH STREET		X										X			Y	X						56	44	NW NE	33	12N	02W
S05	WELL #603 AFM907		X										X			Y		X					119	200	NE NW	27	12N	02W
S07	BAICHTEL #1 AFM906		X												X	Y		X					112	50	NW NW	34	12N	02W
S08	EUREKA #3 AFM904		X										X			Y		X					150	50	NW SE	28	12N	02W
S09	BAICHTEL #2 AET197		X										X			Y		X					138	125	NW NW	34	12N	02W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
97500 C	WINLOCK CITY	LEWIS	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?)	0	563	Unspecified
a. Full Time Single Family Residences (Occupied 180 days or more per year)	491		
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	19		
b. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	72		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	68	68	
28. TOTAL SERVICE CONNECTIONS		631	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 1400

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?												

31. 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?	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000
b. How many days per month is water accessible to the public?	30	30	30	30	30	30	30	30	30	30	30	30

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?	700	700	700	700	700	400	400	400	700	700	700	700
b. How many days per month are they present?	30	30	30	30	30	30	30	30	30	30	30	30

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	2	2	2	2	2	2	2	2	2	2	2	2

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 08/28/2002
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Other

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
04589 L	TELLA LANE	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
ARNOLD HABERSTROH [OWNERS]
PO BOX 765
NAPAVINE, WA 98565

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS
ARNOLD HABERSTROH
PO BOX 765
NAPAVINE, WA 98565

8. Owner Number 017779
TITLE:

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 262-3634	Owner Daytime Phone:	(360) 262-3634
Primary Contact Mobile/Cell Phone:	(360) 520-2149	Owner Mobile/Cell Phone:	(360) 520-2149
Primary Contact Evening Phone:	(xxx) xxx-xxxx	Owner Evening Phone:	(xxx) xxx-xxxx
Fax:	| E-mail: XXXXXX	Owner Fax Phone:	| E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [x] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)
0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER		PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1		X										X			Y	X						157	35	NW NE	28	12N	02

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 12/08/2011
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
06046 H	SWARD #1 - 278	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
KIMBERLY S. GUBBE [WATER PURVEYOR]
921 LAKERIDGE WAY SW SUITE 301
OLYMPIA, WA 98502

7. OWNER NAME & MAILING ADDRESS
THURSTON PUD
JOHN G. WEIDENFELLER
921 LAKERIDGE WAY SW SUITE 301
OLYMPIA, WA 98502

8. Owner Number 018163
TITLE: GENERAL MANAGER

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN THURSTON PUD
ADDRESS 921 LAKERIDGE WAY SW SUITE 301
CITY OLYMPIA STATE WA ZIP 98502

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 357-8783	Owner Daytime Phone: (360) 357-8783
Primary Contact Mobile/Cell Phone: (360) 359-8554	Owner Mobile/Cell Phone: (360) 870-5885
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 357-1172 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☒ Owned and Managed — SMA NAME: THURSTON PUD — SMA Number: 147
- ☐ Managed Only
- ☐ Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)
1,000

15 Source Number	16 SOURCE NAME: 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	17 INTERTIE: INTERTIE SYSTEM ID NUMBER	18 SOURCE CATEGORY: WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	19 USE: PERMANENT	SEASONAL	EMERGENCY	20 SOURCE METERED	21 TREATMENT: NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	22 DEPTH: DEPTH TO FIRST OPEN INTERVAL IN FEET	23 CAPACITY (GALLONS PER MINUTE)	24 SOURCE LOCATION: 1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1 NO WELL TAG		X										X			Y	X						195	30	SE NW	08	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
04775 J	FOREST ACRES #2	LEWIS	B	

	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?)	0	4	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	4		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		4	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 12

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 01/07/2010
Printed: 8/3/2015
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
04775 J	FOREST ACRES #2	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
CHUCK STANFIELD [MANAGER]
141 BETHANY LANE
WINLOCK, WA 98596

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS
FOREST ACRES ASSOCIATION
CHUCK STANFIELD
141 BETHANY LANE
WINLOCK, WA 98596

8. Owner Number 019870
TITLE: MANAGER

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 785-9490	Owner Daytime Phone:	(360) 785-9490
Primary Contact Mobile/Cell Phone:	(360) 359-0195	Owner Mobile/Cell Phone:	(360) 359-0195
Primary Contact Evening Phone:		Owner Evening Phone:	(xxx) xxx-xxxx
Fax: | E-mail: XXXXXX		Owner Fax Phone: | E-mail: XXXXXX	

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [x] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)
0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 IN A FIELD	WELL IN A WELL	SPRING	SPRING IN A FIELD	SPRING IN A WELL	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1 AGN924 EAST		X										X			Y	X						140	40	NW NW	15	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
04773 H	SHILOH ROAD	LEWIS	B	

	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?)	0	4	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	4		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		4	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 10

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 06/07/2011
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Other

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
04773 H	SHILOH ROAD	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
KYLE WATSON [OWNER CONTACT]
165 SHILOH RD
WINLOCK, WA 98596

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS **8. Owner Number 031476**
SHILOH ROAD HOA
KYLE WATSON
165 SHILOH RD
WINLOCK, WA 98596
TITLE: OWNER CONTACT

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 785-3668	Owner Daytime Phone: (360) 785-3668
Primary Contact Mobile/Cell Phone: (360) 520-3707	Owner Mobile/Cell Phone: (360) 520-2707
Primary Contact Evening Phone:	Owner Evening Phone: (xxx) xxx-xxxx
Fax: | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [x] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)
0

15 Source Number	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22 DEPTH	23	24 SOURCE LOCATION			
	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 GROUNDWATER UNDER INFLUENCE	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1 AGN940		X										X			Y	X						157	34	SE SE	27	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
04589 L	TELLA LANE	LEWIS	B	

	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?)	0	6	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	6		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		6	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 12

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
06046 H	SWARD #1 - 278	LEWIS	B	

	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?)	0	4	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	4		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		4	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per 10

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 08/11/2015
Printed: 11/30/2016
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
06131 T	BAY, JACK	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 008610
JENNIFER A. DICKINSON [MANAGER] TRI-COUNTY WATER 1162 NW STATE AVE CHEHALIS, WA 98532	JACK BAY PO BOX 130 WINLOCK, WA 98596	
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**	
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 748-3805		Owner Daytime Phone: (360) 269-4683	
Primary Contact Mobile/Cell Phone: (360) 520-5677		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax: (360) 748-8343	E-mail: xxxxxxxxxxxxxxxxxxxx	Fax:	E-mail: xxxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

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)

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	SOURCE NAME 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 INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	Well #1		X										X				X						108	27	NE SE	35	12N	02W
S02	Well #2		X										X			N	X						0	48	NE SE	35	12N	02W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
06131 T	BAY, JACK	LEWIS	B	

	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?)		13	Undetermined
A. Full Time Single Family Residences (Occupied 180 days or more per year)	13		
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	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		13	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 21

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?												

31. 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												

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: _____ DATE: _____

PRINT NAME: _____ TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 07/14/2014
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Reactivate

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
06519 X	WOODBRIDGE GARDENS	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 035209
JEREMY MOHNEY [WAREHOUSE MANAGER] 739 NEVIL RD WINLOCK, WA 98596	MICHAEL MARIETTA 1500 E. 27TH TERRACE PITTSBURGH, KS 66762	TITLE:
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP	**STREET ADDRESS IF DIFFERENT FROM** ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 785-0859	Owner Daytime Phone: (800) 766-1277
Primary Contact Mobile/Cell Phone: (620) 704-3632	Owner Mobile/Cell Phone: (620) 704-3097
Primary Contact Evening Phone:	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 785-3748 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

0

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	SOURCE NAME 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 INTERTIE SYSTEM ID NUMBER	WELL	WELL IN A FIELD	WELL IN A WELL FIELD	SPRING	SPRING IN A SPRING FIELD	SPRING IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
501	WELL #1 AEF644		X										X			Y	X						175	66	NE SE	27	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
06519 X	WOODBRIDGE GARDENS	LEWIS	B	

	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?)	0	0	0
a. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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.	1	1	1
28. TOTAL SERVICE CONNECTIONS		1	1

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 0

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?												

31. 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?						1	1	1				
b. How many days per month is water accessible to the public?						15	15	15				

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?	3	3	5	7	15	25	5	3	3	3	3	3
b. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

33. ROUTINE COLIFORM SCHEDULE	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 01/19/2005
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Annual 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
06522 K	FISHER WATER SYTEM	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 019913
WILLARD FISHER [OWNER] PO BOX 42 WINLOCK, WA 98596	WILLARD FISHER PO BOX 42 WINLOCK, WA 98596	TITLE:
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS 113 WINTEROAD RD CITY WINLOCK STATE WA ZIP 98596	**STREET ADDRESS IF DIFFERENT FROM** ATTN ADDRESS 113 WINTEROAD RD CITY WINLOCK STATE WA ZIP 98596	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 785-4690	Owner Daytime Phone: (360) 785-4690
Primary Contact Mobile/Cell Phone:	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax: | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [x] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL 1		X									X					X						125	0	SW SW	33	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
06522 K	FISHER WATER SYTEM	LEWIS	B	

	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?)	0	3	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	3		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		3	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per 8

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 12/08/2011
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
06696 K	ANTRIM - 378	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS

KIMBERLY S. GUBBE [WATER PURVEYOR]

921 LAKERIDGE WAY SW SUITE 301
OLYMPIA, WA 98502

7. OWNER NAME & MAILING ADDRESS — **8. Owner Number 018163**

THURSTON PUD
TITLE: GENERAL MANAGER

JOHN G. WEIDENFELLER
921 LAKERIDGE WAY SW SUITE 301
OLYMPIA, WA 98502

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN THURSTON PUD
ADDRESS 921 LAKERIDGE WAY SW SUITE 301
CITY OLYMPIA STATE WA ZIP 98502

STREET ADDRESS IF DIFFERENT FROM

ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 357-8783	Owner Daytime Phone:	(360) 357-8783
Primary Contact Mobile/Cell Phone:	(360) 359-8554	Owner Mobile/Cell Phone:	(360) 870-5885
Primary Contact Evening Phone:	(xxx) xxx-xxxx	Owner Evening Phone:	(xxx) xxx-xxxx
Fax:(360) 357-1172	| E-mail: XXXXXX	Owner Fax Phone:	| E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☒ Owned and Managed — SMA NAME: THURSTON PUD — SMA Number: 147
- ☐ Managed Only
- ☐ Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1 AGP259		X										X			Y	X						120	30	NW NW	15	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
06696 K	ANTRIM - 378	LEWIS	B	

	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?)	0	6	6
a. Full Time Single Family Residences (Occupied 180 days or more per year)	6		
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		6	6

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per 12

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 06/30/2003
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Non-Periodic

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
06707 W	WEYER, MARK	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
RICHIE L. GALL [MANAGER]
TRI-COUNTY WATER
1162 NW STATE AVE
CHEHALIS, WA 98532-0813

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS
MARK WEYER
PO BOX 345
WINLOCK, WA 98596

8. Owner Number 020063
TITLE:

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 748-3805	Owner Daytime Phone:	(360) 785-0775
Primary Contact Mobile/Cell Phone:	(360) 520-9519	Owner Mobile/Cell Phone:	
Primary Contact Evening Phone:	(xxx) xxx xxxx	Owner Evening Phone:	(xxx) xxx-xxxx
Fax:(360) 740-9715 | E-mail: XXXXXX		Owner Fax Phone: | E-mail: XXXXXX	

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)
0

15 Source Number	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22 DEPTH	23	24 SOURCE LOCATION			
	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 A SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1 AGN978		X										X			Y	X						130	30	NW NW	15	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
06707 W	WEYER, MARK	LEWIS	B	

	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?)	0	2	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	2		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		2	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 18

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 3
Updated: 05/20/2013
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
06991 C	LEWIS COUNTY FOREST PRODUCTS LLC	LEWIS	A	NTNC

6. PRIMARY CONTACT NAME & MAILING ADDRESS
PHILIP F. JOHNSON [OWNER]
LONGBELL VENTURES LLC
154 HALE RD E.
WINLOCK, WA 98596-0427

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN LEWIS COUNTY FOREST PRODUCTS LLC
ADDRESS 154 HALE RD E.
CITY WINLOCK STATE WA ZIP 98596-0427

7. OWNER NAME & MAILING ADDRESS
LONGBELL VENTURES LLC
PHILIP F. JOHNSON
154 HALE RD E
WINLOCK, WA 98596-0427

8. Owner Number 030073
TITLE: OWNER

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 785-3915	Owner Daytime Phone:	(360) 785-3915
Primary Contact Mobile/Cell Phone:	(503) 931-5146	Owner Mobile/Cell Phone:	(503) 931-5746
Primary Contact Evening Phone:		Owner Evening Phone:	(xxx) xxx-xxxx
Fax:(360) 785-4172	| E-mail: XXXXXX	Owner Fax Phone:	| E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] Managed Only
- [ ] Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [ ] Agricultural
- [x] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [x] Investor
- [ ] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons): 0

15	16	17	18									19			20	21						22	23	24			
Source Number	SOURCE NAME 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 INTERTIE SYSTEM ID NUMBER	SOURCE CATEGORY WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	USE PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	TREATMENT NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	SOURCE LOCATION 1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	InAct 01/12/2005 Well #1 AFS007 6"		X									X				X						96	20	SW SW	09	12N	02
S02	Well #2 AKS510 8"		X									X			N	X						120	25	SW SW	09	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
06991 C	LEWIS COUNTY FOREST PRODUCTS LLC	LEWIS	A	NTNC

	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?)	0	1	0
a. Full Time Single Family Residences (Occupied 180 days or more per year)	1		
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.	2	2	3
28. TOTAL SERVICE CONNECTIONS		3	3

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 4

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?												

31. 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?	31	31	31	31	31	31	31	31	31	31	31	31
b. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	1	1	1	1	1	1	1	1	1	1	1	1

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 04/09/2012
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
07844 K	WHISPERING FIRS 1	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 019658
RICHIE L. GALL [MANAGER] TRI-COUNTY WATER 1162 NW STATE AVE CHEHALIS, WA 98532-0813	NORTHBAY WATER UTILITY CORP JENNIFER A. DICKINSON 1162 NW STATE AVE CHEHALIS, WA 98532-1813	TITLE: WFI CONTACT
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP	STREET ADDRESS IF DIFFERENT FROM ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 748-3805	Owner Daytime Phone: (360) 748-3805
Primary Contact Mobile/Cell Phone: (360) 520-9519	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 740-9715 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons): 0

15 Source Number	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22 DEPTH	23	24 SOURCE LOCATION			
	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 IN SPRING FIELD	SPRING IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
501	Well #1 AGN913		X										X			Y	X						140	32	NW NW	22	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
07844 K	WHISPERING FIRS 1	LEWIS	B	

	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?)	0	1	5
a. Full Time Single Family Residences (Occupied 180 days or more per year)	1		
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		1	5

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 1

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

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

ONE FORM PER SYSTEM

Quarter: 0
Updated: 04/09/2012
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
07846 L	WHISPERING FIRS 3	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
RICHIE L. GALL [MANAGER]
TRI-COUNTY WATER
1162 NW STATE AVE
CHEHALIS, WA 98532-0813

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS
NORTHBAY WATER UTILITY CORP
JENNIFER A. DICKINSON
1162 NW STATE AVE
CHEHALIS, WA 98532-1813

8. Owner Number 019658
TITLE: WFI CONTACT

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 748-3805	Owner Daytime Phone: (360) 748-3805
Primary Contact Mobile/Cell Phone: (360) 520-9519	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx) xxx xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 740-9715 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)
0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	InAct 05/14/2002 W FIRS 3 WELL 3			X								X			Y	X						140	31	NW NW	22	12N	02
S02	Well #1 ABF069		X									X			Y	X						140	31	NW NW	22	12N	02
S03	InAct 05/14/2002 GENERIC WW No				X							X			N	X						0	0			00N	00E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
07846 L	WHISPERING FIRS 3	LEWIS	B	

	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?)	0	1	5
a. Full Time Single Family Residences (Occupied 180 days or more per year)	1		
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		1	5

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per 2

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S02

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 12/08/2011
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
08272 L	PLATT 2 511	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS

KIMBERLY S. GUBBE [WATER PURVEYOR]

921 LAKERIDGE WAY SW SUITE 301
OLYMPIA, WA 98502

7. OWNER NAME & MAILING ADDRESS

THURSTON PUD

JOHN G. WEIDENFELLER
921 LAKERIDGE WAY SW SUITE 301
OLYMPIA, WA 98502

8. Owner Number 018163

TITLE: GENERAL MANAGER

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN THURSTON PUD
ADDRESS 921 LAKERIDGE WAY SW SUITE 301
CITY OLYMPIA STATE WA ZIP 98502

STREET ADDRESS IF DIFFERENT FROM

ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 357-8783	Owner Daytime Phone:	(360) 357-8783
Primary Contact Mobile/Cell Phone:	(360) 359-8554	Owner Mobile/Cell Phone:	(360) 870-5885
Primary Contact Evening Phone:	(xxx) xxx-xxxx	Owner Evening Phone:	(xxx) xxx-xxxx
Fax:(360) 357-1172	| E-mail: XXXXXX	Owner Fax Phone:	| E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☒ Owned and Managed — SMA NAME: THURSTON PUD — SMA Number: 147
- ☐ Managed Only
- ☐ Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

1,780

15 Source Number	16 SOURCE NAME (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	17 INTERTIE (INTERTIE SYSTEM ID NUMBER)	18 SOURCE CATEGORY: WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING IN SPRING FIELD	SPRING IN GALLERY-INFILTRATION SYSTEM	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	19 USE: PERMANENT	SEASONAL	EMERGENCY	20 SOURCE METERED	21 TREATMENT: NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	22 DEPTH: DEPTH TO FIRST OPEN INTERVAL IN FEET	23 CAPACITY (GALLONS PER MINUTE)	24 SOURCE LOCATION: 1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1 AFC758 PLATT		X										X			Y	X						380	6	SE SE	08	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
08272 L	PLATT 2 511	LEWIS	B	

	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?)	0	6	6
a. Full Time Single Family Residences (Occupied 180 days or more per year)	6		
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		6	6

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per year: 15

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 02/21/2002
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Non-Periodic

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
01268 0	BEARSE WATER WORKS	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
WILLIAM BEARSE [MANAGER]
416 SR 505
WINLOCK, WA 98596

7. OWNER NAME & MAILING ADDRESS — **8. Owner Number 008061**
BEARSE WATER WORKS
TITLE: OWNER ORG - PRIMARY CONTACT
NEED PRIMARY CONTACT OWNER ORG 008061 BEARSE WATER WORKS
416 SR 505
WINLOCK, WA 98596

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 785-3039	Owner Daytime Phone:
Primary Contact Mobile/Cell Phone:	Owner Mobile/Cell Phone:
Primary Contact Evening Phone:	Owner Evening Phone:
Fax: | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [x] Investor
- [ ] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)
0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	Well 01		X										X				X						145	22	SW NW	34	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
01268 0	BEARSE WATER WORKS	LEWIS	B	

	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?)	0	2	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	2		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		2	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 5

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 02/08/2005
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Annual 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
02311 9	LEWIS CO AREA 3 SHOP	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
MARK R. COOK [COUNTY ENGINEER]
350 N MARKET BLVD
CHEHALIS, WA 98532-2626

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS
LEWIS COUNTY PUBLIC WORKS
TIM ELSEA
2025 NE KRESKY AVE
CHEHALIS, WA 98532

8. Owner Number 006075
TITLE: DIRECTOR

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 740-1122	Owner Daytime Phone: (360) 740-1123
Primary Contact Mobile/Cell Phone:	Owner Mobile/Cell Phone: (360) 269-5909
Primary Contact Evening Phone:	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 740-1479 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] Managed Only
- [ ] Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [x] County
- [ ] Investor
- [ ] Special District
- [ ] City / Town
- [ ] Federal
- [ ] Private
- [ ] State

14. STORAGE CAPACITY (gallons)
0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1		X												X		X						137	0	SW NE	09	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
02311 9	LEWIS CO AREA 3 SHOP	LEWIS	B	

	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?)	0	0	0
a. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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.	1	1	1
28. TOTAL SERVICE CONNECTIONS		1	1

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 0

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?												

31. 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?	14	14	14	14	14	20	20	20	14	14	14	14
b. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

33. ROUTINE COLIFORM SCHEDULE	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 05/17/2005
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Annual 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
31225 H	HARKINS ROAD H20 SYSTEM	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 002426
VICKIE REICH [MANAGER] 142 HARKINS RD WINLOCK, WA 98596	HARKINS RD WATER SYSTEM VICKIE REICH 142 HARKINS RD WINLOCK, WA 98596	TITLE: MANAGER
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP	STREET ADDRESS IF DIFFERENT FROM ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 785-4332	Owner Daytime Phone: (360) 785-4332
Primary Contact Mobile/Cell Phone:	Owner Mobile/Cell Phone:
Primary Contact Evening Phone:	Owner Evening Phone: (xxx) xxx-xxxx
Fax: | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [x] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	Well #1 AKK602		X										X				X						141	25	SW NE	34	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
31225 H	HARKINS ROAD H20 SYSTEM	LEWIS	B	

	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?)	0	3	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	3		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		3	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per 8

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 10/20/2004
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Annual 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
34198 X	HOPE GRANGE	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
VICTORIA M. LANTAU [SMA 125]
PACIFIC WATER SYSTEMS
PO BOX 780
NAPAVINE, WA 98565

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS 333 N PRAIRIE RD
CITY CHEHALIS STATE WA ZIP 98532

7. OWNER NAME & MAILING ADDRESS
HOPE GRANGE
STEVE PORTER
250 SE WINCHESTER HILL DR
CHEHALIS, WA 98532

8. Owner Number 002647
TITLE: MANAGER

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 262-9580	Owner Daytime Phone: (360) 740-0447
Primary Contact Mobile/Cell Phone: (360) 623-5104	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 266-8100 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: Pacific Water Systems, Inc. SMA Number: 125

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)
0

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
501	Well #1		X									X				X						0	0	NE NE	16	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
34198 X	HOPE GRANGE	LEWIS	B	

	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?)	0	0	0
a. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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.	1	1	1
28. TOTAL SERVICE CONNECTIONS		1	1

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per 3

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?												

31. 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?	500	500	500	500	500	500	500	500	500	500	500	500
b. How many days per month is water accessible to the public?	30	30	30	30	30	30	30	30	30	30	30	30

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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 03/27/2008
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Annual 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
04774 1	FOREST ACRES #1	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
KATHERINE NIEMI [OWNER]
PO BOX 787
WINLOCK, WA 98596

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS **8. Owner Number 018499**
KATHERINE NIEMI
PO BOX 787
WINLOCK, WA 98596
TITLE:

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 785-9465	Owner Daytime Phone: (360) 785-9465
Primary Contact Mobile/Cell Phone:	Owner Mobile/Cell Phone:
Primary Contact Evening Phone:	Owner Evening Phone: (xxx) xxx-xxxx
Fax: | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [x] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)
0

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 IN GROUP	WELL IN A WELL FIELD	SPRING	SPRING IN SPRING FIELD	SPRING IN GALLERY	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
501	WELL #1 AGN923 WEST		X										X			Y	X						140	33	NW NW	15	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
04774 1	FOREST ACRES #1	LEWIS	B	

	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?)	0	4	Undetermined
a. Full Time Single Family Residences (Occupied 180 days or more per year)	4		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		4	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per 12

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 10/06/2005
Printed: 11/30/2016
WFI Printed For: On-Demand
Submission Reason: Annual 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
66606 E	SHOOK DUPLEXES	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 031641
DAN GODAT [OWNERS] 463 TENNESSEE RD WINLOCK, WA 98596	DAN GODAT 463 TENNESSEE RD WINLOCK, WA 98596	
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: (360) 785-4919		Owner Daytime Phone: (360) 785-4919	
Primary Contact Mobile/Cell Phone: (360) 520-9044		Owner Mobile/Cell Phone: (360) 520-9044	
Primary Contact Evening Phone:		Owner Evening Phone:	
Fax:	E-mail: xxxxxxxxxxxxxxxxxxxx	Fax:	E-mail: xxxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☒ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☐ Managed Only
- ☐ Owned Only

SMA NAME: _____ SMA Number:

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)

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	SOURCE NAME 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 INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL #1 NO TAG ID #		X										X			N	X							0	SW NW	35	12N	02W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
66606 E	SHOOK DUPLEXES	LEWIS	B	

	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?)		2	Undetermined
A. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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	1		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	2		
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)	1	1	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	
28. TOTAL SERVICE CONNECTIONS		3	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 4

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?												

31. 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?	75	75	75	75	75	100	100	100	75	75	75	75
B. How many days per month is water accessible to the public?	20	20	20	20	20	20	20	20	20	20	20	20

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?	5	5	5	5	5	5	5	5	5	5	5	5
B. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290												

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: _____ DATE: _____

PRINT NAME: _____ TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 04/09/2012
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
07845 3	WHISPERING FIRS 2	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
RICHIE L. GALL [MANAGER]
TRI-COUNTY WATER
1162 NW STATE AVE
CHEHALIS, WA 98532-0813

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS **8. Owner Number 019658**
NORTHBAY WATER UTILITY CORP
JENNIFER A. DICKINSON
1162 NW STATE AVE
CHEHALIS, WA 98532-1813
TITLE: WFI CONTACT

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 748-3805	Owner Daytime Phone: (360) 748-3805
Primary Contact Mobile/Cell Phone: (360) 520-9519	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx) xxx xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 740-9715 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

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)
0

15 Source Number	16 SOURCE NAME (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)	17 INTERTIE (INTERTIE SYSTEM ID NUMBER)	18 SOURCE CATEGORY: WELL	WELL FIELD	WELL IN A WELL	SPRING	SPRING FIELD	SPRING IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	19 USE: PERMANENT	SEASONAL	EMERGENCY	20 SOURCE METERED	21 TREATMENT: NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	22 DEPTH: DEPTH TO FIRST OPEN INTERVAL IN FEET	23 CAPACITY (GALLONS PER MINUTE)	24 SOURCE LOCATION: 1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	InAct 05/14/2002 W FIRS 2 WELL #1				X								X			Y	X						140	32	NW NW	22	12N	02
S02	WELL 1		X										X			Y	X						140	32	NW NW	22	12N	02
S03	InAct 05/14/2002 GENERIC WW				X								X			N	X						0	0			00N	00E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
07845 3	WHISPERING FIRS 2	LEWIS	B	

	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?)	0	2	6
a. Full Time Single Family Residences (Occupied 180 days or more per year)	2		
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		2	6

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per ^ 2

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S02

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

Washington State Department of Health
Drinking Water Program

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 2
Updated: 04/22/2014
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: No Change

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
88381 Q	TIMBERLANE MOBILE HOME PARK	LEWIS	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 006047
VICTORIA M. LANTAU [SMA 125] PACIFIC WATER SYSTEMS PO BOX 780 NAPAVINE, WA 98565	ROBERT S. SMARZ 4216 NW 118TH CIR VANCOUVER, WA 98685	TITLE:
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS 333 N PRAIRIE RD CITY CHEHALIS STATE WA ZIP 98532	**STREET ADDRESS IF DIFFERENT FROM** ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 262-9580	Owner Daytime Phone: (360) 896-8063
Primary Contact Mobile/Cell Phone: (360) 623-5104	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 266-8100 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: Pacific Water Systems, Inc. SMA Number: 125

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

0

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
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 SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	WELL #1 AFS020		X										X			Y	X						80	60	SE NE	27	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
88381 Q	TIMBERLANE MOBILE HOME PARK	LEWIS	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?)	0	17	20
a. Full Time Single Family Residences (Occupied 180 days or more per year)	17		
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		17	20

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per ___63___

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?												

31. 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
	1	1	1	1	1	1	1	1	1	1	1	1

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 3
Updated: 10/02/2014
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: SMA 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
23953 8	EVALINE SCHOOL	LEWIS	A	NTNC

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 001805
VICTORIA M. LANTAU [MANAGER] PACIFIC WATER SYSTEMS PO BOX 780 NAPAVINE, WA 98565	EVALINE SCHOOL CHRISTINA L. BRADSHAW 111 SCHOOL HOUSE RD WINLOCK, WA 98596	TITLE: MANAGER
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS 333 N PRAIRIE RD CITY CHEHALIS STATE WA ZIP 98532	**STREET ADDRESS IF DIFFERENT FROM** ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (360) 262-9580	Owner Daytime Phone: (360) 785-3460
Primary Contact Mobile/Cell Phone: (360) 623-5104	Owner Mobile/Cell Phone: (360) 520-2076
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(360) 266-8100 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: Pacific Water Systems, Inc. SMA Number: 125

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

0

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	InAct 09/20/2010 Well #1 ABR976		X									X				X						84	10	SE NW	09	12N	02
S02	Well #2 APA131		X									X			Y	X						93	32	NE SW	09	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
23953 8	EVALINE SCHOOL	LEWIS	A	NTNC

	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?)	0	0	0
a. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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.	1	1	1
28. TOTAL SERVICE CONNECTIONS		1	1

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per ^ 0

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?												

31. 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?	50	50	50	50	50	50	1	1	50	50	50	50
b. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	1	1	1	1	1	1	0	0	1	1	1	1

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 3
Updated: 04/23/2014
Printed: 11/30/2016
WFI Printed For: On-Demand
Submission Reason: Source 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
56555 2	WINLOCK HIGH SCHOOL	LEWIS	A	NTNC

6. PRIMARY CONTACT NAME & MAILING ADDRESS

LEROY A. ZWEIFELHOFER [MAINT. SUPV.]
241 N MILITARY RD
WINLOCK, WA 98596

7. OWNER NAME & MAILING ADDRESS

WINLOCK SCHOOL DIST 232
SHANNON CRISS — SUPERINTENDENT
241 N MILITARY RD
WINLOCK, WA 98596

8. OWNER NUMBER: 003920

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

Primary Contact Daytime Phone: (360) 880-7771
Primary Contact Mobile/Cell Phone: (360) 880-7771
Primary Contact Evening Phone: (xxx)-xxx-xxxx
Fax: (360) 864-3104 E-mail: xxxxxxxxxxxxxxxxxxxx

10. OWNER CONTACT INFORMATION

Owner Daytime Phone: (360) 785-3582
Owner Mobile/Cell Phone: (360) 508-1670
Owner Evening Phone:
Fax: (360) 864-3101 E-mail: xxxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

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
- [x] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [ ] Private
- [x] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

2,000

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	SOURCE NAME 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 INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL #1 AFS001 WW				X								X			Y		X					34	100	SW SE	26	12N	02W
S02	WELL #2 BBP638 WW				X								X			Y		X					137	100	SW SE	26	12N	02W
S03	WF(S01,S02) CT6 Required			X									X			Y		X					34	200	NW NE	35	12N	02W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
56555 2	WINLOCK HIGH SCHOOL	LEWIS	A	NTNC

	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?)		0	0
A. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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.	4	4	1
28. TOTAL SERVICE CONNECTIONS		4	1

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 0

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?												

31. 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?	400	400	400	400	400	400	4	4	400	400	400	400
B. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

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	0	0	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: _____ DATE: _____

PRINT NAME: _____ TITLE: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 08/11/2015
Printed: 11/30/2016
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
AA904 F	BAY II	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 008610
JENNIFER A. DICKINSON [MANAGER] TRI-COUNTY WATER 1162 NW STATE AVE CHEHALIS, WA 98532	JACK BAY PO BOX 130 WINLOCK, WA 98596	
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: (360) 748-3805		Owner Daytime Phone: (360) 269-4683	
Primary Contact Mobile/Cell Phone: (360) 520-5677		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax: (360) 748-8343	E-mail: xxxxxxxxxxxxxxxxxxxx	Fax:	E-mail: xxxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

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)

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT							22	23	24 SOURCE LOCATION			
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 INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL #1 AGN983		X										X			N	X							126	48	NE SE	35	12N	02W
S02	WELL #2 AGN982 BAY I INTERTIE 06131		X												X	N	X							108	27	NE SE	35	12N	02W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
AA904 F	BAY II	LEWIS	B	

	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?)		9	9
A. Full Time Single Family Residences (Occupied 180 days or more per year)	9		
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		9	9

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 22

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?												

31. 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												

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: _____ DATE: _____

PRINT NAME: _____ TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

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

ONE FORM PER SYSTEM

Quarter: 0
Updated: 11/02/2006
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: Annual 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
AA928 C	WINLOCK SEVENTH DAY ADVENTIST	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
MARK MERRILL [HEAD ELDER]
439 HAYWIRE RD
WINLOCK, WA 98596

7. OWNER NAME & MAILING ADDRESS
WESTERN WA CORPORATION OF SDA
KEITH STEFFENSEN
PO BOX 1337
SHELTON, WA 98584

8. Owner Number 031016
TITLE: PROPERTY MANAGER

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS 201 W. SHELTON VALLEY RD.
CITY SHELTON STATE WA ZIP 98584

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 266-0347	Owner Daytime Phone:	(360) 426-4198
Primary Contact Mobile/Cell Phone:	(360) 480-7900	Owner Mobile/Cell Phone:	(206) 437-1880
Primary Contact Evening Phone:		Owner Evening Phone:	(xxx) xxx-xxxx
Fax:	| E-mail: XXXXXX	Owner Fax Phone:	| E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed — SMA NAME: _____ SMA Number:
- [ ] 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
- [x] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [x] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons): 0

15	16	17	18										19			20	21						22	23	24			
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	SPRING	SPRING FIELD	SPRING IN SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
501	WELL #1AFT869		X										X			N	X						180	0		21	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
AA928 C	WINLOCK SEVENTH DAY ADVENTIST	LEWIS	B	

	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?)	0	0	Unapproved
a. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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	
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	2	2	
28. TOTAL SERVICE CONNECTIONS		2	

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per: 0

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?												

31. 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?	175	175	175	175	175	175	175	175	175	175	175	175
b. How many days per month is water accessible to the public?	8	8	8	8	8	8	8	8	8	8	8	8

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?	1	1	1	1	1	1	1	1	1	1	1	1
b. How many days per month are they present?	8	8	8	8	8	8	8	8	8	8	8	8

33. ROUTINE COLIFORM SCHEDULE	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 02/06/2007
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: New System

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
AA861 3	JACK BELL	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
VICTORIA M. LANTAU [SMA 125]
PACIFIC WATER SYSTEMS
PO BOX 780
NAPAVINE, WA 98565

7. OWNER NAME & MAILING ADDRESS
JACK BELL
380 ST RT 505
WINLOCK, WA 98596

8. Owner Number 030922
TITLE:

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS 333 N PRAIRIE RD
CITY CHEHALIS STATE WA ZIP 98532

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 262-9580	Owner Daytime Phone:	(360) 785-4671
Primary Contact Mobile/Cell Phone:	(360) 623-5104	Owner Mobile/Cell Phone:	(360) 520-4251
Primary Contact Evening Phone:	(xxx) xxx-xxxx	Owner Evening Phone:	(xxx) xxx-xxxx
Fax:(360) 266-8100	E-mail: XXXXXX	Owner Fax Phone:	E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: Pacific Water Systems, Inc. SMA Number: 125

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)
0

15	16	17	18										19			20	21					22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT					DEPTH		SOURCE LOCATION			
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 A SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF.	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
501	WELL #1 AHL310		X										X				X						118	60	SE NE	34	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
AA861 3	JACK BELL	LEWIS	B	

	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?)	0	2	6
a. Full Time Single Family Residences (Occupied 180 days or more per year)	2		
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		2	6

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per year: 5

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?												

31. 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	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

Washington State Department of Health
Drinking Water

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 0
Updated: 04/16/2013
Printed: 8/3/2015
WFI Printed For: On-Demand
Submission Reason: New System

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
AD022 E	GOOD QUARRY	LEWIS	B	

6. PRIMARY CONTACT NAME & MAILING ADDRESS
RICHIE L. GALL [MANAGER]
TRI-COUNTY WATER
1162 NW STATE AVE
CHEHALIS, WA 98532-0813

STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS
GOOD CRUSHING, INC.
ALAN & PAMELA GOOD
265 RUPP RD.
TOLEDO, WA 98591

8. Owner Number 034805
TITLE: OWNERS

STREET ADDRESS IF DIFFERENT FROM
ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:	(360) 748-3805	Owner Daytime Phone:	(360) 751-6980
Primary Contact Mobile/Cell Phone:	(360) 520-9519	Owner Mobile/Cell Phone:	
Primary Contact Evening Phone:	(xxx) xxx-xxxx	Owner Evening Phone:	(xxx) xxx-xxxx
Fax:(360) 740-9715	| E-mail: XXXXXX	Owner Fax Phone:	| E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☐ Owned and Managed
- ☒ Managed Only
- ☐ Owned Only

SMA NAME: TRI COUNTY WATER SMA Number: 138

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)
0

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE				TREATMENT						DEPTH		SOURCE LOCATION			
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 SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
01	Well #1 AKW228 6"		X									X			N	X						160	0	NW SE	08	12N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
AD022 E	GOOD QUARRY	LEWIS	B	

	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?)	0	0	0
a. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
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)	2	2	2
b. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	1	1	1
28. TOTAL SERVICE CONNECTIONS		3	3

29. FULL-TIME RESIDENTIAL POPULATION

a. How many residents are served by this system 180 or more days per year: 0

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?												

31. 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?	200	200	200	200	200	200	200	200	200	200	200	200
b. How many days per month is water accessible to the public?	20	20	20	20	20	20	20	20	20	20	20	20

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?	3	3	3	3	3	3	3	3	3	3	3	3
b. How many days per month are they present?	20	20	20	20	20	20	20	20	20	20	20	20

33. ROUTINE COLIFORM SCHEDULE	Take one sample every 12 months

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
			S01

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: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

APPENDIX B

WELL LOGS

Well #603

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. 62-25856

(1) OWNER: Name TOWN OF WINLOCK Address WINLOCK WASH.

(2) LOCATION OF WELL: County LEWIS ~~NE~~ ¼ ~~NW~~ ¼ Sec ~~27~~ 27 T. 12 N., R. 2W W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☑
Irrigation ☐ Test Well ☐ Other ☐

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

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 170 ft. Depth of completed well 166 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from 0 ft. to 156 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☑ " Diam. from ft. to ft.

Perforations: Yes ☑ No ☐
Type of perforator used MILLS KNIFE
SIZE of perforations ¼ in. by 3 in.
16 perforations from 101 ft. to 106 ft.
12 perforations from 110 ft. to 112 ft.
92 perforations from 119 ft. to 155 ft.

Screens: Yes ☐ No ☑
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☑ No ☐ To what depth? 25 ft.
Material used in seal CEMENT & BENTONITE
Did any strata contain unusable water? Yes ☐ No ☑
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 70 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 WINLOCK
Was a pump test made? Yes ☑ No ☐ If yes, by whom? CITY
Yield: 200 gal./min. with 4 ft. drawdown after 6 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 30 gal./min. with 0 ft. drawdown after 4 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
CLAY - YELLOW	0	55
CONGLOMERATE - YELLOW	55	80
SAND & GRAVEL - 10 G.P.M.	80	92
CONGLOMERATE - YELLOW	92	101
SAND & GRAVEL - 20 G.P.M.	101	106
CONGLOMERATE - YELLOW	106	110
HEAVY SAND - 20 G.P.M.	110	112
CONGLOMERATE - YELLOW	112	119
SAND & GRAVEL - WATER BEARING CONTINOUSLY	119	155
CLAY BLUE	155	170

Work started 10-1, 19 79 Completed 5-7, 19 80

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 BRANK DRILLING (Person, firm, or corporation) (Type or print)
Address WINLOCK WASH.
[Signed] Kenneth C. Brank (Well Driller)
License No. 0040 Date , 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Well Tagging Form

Unique Well Tag No: ABR980

RECORD VERIFICATION (check ✓one)

☒ Well Report available (please attach this form to the well report and submit it to the Ecology Regional Office near you).
If a well report is not available, please complete a "Water Well Report for an Existing Well" form. This form is available at Ecology's headquarters office. **Do not use this form for wells that do not have a Water Well Report.**

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

First Name: City of Winlock Last Name: _____

Street Address: PO Box 777

City: Winlock State: WA 98596

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address: _____

City: Winlock County: Lewis

T. 12 N. R. 2 W W.M. Sec. 27 SW ¼ of the SW

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)*
☐ Location marked on air photo *(please attach)*

FOR AGENCY USE ONLY

WELL CHARACTERISTICS

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

See attached well log

Location of Well identification Tag:

Casing

Was supplemental tag need 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
1200' west + 6000' north of South Quarter of

SECTION 27

COMMENTS:

FOR ECOLOGY WATER RESOURCES PROGRAM ONLY

Water Right # G2-25856 Date Issued 3/16/81

Circle One: Application Permit (Certification) Claim Exempt

Eureka #1 well

WATER WELL REPORT
FOR AN EXISTING WELL

WASHINGTON STATE DEPARTMENT OF ECOLOGY

INSTRUCTIONS:
Use this form only if an original water well report was NEVER filed or is MISSING from Ecology records. Your well must be properly tagged prior to submitting this form. Please fill in all blanks as completely as possible. If information is not known, leave blank. After completing, mail the original form to: Wa State Dept of Ecology, PO Box 47600, Olympia, WA, 98504-7600, ATTN: Marian Bruner.

CURRENT USE: ☐ Domestic ☐ Industrial ☒ Municipal
☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other_____

DIMENSIONS: Diameter of well 8 inches.
Depth of completed well 55 ft. if known.

CONSTRUCTION DETAILS
Liner Installed ☐ Yes ☐ No ☒ Unknown
TYPE: ☐ PVC ☐ Steel ☐ Concrete Liner ☐ Other ☒ Unknown

Perforations: ☐ Yes ☐ No ☒ Unknown
SIZE of perfs____in. by____in. and no. of perfs_____ from _____ft. to _____ft.

Screens: ☐ Yes ☐ No ☒ Unknown Mfr's Name _____
TYPE: ☐ Stainless Steel ☐ PVC ☐ Other
Diam._____Slot Size_____from_____ft. to_____ft.

Gravel/Filter packed: ☐ Yes ☐ No ☒ Unknown
Materials placed from_____ft. to_____ft.

Surface Seal: ☒ Yes ☐ No ☐ Unknown If known, to what depth ? ft
Materials used if known: ☐ Bentonite ☒ Cement

PUMP: ☒ Yes ☐ No Mfr's Name FAIRBANKS-HORSE
Type: VLS - VERTICAL LINESHAFT TURBINE HP 10 HP

WATER LEVELS: Land-surface elevation above mean sea level_____ft.
Static level_____ft. below top of casing Date measured_____
Artesian pressure_____lbs. per square inch Date measured_____
Well head has cap? ☒ Yes ☐ No Shut off valve? ☒ Yes ☐ No

WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? ☐ Yes ☐ No If yes, attach copy
☒ Unknown
Yield:_____gal./min. with_____ft. drawdown after_____hrs.

Unique Ecology Well ID Tag No. AFM 902
Water Right? If yes, attach copy ☒ Yes ○ No
Property Owner Name CITY OF WINLOCK WINLOCK CITY WATER
Well Street Address _____
City WINLOCK, WA County: LEWIS
Tax Parcel No. 6350-000-000

LOCATION
An accurate location of your well is very important. The Township, Range, Section and 1/4, 1/4 can be found on your legal description or through your county asessor's office.

Sec 28 Twn 12N R02W EWM or WWM (circle one)

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

This square represents one section of land, which is approx 640 acres. Within this section, circle the letter that best represents the location of the well within this section.

Lattitude/Longitude **NOTE: Section, Township, Range still REQUIRED**
Lat Deg _____ Lat Min/Sec _____
Long Deg _____ Long Min/Sec _____
☐ GPS ☐ Survey
☐ Topographic Map ☐ Computer Generated

Additional Information, if available:
☐ Location marked on topographic map (please attach)
☐ Location marked on air photo (please attach)

SITE LOCATION TAKEN (GPS) BY DAVE NAVY DEPARTMENT OF ECOLOGY JULY 2003 DURNING SITE VISIT, CHECKING WELL TAGS - WATER RIGHT TRANSFER.

CERTIFICATION: The information reported above is true to the best of my knowledge and belief.

☐ Driller ☐ Engineer ☐ Property Owner ☒ Other

Name GARY LACY ~~Drilling Company~~ CITY OF WINLOCK
Signature GARY LACY
Driller License No. _____
Date Signed 8-15-03

Address of person completing this form:
P.O. BOX 777
City, State, Zip WINLOCK, WASH 98596-0777

Original - Ecology

Ecology is an Equal Opportunity Employer.

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. 024359

Water Right Permit No. _____

(1) OWNER: Name City of Winlock Address P.O. Box 7, Winlock, Wa. 98596

(2) LOCATION OF WELL: County Lewis SE ¼ SE ¼ Sec. 28 T. 12 N., R. 2W W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Unknown

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater ☐ Industrial ☐ Test Well ☐ Municipal ☐ Other ☒

(4) TYPE OF WORK: Owner's number of well (if more than one) Eureka #1

Abandoned ☒ New well ☐ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☒ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.

Drilled 0 feet. Depth of completed well 2 ft.

(6) CONSTRUCTION DETAILS: Not Changed

Casing installed: _____ " Diam. from _____ ft. to _____ ft.

Welded ☐ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.

_____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☒ No ☐

Type of perforator used air rotary

SIZE of perforations .1 in. by 1 in.

~1045 perforations from 2 ft. to 51 ft.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____

Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☐ No ☐ To what depth? _____ ft.

Material used in seal _____

Did any strata contain unusable water? Yes ☐ No ☐

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 _____ 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 ☐ 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 _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(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
Abandonment consisted of:		
1. perforating		
2. pumping 39 sacks cement grout from 54' TD to approx 2'.		
3. capping with welded steel plate		
Note: well has concrete pump pedestal around casing.		

Work started 6/9, 19. Completed 6/9, 19 89

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 Schneider Equipment, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 21881 River Rd., NE St. Paul, OR 9713

(Signed) Stephen D. Schneider (WELL DRILLER) License No. 0643

Contractor's Registration No. SCHNEI*226LG Date 6/14, 19 89

(USE ADDITIONAL SHEETS IF NECESSARY)

SCT 0002

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. 024361

Water Right Permit No. _____

(1) OWNER: Name City of Winlock Address P.O. Box 7, Winlock, Wa. 98596

(2) LOCATION OF WELL: County Lewis NE ¼ of SE¼ Sec. 28 T. 12 N., R. 2W W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) unknown

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other XX ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) Eureka #2

Abandoned XX ☐ New well ☐ Method: Dug ☐ Bored ☐ ☐ Deepened ☐ Cable ☐ Driven ☐ ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches. Drilled 0 feet. Depth of completed well 5 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: _____ " Diam. from _____ ft. to _____ ft.

Welded ☐ _____ " Diam. from _____ ft. to _____ ft.

Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☒ No ☐

Type of perforator used air rotary

SIZE of perforations .1 in. by 1 in.

~1088 perforations from 2 ft. to 52 ft.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____

Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☐ No ☐ To what depth? _____ ft.

Material used in seal _____

Did any strata contain unusable water? Yes ☐ No ☐

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 _____ 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 ☐ 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 _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(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
Abandonment consisted of:		
1. perforating		
2. pumping 51 sacks cement grout from 57' TD to approx 5'.		
3. capping with welded steel plate		
Note: Well has concrete pump pedestal around casing.		

Work started 6/5/89 19. Completed 6/6 19 89

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 Schneider Equipment, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 21881 River Rd., NE St. Paul, OR 97137

(Signed) Stephen Schneider (WELL DRILLER) License No. 0643

Contractor's Registration No. SCHNEI*226LG Date 6/14 19 89

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/82) 1329 3

CCT 9910

Eureka #3 Well

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

WELL LOG No. Appli.4657

Date Sept., 19 57

Record by well driller

Source driller's record

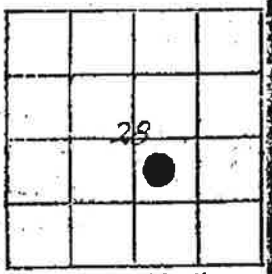

Diagram of Section

Location: State of WASHINGTON

County Lewis

Area

~~Blk~~ Blk.4, Eureka Add.

~~XXXXXXXX~~ sec. 28 T. 12 N., R. 2 ~~E~~ W.

Drilling Co. K & M Well Drilling Co.

Address Centralia, Wash.

Method of Drilling Date , 19

Owner Town of Winlock, Wash.

Address

Land surface, datum ft above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Brown clay	85	85
	Brown clay, boulders gravel sand cemented	29	114
	Loose gravel boulders & sand, water bearing	10	124
	Blue clay - soft shale	26	150
	PUMP TEST:		
	Dim. 150'x8"		
	SWL: 110'4"		
	DD: 15 ft.		
	Yield: 60 g.p.m.		
	Water Temp. 50° F.		
	CASING: 8" diam. Std. steel pipe from 0 to 122'10"		
	Cast steel shoe on the casing.		
	PERFORATIONS: 8 per ft. ½"x1½" from 114 to 122 ft.		

Turn up

Sheet ____ of ____ sheets

The Department of Ecology does not warrantee the data shown on this well report.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Well Tagging Form

Unique Well Tag No: AFM904

RECORD VERIFICATION (check ✓one)

☒ Well Report available (please attach this form to the well report and submit it to the Ecology Regional Office near you).
If a well report is not available, please complete a "Water Well Report for an Existing Well" form. This form is available at Ecology's headquarters office. **Do not use this form for wells that do not have a Water Well Report.**

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

First Name: City of Winlock Last Name: _____

Street Address: PO Box 777

City: Winlock State: WA

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address: So. of Hemlock St., between Third + Fourth Sts

City: Winlock County: _____

T. 12 N. R. 2 W W.M. Sec. 28 NW ¼ of the SE

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)*
☐ Location marked on air photo *(please attach)*

Eureka #3 Well

WATER WELL REPORT
FOR AN EXISTING WELL

WASHINGTON STATE DEPARTMENT OF ECOLOGY

INSTRUCTIONS:
Use this form only if an original water well report was NEVER filed or is MISSING from Ecology records. Your well must be properly tagged prior to submitting this form. Please fill in all blanks as completely as possible. If information is not known, leave blank. After completing, mail the original form to: Wa State Dept of Ecology, PO Box 47600, Olympia, WA, 98504-7600, ATTN: Marian Bruner.

CURRENT USE: ☐ Domestic ☐ Industrial ☒ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

DIMENSIONS: Diameter of well 8 inches. Depth of completed well 150' ft. if known.

CONSTRUCTION DETAILS
Liner Installed ☒ Yes ☐ No ☐ Unknown
TYPE: ☐ PVC ☒ Steel ☐ Concrete Liner ☐ Other ☐ Unknown

Perforations: ☐ Yes ☐ No ☐ Unknown
SIZE of perfs ___ in. by 1½" in. and no. of perfs 8 from 114 ft. to 122 ft.

Screens: ☐ Yes ☐ No ☒ Unknown Mfr's Name _____
TYPE: ☐ Stainless Steel ☐ PVC ☐ Other
Diam. _____ Slot Size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☐ No ☒ Unknown
Materials placed from _____ ft. to _____ ft.

Surface Seal: ☐ Yes ☐ No ☒ Unknown If known, to what depth _____ ft
Materials used if known: ☐ Bentonite ☐ Cement

PUMP: ☒ Yes ☐ No Mfr's Name FRANKLIN
Type: SUBMERSIBLE H.P. 7.5

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 110'4" ft. below top of casing Date measured 4-1957
Artesian pressure UNKNOWN lbs. per square inch Date measured ____
Well head has cap? ☐ Yes ☐ No Shut off valve? ☐ Yes ☐ No

WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? ☒ Yes ☐ No If yes, attach copy ☐ Unknown
Yield: 60 gal./min. with 15' ft. drawdown after UNKNOWN hrs.

Unique Ecology Well ID Tag No. AFM904
Water Right? If yes, attach copy ☒ Yes ○ No
Property Owner Name CITY OF WINLOCK
Well Street Address _____
City WINLOCK, WA County: LEWIS
Tax Parcel No. _____

LOCATION
An accurate location of your well is very important. The Township, Range, Section and 1/4, 1/4 can be found on your legal description or through your county asessor's office.

Sec 28 Twn 12N R 2W EWM or WWM *circle one*

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

This square represents one section of land, which is approx 640 acres. Within this section, circle the letter that best represents the location of the well within this section.

Lattitude/Longitude NOTE: Section, Township, Range still REQUIRED
Lat Deg _____ Lat Min/Sec _____
Long Deg _____ Long Min/Sec _____
☐ GPS ☐ Survey
☐ Topographic Map ☐ Computer Generated

Additional Information, if available:
☐ Location marked on topographic map (please attach)
☐ Location marked on air photo (please attach)

SITE LOCATION TAKEN (GPS) BY DAVE NAZY DEPARTMENT OF ECOLOGY JULY 2003 DURING SITE VIST. CHECKING WELL TAGS - WATER RIGHT TRANSFER

CERTIFICATION: The information reported above is true to the best of my knowledge and belief.

☐ Driller ☐ Engineer ☐ Property Owner ☒ Other

Name GARY LACY Drilling Company CITY OF WINLOCK
Signature GARY LACY Address of person completing this form:
Driller License No. WATER-WASTEWATER OPERATOR P.O. BOX 777
Date Signed 8-15-03 City, State, Zip WINLOCK, WA 98596-0777

Original - Ecology

Ecology is an Equal Opportunity Employer

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. 024358

Water Right Permit No. _____

(1) OWNER: Name City of Winlock Address P.O. Box 7, Winlock, Wa. 98596

(2) LOCATION OF WELL: County Lewis NE ¼ of SE ¼ Sec. 28 T. 12 N., R. 2W W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) unknown

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☒ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) _____

Abandoned ☒ New well ☐ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 0 feet. Depth of completed well 0 ft.

(6) CONSTRUCTION DETAILS:

Casing Installed: _____" Diam. from _____ ft. to _____ ft.
Welded ☐ _____" Diam. from _____ ft. to _____ ft.
Liner installed ☐
Threaded ☐ _____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☒ No ☐
Type of perforator used air rotary
SIZE of perforations .1 in. by 1 in.
~2688 perforations from 0 ft. to 126 ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☐ No ☐ To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? Yes ☐ No ☐
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 _____ 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 ☐ 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 _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(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
Abandonment consisted of		
1. perforating		
2. pumping 158 sacks cement grout		
from 350' TD to approx 5'.		
3. removing approx. 3' of casing		
from +1.5' to -1.5'.		
4. backfilling to top of cement		
with soil to ground level.		

Work started 5/30/89, 19. Completed 5/31, 19 89

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 Schneider Equipment, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 21881 River Rd., NE St. Paul, OR. 9713

(Signed) Stephen D. Schneider (WELL DRILLER) License No. 0643

Contractor's Registration No. SCHNEI*226LG Date 6/14, 19 89

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 060-1-20 (10/87) -1329- 3

SCT 0907

(1) OWNER: Name J E B Address Ft. [illegible]

(2) LOCATION OF WELL: County Lewis Govt. Lot. ¼ ¼ Sec. 34 T 12 N. R 2W W.
Bearing and distance from section or subdivision corner 700' E. & 500' S. of the NW Cor. Sec. 34

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

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

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 151 ft. Depth of completed well 151 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10 " Diam. from 0 ft. to 102 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [X] " 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 [ ]
Manufacturer's Name Johnson
Type Ful-Flo Model No.
Diam. 9 Slot size 50 from 112 ft. to 130 ft.
Diam. Slot size 100 from 131 ft. to 136 ft.
Casing Detail, Screen 9"

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

Surface seal: Yes [X] No [ ] To what depth? 25 ft.
Material used in seal cement Grout
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 64 ft. below top of well Date 11-2-72
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.
"Customer Request Not Make."
"Test Pumping At Later Date."

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 120 gal./min. with 10 ft. drawdown after 1 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
Top soil	0	1
Clay Red	1	2
Clay Yellow	2	67
Clay, Gravel (cemented)	67	85
Sand Cemented	85	107
Sand & Gravel cemented	107	112
Gravel & Coarse Sand		
Water Bearing	112	121
Clay & gravel Cemented	121	129
Sand & Gravel Tight	129	132
Gravel Packed & Coarse		
Sand Water Bearing	132	136
Gravel & Clay Cemented	136	142
Clay & gravel Hard	138	142
Sand & Clay Tight	142	146
Clay, Blue	146	151

Work started 10-1 19 72 Completed 11-2 19 72

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 Williams Well Co. Inc.
(Person, firm, or corporation) (Type or print)

Address Ft. [illegible]

[Signed]
(Well Driller)

License No. Date 11-2 19 72

(USE ADDITIONAL SHEETS IF NECESSARY)

OK Cwm 5-8-75

S. F. No. 7356—OS—(Rev. 4-71).

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Well Tagging Form

Unique Well Tag No: AFM906

RECORD VERIFICATION (check ✓one)

☒ Well Report available (please attach this form to the well report and submit it to the Ecology Regional Office near you).
If a well report is not available, please complete a "Water Well Report for an Existing Well" form. This form is available at Ecology's headquarters office. **Do not use this form for wells that do not have a Water Well Report.**

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

First Name: City of Winlock Last Name: _____

Street Address: PO Box 777

City: Winlock State: WA 98596

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address: Cemetery Rd

City: Winlock County: Lewis

T. 12 N. R. 2 (W) W.M. Sec. 34 NW ¼ of the NW¼

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)*
☐ Location marked on air photo *(please attach)*

FOR AGENCY USE ONLY

WELL CHARACTERISTICS

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

See attached well log

Location of Well identification Tag:

on casing

Was supplemental tag need 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

Well located 500' S. & 700' east of Northwest Corner of SECTION 34

COMMENTS:

FOR ECOLOGY WATER RESOURCES PROGRAM ONLY

Water Right # G2-26206 Date Issued 7/30/82

Circle One: Application Permit Certification Claim Exempt

Water Right Permit # G 2-26206P 98330

WATER WELL REPORT State of Washington
Start Card No. M 134632
Unique Well # AET 197

(1) OWNER: City of Winlock Address: PO Box 777 Winlock, WA 98596

(2) LOCATION OF WELL: County Lewis NW 1/4, NW 1/4, Sec. 24 ,T 12N R 2W WM.
(2a) STREET ADDRESS OF WELL. (or nearest address) WWW2 Cemetary Rd. Winlock, WA Tax Parcel # 6526-7

(3) PROPOSED USE: Municipal

(4) TYPE OF WORK: New Owner's number of well (if more than one)
Method: Air rotary

(5) DIMENSIONS: Diameter of well: 10 inches
Drilled 238 ft. Depth of completed well: 238 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10 " Dia. from +2 ft. to 146 ft.
" Dia. from ft. to ft.
" Dia. from ft. to ft.

Perforations: No
Type of perforator used:
Size of perforations: in. by in.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes
Manufacturer's name: Farwest
Type: Schedule 40 flush joint mill slotted
Dia. 8 5/8" slot size: blank from 138 ft. to 178 ft.
Dia 8 5/8" slot size: .060 from 178 ft. to 218 ft.
Dia. 8 5/8" slot size: blank from 218 ft. to 238 ft.
Dia. slot size: from ft. to ft.

Gravel packed: No Size of gravel:
Gravel placed from. ft. to ft.

Surface seal: Yes To what depth: 40 ft.
Material used in seal: Cement
Did any strata contain unusable water? No
Type of water: Depth of strata:
Method of sealing strata off:

PUMP: Manufacturers name:
Type: Size: H.P.:

(8) WATER LEVELS: Land-surface elevation above mean sea level: ft.
Static level: 72 ft. below top of well Date: 6/29/2001
Artesian pressure: lbs. per sq. in. Date:
Controlled by:

(9) WELL TESTS: Drawdown is amount water level is lowered below static water level.
Was a pump test made? No If yes, by whom:
Yield: GPM with ft. drawdown after hrs.
GPM with ft. drawdown after hrs.
Date of test: / /
Bailer test: GPM w/ ft. drawdown after hrs.
Air test: 100 GPM w/stem set at 235 ft. for 2 hrs.
Artesian flow: GPM Temp: o Chemical analysis:No

(10) WELL LOG

MATERIAL	FROM	TO
Topsoil	0	2
Clay, yellowish red	2	28
Clay, yellow w/gravel	28	113
Sand & gravel	113	124
Clay, yellow w/gravel	124	136
Gravel & sand, yellow	136	146
Sandrock, gray	146	178
Sandrock, black, water bearing	178	225
Shalerock, hard, blue	225	238

RECEIVED
JUL 19 2001
Washington State Department of Ecology

Work Started: 6/18/2001 Completed: 6/29/2001

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 the best of my knowledge and belief.

NAME: WILLIAMS WELL DRILLING, INC.
ADDRESS: 957 Jackson Hwy. So.
Toledo, Wa. 98591 Phone: 864-2951

(Signed)
Willie Williams
License No. 2470 Date: 7/09/201
Cont. Reg. No. WILLIWD251R3

APPENDIX C

WATER RIGHTS DOCUMENTS

City of Winlock
PO Box 777
Winlock WA 98596-0777

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT
Superseding

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Winlock
PO Box 777
Winlock WA 98596-0777

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 29, 1963	6697	6444	5333

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, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	TRIBUTARY OF (IF SURFACE WATERS)
4 Wells	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	175	224

QUANTITY/TYPE OF USE/PERIOD OF USE

144 Acre-feet per year	(Primary)	Municipal supply	Year-round, as needed
80 Acre-feet per year	(Non-additive)	Municipal supply	Year-round, as needed

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
N/A	N/A	12	2W	26	Lewis

PARCEL # 006303000000, 006526007000, 015384011000

ADDITIONAL LEGAL IS ON PAGE 2

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
N/A	N/A	N/A	N/A	26	Lewis

PARCEL # N/A

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

603 Well (ABR980) - 1200 feet West and 600 feet North from the South quarter corner of Section 27 within the SW¼ of Section 27.
Ash St. Well (AFM905) - 900 feet South and 1775 feet West from the Northeast corner of Section 33 within the NE¼ of Section 33.
Baichtel Well No. 1 (AFM906) - 500 feet South and 700 feet East of the Northwest corner of Section 34.

Baichtel Well No. 2 (AET197) - 490 feet South and 700 feet East of the Northwest corner of Section 34.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the City of Winlock is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

PROVISIONS

"If it can be determined that the recommended change in point of withdrawal under this filing causes any impairment of water rights existing at the time of this change, such impairment shall be grounds for curtailment or cessation of any withdrawal resulting from the change, or in mitigation to remedy the situation."

An approved measuring device shall be installed and maintained for each of the sources authorized by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173.
http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html

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

Reported water use data shall be submitted via the Internet or by using the enclosed forms. To set up an Internet reporting account, access https://fortress.wa.gov/ecy/wrx/wrx/Meteringx/. If you have questions or need additional forms, contact the Southwest Regional office.

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. Installation, operation and maintenance requirements are enclosed as a document titled "Water Measurement Device Installation and Operation Requirements".
http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html

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.

The right to 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 90.44.100.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in Chapter 90.14 RCW.

Given under my hand and the seal of this office at Olympia, Washington, this 30th *day of* April, *2008.*

OK

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Jay Manning, Director
Department of Ecology

By Thomas Loranger
Thomas Loranger, Section Manager

Provisions Continued

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

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.

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 of the Department of Ecology.

LEW-11-01
Received 3-17-11

RECEIVED
MAR 18 2011
WA State Department of Ecology (SWRO)

DEPARTMENT OF ECOLOGY
State of Washington

STATE OF WASHINGTON
APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with the Department of Ecology or with County Conservancy Boards

A NON-REFUNDABLE MINIMUM FEE OF $50.00 PAYABLE TO THE DEPARTMENT OF ECOLOGY MUST ACCOMPANY THIS APPLICATION

(Check all that apply)
- ☐ Change purpose(s) of use
- ☒ Add purpose(s) of use
- ☐ Change point(s) of diversion/withdrawal
- ☒ Add point(s) of diversion/withdrawal
- ☒ Change/transfer place of use
- ☐ Other (i.e. consolidation, intertie, trust water)

Explain: _____

FOR OFFICE USE ONLY
CHANGE No. CG2-GWC1385 WRIA 26
DATE ACCEPTED 3/18/11 BY SC
FEE $_____ REC'D ____/____/____
CHECK No. _____
ECY Coding: 001-002-WR10285-000011
SEPA: ☐ Exempt ☐ Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
City of Winlock	(360)785-3811	( )
ADDRESS P.O. Box 777		
CITY Winlock	STATE WA	ZIP CODE 98596

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Arnie Sugar, HWA GeoSciences Inc.	(425)774 0106	( )
ADDRESS 21312 30th Dr NE		
CITY Bothell	STATE WA	ZIP CODE 98021

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER 1385	RECORDED NAME(S) Hinen, A.H.
DO YOU OWN THE RIGHT TO BE CHANGED? ☐ YES ☒ NO	Sale pending
IF NO, PROVIDE OWNER(S) NAME and ADDRESS: Ellen Mower, 361 SR 505 Winlock, WA 98596	
HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? ☒ YES ☐ NO	

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

FOR OFFICE USE ONLY CG2-GWC1385
APP. NO. 245 PERMIT NO. 2293 CERT. NO. 385 CERT. OF CHANGE NO. _____

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Mower well		SW	NE	34	12N	2W	015627000000	

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Mower well		SW	NE	34	12N	2W	015627000000	
New City well		SE	NE	34	12N	2W	015625002000	

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☐ YES ☒ NO PROPOSED: ☐ YES ☒ NO – IF NO, PROVIDE OWNER(S) NAME:

Ellen Mower Rod Murschel – sale pending

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

See attached maps

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation & Domestic	100 GPM	36	

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal	50 GPM	18	Year round (Jan – Dec)
Irrigation/Domestic	50 GPM	18	Year round (Jan – Dec)

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:

See attached water right certificate #1385

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
SW	NE	34	12N	2W	Lewis	015627000000	18

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☐ YES ☒ NO – IF NO, PROVIDE OWNER(S) NAME

Ellen Mower

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:

1) City of Winlock water system service area (as shown in the City's Water System Plan Update and 2) Mower property

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
			12N	2W	Lewis		

DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ☐ YES ☒ NO – IF NO, PROVIDE OWNER(S) NAME

Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application. If platted property, please include a certified copy of the plat map.

Are there any ADDITIONAL WATER rights OR CLAIMS RELATED to the same property as the ONE PROPOSED FOR CHANGE/TRANSFER?

☐ YES ☒ NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S)_____

6. Remarks and Other Relevant Information:

See attached supporting information

IF FOR SEASONAL OR TEMPORARY, START DATE __/__/____ END DATE __/__/____

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request.

Please contact the State Department of Revenue for further information. The phone number is (360) 570-3265. The address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia, WA 98504-7477.

7. Signatures:

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 am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

(Applicant) / / *(Date)*

Ellen Mower

(Water Right Holder) / / *(Date)*

Ellen Mower

(Land Owner(s) of Existing Place of Use) / / *(Date)*

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

☐ APPLICATION FEE NOT ENCLOSED ☐ MAP NOT INCLUDED or INCOMPLETE

☐ ADDITIONAL SIGNATURES REQUIRED ☐ SECTION _____ IS INCOMPLETE

☐ OTHER/EXPLANATION: _____

STAFF: _____ ***DATE:*** ____/____/____

ATTACHMENT FOR
APPLICATION FOR CHANGE

Point(s) of Diversion/Withdrawal - ☐ Existing ☐ Proposed:

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #

DO YOU OWN THE ABOVE POINT(S) OF DIVERSION/WITHDRAWAL? ☐ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

Purpose(s) of Use - ☐ Existing ☐ Proposed:

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE

Place of Use - ☐ Existing ☐ Proposed:

LEGAL DESCRIPTION OF LANDS

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN ABOVE PLACE OF USE? ☐ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

6. **Remarks and Other Relevant Information:**

See attached supporting information

IF FOR SEASONAL OR TEMPORARY START DATE __/__/____ END DATE __/__/____

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request.

Please contact the State Department of Revenue for further information. The phone number is (360) 570-3265. The address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia, WA 98504-7477.

7. Signatures:

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 am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

(Applicant) — 2/3/11 (Date)

Ellen Mower

Ellen Mower

(Water Right Holder) — 2/28/11 (Date)

Ellen Mower

Ellen Mower

(Land Owner(s) of Existing Place of Use) — 2/28/11 (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

- ☐ APPLICATION FEE NOT ENCLOSED
- ☐ MAP NOT INCLUDED or INCOMPLETE
- ☐ ADDITIONAL SIGNATURES REQUIRED
- ☐ SECTION _____ IS INCOMPLETE
- ☐ OTHER/EXPLANATION

STAFF: _____ *DATE:* ____/____/____

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

November 1, 2012

Glen Cook, Mayor
City of Winlock
PO Box 777
Winlock WA 98596

Re: City of Winlock, LEWI-11-01 (CG2-GWC1385)

Dear Mayor Cook:

In accordance with RCW 90.80.080 the Department of Ecology has reviewed the Record of Decision (ROD), Report of Examination (ROE), and all comments, protests, objections and other relevant information submitted by the Lewis County Water Conservancy Board for the above referenced application for change.

The Department of Ecology has **modified** the decision of the Board and the proposed change/transfer of water right is **approved** under the following conditions:

The Department of Ecology will split this right into two. A superseding certificate will issue for Ground Water Certificate 1385(A), in the name of Ellen Mower, with the following attributes:

60 gallons per minute; 7.5 acre-feet per year
1 acre-foot per year for domestic and stockwater supply
6.5 acre-feet per year for the irrigation of 3.9 acres
The point of withdrawal shall remain the same as the original certificate
The place of use will remain the same as the original certificate; Lewis County Parcel No. 015627000000.
A metering device shall be installed and maintained as described in the Board's Report of Examination on Page 7.

The Board's decision as modified by this Order allows the City to develop according to the construction schedule described in the Board's decision on Page 7. The attributes of the City's portion of this right are as follows:

40 gallons per minute; 23.5 acre-feet per year
For continuous municipal supply
The Point of Withdrawal shall be within the SE NE Section 34, T 12 N., R 2 W.W.M. Lewis County Parcel No. 015625002000
The place of use shall be the City of Winlock service area
A metering device shall be installed and maintained as described in the Board's Report of Examination on Page 7.

After development of this portion of the right, a superseding certificate shall issue as Ground Water Certificate 1385(B).

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.
- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Mailing Addresses	Street Addresses
Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903 **Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608	**Pollution Control Hearings Board** 1111 Israel RD SW Ste 301 Tumwater, WA 98501 **Department of Ecology** Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503

Therefore, I ORDER approval of Change Application No. CG2-23928C, subject to existing rights and the provisions specified above.

Signed at Olympia, Washington, this 1ST day of November 2012.

Michael J. Gallagher

Michael J. Gallagher, Section Manager

cc: Lewis County Water Conservancy Board
Arnie Sugar, HWA GeoSciences Inc.
Andy Lane, Cairncross & Hemplemann
Ellen Mower

WASHINGTON STATE DEPARTMENT OF ECOLOGY

LEWIS COUNTY
WATER CONSERVANCY BOARD
Application for Change/Transfer
OF A RIGHT TO THE BENEFICIAL USE OF THE PUBLIC WATERS OF THE STATE OF WASHINGTON

RECEIVED
SEP 24 2012
WA State Department of Ecology (SWRO)

Report of Examination

NOTE TO APPLICANT: Pursuant to WAC 173-153-130(8), the applicant is not permitted to proceed to act on the proposal until Ecology makes a final decision affirming, in whole or in part, the board's recommendation. It is advised that the applicant not proceed until the appeal period of Ecology's decision is complete.

☐ Surface Water ☒ Ground Water

DATE APPLICATION RECEIVED	WATER RIGHT DOCUMENT NUMBER (i.e., claim, permit, certificate, etc.)	WATER RIGHT PRIORITY DATE	BOARD-ASSIGNED CHANGE APPLICATION NUMBER
3/17/2011	Cert # 1385	3/25/1952	LEWI-11-01

NAME: City of Winlock

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 777	Winlock	WA	98596

Changes Proposed: ☐ Change purpose ☒ Add purpose ☐ Add irrigated acres ☐ Change point of diversion/withdrawal ☒ Add point of diversion/withdrawal ☒ Change place of use ☐ Other (Temporary, Trust, Interties, etc.)_____

SEPA
The board has reviewed the provisions of the State Environmental Policy Act of 1971, Chapter 43.21C RCW and the SEPA rules, chapter 197-11 WAC and has determined the application is: ☒ Exempt ☐ Not exempt

BACKGROUND AND DECISION SUMMARY

Existing Right (Tentative Determination)

MAXIMUM CUB FT/ SECOND	MAXIMUM GAL/MINUTE	MAXIMUM ACRE-FT/YR	TYPE OF USE, PERIOD OF USE
	100	30	Irrigation and Domestic

SOURCE	TRIBUTARY OF (IF SURFACE WATER)
Well	

AT A POINT LOCATED: PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE	WRIA	COUNTY.
015627000000	SW	NE	34	12N	2W	26	Lewis

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED

A part of the John B. Provost D.L.C. describes as follows: Beginning 99.85 chains North 64° West from the Northeast corner of said D.L.C., thence North 68° West 14.205 chains; thence South 22° West 19.57 chains; thence South 64° East 14.205 chains; thence North 22° East 19.55 chains to the place of Beginning; EXCEPTING THEREFROM: beginning at a point which is North 68° West 114.055 chains and South 22° West 5.30 chains from the Northeast corner of said D.L.C.; thence South 22° West 940.5 feet; thence South 68° East 209 feet; thence in a Northerly direction to a point which is South 68° East 190.25 feet form the place of beginning; thence North 68° West 190.25 feet to the place of beginning. Sec. 34, Twp. 12 N., Rge. 2 W.W.M.

PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE,
015627000000	SW	NE	34	12N	2W

Proposed Use

MAXIMUM CUB FT/ SECOND	MAXIMUM GAL/MINUTE	MAXIMUM ACRE-FT/YR	TYPE OF USE, PERIOD OF USE
	(A 40 (B) 60	(A) 23.5 (B) 7.5	(A) Municipal, year round (B) Irrigation and Domestic

SOURCE	TRIBUTARY OF (IF SURFACE WATER)
Well	

AT A POINT LOCATED: PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE	WRIA	COUNTY.
(A) 015625002000	SE	NE	34	12N	2W	26	LEWIS
(B) 015627000000	SW	NE	34	12N	2W	26	LEWIS

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

(A) City of Winlock water system service area (as shown in the City's Water System Plan Update)
B) Mower - Parcel #015627000000, MP 120234-1 PART PROVOST DLC LYING NORTHERLY OF HWY 603 EXCEPT HWY 34-12-2W

PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE,

Board's Decision on the Application

MAXIMUM CUB FT/ SECOND	MAXIMUM GAL/MINUTE	MAXIMUM ACRE-FT/YR	TYPE OF USE, PERIOD OF USE
	(A) 40 (B) 60	(A) 23.5 (B) 7.5	(A) Municipal, year round (B) Irrigation and Domestic

SOURCE	TRIBUTARY OF (IF SURFACE WATER)
Well	

AT A POINT LOCATED: PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE	WRIA	COUNTY.
(A) 015625002000	SE	NE	34	12N	2W	26	LEWIS
(B) 015627000000	SW	NE	34	12N	2W	26	LEWIS

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED AS APPROVED BY THE BOARD

(A) City of Winlock water system service area (as shown in the City's Water System Plan Update)
(B) Mower - Parcel #015627000000, MP 120234-1 PART PROVOST DLC LYING NORTHERLY OF HWY 603 EXCEPT HWY 34-12-2W

PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE,

DESCRIPTION OF PROPOSED WORKS

The proposed point of withdrawal will be a new well, in addition to continued use of Mower well, to be drilled on a future City owned parcel. The water will be pumped into the water main that runs along SR 505, and into the City's water system for use throughout the service area. Details of the City's water system can be found in the August 2008 City of Winlock Water System Plan Update, which is available upon request.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	COMPLETE CHANGE AND PUT WATER TO FULL USE BY THIS DATE:
June 1 2017	June 1, 2019	June 1, 2025

REPORT

BACKGROUND [See WAC 173-153-130(6)(a)]

On February 17, 2011, Arnie Sugar of HWA GeoSciences Inc., on behalf of the City of Winlock, Winlock, Washington, filed an application for change of point of withdrawal, place of use, and purpose of use under Water Right Certificate no. 1385 . The application was accepted at an open public meeting on February 17, 2011, and the board assigned application number LEWI 11-01.

Attributes of the water right as currently documented

Name on certificate, claim, permit: Andrew H. Hinen

Water right document number: Cert No. 1385

Priority date, first use: March 25, 1952

Water quantities: Qi: 100 gpm Qa: 36 acre ft./ year

Source: Well

Point of diversion/withdrawal: SW/NE Sec 34 T12N R2W

Purpose of use: Irrigation, 18 acres; domestic supply

Period of use: May 1 - November 1 for irrigation; Continuously for domestic supply.

Place of use: NE Sec 34 T12N R2W

Existing provisions: None stated in certificate.

History of water use

Details of the history of water use are provided in attached documents. A summary is presented below:

- 1952 to 1961 - Farm operated by A. H. Hinen. Mr. Hinen installed irrigation pipes and sprinkler heads and irrigated the property during the dry season.
- 1961 to 1966 – Walter and Ellen Mowers leased the Hinen Farm and operated a dairy and continued farming.
- 1966 – The Mowers purchased Hinen property and continued the dairy and farming operations. They irrigated for hay and pasture from May through October. 10-12 acres were irrigated for hay and then for pasture after haying. Another 16 acres were also in pasture.
- 1979 – The dairy herd was sold and the Mowers began a beef cattle operation. The beef cattle operation included an average of 20-30 head of cattle. The Mowers also continued to irrigate the property for hay and pasture.
- 1979 to 1985 – 5 acres were converted to strawberry production (a U-pick farm). This land was also irrigated daily, in addition to the remaining pasture land.

- 1985-1999 - continued to irrigate the property for hay and pasture
- 1999 – The beef cattle were sold and the farm was leased to Randy Wood.
- 1999 to present – Mr. Wood raises replacement heifers and continues to irrigate pasture land. Mr. Wood irrigates approximately 8 acres for growing silage corn and another approximately 12 acres for hay. In recent years approximately 20 acres was irrigated for hay (2 cuttings) and pasture (basically a third cutting).
- The original well pump was a Jacuzzi vertical line shaft turbine pump with 4-inch riser.
- A new 7.5 HP Grundfos submersible pump was installed in 2004 on 152' riser (110'x4" +42'x3").
- Electric bill records show a consistent usage of electricity in the summer. The irrigation system in on a separate meter than the household. Average electricity usage for the last 5 irrigation seasons indicates an average power consumption of 12 KWH, with the highest 2 years average at 15 KWH, consistent with usage of the 7.5 HP pump.
- Historical air photos from 1999, 1993, 1988, 1984, 1980, 1978, 1974, 1970, 1966, and 1964 show a consistent pattern of apparent irrigation, i.e., fields on the property appear darker on black and white photos, and greener on color photos, than most nearby farmland.

See also attached affidavit, historical air photos, electric usage records, photographs, and pump information.

SEPA

The governmental action relating to the subject application is exempt from the "detailed statement" preparation requirements of SEPA (WAC 197-11-800(4)). The application involves neither appropriations of one (1) cubic foot per second or more of surface water for irrigation purposes nor appropriations of 2,250 gallons per minute of ground water for any purpose.

The information or conclusions in this section were authored and/or developed by Barbara Burres and Robert Thode.

COMMENT AND PROTESTS [See WAC 173-153-130(6)(b)]

Public notice of the application was given in the EAST COUNTY JOURNAL on March 30, 2011 and April 6, 2011. Protest period ended on May 5, 2011.

There were no protests received during the 30 day protest period. In addition, no oral and written comments were received at an open public meeting of the board or other means as designated by the board.

The information or conclusions in this section were authored and/or developed by Barbara Burres and Robert Thode

INVESTIGATION [See WAC 173-153-130(6)(c)]

The following information was obtained from a site inspection conducted by Brian Greene, Barbara Burres and Robert Thode with additional information provided by Arnie Sugar of HWA GeoSciences Inc., published and unpublished technical reports, research of department of Ecology records including well drilling reports and recorded water rights, and conversations with the applicant.

Proposed project plans and specifications

Water from the proposed new point of withdrawal will be pumped into the water main that runs along SR 505, and into the City's water system for municipal use throughout the service area. Details of the City's water system can be found in the August 2008 City of Winlock Water System Plan Update, which is available from the city upon request.

Other water rights appurtenant to the property (if applicable)

The City of Winlock has existing water rights as summarized below. The additional transferred water right will be added to the City's system for municipal use.

Table IV-1 Water Rights Allocation Summary

Water Right Number	Priority Date	Instantaneous Water Right (gpm)	Annual Water Right (acre-feet/year)	Well Name
3286-A	8/5/57	50	80	Eureka #3
5333-A	4/29/63	175	144	Baichtel (1 & 2) Ash Street 603
G2-25856	3/18/81	350	224	Eureka #1 Ash Street 603
G2-26206	7/30/82	200	34	Baichtel
G2-25920		25	3	Winolequa Park
	Total	*800*	*485*	

Public Interest (groundwater only)

The proposed transfer is subject to RCW 90.44.100 and therefore, cannot be detrimental to the public interest, including impacts on any watershed planning activities.

The proposed water right segregation and transfer is not detrimental to the public interest. The City of Winlock is required by the Growth Management Act to have sufficient water to serve the City and its urban growth area. The proposed transfer provides additional water for the City's municipal needs. The proposed transfer will also assist the City in continuing to supply water for the Cardinal Glass plant, ensuring the continued employment of over 200 people in Lewis County. Providing water to support Winlock's anticipated growth needs and ensuring employment, while retaining some water right for irrigation use, provides maximum benefit to Washington citizens. Municipal use will be less consumptive than agricultural, as much of the water will return to the City's waste water treatment facility, for discharge into Olequa Creek.

Tentative Determination

In order to make a water right change decision, the Board must make a tentative determination on the validity and extent of the right. The Board has made the tentative determination as displayed upon the first page of this report. There are several circumstances that can cause the board's tentative determination to differ from the stated extent of the water right within water right documentation. Water right documents attempt to define a maximum limitation to a water right, rather than the actual extent to which a water right has been developed and maintained through historic beneficial use. Additionally, except for a sufficient cause pursuant to RCW 90.14.140, water rights, in whole or in part, not put to a beneficial use for five consecutive years since 1967 may be subject to relinquishment under Chapter 90.14.130 through 90.14.180 RCW. Water rights may additionally be lost through abandonment. The Board's tentative determination was based upon the following findings:

- Average of 17 sprinklers per day were used for irrigation. Each sprinkler uses 5 gpm, for an average flow of 85 gpm.
- The property was irrigated from May through August
- At the certificated maximum instantaneous withdrawal of 100 gpm, 36 AF could be applied over 18 acres in 82 days. At 16 hours/day, 36 AF is applied over 120 days, within the irrigation season.
- The well has an 8-inch well casing and has a depth of 185 feet.
- A 4-inch plastic pipe runs from the well to the barn. From the barn, 4-inch aluminum pipes run to the field. There is enough aluminum pipe installed to water the entire farm.
- The existing right appears to have been put to beneficial use throughout its life, on the basis of historical research (interviews, air photos, etc.)
- Domestic use and stock water is estimated to be about 1 Acre foot per year.

Per RCW 90.03.380, calculation of "annual consumptive quantity" (ACQ) is required because the proposed transfer will add a purpose of use. ACQ is the amount of water used, averaged over the two years of greatest use within the most recent five-year period of continuous beneficial use of the water right. Examination of electricity usage records over the last 5 years, including the two highest use years (2008 and 2009) indicates the water right has been exercised to the certificated amount of 36 AF.

Consumptive use was also estimated using the USDA Washington State Irrigation Guide, Appendix B, for Centralia, Washington, the crop irrigation requirement (CIR) for pasture is 18 inches/year (as fully consumptive allocation with no presumed return flows). 18 inches/year x 18 acres of pasture = 27 AFY. Adding 10 percent evaporative losses for sprinkler systems (Ecology, 2005 - Guidance #1210) yields a consumptive use of 30 AFY.

ACQ was determined to be 31 AFY combining the allowable usage for pasture, and 1 AFY for domestic and stock.

Geologic, Hydrogeologic, or other scientific investigations (if applicable)

PROJECT SITE

The proposed location for the new ground water withdrawal is located approximately 1200 feet east of the Hinen/Mower water right and well. The site lies on the Grand Prairie, a sparsely wooded upland located between the Olequa Creek drainage and a bluff on the western end of the Cowlitz River drainage. Both the existing water right and the proposed point of withdrawal are located along Highway 505, about a mile east of the town of Winlock, in the Olequa Creek drainage basin, in the Cowlitz watershed, WRIA 26.

The area receives an average of 48 inches of rain per year, mostly during the period November to March.

REGIONAL HYDROGEOLOGY

The regional hydrogeology of the sub-basin has been described in Weigle and Foxworthy (1962). The site is approximately 4 miles North West of the Cowlitz River, a regional physiographic feature that drains a large portion of southwest Washington.

The geology of the Grand Prairie area (between Winlock and I-5) is mapped as the Logan Hill Formation. This unit is comprised of outwash sands and gravels extending to at least 200 feet below the surface in the general area surrounding the site. Due to its age, the top 50 to over 200 feet has completely weathered to clay. Below this, the Logan Hill Formation becomes predominately silt. At depths of 50 to 200 feet, saturated sands and gravels known as the Logan Hill Aquifer occur, overlying sedimentary bedrock. The Logan Hill Aquifer is the primary regional water supply aquifer. Some limited ground water production is also obtained from shallow layers in the upper weathered Logan Hill Formation, and from fractured bedrock aquifers beneath it.

The Logan Hill Aquifer is largely contiguous within the mapped area of Logan Hill Formation and serves as the principal water supply aquifer within the area. The aquifer thins near the southern extents of the Logan Hill Formation, south of

Winlock. High confining pressures, in excess of 60 feet, are found over much of the Logan Hill Aquifer extents. Weigle and Foxworthy (1962) report the ground water gradient under the Grand Prairie area is to the southwest.

Ground water in the Logan Hill aquifer is recharged by percolation of precipitation directly on the formation, and possibly recharged from bedrock uplands east of the project area. Recharge to the regional aquifer has been estimated at 12 inches per year out of 48 inches total precipitation. The remaining 36 inches are lost to evapotranspiration, or discharged to surface water via runoff, shallow ground water flow (interflow), or deeper ground water flow.

Available well logs indicate the Logan Hill Aquifer is contiguous over the Grand Prairie area, terminating to the east at the bluff near the I-5 / SR505 interchange. To the west, the aquifer is present on both sides of the Olequa Creek valley near Winlock; however it does not appear contiguous under the creek. Although no well logs are available to provide geologic information for the areas immediately adjacent to the Olequa Creek valley, the Logan Hill Aquifer is reported to discharge to Olequa Creek in this area, as evidenced by springs (Ecology, 2004). Based on the higher aquifer head (approximately 90 feet) relative to the creek elevation at locations near the creek, aquifer materials (unweathered, permeable sands and gravels) do not likely crop out at the valley walls. Discharge of the Logan Hill aquifer to the creek is likely moderated significantly through low permeability weathered Logan Hill soils along the valley walls, formed in-situ by the same processes that formed the aquitard overlying the Logan Hill aquifer. This relationship also likely holds at the eastern margins of the Logan Hill Aquifer in the Grand Prairie area, at the bluff near the I-5 / SR505 interchange. Although some springs are reported, and several drainages have developed along the bluff face, no major streams or surface water flows are mapped here, suggesting no major discharge of the Logan Hill Aquifer at its eastern terminus.

The adjacent mapped geologic unit, the Lackamas Creek Formation, contains a shallow aquifer of similar (but thinner) composition to the Logan Hill, with water levels up to 200 feet lower than potentiometric surfaces in the Logan Hill aquifer. This head difference, and the absence of flowing artesian pressures in wells near the base of the bluff, also suggest minimal discharge of Logan Hill ground water to the east.

LOCAL HYDROGEOLOGY

Drillers' logs from nearby water wells obtained from Ecology indicate ground water was encountered in sands and gravels of the Logan Hill Formation at depths ranging from around 50 to 180 feet below ground surface (bgs) within 0.5 mile of the site. The thickness of the Logan Hill aquifer (based on the few wells that appeared to fully penetrate the aquifer) ranges from 30 to 81 feet, with a thickness of at least 60 feet reported at the Hinen/Mower well, which did not fully penetrate the aquifer. Static water levels in nearby wells range mostly from around 20 to 120 feet bgs (70 feet bgs at the Hinen/Mower well), typically 20 to 100 feet above the aquifer, indicating confined aquifer conditions.

A confining layer, or aquitard, exists above the aquifer and consists of low- permeability elastic silt, clay, and gravels that are highly to completely weathered (i.e., altered to clay). The aquitard at the Hinen/Mower well is 125 feet thick. Based on available well logs, the aquitard extends regionally over a large area. The aquitard limits hydraulic connection between the confined, lower aquifer and any shallow, perched ground water and surface waters.

GROUND WATER QUALITY

Ground water quality in the area, based on testing of other City wells, is good, according to the August 2008 City of Winlock Water System Plan Update

AVAILABILITY OF GROUND WATER

Wells completed in the Logan Hills Aquifer within 0.5 mile of the site have reported yields of three to 230 gpm. Specific capacities range from approximately 0.1 to 50 gpm/ft.

Based on estimated specific capacity values, the theoretical yield of wells installed in the Logan Hills Aquifer in this area would range from less than 10 gpm to over 1,000 .

The closest City well with a recorded pumping test is the '603' well, located in the SE/SW quarter-quarter of Section 27 (approximately one-half mile northwest of the applicant well). The well was pumped at a rate of 200 gpm with four feet of drawdown. The well is completed with approximately 50 feet of perforations in the Logan Hills Aquifer.

The information or conclusions in this section were authored and/or developed by Geologist Arnie Sugar and Robert Thode.

CONCLUSIONS [See WAC 173-153-130(6)(d)]

Tentative determination (validity and extent of the right)

This water right is valid, in good standing, and eligible to be transferred in those quantities recommended.

Relinquishment or abandonment concerns

This water right has been put to beneficial use throughout its history, therefore no relinquishment or abandonment concerns are noted.

Hydraulic analysis

Although no hydraulic analysis has been performed on the original or proposed points of withdrawal, sufficient information exists on the Body of Water that the transfer is in to ascertain ground water and aquifer properties. Most of the domestic, irrigation, and City of Winlock wells in the area are completed with perforations or open casings, limiting the production capacity. The nearest reliable aquifer testing data is available for the Cardinal Glass plant site, located approximately four miles north of the site. A well completed in the same Logan Hills Aquifer at the Cardinal Glass property was constructed using engineered design, wire-wrapped screen, and development methods typical of modern production wells. Aquifer properties (e.g., transmissivity, storage, etc.) were determined at this well during multiple long term and step-drawdown pumping tests. This well was estimated to have a long term safe yield of approximately 490 gpm. Based on this well, and transmissivities estimated from specific capacity information derived from existing well logs at and near the project site, the Logan Hills aquifer is fully capable of supporting the proposed transfer without impairment to senior water rights holders including exempt rights.

Consideration of comments and protests

No comments received

Impairment

POTENTIAL FOR IMPAIRMENT OF EXISTING WATER RIGHTS

Ground water - Sixteen ground water certificates exist within one mile of the proposed point of ground water withdrawal. The certificated ground water right-holders obtain ground water from the Logan Hills aquifer, which is the same water-bearing zone of the proposed transfer. The certified rates are for instantaneous withdrawals of 45 to 370 gpm, at annual withdrawal rates of three to 120 acre-feet per year. The uses for these rights include municipal, irrigation and domestic supply. The nearest point of certified ground water withdrawal (not counting the Hinen right) is approximately one-half mile to the west (250 gpm; 66 acre-feet/year).

The combined totals for ground water rights issued within a one-mile radius of the project site is 3,015 gpm and 872 acre-feet/year. The transfer would not increase the total amount withdrawn, and would spread the withdrawal over the entire year rather than the dry (growing) season. The transfer of seasonal water rights to year-round use would not cause impairment to existing water rights in the non-irrigation season. No claimed ground water rights occur within ½-mile of the proposed point of ground water withdrawal.

The proposed transfer would not impair senior water rights due to no net increase in ground water withdrawal from the Logan Hill Aquifer. The proposed transfer of the point of withdrawal 600 feet east of the current Hinen well location would not impair any senior water rights due to the high confining pressures in the Logan Hill aquifer, and low predicted drawdowns beyond a few hundred feet of any new withdrawal. There are no senior water rights within 1,000 feet of the proposed new point of withdrawal, which is well outside the likely radius of influence of a pumping well, estimated at a few hundred feet.

A domestic / exempt well is located around 400 feet east of the proposed new City well. This well is also completed in the confined Logan Hills aquifer and the log indicates 69 feet of confining pressure (above the top of the water bearing zone). Distance-drawdown analysis conducted at the Cardinal Glass well in the Logan Hills aquifer north of the proposed new point of withdrawal indicates around 8 feet of drawdown at 400 feet from a well pumping at 200 gpm. The proposed new point of withdrawal is therefore unlikely to impair even the closest well.

Surface water – No surface water certificates have been issued within a one-mile radius of the location of the proposed ground water withdrawal. The Logan Hills aquifer in this area may partially discharge to Olequa Creek. Impairment of surface water rights, including instream flows, is unlikely due to no net increase in ground water withdrawal from the Logan Hill Aquifer in the area where it may eventually discharge to Olequa Creek.

There are currently no instream flows set for Olequa Creek or other surface water bodies in the basin. The proposed transfer will therefore not impair any instream flow surface water rights.

Seasonal change - Change in timing of the water rights (irrigation season to year round) is not likely to impair ground water or surface water rights, due to 1) no impairment of ground water or surface water rights as described above, and 2) the distance to surface water and lack of direct connection between ground water and surface water, both of which would greatly attenuate the short term impacts of ground water withdrawal.

Public Interest

The proposed water right segregation and transfer is in the public interest because it provides maximum net benefits for the people of Washington. The City of Winlock is required by the Growth Management Act to have sufficient water to serve the City and its urban growth area. The proposed transfer provides additional water for the City's municipal needs. The proposed transfer will also assist the City in continuing to supply water for the Cardinal Glass plant, ensuring the continued employment of over 200 people in Lewis County. Providing water to support Winlock's anticipated growth needs and ensuring employment, while retaining some water right for irrigation use, provides maximum benefit to Washington citizens. The change from seasonal irrigation to year-round municipal use will distribute withdrawals over the entire year rather than just the dry season, which will have a positive impact on basin water balance and dry season streamflow.

Other

The board also considered the previous provisions associated with the water right as identified in the background section of this report when making its decision.

DECISION [See WAC 173-153-130(6)(e)]

It is the board's decision that :

- 31 AFY is available for transfer. Of this:
  - 23.5 AFY will be transferred to the City of Winlock for Municipal, year round use
  - 7.5 AFY will be retained by Mower for Irrigation, Stock Water and Domestic use with acreage or inches of irrigation per acre reduced correspondingly.
- The maximum withdrawal rate shall be 100 gpm:
  - 40 gpm for the City of Winlock
  - 60 gpm for Mower
- The point of withdrawal shall be:
  - City of Winlock - changed to a well located on parcel number 015625002000 in the SE/NE Sec 34, T12N, R2W
  - Mower - remain at the same location

The information or conclusions in this section were authored and/or developed by Barbara Burres and Robert Thode.

PROVISIONS [See WAC 173-153-130(6)(f)]

Conditions and limitations

Measurements, Monitoring, Metering and Reporting

An approved measuring device shall be installed and maintained for both sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which 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 shall be recorded and provided to Ecology upon request. Water use records shall include the Total Annual Volume (acre-feet per year)and Maximum instantaneous rate of withdrawal (gallons per minute)

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times to the project location and will be allowed to inspect, at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems to ensure there is compliance with the law.

Construction Schedule

- Begin construction by June 1, 2017
- Complete Construction by June 1, 2019
- Water to full beneficial use (Proof of Appropriation) by June 1, 2025

The information or conclusions in this section were authored and/or developed by Barbara Burres and Robert Thode.

The undersigned board commissioner certifies that he/she understands the board is responsible "to ensure that all relevant issues identified during its evaluation of the application, or which are raised by any commenting party during the board's evaluation process, are thoroughly evaluated and discussed in the board's deliberations. These discussions must be fully documented in the report of examination." [WAC 173-153-130(5)] The undersigned therefore, certifies that he/she, having reviewed the report of examination, knows and understands the content of this report and concurs with the report's conclusions.

Signed at Chehalis, Washington
This 20th day of September, 2012

Robert Thode, Barbara Burton-Burres
Lewis County Water Conservancy Board

If you have special accommodation needs or require this form in alternate format, please contact 360-407-6607 (Voice) or 711 (TTY) or 1-800-833-6388 (TTY).

Ecology is an equal opportunity employer

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Lewis County
WATER CONSERVANCY BOARD
Application for Change/Transfer
Record of Decision

For Ecology Use Only
Received: RECEIVED
SEP 24 2012
WA State Department of Ecology (SWRO)
Reviewed by: _____
Date Reviewed: _____

Applicant: City of Winlock

Application Number: LEWI 11-01

This record of decision was made by a majority of the board at an open public meeting of the Lewis County Water Conservancy Board held on September 20, 2012. The undersigned board commissioners certify that they each understand the board is responsible "to ensure that all relevant issues identified during its evaluation of the application, or which are raised by any commenting party during the board's evaluation process, are thoroughly evaluated and discussed in the board's deliberations. These discussions must be fully documented in the report of examination." [WAC 173-153-130(5)] The undersigned therefore, certifies that each commissioner, having reviewed the report of examination, knows and understands the content of the report.

X Approval: Lewis County Water Conservancy Board hereby **grants** conditional approval for the water right transfer described and conditioned within the report of examination on September 20, 2012 and submits this record of decision and report of examination to the Department of Ecology for final review.

☐ **Denial:** The (board name) Water Conservancy Board hereby **denies** conditional approval for the water right transfer as described within the report of examination on (date report of exam was signed) and submits this record of decision to the Department of Ecology for final review.

Signed:

Robert Thode, Chair
Lewis County Water Conservancy Board

Date: September 20, 2012

Approve	X
Deny	☐
Abstain	☐
Recuse	☐
_____ Other	☐

Barbara Burton-Burres, Member
Lewis County Water Conservancy Board

Date: September 20, 2012

Approve	X
Deny	☐
Abstain	☐
Recuse	☐
_____ Other	☐

_____
(Name), (Title)
Lewis County Water Conservancy Board

Date: _____

Approve	☐
Deny	☐
Abstain	☐
Recuse	☐
_____ Other	☐

_____
(Name), (Title)
(Board Name) Water Conservancy Board

Date: _____

Approve	☐
Deny	☐
Abstain	☐
Recuse	☐
_____ Other	☐

_____
(Name), (Title)
(Board Name) Water Conservancy Board

Date: _____

Approve	☐
Deny	☐
Abstain	☐
Recuse	☐
_____ Other	☐

Mailed with all related documents to the Dept of Ecology Southwest Regional Office, and other interested parties on _____.

If you have special accommodation needs or require this form in alternate format, please contact 360-407-6607 (Voice) or 711 (TTY) or 1-800-833-6388 (TTY).

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

May 31, 2012

Glen Cook, Mayor
City of Winlock
PO Box 777
Winlock WA 98596

Re: City of Winlock, LEWI-11-02 CG2-23928(A)

Dear Mayor Cook:

In accordance with RCW 90.80.080 the Department of Ecology has reviewed the Record of Decision (ROD), Report of Examination (ROE), and all comments, protests, objections and other relevant information submitted by the Lewis County Water Conservancy Board for the above referenced application for change. On DATE Ecology reversed the Board's decision in this matter. On appeal, Ecology and Cardinal Glass (Cardinal, representing the City) have agreed to settle the appeal.

The Department of Ecology is now **modifying** the decision of the Board, superseding the earlier reversal with this order, and the proposed change/transfer of water right is **approved** with the following modifications:

Page 1
Ecology's tentative determination of the extent of the right to be transferred is 100 gallons per minute, 23.4 Acre-Feet per Year (AFY) of irrigation water.

Ecology's decision on the right to be transferred is 100 gallons per minute, 23.4 Acre-Feet per Year (AFY) for municipal supply, year round.

The points of withdrawal and places of use remain unchanged from the Board's decision.

Page 3 (and 4)
Tentative determination of the extent and validity of the water right. Ecology replaces the Board's analysis of the extent and validity of the right.

As part of the settlement process, Cardinal submitted the administrative division of a water right forms, effectively severing the properties not owned by Mr. Hartzel, from the portion of the water right Mr. Hartzel has contracted to sell to the City of Winlock. The administrative division of the right essentially leaves Mr. Hartzel with the right to irrigate the tree farm. Considering the fact that this change now does not involve adding purposes of use to the right, there is no need for an Annual Consumptive Quantity analysis.

Aerial photos and land photos from 2006 show the land west of the road (the tree farm) being irrigated (approximately 20 acres). It's most likely the same occurred in 2007 to get the young trees established. Cardinal's consultant estimates this water use to be 22 AFY.

For the nursery irrigation, Ecology will use a water duty of 1.5 times the Washington Irrigation Guide values for a generic crop in this location (1.5 to account for the longer irrigation season a nursery may need). A water duty of 1.5 AFY times 1.5 gives us 2.25 AFY. The irrigated area of the nursery is 0.61 acres for a water duty of 1.4 AFY.

The combined total from the tree farm and the nursery comes to 23.4 AFY available for transfer to the City.

Page 5
Conclusions
Tentative determination of extent and validity.
See above.

Page 5
Potential for impairment of existing water rights
The Board's impairment analysis for this change was incomplete. When considering a transfer of a seasonal right to a year-round use, there must be an examination as to whether the use in the new season would cause impairment to existing water rights.

In this case, the analysis must determine whether senior rights would be impaired by exercising this right in the non-irrigation season. Ecology agrees with the Board's analysis of the potential impairment to other ground water rights and finds none. Ecology also agrees with the analysis of the potential impairment of surface water rights. Both of these findings have merit in the non-irrigation season.

Page 6
Decision
Ecology finds that 23.4 AFY can be changed from seasonal irrigation to continuous municipal supply, from a well located as described in the Board's decision.

Page 7
Construction Schedule
Ecology modifies the construction schedule as follows:

- Begin construction by June 1, 2017
- Complete Construction by June 1, 2019
- Water to full beneficial use (Proof of Appropriation) by June 1, 2025

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Therefore, I ORDER approval of Change Application No. CG2-23928(A), subject to existing rights and the provisions specified above.

Signed at Olympia, Washington, this 30th day of May 2012.

Michael J. Gallagher

Michael J. Gallagher, Section Manager

cc: Janet Rajala, Ecology ERO
Lewis County Water Conservancy Board
Arnie Sugar, HWA GeoSciences Inc.
Andrew Lane, Cairncross & Hemplemann

BY CERTIFIED MAIL: 7011 1150 0000 7881 9258

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Lewis County
WATER CONSERVANCY BOARD
Application for Change/Transfer
Record of Decision

For Ecology Use Only
Received:
RECEIVED
SEP 30 2011
WA State Department of Ecology (SWRO)
Reviewed by:
Date Reviewed:

Applicant: City of Winlock

Application Number: LEWI-11-02

This record of decision was made by a majority of the board at an open public meeting of the Lewis County Water Conservancy Board held on September 15, 2011. The undersigned board commissioners certify that they each understand the board is responsible "to ensure that all relevant issues identified during its evaluation of the application, or which are raised by any commenting party during the board's evaluation process, are thoroughly evaluated and discussed in the board's deliberations. These discussions must be fully documented in the report of examination." [WAC 173-153-130(5)] The undersigned therefore, certifies that each commissioner, having reviewed the report of examination, knows and understands the content of the report.

X Approval: The Lewis County Water Conservancy Board hereby **grants** conditional approval for the water right transfer described and conditioned within the report of examination on September 15,2011 and submits this record of decision and report of examination to the Department of Ecology for final review.

☐ **Denial:** The (board name) Water Conservancy Board hereby **denies** conditional approval for the water right transfer as described within the report of examination on (date report of exam was signed) and submits this record of decision to the Department of Ecology for final review.

Signed:

Robert Thode, Chair
Lewis County Water Conservancy Board
Date: Sept 15, 2011
Approve X
Deny ☐
Abstain ☐
Recuse ☐
Other ☐

Barbara Burton-Burres, Member
Lewis County Water Conservancy Board
Date: 9/15/2011
Approve X
Deny ☐
Abstain ☐
Recuse ☐
Other ☐

Brian Greene, Alternate
Lewis County Water Conservancy Board
Date: 15 Sept 2011
Approve X
Deny ☐
Abstain ☐
Recuse ☐
Other ☐

(Name), (Title)
(Board Name) Water Conservancy Board
Date:
Approve ☐
Deny ☐
Abstain ☐
Recuse ☐
Other ☐

(Name), (Title)
(Board Name) Water Conservancy Board
Date:
Approve ☐
Deny ☐
Abstain ☐
Recuse ☐
Other ☐

Mailed with all related documents to the Dept of Ecology (regional office name) Regional Office, and other interested parties on (date mailed) 9-30-11

If you have special accommodation needs or require this form in alternate format, please contact 360-407-6607 (Voice) or 711 (TTY) or 1-800-833-6388 (TTY).

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WASHINGTON STATE DEPARTMENT OF ECOLOGY

Lewis County
WATER CONSERVANCY BOARD
Application for Change/Transfer
OF A RIGHT TO THE BENEFICIAL USE OF THE PUBLIC WATERS OF THE STATE OF WASHINGTON

RECEIVED
SEP 30 2011
WA State Department of Ecology (SWRO)

Report of Examination

NOTE TO APPLICANT: Pursuant to WAC 173-153-130(8), the applicant is not permitted to proceed to act on the proposal until Ecology makes a final decision affirming, in whole or in part, the board's recommendation. It is advised that the applicant not proceed until the appeal period of Ecology's decision is complete.

NOTE TO AUTHOR: *Read the instructions for completing a water conservancy board report of examination. Use the F11 key to move through the form.*

Surface Water X Ground Water

DATE APPLICATION RECEIVED	WATER RIGHT DOCUMENT NUMBER (i.e. claim, permit, certificate, etc.)	WATER RIGHT PRIORITY DATE	BOARD-ASSIGNED CHANGE APPLICATION NUMBER
3/17/2011	G2-23928C	08/19/1975	LEWI-11-02

NAME			
City of Winlock			
ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 777	Winlock	WA	98596

Changes Proposed: x Change purpose Add purpose Add irrigated acres x Change point of diversion/withdrawal

Add point of diversion/withdrawal x Change place of use Other (Temporary, Trust, Interties, etc.)

SEPA
The board has reviewed the provisions of the State Environmental Policy Act of 1971, Chapter 43.21C RCW and the SEPA rules, chapter 197-11 WAC and has determined the application is: X Exempt Not exempt

BACKGROUND AND DECISION SUMMARY

Existing Right (Tentative Determination)

MAXIMUM CUB FT/ SECOND	MAXIMUM GAL/MINUTE	MAXIMUM ACRE-FT/YR	TYPE OF USE, PERIOD OF USE			
	100	52	Irrigation, stockwater and Domestic			
SOURCE			TRIBUTARY OF (IF SURFACE WATER)			
Well						
AT A POINT LOCATED: PARCEL NO.	¼	¼	SECTION	TOWNSHIP N	RANGE	WRIA	COUNTY
011987005000	NW	SW	02	11	2W	26	Lewis

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED
That part of Joseph P. Mannen D.L.C. No. 37, Secs 2 and 3, T11N, R02W, beginning at the southeast corner of said D.L.C. thence north 1320 feet; thence west 1320 feet thence south 1320 feet; thence east 1320 feet to the point of the beginning. EAST 1320' OF SOUTH 1320' OF MANNEN DLC EXCEPT MILITARY ROAD 2-11-2W

PARCEL NO	¼	¼	SECTION	TOWNSHIP N	RANGE
011987005000	NW	SW	02	11	2W

Proposed Use

MAXIMUM CUB FT/ SECOND	MAXIMUM GAL/MINUTE	MAXIMUM ACRE-FT/YR	TYPE OF USE, PERIOD OF USE			
	100	58	Municipal, year round			
SOURCE			TRIBUTARY OF (IF SURFACE WATER)			
Well						
AT A POINT LOCATED: PARCEL NO	¼	¼	SECTION	TOWNSHIP N	RANGE	WRIA	COUNTY
015627000000	SW	NE	34	12	2W	26	Lewis

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED
City of Winlock water system service area (as shown in the City's Water System Plan Update)

PARCEL NO	¼	¼	SECTION	TOWNSHIP N	RANGE
			24,25,27-29,32-36	12	2W

Board's Decision on the Application

MAXIMUM CUB FT/ SECOND	MAXIMUM GAL/MINUTE	MAXIMUM ACRE-FT/YR	TYPE OF USE, PERIOD OF USE			
	100	52	Municipal, year round			
SOURCE			TRIBUTARY OF (IF SURFACE WATER)			
Well						
AT A POINT LOCATED: PARCEL NO	¼	¼	SECTION	TOWNSHIP N	RANGE	WRIA	COUNTY
015627000000	SW	NE	34	12	2W	26	Lewis

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED AS APPROVED BY THE BOARD
City of Winlock water system service area (as shown in the City's Water System Plan Update)

PARCEL NO	¼	¼	SECTION	TOWNSHIP N	RANGE
			24,25,27-29,32-36	12	2W

DESCRIPTION OF PROPOSED WORKS

The proposed point of withdrawal will be a new well to be drilled on a future City owned parcel. The water will be pumped into the water main that runs along SR 505, and into the City's water system for use throughout the service area. Details of the City's water system can be found in the August 2008 City of Winlock Water System Plan Update, which is available upon request.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	COMPLETE CHANGE AND PUT WATER TO FULL USE BY THIS DATE:
December 1,2011 or later	09/30/2016	09/30/2021

REPORT

NOTE TO AUTHOR: This form reflects the minimum regulatory requirements as required in WAC 173-153-130(6). In accordance with WAC 173-153-130(5), "It is the responsibility of the water conservancy board to ensure that all relevant issues identified during its evaluation of the application, or which are raised by any commenting party during the board's evaluation process, are thoroughly evaluated and discussed in the board's deliberations. These discussions must be fully documented in the report of examination." Completion solely of the minimum regulatory requirements may not constitute a fully documented decision.

BACKGROUND [See WAC 173-153-130(6)(a)]

On March 17, 2011 Arnie Sugar of HWA GeoSciences Inc., on Behalf of the City of Winlock of Winlock, Washington filed an application for change of point of withdrawal, place of use, and purpose of use for permit # G2-23928C. The application was accepted at an open public meeting on March 17, 2011, and the board assigned application number LEWI-11-02.

Attributes of the water right as currently documented

Name on certificate, claim, permit: Clay M. Hartzell.

Water right document number: cert # G2-23928C

As modified by certificate of change number: None

Priority date, first use: August 19, 1975

Water quantities: Qi: 100 gpm Qa: 62 acre ft./ year

Source: Well

Point of diversion/withdrawal:NW/SW Sec 02 T11N R2W

Purpose of use: Irrigation, 40 acres; stockwater, domestic supply

Period of use: May 1 through October 1 for irrigation and continuously for stockwater and domestic

Place of use: NW/SW Sec 02 T11N R2W

Existing provisions: The access port as required on the permit shall be maintained at all times. Owing to the proximity of neighboring wells, the certificate holder is reminded of his responsibility toward same and advised that he may be required to regulate his withdrawal pumping rate if existing rights are injuriously affected.

Tentative determination of the water right

The tentative determination is provided on the front page of this report.

History of water use

- 1975: Drilled well. 160 ft deep, installed 6" casing and well seal, obtained certificate of water right.
- 1976: Installed 5 hp submersible pump and 5 hp booster pump.
- Installed approximately 2000 ft of 4" pvc mainline w/risers.
- Purchased 30 aluminum 3" laterals w/ 5 gpm sprinklers.
- These 40' sprinkler pipes allowed pumping of 100 gpm covering nearly 1300 ft per setting.
- At the certificated maximum instantaneous withdrawal of 100 gpm, 60 AF could be applied over 40 acres in 136 days, within the 150 day irrigation season.
- 1976-2003: Water used for irrigation of pasture and hay.
- 1992-2007 Water used for Nursery Operation including 0.5 acres of Nursery Stock and 5000 square feet of nursery.
- 2002 Additional well drilled for exempt uses.
- 2006-2007 Irrigated 20 acres of Christmas trees.
- Nursery operation continued, but as an exempt use from the exempt well.

Previous changes

Sale of small acreages to Lewis County and various individuals leaving total acreage of 34.69 acres,. The two small parcels that were sold reduced the acreage to 86.725% of the original acreage.

SEPA

Continued

The board has reviewed the proposed project in its entirety. The governmental action relating to the subject application is exempt from the "detailed statement" preparation requirements of SEPA (WAC 197-11-800(4)). The application involves neither appropriations of one (1) cubic foot per second or more of surface water for irrigation purposes nor appropriations of 2,250 gallons per minute of ground water for any purpose.

Other

None

The information or conclusions in this section were authored and/or developed by: Barbara Burton-Burres, Robert Thode, and Brian Greene.

COMMENT AND PROTESTS [See WAC 173-153-130(6)(b)]

Public notice of the application was given in the East County Journal on 3/30/2011 and on 4/06/2011. Protest period ended on 5/06/2011.

There were no protests received during the 30 day protest period. In addition, no oral and written comments were received at an open public meeting of the board or other means as designated by the board.

The information or conclusions in this section were authored and/or developed by Barbara Burton-Burres, Robert Thode, and Brian Greene.

INVESTIGATION [See WAC 173-153-130(6)(c)]

The following information was obtained from a site inspection conducted by Brian Greene on 5/31/2011, technical reports, research of department records, aerial photos, infrared images and conversations with the applicant and/or other interested parties.

Proposed project plans and specifications

Pending the culmination of the sale between Clay M Hartzell and the City of Winlock, water from the proposed new point of withdrawal will be pumped into the water main that runs along SR 505, and into the City's water system for municipal use throughout the service area. Details of the City's water system can be found in the August 2008 City of Winlock Water System Plan Update, which is available upon request. The change from seasonal irrigation to year-round municipal use will distribute withdrawals over the entire year rather than just the dry season, which will have a positive impact on basin water balance and dry season stream flow. Municipal use will also be less consumptive than agricultural, as much of the water will return to the City's reclaimed water treatment facility, for discharge into Olequa Creek. There is at least one other known application for water right transfer from irrigation to municipal in this area. Senior rights were reviewed.

Other water rights appurtenant to the property (if applicable)

Exempt well.

Public Interest (groundwater only)

The proposed transfer is subject to RCW 90.44.100 and therefore, cannot be detrimental to the public interest, including impacts on any watershed planning activities. The proposed water right transfer is in the public interest because it provides maximum net benefit for the people of Washington and it protects and enhances the natural environment. The City of Winlock is required by the Growth Management Act to have sufficient water to serve the City and its urban growth area, which was designated by Lewis County and upheld by the Western Washington Growth Management Hearings Board. The proposed transfer provides additional water for the City's municipal needs. The proposed transfer will also assist the City in continuing to supply water for the Cardinal Glass plant, ensuring the continued employment of over 200 people in Lewis County. Providing water to support Winlock's anticipated growth needs and ensuring employment provides maximum benefit to Washington citizens.

Tentative Determination

In order to make a water right change decision, the Board must make a tentative determination on the validity and extent of the right. The Board has made the tentative determination as displayed upon the first page of this report. There are several circumstances that can cause the board's tentative determination to differ from the stated extent of the water right within water right documentation. Water right documents attempt to define a maximum limitation to a water right, rather than the actual extent to which a water right has been developed and maintained through historic beneficial use. Additionally, except for a sufficient cause pursuant to RCW 90.14.140, water rights, in whole or in part, not put to a beneficial use for five consecutive years since 1967 may be subject to relinquishment under Chapter 90.14.130 through 90.14.180 RCW. Water rights may additionally be lost through abandonment. The Board's tentative determination was based upon the following findings:

A percentage of the property was sold, and the remaining water right was calculated to be 56.6 AFY. This assumes a starting point of 62 AFY reduced to 91.29% for the property sales.
Determination was made that the last 5 years of continuous use were 2003 through 2007. All subsequent use of water on the property was from an exempt well for exempt purposes.

Highest use years were 2003 and 2006. Power use, crop information and owner testimony uphold full use of the water right in 2003. In 2006, our calculations indicate that 32.0 AFY were used. This is based on 20 acres of Christmas trees with an estimated crop demand of 12" x 75% efficiency x 20 acres = 25 AFY, plus the 5000 square foot nursery uses approximately 1.5 acre/foot/year (AFY) and the 0.5 acre nursery stock uses 3.6 AFY, for a total of 5 AF for nursery operations. The 25 AFY for trees plus 5 for nursery plus the domestic and stock water equals 32.0 AFY.

The average of these two highest years is 44.3 AFY.

Geologic, Hydrogeologic, or other scientific investigations (if applicable)

PROJECT SITE
The proposed location for the new ground water withdrawal is located approximately one mile northwest of the Hartzell water right and well. Both sites lie on the Grand Prairie, a sparsely wooded upland located between the Olequa Creek drainage and a bluff on the western end of the Cowlitz River drainage. The existing water right is located along Military Road, and the proposed point of withdrawal is located along Highway 505, about a mile east of the town of Winlock, Both locations are within in the Olequa Creek drainage basin, in the Cowlitz watershed, WRIA 26.

The area receives an average of 48 inches of rain per year, mostly during the period November to March.

REGIONAL HYDROGEOLOGY

The regional hydrogeology of the sub-basin has been described in Weigle and Foxworthy (1962). The site is approximately 4 miles north west of the Cowlitz River, a regional physiographic feature that drains a large portion of southwest Washington. The geology of the Grand Prairie area (between Winlock and I-5) is mapped as the Logan Hill Formation. This unit is comprised of outwash sands and gravels extending to at least 200 feet below the surface in the general area surrounding the site. Due to its age, the top 50 to over 200 feet has completely weathered to clay. Below this, the Logan Hill Formation becomes predominately silt. At depths of 50 to 200 feet, saturated sands and gravels known as the Logan Hill Aquifer occur, overlying sedimentary bedrock. The Logan Hill Aquifer is the primary regional water supply aquifer. Some limited ground water production is also obtained from shallow layers in the upper weathered Logan Hill Formation, and from fractured bedrock aquifers beneath it.

The Logan Hill Aquifer is largely contiguous within the mapped area of Logan Hill Formation and serves as the principal water supply aquifer within the area. The aquifer thins near the southern extents of the Logan Hill Formation, south of Winlock. High confining pressures, in excess of 60 feet, are found over much of the Logan Hill Aquifer extents. Weigle and Foxworthy (1962) report the ground water gradient under the Grand Prairie area is to the southwest. . Figures 1, 2, and 3 in the Supporting Information show a location map and two geologic cross sections through the Logan Hills Aquifer. These cross sections also show a westerly gradient, towards Olequa Creek, and show the Hartzell well is in the same source of supply as the proposed new point of withdrawal, and largely isolated from surface waters across the aquifer's extent. Ground water in the Logan Hill aquifer is recharged by percolation of precipitation directly on the formation, and possibly recharged from bedrock uplands east of the project area. Recharge to the regional aquifer has been estimated at 12 inches per year out of 48 inches total precipitation. The remaining 36 inches are lost to evapotranspiration, or discharged to surface water via runoff, shallow ground water flow (interflow), or deeper ground water flow.

Available well logs indicate the Logan Hill Aquifer is contiguous over the Grand Prairie area, terminating to the east at the bluff near the I-5 / SR505 interchange. To the west, the aquifer is present on both sides of the Olequa Creek valley near Winlock, however it does not appear contiguous under the creek. Although no well logs are available to provide geologic information for the areas immediately adjacent to the Olequa Creek valley, the Logan Hill Aquifer is reported to discharge to Olequa Creek in this area, as evidenced by springs (Ecology, 2004). Based on the higher aquifer head (approximately 90 feet) relative to the creek elevation at locations near the creek, aquifer materials (unweathered, permeable sands and gravels) do not likely crop out at the valley walls. Discharge of the Logan Hill aquifer to the creek is likely moderated significantly through low permeability weathered Logan Hill soils along the valley walls, formed in-situ by the same processes that formed the aquitard overlying the Logan Hill aquifer. This relationship also likely holds at the eastern margins of the Logan Hill Aquifer in the Grand Prairie area, at the bluff near the I-5 / SR505 interchange. Although some springs are reported, and several drainages have developed along the bluff face, no major streams or surface water flows are mapped here, suggesting no major discharge of the Logan Hill Aquifer at its eastern terminus.

The adjacent mapped geologic unit, the Lacamas Creek Formation, contains a shallow aquifer of similar (but thinner) composition to the Logan Hill, with water levels up to 200 feet lower than potentiometric surfaces in the Logan Hill aquifer. This head difference, and the absence of flowing artesian pressures in wells near the base of the bluff, also suggest minimal discharge of Logan Hill ground water to the east.

LOCAL HYDROGEOLOGY

Drillers' logs from nearby water wells obtained from Ecology indicate ground water was encountered in sands and gravels of the Logan Hill Formation at depths ranging from around 50 to 180 feet below ground surface (bgs) within 0.5 mile of the site. The thickness of the Logan Hill aquifer (based on the few wells that appeared to fully penetrate the aquifer) ranges from 30 to 81 feet, with a thickness of at least 60 feet reported at the Hinen/Mower well, which did not fully penetrate the aquifer. Static

water levels in nearby wells range mostly from around 20 to 120 feet bgs (48 feet at the Hartzell well, 70 feet bgs at the Hinen/Mower well near the proposed new City well), typically 20 to 100 feet above the aquifer, indicating confined aquifer conditions.

A confining layer, or aquitard, exists above the aquifer and consists of low- permeability clastic silt, clay, and gravels that are highly to completely weathered (i.e., altered to clay). The aquitard at the Hartzell well is 109 to 123 feet thick; at the Hinen/Mower well near the proposed new City well it is 125 feet thick. Based on available well logs, the aquitard extends regionally over a large area. The aquitard limits hydraulic connection between the confined, lower aquifer and any shallow, perched ground water and surface waters. Surficial drainages and streams are therefore not in hydraulic continuity with the Logan Hills aquifer.

GROUND WATER QUALITY

Ground water quality in the area, based on testing of other City wells, is good, according to the August 2008 City of Winlock Water System Plan Update.

AVAILABILITY OF GROUND WATER

Wells completed in the Logan Hills Aquifer within 0.5 mile of the proposed new point of withdrawal have reported yields of three to 230 gpm. The Hartzell well tested at 100 gpm at time of drilling, the Hinen well (near the proposed new point of withdrawal) tested at 110 gpm. Specific capacities in the area range from approximately 0.1 to 50 gpm/ft.
Based on estimated specific capacity values, the theoretical yield of wells installed in the Logan Hills Aquifer in this area would range from less than 10 gpm to over 1,000.

The closest City well with a recorded pumping test is the '603' well, located in the SE/SW quarter-quarter of Section 27 (approximately one-half mile northwest of the applicant well). The well was pumped at a rate of 200 gpm with four feet of drawdown. The well is completed with approximately 50 feet of perforations in the Logan Hills Aquifer.

Other

None

The information or conclusions in this section were authored and/or developed by Bob Thode.

CONCLUSIONS [See WAC 173-153-130(6)(d)]

Tentative determination (validity and extent of the right)

This water right is valid, in good standing, and 44.3 AFY are eligible to be transferred.

Relinquishment or abandonment concerns

We determined that there was a partial relinquishment due to reduction in the use toward the end of the most recent 5 years of continuous use.

Hydraulic analysis

Although no hydraulic analysis has been performed on the original or proposed points of withdrawal, sufficient information exists on the Body of Water that the transfer is in to ascertain ground water and aquifer properties. Most of the domestic, irrigation, and City of Winlock wells in the area are completed with perforations or open casings, limiting the production capacity. The nearest reliable aquifer testing data is available for the Cardinal Glass plant site, located approximately four miles north of the site. A well completed in the same Logan Hills Aquifer at the Cardinal Glass property was constructed using engineered design, wire wrapped screen, and development methods typical of modern production wells. Aquifer properties (e.g., transmissivity, storage, etc.) were determined at this well during multiple long term and step-drawdown pumping tests. This well was estimated to have a long term safe yield of approximately 490 gpm. The City '603' well, located approximately one-half mile northwest of the proposed new point of withdrawal, was pumped at a rate of 200 gpm with four feet of drawdown. The Hinen well (located 1000 feet west of the proposed new point of withdrawal) tested at 110 gpm at time of drilling; the Hartzell well tested at 100 gpm at time of drilling.

Based on these wells, and transmissivities estimated from specific capacity information derived from existing well logs at and near the proposed new point of withdrawal, the Logan Hills aquifer is fully capable of supporting the proposed transfer without impairment to senior water rights holders including exempt rights.

Consideration of comments and protests

None received.

Impairment

POTENTIAL FOR IMPAIRMENT OF EXISTING WATER RIGHTS

Twenty-seven ground water certificates exist within one mile of the proposed point of ground water withdrawal. The certificated ground water right-holders obtain ground water from the Logan Hills aquifer, which is the same water-bearing

zone of the proposed transfer. The certified rates are for instantaneous withdrawals of 45 to 350 gpm, at annual withdrawal rates of three to 224 acre-feet per year, respectively. The uses for these rights include municipal, irrigation and domestic supply. The nearest point of certified ground water withdrawal is approximately one-half mile to the east (200 gpm; 34 -acre-feet/year).

The combined totals for ground water rights issued within a one-mile radius of the project site is 3,791 gpm and 1,341 acre-feet/year. The transfer would not increase the total amount withdrawn, and would spread the withdrawal over the entire year rather than the dry (growing) season.

No claimed ground water rights occur within ½-mile of the proposed point of ground water withdrawal.

The proposed transfer would not impair senior water rights due to no net increase in ground water withdrawal from the Logan Hill Aquifer. The proposed transfer of the point of withdrawal approximately one mile northwest of the current Hartzell well location would not impair any senior water rights due to the high confining pressures in the Logan Hill aquifer, and low predicted drawdowns beyond a few hundred feet of any new withdrawal. There are no senior water rights within 1,000 feet of the proposed new point of withdrawal, which is well outside the likely radius of influence of a pumping well, estimated at a few hundred feet.

A domestic / exempt well is located around 400 feet east of the proposed new City well. This well is also completed in the confined Logan Hills aquifer and the log indicates 69 feet of confining pressure (above the top of the water bearing zone). Distance-drawdown analysis conducted at the Cardinal Glass well in the Logan Hills aquifer north of the proposed new point of withdrawal indicates around 8 feet of drawdown at 400 feet from a well pumping at 200 gpm. The proposed new point of withdrawal is therefore unlikely to impair even the closest well.

Six surface water certificates have been issued within a one-mile radius of the location of the proposed ground water withdrawal. The points of surface water withdrawal for these three certificated rights are Olequa Creek and an unnamed spring. The Logan Hills aquifer in this area may partially discharge to Olequa Creek. Impairment of surface water rights, including instream flows, is unlikely due to no net increase in ground water withdrawal from the Logan Hill Aquifer in the area where it may eventually discharge to Olequa Creek.

Public Interest

The proposed water right transfer is in the public interest because it provides maximum net benefits for the people of Washington and it protects and enhances the natural environment. The City of Winlock is required by the Growth Management Act to have sufficient water to serve the City and its urban growth area, which was designated by Lewis County and upheld by the Western Washington Growth Management Hearings Board. The proposed transfer provides additional water for the City's municipal needs. The proposed transfer will also assist the City in continuing to supply water for the Cardinal Glass plant, ensuring the continued employment of over 200 people in Lewis County. Providing water to support Winlock's anticipated growth needs and ensuring employment, while retaining some water right for irrigation use, provides maximum benefit to Washington citizens. The change from seasonal irrigation to year-round municipal use will distribute withdrawals over the entire year rather than just the dry season, which will have a positive impact on basin water balance and dry season streamflow.

Other

The board also considered the previous provisions associated with the water right as identified in the background section of this report when making its decision.

DECISION [See WAC 173-153-130(6)(e)]

It is the board's decision that :

- 44.3 AFY is available for transfer
- The maximum withdrawal rate shall be 100 gpm
- The proposed use shall be changed to Municipal and year round use.
- The point of withdrawal shall be changed to a well located on parcel number 015627000000 in the SW/NE Sec 34, T12N, R2W

The information or conclusions in this section were authored and/or developed by Bob Thode.

PROVISIONS [See WAC 173-153-130(6)(f)]

Conditions and limitations

The sale between Clay Hartzell and the City of Winlock must be finalized.
Meter Installation
An approved measuring device shall be installed and maintained for the new well constructed under this water right. In accordance with "Requirements for Measuring and Reporting Water Use" Chapter 173-173 WAC.

Mitigation (if applicable)

None required

Continued

Construction Schedule

Year Task

---

0 Transfer approved / permit issued
1 New well site short plat finalized
2 New well site property transfer completed
3 Well and water line engineering, plans/specifications
4 Well and water line construction
5 Well /aquifer/water testing
10 Water put to beneficial use / submit Proof of Appropriation of Water affidavit

Other

None

The information or conclusions in this section were authored and/or developed by Brian Greene.

The undersigned board commissioner certifies that he/she understands the board is responsible "to ensure that all relevant issues identified during its evaluation of the application, or which are raised by any commenting party during the board's evaluation process, are thoroughly evaluated and discussed in the board's deliberations. These discussions must be fully documented in the report of examination." [WAC 173-153-130(5)] The undersigned therefore, certifies that he/she, having reviewed the report of examination, knows and understands the content of this report and concurs with the report's conclusions.

Signed at Chehalis, Washington
This 15th day of September, 2011

Robert Thode, Board Representative

Barbara Burton-Burres, Board Representative

Lewis County Water Conservancy Board

If you have special accommodation needs or require this form in alternate format, please contact 360-407-6607 (Voice) or 711 (TTY) or 1-800-833-6388 (TTY).

Ecology is an equal opportunity employer

Attachments:

- Water right certificate
- Hartzell well log
- Figure 1 Vicinity map
- Figure 2 Location map
- Figure 3 Plat map / air photo
- Electric bills
- Electricity usage graph
- Electricity usage tables and calculations
- Pump / irrigation photos
- Historic air photos
- Geologic Cross Section Figure 1 Location Map
- Geologic Cross Section A - A'
- Geologic Cross Section B – B'
- Cross section well logs
- Affidavit of Mr. Clay Hartzell

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
March 16, 1981	G 2-25856	G 2-25856 P	G 2-25856 C

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 7	Winlock	Washington	98596

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
3 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	350	224

QUANTITY, TYPE OF USE, PERIOD OF USE
224 acre-feet per year — municipal supply — continuously

(est. pop - 2,000 by year 2,000)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL #1 - 1200 feet west and 600 feet north from the South Quarter corner of Section 27 within SW¼ of Section 27. #2 - 1200 feet north and 1010 feet west from the Southeast corner of Section 28, within SE¼ of Section 28. # 3 - 900 feet south and 1775 feet west from the Northwest Corner Section 33 within NE¼ of Section 33.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
		12	2 W	26	Lewis

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 City of Winlock.

(SEE REVERSE SIDE)

CERTIFICATE

"Total annual withdrawal for municipal supply shall be limited to 448 acre-feet per year from this municipal water system."

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* 29th *day of* June, *19*84.

DONALD W. MOOS, Director
Department of Ecology

ENGINEERING DATA
OK

by Joan K. Thomas
Joan K. Thomas, Regional Manager

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
March 16, 1981	G 2-25856	G 2-25856 P	

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 7	Winlock	Washington	98596

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
3 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	350	224

QUANTITY, TYPE OF USE, PERIOD OF USE
224 acre-feet per year — municipal supply — continuously

(est. pop - 2,000 by year 2,000)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL #1 - 1200 feet west and 600 feet north from the South Quarter corner of Section 27 within SW¼ of Section 27. #2 - 1200 feet north and 1010 feet west from the Southeast corner of Section 28, within SE¼ of Section 28. # 3 - 900 feet south and 1775 feet west from the Northwest Corner Section 33 within NE¼ of Section 33.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
		12	2 W	26	Lewis

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 City of Winlock.

DESCRIPTION OF PROPOSED WORKS

Well # 1 - 8" x 156'; well # 2 and Well #3 - no logs available. All to connect to existing service lines.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	April 1, 1984	April 1, 1986

PROVISIONS

"Total annual withdrawal for municipal supply shall be limited to 448 acre-feet per year from this municipal water system."

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* 30 *day of* September, *19* 81

DONALD W. MOOS, Director
Department of Ecology

by E.W. Adselstine, Regional Manager

ENGINEERING DATA

OK 9-25-81
VES 9-25-81

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
March 16, 1981	G 2-25856		

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
~~322 NE First Street~~ PO Box 7	Winlock	Washington	98596

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
3 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	350	224

QUANTITY, TYPE OF USE, PERIOD OF USE
224 acre-feet per year — municipal supply — continuously

(est. pop - 2,000 by year 2,000)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL #1 - 1200 feet west and 600 feet north from the South Quarter corner of Section 27 within SW¼ of Section 27. #2 - 1200 feet north and 1010 feet west from the Southeast corner of Section 28, within SE¼ of Section 28. # 3 - 900 feet south and 1775 feet west from the Northwest Corner Section 33 within NE¼ of Section 33.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
		12	2 W	26	Lewis

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 City of Winlock.

DESCRIPTION OF PROPOSED WORKS

Well # 1 - 8" x 156'; well # 2 and Well #3 - no logs available. All to connect to existing service lines.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	April 1, 1984	April 1, 1986

REPORT

BACKGROUND:
This application was received and accepted in this office on March 16, 1981. The first public notice, which advertised the proposed Well # 1 appeared in the Daily Chronicle on May 5 and 12, 1981. After discussing the water system with city officials and Winlock's consulting engineer a revised public notice was prepared and published which amended the original application; there were no protests received from either public notice. The City of Winlock has requested ground water rights from two existing and one proposed well in the amount of 350 gallons per minute for municipal supply.

INVESTIGATION:
The City of Winlock has the following water right claims and certificates recorded:

Water Right Claims:	Source	Amount	Use	Priority Dates
082540	well	125 gpm	Municipal	1952
082541	well	40 gpm	municipal	1958
082542	well	25 gpm	municipal	1941
082543	well	60 gpm	municipal	1952
082544	well	175 gpm	municipal	1963

Water Right Certificates	Source	Amount	Use
No. 4293	North Ferrier Creek	2 cfs	municipal pool
3286	well	50 gpm	municipal
		80 acre-feet per year	
5333	well	175 gpm	municipal
		224 acre-feet per ~~second~~ year	

All existing rights are limited to 224 acre-feet per year.

The well noted in Claim No. 082541 is the same well as noted in Certificate No. 3286; and the well noted in Claim No. 082544 is the same well noted in Certificate No. 5333 Claim No. 082542 appears to be a vested right. The present application will document the two wells under Claims No. 082540 and 082543 as well as a new well recently drilled. An inspection was conducted on the new well site on June 1, 1981. The well had been drilled and a 15 horsepower pump was installed. The service lines had not been connected nor had the electric lines been installed. The annual water demand for the City of Winlock is based on an estimated per capita demand of 200 gallons per day for a population of 2,000 by the year 2,000 or a total annual withdrawal of 448 acre-feet per year; 224 acre-feet per year has been granted under this application. There is no history of well interference problems in the area.

CONCLUSION:
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 350 gallons per minute and 224 acre-feet per year for municpial supply, based on the following provisions:

"Total annual withdrawal for municipal supply shall be limited to 448 acre-feet per year from this municipal water system."

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: Aug. 5, 1981

The State Water Code requires a $20.00 permit fee for municipal supply.

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 1, 1981	G 2-25920	G 2-25920 P	G 2-25920 C

NAME
CITY OF WINLOCK - Winolequa Park

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 7	Winlock	Washington	98596

This is to certify that the herein named applicant has made proof to the satisfaciton 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
	25	3

QUANTITY, TYPE OF USE, PERIOD OF USE
3 acre-feet per year — community domestic supply — continuously

(public park)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
175 feet north and 150 feet west from the Southeast corner of Section 21.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼SE¼	21	12	2 W	26	Lewis

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 lies within SE¼SE¼ Section 21, T. 12 N., R. 2 W.W.M., lying east of State Highway No. 603.

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* 10th *day* of March, 19 82

DONALD W. MOOS, Director
Department of Ecology

by E.W. Abeistine, Regional Manager

ENGINEERING DATA
OK'd-R-2-82
REC'D 3-82

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 1, 1981	G 2-25920	G 2-25920 P	

NAME
CITY OF WINLOCK - Winolequa Park

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 7	Winlock	Washington	98596

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
	25	3

QUANTITY, TYPE OF USE, PERIOD OF USE
3 acre-feet per year — community domestic supply — continuously
(public park)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
175 feet north and 150 feet west from the Southeast corner of Section 21.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼SE¼	21	12	2 W.	26	Lewis

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 lies within SE¼SE¼ Section 21, T. 12 N., R. 2 W.W.M., lying east of State Highway No. 603.

DESCRIPTION OF PROPOSED WORKS

Well - 6" x 59' with 1 hp submersible pump and service lines to caretaker's home and park facilities.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Complete and in use	June 1, 1983

PROVISIONS

The access port shall be continuously maintained.

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* 21 *day of* January, 19 82

DONALD W. MOOS, Director
Department of Ecology

by _____
E.W. Asselstine, Regional Manager

ENGINEERING DATA
OK 11-25-82
WES 12-2-82

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 1, 1981	G-2-25920		

NAME
CITY OF WINLOCK - Winlequa Park

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 7	Winlock	Washington	98596

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
	25	3

QUANTITY, TYPE OF USE, PERIOD OF USE
.3 acre-feet per year community domestic supply continuously
(public park)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
175 feet north and 150 feet west from the Southeast corner of Section 21.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼SE¼	21	12	2 W.	26	Lewis

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 lies within S½S½ Section 21, T. 12 N., R. 2 W.W.M., lying east of State Highway No. 603.

DESCRIPTION OF PROPOSED WORKS

Well - 6" x 59' with 1 hp submersible pump and service lines to caretaker's home and park facilities.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Complete and in use	June 1, 1983

REPORT

BACKGROUND:
This application was received and accepted in this office on June 1, 1981. The public notice appeared in The Daily Chronicle on June 26 and July 1, 1981. There were no objections to this withdrawal during the 30-day protest period. The applicants have requested ground water rights from an existing well in the amount of 25 gallons per minute for community domestic supply for public park facilities.

INVESTIGATION:
I inspected the property and water system on August 4, 1981. The works, as described above, were complete and in use at that time. The caretaker's home is a large mobile unit occupied by Mr. Chastain and family. The park contains two ball fields, kitchen facilities and two restrooms as well as several picnic tables and drinking fountains. The park is normally under heavy use thrpugh out the year. 3 acre-feet per year will meet the water demand for the entire park facility, to include ½ acre of irrigation for the ball fields and caretakers residence. There is no history of well interference problems in the immediate vicinity.

CONCLUSION:
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 25 gallons per minute and 3 acre-feet per year for community domestic supply, based on the following provisions:

The access port shall be continuously maintained.

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.

REPORTED BY: Gary E. Hansen

DATE: 12-16-81

The State Water Code requires a $20.00 permit fee for community domestic supply.

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
July 30, 1982	G 2-26206	G 2-26206 P	G 2-26206 C

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 777	Winlock	Washington	98596

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
	200	34

QUANTITY, TYPE OF USE, PERIOD OF USE
34 acre-feet per year — community domestic supply — continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
500 feet south and 700 feet east of the Northwest corner of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼NW¼	34	12	2 W	26	Lewis

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 the City of Winlock.

PROVISIONS

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

At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through WAC 508-64-040.

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* 11th *day of* October, *19* 83

DONALD W. MOOS, Director
Department of Ecology

ENGINEERING DATA
OK

by Norman L. Glenn
Norman L. Glenn, Regional Manager

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
July 30, 1982	G 2-26206	G 2-26206 P	

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 777	Winlock	Washington	98596

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
	200	34

QUANTITY, TYPE OF USE, PERIOD OF USE		
34 acre-feet per year	community domestic supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
500 feet south and 700 feet east of the Northwest corner of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
[illegible]	34	12	2 W	26	Lewis

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 the City of Winlock.

DESCRIPTION OF PROPOSED WORKS

Well 10" x 151 feet deep - dual pumps at present time - 5 and 20 horsepower - 500 gallon storage at site with 2 and 3 inch mainlines.

DEVELOPMENT SCHEDULE

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

PROVISIONS

The access port shall be maintained at all times on this well.

At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through WAC 508-64-040.

Ground Water Certificate No. G 2-20841C shall be relinquished before this right becomes final.

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* 8th *day of* September, 19 83

DONALD W. MOOS, Director
Department of Ecology

by Norman L. Glenn
Norman L. Glenn, Regional Manager

ENGINEERING DATA
ok

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
March 16, 1981	G 2-25856	G 2-25856 P	

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 7	Winlock	Washington	98596

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
3 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	350	224

QUANTITY, TYPE OF USE, PERIOD OF USE		
224 acre-feet per year	municipal supply	continuously

(est. pop - 2,000 by year 2,000)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL #1 - 1200 feet west and 600 feet north from the South Quarter corner of Section 27 within SW¼ of Section 27. #2 - 1200 feet north and 1010 feet west from the Southeast corner of Section 28, within SE¼ of Section 28. # 3 - 900 feet south and 1775 feet west from the Northwest Corner Section 33 within NE¼ of Section 33.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
		12	2 W	26	Lewis

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 City of Winlock.

DESCRIPTION OF PROPOSED WORKS

Well # 1 - 8" x 156'; well # 2 and Well #3 - no logs available. All to connect to existing service lines.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	April 1, 1984	April 1, 1986

PROVISIONS

"Total annual withdrawal for municipal supply shall be limited to 448 acre-feet per year from this municipal water system."

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

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 30, 1982	G 2-26206		

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 777	Winlock	Washington	98596

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
	200	34

QUANTITY, TYPE OF USE, PERIOD OF USE
34 acre-feet per year — community domestic supply — continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
500 feet south and 700 feet east of the Northwest corner of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼NW¼	34	12	2 W	26	Lewis

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 the City of Winlock.

DESCRIPTION OF PROPOSED WORKS

Well 10" x 151 feet deep - dual pumps at present time - 5 and 20 horsepower - 500 gallon storage at site with 2 and 3 inch mainlines.

DEVELOPMENT SCHEDULE

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

REPORT

BACKGROUND:
This application was received and accepted on July 30, 1982. The application was published in the Centralia Daily Chronicle on August 24 and 31, 1982. The quantity requested is 200 gallons per minute for the purpose of community domestic supply. The application was originally submitted by Junior F. Baichtal but was assigned to the City of Winlock on October 28, 1982.

The well covered by this application is already covered by a water right, Ground Water Certificate No. G 2-20841 C, for domestic supply and irrigation of 30 acres in the amount of 250 gallons per minute and 61 acre-feet per year.

The following individuals objected to this request because they felt that granting this request would be detrimental to existing rights and reduce the water table in the immediate area.

Richard D. Thompson — September 14, 1982
123 Bay Road
Winlock, WA 98596

Charles Dueber — September 27, 1982
3023 State Highway 603
Winlock, WA 98596

Dennis and Sharon Couch — September 27, 1982
136 Kakela Road
Winlock, WA 98596

J.L. "Bud" Shook — September 28, 1982
115 Kakela Road
Winlock, WA 98596

Robert W. Leitch — September 30, 1982
114 Kakela Road
Winlock, WA 98596

INVESTIGATION:
In researching our files we could find no recorded water rights for any of the protestants but Charles Dueber does have a registered water right claim for domestic supply.

On October 13, 1982, Linton Wildrick, a ground water geologist, accompanied by the writer and Norm Glenn of the Washington Department of Ecology Southwest Regional Office made a brief investigation of wells and groundwater conditions in the Winlock, Washington area. The purpose of investigation was to determine if pumping the well as requested in this application would have any long term effect on the aquifers in the area.

During the investigation we visited several wells and obtained water level measurements. These were compared with water level records from well logs obtained from Washington Department of Ecology files. Roadside out-crops were visited and compared to geologic maps and lithologic well logs to gain an understanding of the geology and ground water occurrence in the area. Also noted was the location of nearby streams and springs in relation to the geologic strata.

There appears to be three aquifers in the area: a shallow aquifer in glacial outwash deposits, a deep aquifer in glacial outwash deposits, and a bedrock aquifer in the sandstone underlying the glacial deposits. The deep glacial aquifer is the most productive but appears to be of limited area extent. This aquifer is comprised of sandy gravels which were deposited immediately above bedrock in an east-to-west oriented valley.

North and south of the buried valley the gravels are mostly absent and ground water supplies are limited principally to the shallow glacial aquifer or the sandstone aquifer. Between the shallow and deep glacial aquifers are fine-grained sediments (alluvium) which yield little or no water to wells.

The water table in the area slopes generally toward the Olequa Creek Valley to the west where the ground water emerges in numerous springs at the glacial deposits/bedrock contact. At any given location, the static water levels in all three aquifers are probably the same. Geologic conditions are such that water can percolate to successively deeper aquifers with little head loss despite intervening fine-grained clay or silt layers. This means that pumping from any of the three aquifers will affect water levels in all nearby wells; however the aquifer is highly permeable and, therefore, even at pumping rates of several hundred gallons per minute, the water table drawdown would amount to only a few feet at distances of a few hundred feet from the wells.

Based on the October 13, 1982 static water levels and previous water levels there has been no water level decline in the area. Several large irrigation wells have historically pumped 100 or more gallons per minute during the irrigation season and it is apparent that these wells have not caused any problem. It is not likely that a few additional large wells, such as the new City of Winlock well, Ground Water Permit No. G2-25856 P, will create water level declines. Given the high yearly rainfall and substantial aquifer recharge it appears that present ground water usage is far below its potential for development. Finally, the well (G 2-26206) covered by this application and Ground Water Certificate No. G2-20841 C is expected to produce less water for community domestic supply than it did for irrigation supply. Therefore, the well will certainly not cause any long-term ground water decline in the aquifer.

This request for additional water for the City of Winlock is for the purpose of serving an area not previously served by the city. Therefore, any right granted under this application will be granted as a primary right.

Based on 200 gallons per day per capita and an estimated population increase of 150, the annual quantity required from this well is 34 acre-feet per year.

The quantities to be recommended for approval for the City of Winlock are substantially less than what can be pumped under existing right, G 2-20841 C.

A condition of any right granted under this application will be that Certificate of Water Right No. G2-20841 C be relinquished.

CONSIDERATION OF OBJECTIONS :
Based on the information obtained by this investigation and the historical information of the area in question the effect of this well on the aquifer in question will be minimal.

CONCLUSION:
It is the writers opinion that there is water available for appropriation, that the proposed use of the water is a benefical use, that the granting of this right will not adversely, affect existing rights and the approval will not be detrimental to the best public interest.

RECOMMENDATIONS:
It is recommended that this application be approved for 200 gallons per minute and 34 acre-feet per year for community domestic supply based on the following conditions:

1. That Ground Water Certificate No. G2-20841 C be relinquished before this right becomes final.

2. The access port shall be maintained at all times on this well.

3. 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.

4. At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through WAC 508-64-040.

REPORTED BY: Gayle Hamm

DATE: June 3, 1983

The statutory permit fee for community domestic supply is $20.00.

JOHN SPELLMAN
Governor

DONALD W MOOS
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
7272 Cleanwater Lane, LU-11 • Olympia, Washington 98504 • (206) 753-2353

FINDINGS OF FACT AND DECISION

Upon Review of the above report, I find that all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find that water is available for appropriation for a beneficial use and that the appropriation thereof as recommended in the above report will not impair existing rights or be detrimental to the public welfare. Therefore, it is ORDERED that, subject to existing rights and the provisions herein, permit issue under Ground Water Application Number G 2-26206 for the appropriation of public waters in the amount and for the uses set forth in the foregoing report, in accordance with the examiner's conclusions and recommendations.

Signed at Olympia, Washington, this 10th day of June, 1983.

Norman L. Glenn

NORMAN L. GLENN, Regional Manager
Department of Ecology
Southwest Region

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 30, 1982	G 2-26206		

NAME
CITY OF WINLOCK

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 777	Winlock	Washington	98596

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
	200	34

QUANTITY, TYPE OF USE, PERIOD OF USE
34 acre-feet per year — community domestic supply — continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
500 feet south and 700 feet east of the Northwest corner of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼NW¼	34	12	2 W	26	Lewis

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 the City of Winlock.

DESCRIPTION OF PROPOSED WORKS

Well 10" x 151 feet deep - dual pumps at present time - 5 and 20 horsepower - 500 gallon storage at site with 2 and 3 inch mainlines.

DEVELOPMENT SCHEDULE

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

REPORT

BACKGROUND:
This application was received and accepted on July 30, 1982. The application was published in the Centralia Daily Chronicle on August 24 and 31, 1982. The quantity requested is 200 gallons per minute for the purpose of community domestic supply. The application was originally submitted by Junior F. Baichtal but was assigned to the City of Winlock on October 28, 1982.

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Winlock, WA 98596

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3023 State Highway 603
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Dennis and Sharon Couch — September 27, 1982
136 Kakela Road
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J.L. "Bud" Shook — September 28, 1982
115 Kakela Road
Winlock, WA 98596

Robert W. Leitch — September 30, 1982
114 Kakela Road
Winlock, WA 98596

INVESTIGATION:
In researching our files we could find no recorded water rights for any of the protestants but Charles Dueber does have a registered water right claim for domestic supply.

On October 13, 1982, Linton Wildrick, a ground water geologist, accompanied by the writer and Norm Glenn of the Washington Department of Ecology Southwest Regional Office made a brief investigation of wells and groundwater conditions in the Winlock, Washington area. The purpose of investigation was to determine if pumping the well as requested in this application would have any long term effect on the aquifers in the area.

During the investigation we visited several wells and obtained water level measurements. These were compared with water level records from well logs obtained from Washington Department of Ecology files. Roadside out-crops were visited and compared to geologic maps and lithologic well logs to gain an understanding of the geology and ground water occurrence in the area. Also noted was the location of nearby streams and springs in relation to the geologic strata.

There appears to be three aquifers in the area: a shallow aquifer in glacial outwash deposits, a deep aquifer in glacial outwash deposits, and a bedrock aquifer in the sandstone underlying the glacial deposits. The deep glacial aquifer is the most productive but appears to be of limited area extent. This aquifer is comprised of sandy gravels which were deposited immediately above bedrock in an east-to-west oriented valley.

North and south of the buried valley the gravels are mostly absent and ground water supplies are limited principally to the shallow glacial aquifer or the sandstone aquifer. Between the shallow and deep glacial aquifers are fine-grained sediments (alluvium) which yield little or no water to wells.

The water table in the area slopes generally toward the Olequa Creek Valley to the west where the ground water emerges in numerous springs at the glacial deposits/bedrock contact. At any given location, the static water levels in all three aquifers are probably the same. Geologic conditions are such that water can percolate to successively deeper aquifers with little head loss despite intervening fine-grained clay or silt layers. This means that pumping from any of the three aquifers will affect water levels in all nearby wells; however the aquifer is highly permeable and, therefore, even at pumping rates of several hundred gallons per minute, the water table drawdown would amount to only a few feet at distances of a few hundred feet from the wells.

Based on the October 13, 1982 static water levels and previous water levels there has been no water level decline in the area. Several large irrigation wells have historically pumped 100 or more gallons per minute during the irrigation season and it is apparent that these wells have not caused any problem. It is not likely that a few additional large wells, such as the new City of Winlock well, Ground Water Permit No. G2-25856 P, will create water level declines. Given the high yearly rainfall and substantial aquifer recharge it appears that present ground water usage is far below its potential for development. Finally, the well (G 2-26206) covered by this application and Ground Water Certificate No. G2-20841 C is expected to produce less water for community domestic supply than it did for irrigation supply. Therefore, the well will certainly not cause any long-term ground water decline in the aquifer.

This request for additional water for the City of Winlock is for the purpose of serving an area not previously served by the city. Therefore, any right granted under this application will be granted as a primary right.

Based on 200 gallons per day per capita and an estimated population increase of 150, the annual quantity required from this well is 34 acre-feet per year.

The quantities to be recommended for approval for the City of Winlock are substantially less than what can be pumped under existing right, G 2-20841 C.

A condition of any right granted under this application will be that Certificate of Water Right No. G2-20841 C be relinquished.

CONSIDERATION OF OBJECTIONS :
Based on the information obtained by this investigation and the historical information of the area in question the effect of this well on the aquifer in question will be minimal.

CONCLUSION:
It is the writers opinion that there is water available for appropriation, that the proposed use of the water is a benefical use, that the granting of this right will not adversely, affect existing rights and the approval will not be detrimental to the best public interest.

RECOMMENDATIONS:
It is recommended that this application be approved for 200 gallons per minute and 34 acre-feet per year for community domestic supply based on the following conditions:

1. That Ground Water Certificate No. G2-20841 C be relinquished before this right becomes final.

2. The access port shall be maintained at all times on this well.

3. 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.

4. At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through WAC 508-64-040.

REPORTED BY: Gayle Brown

DATE: JUNE 3, 1983

The statutory permit fee for community domestic supply is $20.00.

JOHN SPELLMAN
Governor

DONALD W MOOS
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
7272 Cleanwater Lane, LU-11 • Olympia, Washington 98504 • (206) 753-2353

FINDINGS OF FACT AND DECISION

Upon Review of the above report, I find that all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find that water is available for appropriation for a beneficial use and that the appropriation thereof as recommended in the above report will not impair existing rights or be detrimental to the public welfare. Therefore, it is ORDERED that, subject to existing rights and the provisions herein, permit issue under Ground Water Application Number G 2-26206 for the appropriation of public waters in the amount and for the uses set forth in the foregoing report, in accordance with the examiner's conclusions and recommendations.

Signed at Olympia, Washington, this 10th day of June, 1983.

Norman L. Glenn

NORMAN L. GLENN, Regional Manager
Department of Ecology
Southwest Region

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
DEPARTMENT OF ECOLOGY
APR 17 1974 092030
CASH OTHER NONE

1. NAME CITY OF WINLOCK

ADDRESS P.O. BOX 7

WINLOCK, WASH. ZIP CODE 98596

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: GROUND WATER (SURFACE OR GROUND WATER)

W.R.I.A. 26 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS ASH STREET WELL, CITY OF WINLOCK

B. IF SURFACE WATER, THE SOURCE IS -

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 60 (CUBIC FEET PER SECOND ~~OR GALLONS PER MINUTE~~) PRESENTLY USED 55

B. ANNUAL QUANTITY CLAIMED 100 (ACRE FEET PER YEAR) PRESENTLY USED 90

C. IF FOR IRRIGATION, ACRES CLAIMED - PRESENTLY IRRIGATED -

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: JANUARY 1 to DECEMBER 31

4. DATE OF FIRST PUTTING WATER TO USE: MONTH JUNE YEAR 1952

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 900 FEET SOUTH AND 1775 FEET WEST FROM THE NORTHEAST CORNER OF SECTION 33

BEING WITHIN THE NW 1/4 NE 1/4 OF SECTION 33, T. 12 N., R. 02 W. (E OR W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT -B/T BLOCK 9 & 10 OF

WINLOCK R.E. & INV. CO'S ADDITION, CITY OF WINLOCK IN ASH STREET
(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED:

COUNTY

7. PURPOSE(S) FOR WHICH WATER IS USED: MUNICIPAL SUPPLY

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: APPROPRIATION

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

OCT 07 1974 02543

DIRECTOR DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF

X Gene L Matthews

DATE APRIL 16, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW

GENE LEROY MATTHEWS
P.O. BOX 39
WINLOCK, WASHINGTON 98596

☒ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND OR WELL CONSTRUCTION IS AVAILABLE

A FEE OF $2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

RETURN ALL THREE COPIES WITH CARBONS INTACT ALONG WITH YOUR FEE TO DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIM REGISTRATION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
DEPARTMENT OF ECOLOGY
APR 17 1974 092027
CASH OTHER MISC

1. NAME CITY OF WINLOCK

ADDRESS P.O. BOX 7

WINLOCK, WASHINGTON ZIP CODE 98596

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: GROUND WATER (SURFACE OR GROUND WATER)

W.R.I.A. 26 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS EUREKA #1 WELL, CITY OF WINLOCK

B. IF SURFACE WATER, THE SOURCE IS -

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 125 (CUBIC FEET PER SECOND OR GALLONS PER MINUTE) PRESENTLY USED 105

B. ANNUAL QUANTITY CLAIMED 200 (ACRE FEET PER YEAR) PRESENTLY USED 170

C. IF FOR IRRIGATION, ACRES CLAIMED - PRESENTLY IRRIGATED -

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: JANUARY 1 to DECEMBER 31

4. DATE OF FIRST PUTTING WATER TO USE: MONTH JUNE YEAR 1952

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 1200 FEET NORTH AND 1010 FEET WEST FROM THE SOUTHEAST CORNER OF SECTION 28

BEING WITHIN THE SE 1/4 SE 1/4 OF SECTION 28, T. 12 N., R. 02 W. (E or W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT - BLOCK 32 OF LEONARD'S FIRST ADDITION, CITY OF WINLOCK (GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: -

COUNTY

7. PURPOSE(S) FOR WHICH WATER IS USED: MUNICIPAL SUPPLY

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: APPROPRIATION

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED - THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

OCT 1 4082540

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF

X Gene L. Matthews

DATE APRIL 16, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW

GENE LEROY MATTHEWS
P.O. BOX 39
WINLOCK, WASH. 98596

☒ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND OR WELL CONSTRUCTION IS AVAILABLE

A FEE OF $2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

RETURN ALL SHEETS OF THIS CLAIM IN INTACT ALONG WITH YOUR FEE TO DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
DEPARTMENT OF ECOLOGY
APR 17 1974 092029
CASH OTHER NONE

1. NAME CITY OF WINLOCK

ADDRESS P.O. BOX 7

WINLOCK, WASHINGTON ZIP CODE 98596

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: GROUND WATER (SURFACE OR GROUND WATER)

W.R.I.A. 26 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS EUREKA #2 WELL, CITY OF WINLOCK

B. IF SURFACE WATER, THE SOURCE IS -

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 25 (CUBIC FEET PER SECOND OR GALLONS PER MINUTE) PRESENTLY USED 0

B. ANNUAL QUANTITY CLAIMED 40 (ACRE FEET PER YEAR) PRESENTLY USED 0

C. IF FOR IRRIGATION, ACRES CLAIMED - PRESENTLY IRRIGATED -

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: JANUARY 1 to DECEMBER 31

4. DATE OF FIRST PUTTING WATER TO USE: MONTH JULY YEAR 1941

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 1750 FEET NORTH AND 1030

FEET WEST FROM THE SOUTHEAST CORNER OF SECTION 28

BEING WITHIN THE NE 1/4 SE 1/4 OF SECTION 28, T. 12 N., R. 02 W (E OR W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, ~~XXXXXX~~ B/T BLOCK 6 & 7 OF

LEONARD'S SECOND ADDITION, CITY OF WINLOCK IN HEMLOCK STREET
(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED:

COUNTY

7. PURPOSE(S) FOR WHICH WATER IS USED: MUNICIPAL SUPPLY

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: APPROPRIATION

DO NOT USE THIS SPACE

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DATE RETURNED THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

OCT 17 1974 082542

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

X Gene L. Matthews

DATE APRIL 16, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW

Gene Leroy Matthews
Box 39
Winlock, Wash. 98596

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND OR WELL CONSTRUCTION IS AVAILABLE

A FEE OF $2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

RETURN ALL THREE COPIES WITH CASHIER'S STUB OR RECEIPT FOR YOUR FEE TO DEPARTMENT OF ECOLOGY WATER RIGHT CLAIM REGISTRATION P.O. BOX 829 OLYMPIA, WASHINGTON 98504

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
DEPARTMENT OF ECOLOGY
APR 17 1974 092028
CASH__OTHER 1 NONE__

1. NAME CITY OF WINLOCK

ADDRESS P.O. BOX 7

WINLOCK, WASH. ZIP CODE 98596

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: GROUND WATER (SURFACE OR GROUND WATER)

W.R.I.A. 26 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS EUREKA #3 WELL, CITY OF WINLOCK

B. IF SURFACE WATER, THE SOURCE IS ---

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 40 ~~CUBIC FEET PER SECOND~~ OR GALLONS PER MINUTE) PRESENTLY USED 33

B. ANNUAL QUANTITY CLAIMED 65 (ACRE FEET PER YEAR) PRESENTLY USED 53

C. IF FOR IRRIGATION, ACRES CLAIMED - PRESENTLY IRRIGATED -

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: JANUARY 1 to DECEMBER 31

4. DATE OF FIRST PUTTING WATER TO USE: MONTH JUNE YEAR 1958

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 1650 FEET NORTH AND 1340 FEET WEST FROM THE SOUTHEAST CORNER OF SECTION 28

BEING WITHIN THE NE 1/4 SE 1/4 OF SECTION 28 T. 12 N., R. 02 W ~~E~~ W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT 6 BLOCK 4 OF EUREKA ADDITION, CITY OF WINLOCK
(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED-

COUNTY

7. PURPOSE(S) FOR WHICH WATER IS USED: MUNICIPAL SUPPLY

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: APPROPRIATION

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

OCT 07 1974 082541

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF

X Gene L. Matthews

DATE APRIL 16, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW

Gene Leroy Matthews
P.O. Box 39
Winlock, Wash. 98596

☒ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND OR WELL CONSTRUCTION IS AVAILABLE

A FEE OF $2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

SIGN ALL THREE COPIES WITH CARBON INTACT. ALONG WITH YOUR FEE TO [illegible] DEPARTMENT OF ECOLOGY [illegible] WATER RIGHT CLAIMS REGISTRATION [illegible]

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
DEPARTMENT OF ECOLOGY
APR 17 1974 092031
CASH OTHER NONE

1. NAME City of Winlock

ADDRESS P.O. Box 7

Winlock, Wash. ZIP CODE 98596

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: Ground Water (SURFACE OR GROUND WATER)

W.R.I.A. 26 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS Walnut Street Well

B. IF SURFACE WATER, THE SOURCE IS

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 175 PRESENTLY USED 50 (OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED 224 PRESENTLY USED 25 (ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED 0 PRESENTLY IRRIGATED 0

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: January 1 to December 31

4. DATE OF FIRST PUTTING WATER TO USE: MONTH August YEAR 1963

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 700 FEET North AND 1340 FEET East FROM THE Southwest CORNER OF SECTION 28

BEING WITHIN The SE 1/4 SW 1/4 OF SECTION 28 T. 12 N., R. 02 W. (E.OR W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, B/T BLOCK 12 & 13 OF Great Northern Addition in Walnut Street
(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED:

COUNTY

7. PURPOSE(S) FOR WHICH WATER IS USED: Municipal Supply

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: Appropriation

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

OCT 8 1402544

DIRECTOR DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF

X Gene L. Matthews

DATE APRIL 16, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

Gene Leroy Matthews
Box 39
Winlock, Wash. 98596

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE

A FEE OF $2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

RETURN ALL THREE COPIES WITH CARBONS INTACT ALONG WITH YOUR FEE TO DEPARTMENT OF ECOLOGY WATER RIGHT CLAIMS REGISTRATION

ORIGINAL DWR

D. F. No. 1031—1-57—211 Grms.

CERTIFICATE RECORD NO. 7 PAGE NO. 3286-A

STATE OF WASHINGTON, COUNTY OF Lewis

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY That TOWN OF WINLOCK, WASHINGTON

~~of~~ , has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a well located within Block 4 of Eureka Addition to Town of Winlock Sec. 28, Twp. 12 N., R. 2 W. W.M. for the purpose of municipal water supply under and subject to provisions contained in Ground Water Permit No. 4403 issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume 7 at page 3286-A; that the right hereby confirmed dates from August 5, 1957; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 50 gallons per minute; 80 acre-feet per year for municipal water supply.

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

Town of Winlock, Lewis County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 16th day of February, 19 59.

M B Walker

State Supervisor of Water Resources.

APPENDIX D

CONSTRUCTION STANDARDS

DESIGN AND CONSTRUCTION STANDARDS

CHAPTER 1
ADMINISTRATION

Table of Contents

Table of Drawings

GENERAL CONSIDERATIONS

1.00 Introduction

A. These Design Guidelines have been developed to serve as a baseline for improvements within the City of Winlock and the Urban Growth Area by other entities. The language in this document is to be used as a guideline during the design and construction process, and does not relieve the user of responsibility for public health and safety. These guidelines may use the words "standards" and "specifications" where referencing other documents.

1.01 Applicability

A. The guidelines addressed in this document will apply to construction and improvement activities that take place within the right-of-way, or that impact the water, sanitary sewer, storm sewer, sidewalk, street or transportation system, or other such activities within the City of Winlock (City) and the Urban Growth Area (UGA) (see definitions). These guidelines will be considered reasonable minimum regulations unless, a variance request is granted by the City.

B. At this time, the City and Lewis County have adopted an Interlocal Cooperation Agreement authorizing the City joint management of certain permitting inspections and regulatory authority over the activities within the UGA including those that pertain to water and sewer service. The guidelines addressed in this document are applicable to development projects affecting public utilities and infrastructure within the UGA. In addition, the guidelines may be enforced at the time of annexation by the City for all new construction and improvement projects undertaken when these guidelines were in effect. An exception may be made if the non-conforming utility or infrastructure remains under private ownership rather than being accepted by the City.

C. These guidelines will prevail in the event a conflict is found or identified with any other City practice or policy. However, the criteria contained herein shall not supersede any other legally constituted standards that are more stringent than these guidelines.

1.02 Definitions

Applicant - The applicant for any development and/or improvement permit, their successors, and/or assigns.

APWA – The American Public Works Association.

AWWA – The American Water Works Association.

Bond/Surety – Any document, instrument, or individual bound with and for the acceptable performance, execution, and completion of the work, and for the satisfaction of all obligations incurred.

City – The City of Winlock.

City Engineer – The City Engineer or duly authorized representative/consultant for the City.

Community Development Coordinator – The Community Development Coordinator or duly authorized representative for the City.

Community Services Director – The Community Services Director or duly authorized representative for the City.

Contractor – References to the "Contractor" in these guidelines shall generally mean a person or company hired by the property owner and/or development applicant that is licensed and bonded to perform the required work.

County - Lewis County.

Dedication – The deliberate appropriating of land by an owner(s) for any general and public uses, reserving to themselves no other rights than such as are compatible with the full exercise and enjoyment of the public uses to which the property is to be devoted. The intent to dedicate will be evidenced by the owner by the presentment for a filing of a final plat, short plat, or binding site plan that shows the dedication thereon. Acceptance by the public will be evidenced by written approval issued by the City of such document for filing with the County Auditor.

Deferral – A temporary delay from the installation of any or all requirements of these guidelines, issued by the City, based on the site-specific conditions of a project.

Department of Ecology (DOE) - The Washington State Department of Ecology.

Department of Health (DOH) - The Washington State Department of Health.

Department of Transportation, (DOT or WSDOT) - The Washington State Department of Transportation.

Design Guidelines – The City of Winlock Public Design Guidelines will be cited routinely in the text as the "Design Guidelines".

Developer – An individual, firm, corporation, association, syndicate, trust, other legal entity, their successors, and/or assign that initiates proceedings and or files application(s) for the development of land including but not limited to a subdivision, short plat, site development plan, improvement permit and/or utility extensions. The

Developer need not be the owner of record of the land.

Easement – The right granted by a property owner to another to make lawful and beneficial use of a defined area of their property for a specific purpose, created through an expressed or implied agreement.

Engineer or PE – Any professional engineer, licensed in the State of Washington.

Equivalent Residential Unit (ERU) – ERUs are used to calculate water and sewer capacity and related charges. The specific ERU value that is utilized for water and sewer is identified in the latest Water System Plan Update or Amendment as applicable. For purposes of these design guidelines, ERU's will be allocated as follows:

- Single family residence, including mobile homes: One ERU per living unit.
- Duplex (two-family residence), Triplex (three-family residence), Fourplex (four-family residence): one ERU per dwelling unit.
- Residential buildings containing more than four living units, commercial, industrial or other non-residential customers: ERU values shall be determined by dividing the estimated water use or sewer discharge by the specific ERU value applicable at the time of application for service. Capacity estimates shall be based on applicable published guidance by DOH or Ecology and/or an engineering analysis utilizing data from an analogous use(s).

Fire Department – Lewis County Fire District No. 15.

Frontage – The area between any lot lines that intersect the boundary of a street right-of-way, or the portion of a lot that directly abuts a street right-of-way

Frontage Improvements – All of the street pavement, curb, gutter, sidewalk, storm drainage, water and sewer utilities, power and communications cable undergrounding, street trees and street lighting, as specified by these design guidelines, located within any public right-of-way abutting the property boundary of a development.

Grading Permit – A permit issued by the City prior to the commencement of any filling, grading, clearing or other land disturbing activities.

Hearing Examiner – One who hears, decides, and adjudicates appeals arising from decisions made by the City.

Impervious Surface – Any surface that cannot be effectively and easily penetrated by water.

Improvements – Any act that improves the value of public, real and personal property, or that is necessary as a condition of development, including but not limited to: streets and roads complying with the development regulations, design guidelines and specifications adopted by the City; public utility and pedestrian facilities; streetlights; landscape features; sewer and waterlines; bridge structures; storm drainage facilities;

and traffic control devices as required to be installed as part of a subdivision, short subdivision, large lot subdivision, binding site plan or commercial/industrial development.

Local Improvement District (LID) – A public improvement provided to a specific area that benefits that area and that is usually paid for by a special assessment of a defined set of property owners benefiting from the improvement.

Manual on Uniform Traffic Control Devices (MUTCD) – The Manual on Uniform Traffic Control Devices, as published and amended by the U.S. Department of Transportation, Federal Highway Administration, as modified by the Washington State Department of Transportation.

New Development – "New development" is defined as any site action involving SEPA. This may include previous development on a site with consideration to cumulative impacts for the purpose of making a SEPA threshold decision.

Not to Scale (N.T.S.) – The drawing or detail may not be to a specific scale or drawn entirely at a uniform scale.

Planned Unit Development (PUD) – Provides for development using different "site specific" standards that permit greater flexibility and achieve a more appropriate design.

Plans – The plans, profiles, cross-sections, elevations, details, and supplementary specifications, signed by a professional engineer licensed in the State of Washington and approved by the City, showing the location, character, dimensions, and details of the work to be performed.

Private Street – A privately owned and maintained vehicular access tract serving private property.

Project – General term encompassing all phases of the work to be performed and is synonymous with the term "improvement" and/or "work".

Proposed Project – The term "proposed project" may be used to refer to an entire development or portion thereof.

Public Street – A publicly owned and maintained street.

Public Works Department or Department of Public Works – The City of Winlock Public Works Department.

Public Works Superintendent or Superintendent of Public Works – The Superintendent of Public Works, or duly authorized representative for the City.

Redevelopment – Any project designed to renew, restore, or revitalize an existing building, property or street. Re-development also includes expanded or increased development that required SEPA, or use or occupancy of a building or site that has been dormant for a period of more than five (5) years.

Right-of-Way (ROW) – A general term denoting public land, property, or interest therein acquired for or devoted to a public street, public access or public use.

Right-of-Way Permit – A permit issued by the City, authorizing disturbance, construction, occupancy or use of a City street or right-of-way.

Site Plan – A development plan for one or more lots showing the existing and proposed conditions of the lot(s), including topography; vegetation; drainage; flood plains; walkways; means of ingress and egress; circulation; utility services; structures and buildings; signs and lighting; berms, buffers, and screening devices; surrounding development; and any additional information that may be required.

Standard Specifications – The most recent edition of the Standard Specifications for Road, Bridge, and Municipal Construction, as published by the Washington State Department of Transportation (WSDOT) and the Washington State Chapter of the APWA, including Standard Plans for Road, Bridge and Municipal Construction; along with any amendments made thereto.

Surveyor – Any professional land surveyor licensed by the State of Washington.

Utility – A company providing public service including, but not limited to, gas, oil, electric power, street lighting, telephone, telegraph, water, sewer, or cable television, whether or not such company is privately owned or owned by a government entity.

Urban Growth Area (UGA) – The area outside the City limits that has been designated in the Winlock Comprehensive Plan for future expansion of the City.

Variance – A modification of the terms of this title that may be granted because of the unusual shape, exceptional topographic conditions or other extraordinary situation or condition in connection with a specific piece of property, where the literal enforcement of this title would involve practical difficulties and cause undue hardship unnecessary to carry out the spirit and intent of this title.

Winlock Municipal Code (WMC) – The latest version of the Winlock Municipal Code. This document includes the laws and ordinances that govern the City as adopted by the City Council.

1.03 General Guidelines, Specifications and Other Criteria

A. These Design Guidelines are supplemented by the following criteria. The following

list is not all inclusive and other specifications, standards and criteria not listed shall apply when required by the City. In the event of any conflict in the provisions or interpretations of specifications and/or standards, as they may relate to any issue, the strictest provision or interpretation, as determined by the City, will prevail.

1. Design detail, workmanship and materials will be in conformance with the most recent edition of the Standard Specifications, except where these City guidelines provide otherwise. Materials proposed for use in construction of publicly owned or maintained utilities must be in conformance with approved material standards in place at the time of submittal.

2. Conditions and standards as set forth in the most recent edition of the City of Winlock Water System Plan.

3. Conditions and standards as set forth in the most recent edition of the City of Winlock General Sewer Plan.

4. Conditions and standards as set forth in the most recent edition of the City of Winlock Stormwater Management Plan.

5. Conditions and standards as set forth in the Winlock Comprehensive Plan.

6. Conditions and Standards as set forth in the most recent edition of the Winlock Development Regulations.

7. Rules and regulations as adopted in the Winlock Municipal Code.

8. Criteria set forth in the Local Agency Guidelines, as amended and approved by the Washington State Department of Transportation.

9. The most recent edition of the City and County Design Standards for the Construction of Urban and Rural Arterial and Collector Roads promulgated by the City Engineers Association of Washington.

10. U.S. Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD), as amended and approved by the Washington State Department of Transportation.

11. DOT Construction Manual, as amended and approved by Washington State Department of Transportation.

12. Rules and regulations of the State Board of Health regarding public water supplies, as published by the State Department of Health.

13. Conditions and standards as set forth in the most recent issue of the State of Washington Department of Ecology *"Criteria for Sewage Works Design"*.

14. Conditions and standards as set forth by the State of Washington, Department of Labor and Industries.

15. Design criteria of federal agencies including Department of Housing and Urban Development and the Federal Housing Administration.

16. The most recent edition of "*A Policy on Geometric Design of Highways and Streets*", by the American Association of State Highway and Transportation Officials (AASHTO)

17. The most recent edition of *"Pedestrian Facilities Guidebook"* by Otak.

1.04 Severability

A. If any part of these Design Guidelines is found invalid, all other provisions will remain in effect.

1.05 Appeals

A. Appeals proposing deviations from technical standards must demonstrate the following: (1) no negative impact to public health and safety; (2) no negative impact to the environment; (3) no negative impact on the City's ability to safely and cost-effectively operate and maintain public utilities and infrastructure; (4) conformance to applicable rules and regulations; and (5) methods and materials of equal or higher quality to the standard from which deviation is desired.

1.06 Frontage Improvements

A. General

1. Any permit authorizing a development or redevelopment within industrial, residential, and commercial zones will require that the Developer or property owner be responsible for construction or installation of frontage improvements. Frontage improvements shall include sidewalk, curb and gutter, streetlights, water, sewer and storm drains in accordance with the requirements of these Design Guidelines.

2. Frontage improvements will be installed in such a manner as to provide continuity for future frontage improvements along adjacent properties.

3. All costs associated with frontage improvements shall be born by the applicant and work must be performed by a licensed and bonded Contractor.

B. Exceptions

1. If, in the opinion of the City, the existing frontage features are properly installed, in good condition, operational, and not hazardous to public health, safety, or welfare, the development will be exempt from frontage improvement standards.

2. When frontage improvements are a continuation of existing improvements that no longer meet current design guidelines, the proposed improvements may be allowed to maintain continuity if approved by the City.

3. The following types of development will be exempt from the frontage improvement requirements:

    a. Any addition to and/or remodeling of an existing single-family residence or duplex.
    b. Development of one existing lot for one single-family home or one duplex housing unit where the lot does not have existing frontage improvements abutting the property. Legacy lots are not given exemption under this section.
    c. Any conversion or change in use of a building where the area being converted is less than 1,000 square feet and the change in use is not likely to result in 25% more vehicle trips during the peak traffic hours. Trip generation rates will be determined on the basis of the methodology set forth elsewhere in these guidelines.
    d. Remodeling of an existing building if no change in use or additional gross floor area results.

C. Deferrals

1. For all projects that are granted a deferral of any frontage improvement, the property owner of record will be required to enter into an agreement with the City to install the deferred improvements at a future date, not to exceed three (3) years from the date of the deferral. The deferral agreement will be recorded with the property to ensure the City's ability to enforce the deferral regardless of changes in property ownership and will be enforceable as allowed by law. The property owner will execute and record a covenant document, as supplied by the City, ensuring participation of the subject property owner(s) in the construction of frontage improvements. The City may require bonding as a condition for a deferral.

2. Any redevelopment project, regardless of location, that is necessitated by fire, flood, other natural disaster, or act of the public enemy will be granted a deferral from the installation of frontage improvements under the following conditions:

    a. The redevelopment project is of the same size, type, and usage as existed on the property prior to the damage.
    b. There are no negative impacts to the health, safety, or welfare of the public or environment that will be created or perpetuated by the delay of the frontage improvements.

c. If the property is located on a street requiring mandatory frontage improvements, the deferral will be for a period of three (3) years from the time of completion of the redevelopment project. At that time, the property owner will install the deferred improvements to Design Guidelines.

1.07. Variances

A. Purpose. Any applicant may seek modification of the provisions of these Design Guidelines where it appears that extraordinary conditions of topography, access, location, shape, size, drainage or other physical features of the site or adjacent development exists.

B. Application Procedure. Any development plan that includes a request for a variance to one or more of the requirements of these Design Guidelines must be accompanied by a statement detailing any such variance(s) and the reasons therefore. Variance requests must include the technical aspects of a specific project that necessitates the need for a variance. A variance from the Design Guidelines will not be granted based solely on financial or convenience issues. Upon receiving a variance request, the City will review the information presented and make a determination as to the merits of the request. Upon completion of the review, the petitioner will be notified in writing of the decision.

C. Conditions. No variance will be authorized that would have the effect of granting a special privilege not shared by other properties in the same vicinity. To grant a variance(s), the City will determine whether the following conditions have been met:

1. There are exceptional or extraordinary circumstances or conditions that apply only to the property referred to in the application and not to other properties in the vicinity. These include, but are not limited to, size, shape, topography, location, or surroundings. The granting of the application is necessary for the preservation and enjoyment of substantial property rights of the petitioner.

2. The granting of the application will not, under the circumstances of the particular case, adversely affect the health or safety of persons residing or working in the neighborhood of the property referred to in the application and will not be detrimental to the public welfare or injurious to property or improvements in the neighborhood or adversely affect the Comprehensive Plan.

1.08 Latecomers Agreements

A. Any person who constructs a water or sewer main extension or other public improvement in excess of that which is required to meet minimum City of Winlock Design Criteria and the needs of the development, may, with the approval of the City Council, enter into a contract with the City which will allow the Developer to be reimbursed for the portion of the construction cost that benefits other adjoining properties and/or is in excess of the minimum standards. This contract is commonly termed a "Latecomers Agreement."

1.09 Plan Review

A. Four copies of plans must be submitted to the City for review along with a completed Plan Checklist. All necessary easements, dedications, contracts, agreements or bonds will be submitted for review along with the plans. The City will check the plans for completeness. If plans meet the minimum checklist requirements for completeness, the plans will be routed to appropriate City staff and the plan review process will begin. Two plan reviews will be conducted at no additional charge as part of the plan review process.

B. If plans require a third submittal, additional fees may be levied as established by the City. "Third Submittal" will mean the third and any subsequent submittals of construction drawings, specifications, drainage calculations or other information requiring additional plan checking pertaining to public facilities or any applicable construction or development in the right-of-way. New review comments provided by the City, that are not related to changes/corrections from the engineer will not trigger "Third Submittal" requirements.

C. Upon approval of the plans, the applicant will be requested to submit the original drawings for signature by the City, or their duly appointed representative. Approved plans will be returned only to the applicant and only after all applicable fees have been paid. The plan approval will typically be valid for one (1) year. During that time, the project proponent will not be responsible to update the plans in accordance with any new Design Guidelines that may be developed, other than as necessary to preserve the health and welfare of the public. If a project has not been initiated and substantially completed upon plan expiration, any new requirements that have been adopted by the City will be applicable.

1.10 Enforcement

A. **Inspection.** All construction or work within the scope of this code and all construction or work for which a permit is required will be subject to inspection by the City or duly appointed designee, in accordance with and in the manner provided by this code.

It is the responsibility of the Contractor to notify the City two (2) business days in advance of the commencement of any authorized work. Failure to provide sufficient advance notice as noted in these guidelines may lead to a delay in the start of construction. In such cases, the City accepts no liability for construction delays.

All specific tests and inspections required by these Criteria or necessitated by the unique nature of a project will be performed at the Contractor's expense. In addition, one re-inspection will be granted at no cost. Non-compliant or unsatisfactory work may result in additional inspection(s) and additional fees as established by

resolution.

B. **Construction Control.** Work performed for the construction or improvement of City streets and utilities whether by or for a private Developer, by City forces, or by a Contractor hired by the City, will be done in accordance with approved plans. No work is to begin until such plans have been approved. The City and the City Engineer/Consultant must approve any revision to such plans prior to implementation. Failure to receive prior approval of plans and/or revisions may result in removal or modification of construction at the expense of the Contractor or Developer.

C. **Violations.** It is unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, convert, equip, use or maintain any frontage improvements/public utilities or cause or permit the same to be done in violation of this code.

D. **Abatement.** All frontage improvements and infrastructure that are determined after inspection by the City, to not comply or meet minimum standards as defined in these Design Guidelines, will be abated by repair, rehabilitation or removal. A Correction Notice may be issued by the City to define the work that must be adjusted.

E. **Appeals.** In order to provide for reasonable interpretation of the provisions of this code and to hear appeals provided for hereunder, appeals must initially be addressed to the City.

1.11 Permits

A. General

1. Much of the work covered under these Design Guidelines will require multiple permit authority review and approvals. Several types of permits and approvals require prior approval from the authority before a building or other permit can be issued. Any questions regarding information about permits, approvals and agreements should be directed to the City

2. The issuance or granting of a permit or approval of plans, specifications, and computations will not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. Permits appearing to give authority to violate or cancel the provisions of these Design Guidelines or other ordinances of the jurisdiction will not be valid.

3. The issuance of a permit based upon plans, specifications, and other data will not prevent the City from thereafter requiring the correction of errors in said plans, specifications, and other data, or from preventing operations being carried on when in violation of these Design Guidelines or of any other ordinances of this

jurisdiction.

4. The City may, in writing, suspend or revoke a permit issued under the provisions of this code whenever the permit is issued in error or on the basis of incorrect information supplied, or in violation of any ordinance or regulation or any of the provisions of these Design Guidelines.

B. Right of Way Permit. A Right-of-Way Permit will be obtained from the City before any person, firm or corporation will:

1. Commence any work to alter, construct, or repair any facilities within a public right-of-way or easement, including but not limited to: pavement, sidewalk, utilities, conduits, vaults, or any other structure, utility or improvement located over, under or upon a public right-of-way or easement in the City, or;

2. Place any structure, building, barricade, or materials tending to cause a dangerous situation or obstruct, damage, or disturb the free use of the right-of-way or any improvement situated therein.

3. A separate permit will be obtained for each separate project. The timeline for a Right-of-Way Permit will depend upon the needs of the project. However, the City will also factor the health, safety, and welfare of the community when determining the allowable time for a permit to remain valid. In no case will Right-of-Way Permits be issued for longer than one (1) year. Upon expiration of a permit, a new permit request may be submitted for consideration, by the City.

C. **Building Permit.** Building permits for new construction of single-family subdivisions will not be issued without final approval of the City. For commercial projects, building permits may be issued upon completion and acceptance of the required fire protection facilities. A construction bond will be required for the remaining improvements. A *Certificate of Occupancy* will not be issued until final City approval is given for all improvements.

1.12 Construction Documents

A. Detailed construction documents prepared by a licensed engineer must be submitted to the City for review and approval prior to the commencement of any construction. Applicant's engineer will be a Professional Engineer registered as such in the State of Washington. All plans must be signed and stamped by the applicant's engineer prior to submittal for plan review. The City will review all submittals for general compliance with these Design Guidelines. An acceptance by the City does not relieve the applicant or the applicant's engineer from the responsibility of ensuring that all facilities are safe and that calculations, plans, specifications, construction, and as-built drawings comply with normal Engineering Standards, these Design Guidelines, and all applicable Federal, State, and local laws and codes.

B. Plan and profile drawings are required for all proposed transportation-related improvements; street illumination; traffic signalization; storm drainage facilities; or sewer and water improvements. For specific minimum requirements, see the Plan Checklist at the end of this chapter. On occasion, the scope of a project (i.e., installation of a driveway, replacement of sidewalk, or replacement of sanitary side-sewer) may not require engineered plans and can be handled via a Right-of-Way Permit, as determined by the City.

C. Final plans must be signed and approved by the City prior to the start of construction. The applicant will provide the City with two full sized copies, 22" x 24", and two 11" x 17" copies with no disclaimers. An electronic or digital copy in an AutoCAD-readable format will be submitted with the mylar plan set. It is the Contractor's responsibility to ensure that a signed and approved set of plans and all necessary permits are on the job site whenever work is being performed.

D. The City must also approve any subsequent revisions to the plans deemed significant. Failure to secure City approval for plan modifications may lead to corrective actions undertaken at the expense of the Developer. The City may seek reimbursement for staff and material costs associated with any re-work necessitated by unapproved modifications.

E. Materials proposed for use in construction of publicly owned or maintained utilities must be in conformance with approved material standards in place at the time of submittal. Alternate materials will not be evaluated or considered during the plan review period.

F. Specifications will be required and submitted with the plans if General Notes do not adequately cover the project requirements.

1.13 Drafting Standards

A. Design drawings will be submitted on clean, legible blue or black line format free of photographs or stick-ons. Half-size drawings may be submitted for design review if prior authorization is granted by the City. Half-size drawings will be 11" x 17" and will be in a format that can be scaled using a standard engineer's scale. Minimum nominal text size will be 1/8".

B. The General Notes provided in the Standard Details and applicable Standard Details must be included on all plans. City will provide an electronic version of Standard Details for a nominal fee.

C. Street drawings will be either 1" = 5', 1" = 10', 1" = 20', or 1" = 30' horizontal with vertical not to exceed 1" = 10'. Utility drawings may be accepted at 1" = 50' or 1" = 40' if they are legible and able to be microfilmed. No engineering plans will be accepted with architect's scale.

D. Plans will show all existing and proposed monuments. All monuments will be described using current City coordinates. Coordinate Datum is NAD 83-91 (Washington State South Zone). Centerline of roadways, easements (with type and dimensions), and other pertinent data will be referenced to existing monuments.

E. All existing features (pipes, curbs, power poles, etc.) are to be produced with a small pen or half tones. Proposed features will be distinguished by a larger or bolder line weight.

F. Different line types and symbols will be used to distinguish different features.

G. It will be noted that the preceding guidelines should not be construed to be the only requirements for completed drawings, rather an outline of minimum requirements for submitting complete drawings for the City's review. Particular care should be exercised in the preparation of the plans to ensure their completeness and clarity that will facilitate a timely City's review.

1.14 Fees

A. Fees, charges or bonding requirements will be as established by an ordinance passed by the City Council except where specifically set forth in the WMC. The City Council will further set the dollar penalty for failure to pay said fee or charge in a timely manner by passage of such ordinance.

B. All plan check fees are due prior to the release of approved plans and all inspection fees are due at the time of the pre-construction meeting. In addition, there are various miscellaneous service and connection fees and charges. Applicants may request an estimate of these fees and charges from the City.

C. Prior to physical connection to and use of City water and sewer systems, all Public Works improvements must be completed and approved and all applicable fees paid.

1.15 Bonding

A. Bonds or other allowable securities may be required by the City to guarantee the performance or maintenance of required work. The type and amount of security will be consistent with the required work and approved by the City Attorney. . Types of securities include, but are not limited to, a bond with a surety qualified to do a bonding business in this State, a cash deposit, an assigned savings account, or a set aside letter.

B. No development permits will be issued until all required improvements are reflected in the approved civil engineering plans. Upon completion of building construction and with the approval of the City, appropriate surety for improvements may be accepted and a performance bond posted with the City. The performance bond must be in an

amount equal to 150 percent of the estimated cost of the improvements.

1.16 Utility Locations

A. Existing utilities within a right-of-way or easement on new roads or in roadways where existing utilities are not in conflict will be located in accordance with these Design Guidelines as approved by the City. Where existing utilities are in place, new utilities will conform to these Design Guidelines as nearly as practical and yet be compatible with the existing installations. All deviations of location must be approved by the City. Existing utilities will be shown using the best information available. This verification may require exploration/excavation (potholing) if utilities are in conflict with proposed design. The Contractor/Developer will be responsible for utility locates in conjunction with their project.

B. All new utilities other than those located on private property will be installed underground by the utility owning said facility and as set forth in these Design Guidelines and/or in the applicable Franchise Agreement.

C. A Right-of-Way Permit is required of any utility, except City owned facilities and utilities, with a Franchise Agreement with the City for all work done within the right-of-way. The utility will comply with all provisions as set forth in these Design Guidelines.

1.17 Easements

A. Where public utilities and/or their conveyance systems cross private lands, an easement must be granted to the City. The Developer must process, record and file all easements. If the property is platted, the easement may be conveyed when the short plat or final plat is filed. All easements not shown on a plat, must be prepared by a land surveyor or engineering firm, licensed by the State of Washington, and able to perform such work. Easements shall provide for unrestricted access.

B. Easement widths will typically be twenty (20) feet for each utility. Construction easements will be a minimum of thirty (30) feet wide, including the permanent easement. Under special circumstances, the City may require alternate easement widths. Utilities shall be installed no closer than seven (7) feet from the edge of the easement.

C. Easements are required to be submitted in draft form, unsigned, for review and approval prior to plan approval. Signed copies are required prior to final acceptance of the project and issuance of Certificate of Occupancy. Any change in design that places an amenity, i.e., water, sewer, sidewalk, etc., outside of the easement may necessitate stopping of construction until plans and easements can be resubmitted and approved. Easements will be filed by the City upon satisfactory completion of the work.

1.18 Annexation Agreement Requirement

A. Owners of properties lying outside City boundaries must sign an Annexation Agreement that legally commits their property to eventual annexation prior to being served by City utilities. This Annexation Agreement requirement will be applied to all extensions of City utilities to areas outside the City limits.

1.19 Traffic Control

A. The Contractor/Developer will be responsible for traffic control during construction on or along traveled roadways. Traffic control will follow the guidelines of the Standard Specifications. All barricades, signs, coning and flagging will conform to the requirements of the MUTCD. A traffic control plan will be submitted for review by the City prior to the start of construction. All necessary and/or required traffic control devices will be in place prior to the beginning of project construction, or on a daily basis during project construction. Signs must be legible and visible and will be removed at the end of each work day if not applicable after construction hours.

B. City utilities constructed within the Lewis County right-of-way will follow all traffic control requirements set forth by the Lewis County Department of Public Works and MUTCD.

C. When road closures and detours cannot be avoided, the Contractor/Developer will notify the City a minimum of two (2) business days in advance. The City may require that a detour plan be prepared and submitted for approval prior to closing any portion of a City roadway or street. The owner/Developer/Contractor will notify the Fire Department of potential road closures.

1.20 Call Before You Dig

A. All Contractors/Developers are responsible for timely notification of all utilities in advance of any construction in the right-of-way or utility easements. The Underground Utilities Location Center telephone number is 1-800-424-5555. A minimum of two (2) business days advance notice is required. The Contractor/Developer must provide separate notification to any utility not participating in or using the Underground Location Center.

1.21 Record Drawings

A. After the improvements are completed and approved, a set of "record drawings" shall be submitted to the City as a permanent record. Record drawings shall be submitted on static-free 4-mil mylar with permanent image, and three (3) sets of copies. Sheet sizes will be 22" x 34". No sepia will be accepted. Final acceptance of development will not be granted until record drawings are accepted by the City. The City may withhold plat approval or utility service for failure to comply with record drawing requirements.

1.22 Plan Checklist

A. The Plan Checklist on the following pages provides a list of the information that is to be included on the plans submitted to the City for review. The list is not all-inclusive and is intended as a general guide for reference purposes. Not all items listed will apply in all situations. The checklist should be completed by the applicant and included with all plan submissions.

PLAN CHECKLIST

STANDARD ITEMS: WATER, SANITARY SEWER, STORM, SEWER, STREET, LIGHTING & SIGNALS

CHECK BOXES AS APPLICABLE

- ❑ Vicinity Map
- ❑ Legend (Line Types and Symbols)
- ❑ North Arrow
- ❑ Scale Bar
- ❑ Datum – Bench Mark Elevation and Location
- ❑ Title Block:
  - ❑ Title:
  - ❑ Date:
  - ❑ Design By:
  - ❑ Checked By:
  - ❑ Drawing Number (if applicable)
  - ❑ Signature Approval Block (see above example)
  - ❑ Sheet Number of Total Sheets
  - ❑ Revisions & Revising Dates
- ❑ Section, Township and Range
- ❑ Engineer/Land Surveyor Stamp (signed & dated)
- ❑ Plan Submitted on 22" x 34" sheet (mylar)
- ❑ Detail Sheet(s) (describing applicable work)
- ❑ "Call Before You Dig" note
- ❑ General Notes and Construction Notes
- ❑ Traffic Control Plan (per MUTCD)
- ❑ Coordinates

APPROVED FOR CONSTRUCTION

BY_____ DATE _____
CITY OF WINLOCK

APPROVAL EXPIRES: _____

PLAN PORTION STANDARD ITEMS

- ❑ Adjacent Property Lines, Ownership and Addresses
- ❑ Edge of Pavement, Width and Pavement Type
- ❑ Right-of-Way Dimensions and Right-of-Way Lines Labeled
- ❑ Sidewalk and Width
- ❑ Match Lines with Station and Match Reference
- ❑ Existing Utilities (above ground and below ground)
- ❑ Easements, Existing, Proposed, Type, and Dimensions (if applicable)
- ❑ Define Survey Baseline vs construction baseline (if applicable)
- ❑ Street Names and names of other significant topographic features

PROFILE PORTION STANDARD ITEMS

- ❑ Existing Ground Profile
- ❑ Scale (horizontal and vertical)
- ❑ Stationing
- ❑ Vertical Elevation Increments
- ❑ Profile Grades
- ❑ Existing and Proposed Utilities
- ❑ Existing and Proposed Structures

SANITARY SEWER

Plan View

- ❑ Station and Offset Shown at Each Proposed Manhole
- ❑ Manholes Numbered With Type Designation and Invert and Rim Elevations
- ❑ Flow Direction (with arrow on pipe)
- ❑ Depth at Property Line (if applicable)
- ❑ Distance from Water Lines (if applicable)
- ❑ Type, Size and Length of Pipe from Center of Manhole to Center of Manhole
- ❑ Station for Sewer laterals at Property Line
- ❑ Force Main and Appurtenances with Station and Offset
- ❑ Standard Detail References

Profile View

- ❑ Manholes Numbered, with Type Designation and Invert Elevations Showing Direction In and Out
- ❑ Rim Elevation
- ❑ Pipe Slope (decimal form FT./FT.)
- ❑ Type of Pipe
- ❑ Size of Pipe
- ❑ Length of Pipe (in L.F.) From Center of Manhole to Center of Manhole
- ❑ Existing Utilities Crossings
- ❑ Force Main and Appurtenances With Stations and Offsets

WATER

Plan View

- ❑ Fire Hydrants
- ❑ Vacuum and Air Release Valves When Required
- ❑ Tees, Crosses, Elbows, Adapters and Valves, Meter Station and Offset
- ❑ Distance from Sanitary or Storm Sewer (if applicable)
- ❑ Type, Size, and Length of Pipe Between Fixtures
- ❑ Blocking end and/or rodding detail
- ❑ Standard Detail References

Profile View

- ❑ Existing and Proposed Utility Crossings
- ❑ Fittings With Stations and Elevations
- ❑ Show Valves With Stations and Elevations
- ❑ Type, Size and length of Pipe Between Fittings

STORM SEWER

Plan View

- ❑ Station and Offset at each Manhole/Catchbasin
- ❑ Numbered Manhole/Catchbasins w/ Type and Size
- ❑ Manhole/Catchbasin Rim Elevations
- ❑ Flow Direction with Arrow on Pipe or Channel
- ❑ Type, Size and Length of Pipe
- ❑ Stormwater Detention Facility (pond dimensions with elevations)
- ❑ Control Structure with Orifice Size and Elevation
- ❑ Emergency Overflow Location and Elevation
- ❑ Design High Water Elevation
- ❑ Standard Detail References

Profile View

- ❑ Station and Offset at Each Manhole/Catchbasin
- ❑ Invert Elevations on Manholes/Catchbasins Showing Direction of Flow
- ❑ Manhole/Catchbasin Type and Size

- ❑ Rim Elevation
- ❑ Type, Size and Length of Pipe (in linear feet)
- ❑ Pipe Slope (decimal form FT./FT.)
- ❑ Existing and Proposed Utility Crossings
- ❑ Stormwater Detention Facilities
- ❑ Control Structures

EROSION CONTROL DRAWING

- ❑ Construction Entrance Detail
- ❑ Silt Fences and Traps
- ❑ Mulching and Vegetation Areas
- ❑ Clearing and Grubbing Limits
- ❑ Existing and Finished Grade
- ❑ Details and Locations of all BMPs Recommended
- ❑ Location and Details of Temporary Sediment Ponds

STREET

Plan View

- ❑ Centerline and Stations
- ❑ Proposed Survey Monument Locations
- ❑ Roadway and Restoration Sections (if applicable)
- ❑ Flow Direction Arrows at Curb Returns Showing Grade
- ❑ Spot Elevations on Curb Returns
- ❑ PC, PT, PI Stationing of Horizontal Curves
- ❑ Curve Information Delta, Radius, Length and Tangent
- ❑ BCR and ECR (Begin Curb Radius, End Curb Radius)
- ❑ Identify all Field Design Situations by Notes
- ❑ Match Existing Features Noted by Station with Elevation
- ❑ Typical Roadway Sections and Pavement Types
- ❑ Pavement Markings Noted by Station and Offset
- ❑ Sidewalks
- ❑ Driveway Entrances
- ❑ Station at Center of Street
- ❑ Width, Type (AC, PCC), Note Applicable City Standard Detail
- ❑ Curb and Access Ramps
- ❑ Standard Detail References

Profile View

- ❑ Vertical Information PVC, PVI, PVT, AP, Low Point, High Point
- ❑ Show Grades in Decimal Form (FT./FT.) with (+ and -) Slope
- ❑ Super Elevated Roadway Segments

ILLUMINATION

- ❑ Station and Offset of Fixtures
- ❑ Pole Type, Including Manufacturer and Model Number
- ❑ Mounting Height, Arm Length, Anchor Bolt Size and Pattern
- ❑ Power Source
- ❑ Wire Size, Type, Conduit
- ❑ Luminaire Type, Lamp Wattage
- ❑ Location of Service Disconnects
- ❑ Line Loss Calculations
- ❑ J-Box Location

SIGNALS

- ❑ Station and Offset of Signal Base, Cabinets, Ped. Lead, Loops, Etc.

- ❑ Wiring Schedule
- ❑ Signal Heads and Mounting Assembly
- ❑ Detection Loops
- ❑ Opticom
- ❑ Control Cabinet, Size and Layout
- ❑ Power Source
- ❑ Conduit
- ❑ Wire Size and Type
- ❑ Construction Notes
- ❑ J-Box Schedule
- ❑ Pedestrian Signal Type with Push Button
- ❑ Controller Type, Configuration, and Wiring Schematic

Project Category: _____

Reviewed By: _____ **Date:** _____

Checked By: _____ **Date:** _____

CHAPTER 4
WATER

Table of Contents

Table of Drawings

WATER

4.01 General

A. The Water System Criteria and Specifications are minimum base level performance, design and construction standards used to maintain uniformity of design within the water utility.

B. Any extension of the water system must be approved by the City and conform to these guidelines, Department of Health regulations and guidelines, the City of Winlock Water System Plan, and Lewis County Fire District No. 15 requirements to the extent not inconsistent with City criteria.

C. Proposed plans must show how water shall be supplied and the applicant shall demonstrate whether adequate water pressure and volume shall be maintained in case of fire. An analysis of the system may be required, at the Applicant's cost, if it appears that the system might be inadequate.

D. Anyone desiring to extend or connect to the City water system must contact the City for a Pre-construction Application form. After the completed application is returned to the City, along with any other information that may be required or requested, staff shall determine the conditions of service for connection to the water system.

E. Extension of or connection to City water lines outside of the Winlock Urban Growth Area (UGA) may be limited under the provisions of the Lewis County Comprehensive Plan. The City shall not allow service outside of the UGA without written permission from the County.

4.02 Design Criteria

A. The design of any water extension/connection shall conform to these guidelines and all other applicable standards. The layout of extensions shall provide for continuation and/or looping of the existing system. The City has the authority to apply or necessitate items not covered or mentioned in this chapter. .

B. All pipe, valves, meters, hydrants, fitting and special materials shall be new undamaged and designated for use in potable water systems. All labor, equipment and materials shall be in conformance with the Standard Specifications for Road, Bridge and Municipal Construction, WSDOT and APWA, and the specification of the American Water Works Association, expect as modified herein. Materials or additives must be in compliance with NSF Standards 60 and 61 as required in WAC 246-290-220.

C. Watermains shall be sized to provide adequate Peak Hour Demand (PHD) at a minimum residual pressure of 30 psi and Maximum Day Demand (MDD) plus fire

flows at a minimum residual pressure of at least 20 psi. Specific fire flow requirements shall be determined by the City for each development application. However, the quantity of water required shall in no case be less than 500 gpm at 20psi residual pressure for 30 minutes in residential areas; 750 gpm at 20psi residual pressure for 60 minutes multi-family residential and commercial areas; or 1,000gpm at 20psi residual pressure for 60 minutes in industrial areas.

D. The minimum watermain size shall be six (6) inches in diameter where looped. Dead-end mains shall be a minimum of eight (8) inches in diameter. All mains that may be extended or looped must end with an approved mechanical joint gate valve and 3-foot pipe extension, cap and thrust blocking.

E. Larger sized mains may be required in specific areas identified in the Winlock Water System Plan. The City may also require the installation of larger mains if determined necessary to meet fire protection needs, domestic requirements and/or for future service needs.

4.03 Pipe, Valves and Fittings

A. Pipe. All pipe for watermains shall have flexible gasketed joints and shall be PVC or Ductile Iron in accordance with the following specifications:

1. Ductile Iron Pipe: Ductile Iron Pipe shall conform to AWWA C 151 Class 50 or greater if required in accordance with the criteria specified in AWWA C150. Ductile iron pipe shall be cement mortar lined with a bituminous seal coat outside in accordance with AWWA C 104. All pipes shall be joined using rubber gaskets, push-on type or mechanical joint, conforming to AWWA C 111, and be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise.

2. Polyvinyl Chloride (PVC): Six inch and larger PVC pipe shall be AWWA C900, minimum pressure Class 150. All pipe shall be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise and assembled with a non-toxic lubricant.

B. Fittings. All fittings shall be ductile iron compact fittings conforming to AWWA C153 or, AWWA C110 or C111. All fittings shall be cement mortar lined conforming to AWWA C104. All fittings shall be connected by flanges or mechanical joints. Restraining glands shall be provided on all mechanical joints unless otherwise directed.

C. Pipe Installation. Pipe installation shall be in accordance with the Standard Specifications, Standard Details and Standard Plans, except as modified herein.

1. Pipe Cover. A minimum of thirty (36) inches of cover over the pipe and, to the extent practical, a maximum of forty-two (42) inches cover is required from the finished or exiting ground surface, whichever is greater, to the top of the pipe for