CITY OF SEQUIM

CLALLAM COUNTY, WASHINGTON

DRAFT WATER SYSTEM PLAN

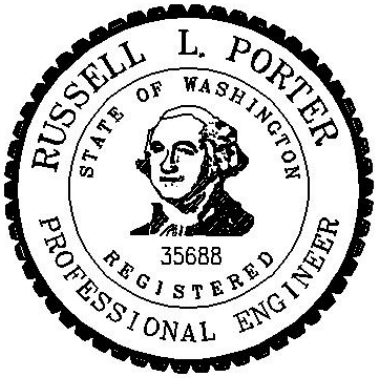
G&O No. 11593
MARCH 2013

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CITY OF SEQUIM

CLALLAM COUNTY **WASHINGTON**

WATER SYSTEM COMPREHENSIVE PLAN



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LIST OF ABBREVIATIONS

AAF	average annual flow
ac	acre
ACOE	Army Corps of Engineers
ADWF	average dry weather flow
AKART	all known, available, and reasonable technologies
avg.	average
BOD_5	5-day biochemical oxygen demand
BTU	British thermal units
$CaCO_3$	calcium carbonate
$CBOD_5$	5-day carbonaceous biochemical oxygen demand
CCWF	Centennial Clean Water Fund
cf	cubic feet
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cfs	cubic feet per second
CFU	colony-forming units
CIP	Capital Improvement Projects
CM	construction management
CMU	concrete masonry units
COD	chemical oxygen demand
conc.	concentration
constr.	construction
CWA	Clean Water Act
cy	cubic yards
DMR	discharge monitoring reports
DNS	determination of non-significance
DO	dissolved oxygen
DOH	Department of Health
DT	dry tons
EA	each
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERU	equivalent residential unit
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
F/M	food-to-microorganism ratio
fps	feet per second
ft^2	square feet
FTE	full-time equivalent
gal.	gallons
gfd	gallons per square foot per day
GMA	Growth Management Act

LIST OF ABBREVIATIONS

gpad	gallons per acre per day
gpcd	gallons per capita per day
gpd	gallons per day
gpd/ft^2	gallons per day per square foot
gph	gallons per hour
gpm	gallons per minute
gpm/ft^2	gallons per minute per square foot
HDPE	high density polyethylene
HMI	Human-Machine Interface
hp	horsepower
HPA	Hydraulic Project Approval
HRT	hydraulic residence time
HVAC	heating, ventilation, and air conditioning
I/I	infiltration and inflow
in.	inches
kVA	kilovolt-amps
kW	kilowatt
kWh	kilowatt hour
lb	pounds
lb/cap/d	pounds per capita per day
lb/d	pounds per day
$lb/ft^2/d$	pounds per square foot per day
lf	linear foot
LS	lump sum
max.	maximum
MBR	membrane bioreactor
MDF	maximum day flow
mg	milligrams
MG	million gallons
mgd	million gallons per day
mg/L	milligrams per liter
misc.	miscellaneous
mJ/cm^2	millijoules per square centimeter (UV dose measurement)
ml	milliliters
MLSS	mixed liquor suspended solids
mm	millimeter
MM	maximum month
MMF	maximum month flow
MSL	mean sea level
N/A	not applicable
NEPA	National Environmental Policy Act
NH_3	ammonia-nitrogen
NMFS	National Marine Fisheries Service
NO_3-N	nitrate - nitrogen
NPDES	National Pollutant Discharge Elimination System

LIST OF ABBREVIATIONS

NR	not reported
NRCS	National Resource Conservation Service
NTU	nephelometric turbidity units
NWI	National Wetlands Inventory
OD	outside diameter
OFM	Office of Financial Management
O&M	operation and maintenance
PDF	peak day flow
PFRP	process to further reduce pathogens
pH	negative log hydronium ion concentration
PHF	peak hour flow
PHS	priority habitat and species
PLC	Programmable Logic Controller
PMAC	plan to maintain adequate capacity
P.S.	pump station
psi	pounds per square inch
PSRP	process to significantly reduce pathogens
PWTF	Public Works Trust Fund
Q	flow rate
RAS	return activated sludge
RCW	Revised Code of Washington
ROW	right-of-way
rpm	revolutions per minute
SBR	sequencing batch reactor
scfm	standard cubic feet per minute
SEPA	State Environmental Policy Act
SERP	State Environment Review Process
sf	square feet
S.F.	safety factor
SR	State Route
SRF	State Revolving Fund
SRT	solids retention time
SWD	side water depth
TBD	to be determined
TDH	total dynamic head
TKN	total Kjehldahl nitrogen
TMDL	total maximum daily load
TSS	total suspended solids
UGA	Urban Growth Area
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
UV	ultraviolet radiation
V	volts
VFD	variable frequency drive
VOC	volatile organic compounds

LIST OF ABBREVIATIONS

VS	volatile solids
VSS	volatile suspended solids
WAC	Washington Administrative Code
WAS	waste activated sludge
WDFW	Washington State Department of Fish and Wildlife
WT	wet tons
WWTP	wastewater treatment plant
µm	micrometer (micron)

EXECUTIVE SUMMARY

INTRODUCTION

The City of Sequim 2012 Water System Plan (Plan) provides a long-term planning strategy for the City's water utility for the 6- and 20-year planning periods. It has been prepared consistent with Department of Health requirements specified in Washington Administrative Code Chapter 246-290. The Department of Health, who will review this plan, considers this Plan to represent a commitment by the City to follow-up and implement the Plan's recommendations and capital improvements.

The City's water system currently consists of three sources of supply; the Infiltration Gallery, the Silberhorn Wellfield, and the Port Williams Wellfield, three storage reservoirs totaling 2.9 MG of active storage, four booster stations and approximately 65 miles of distribution and transmission main piping. The City has six pressure zones.

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The principal issues discussed in the Plan include:

- Improvements to transmission and distribution capacity to the anticipated growth areas within the City of Sequim Urban Growth Area (UGA);
- Development of a conservation program to reduce distribution system leakage, reduce 6-year and 20-year water system source and water right needs, and delay improvements.
- The potential for the City to become a regional water service provider; and
- A capital improvement program to meet projected growth and sewer system needs.

WATER DEMAND FORECASTING – CITY OF SEQUIM

Population within the City of Sequim UGA is projected to grow at 2.0 percent annually for the next 20 years. Currently, the Sequim water system only serves customers within the UGA, however not all residents in the City or UGA are on the City water system. The projected service area population is projected to be 12,989 persons in the year 2032. Table E-1 illustrates the water use projections analyzed in the Plan.

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Table E-1 – Sequim Water Service Area Demand Projections

Year	Population	Average Daily Demand (gal)	Total DSL @ 14.9% (gpd)(1)	Average Day Production (gal)	Maximum Day Production (gal)/(gpm)	Peak Hour Production (gpm)
2012	7,043	800,917	139,849	940,766	1,901,866/1,321	2,131
2013	7,270	820,061	143,192	963,253	1,947,326/1,352	2,180
2014	7,504	839,682	146,618	986,300	1,993,919/1,385	2,231
2015	7,744	859,793	150,129	1,009,922	2,041,673/1,418	2,282
2016	7,990	880,404	153,728	1,034,132	2,090,618/1,452	2,335
2017	8,244	901,531	157,417	1,058,948	2,140,785/1,487	2,390
2018	8,505	923,186	161,198	1,084,384	2,192,206/1,522	2,445
2022	9,620	1,015,365	177,294	1,192,659	2,411,097/1,674	2,682
2032	12,989	1,290,207	225,284	1,515,491	3,063,740/2,128	3,388

(1) DSL – Distribution System Leakage, based on current rate of 14.9%

WATER RIGHTS

Table E-2 summarizes the City's future annual water rights analysis. Table E-3 shows the analysis of future instantaneous water demand (Maximum Day Production). The City's total instantaneous water right of 3,668 gpm and total annual withdrawal of 1,850 acre-feet provide sufficient instantaneous withdrawal to meet the forecasted demands through the 20-year planning period. However, since the City source is limited to 2,195 gpm, the reliable production capacity will limit additional growth by the year 2032. Table E-4 shows the analysis of future annual withdrawal water demand. As the tables show, the City has adequate instantaneous and annual withdrawal water rights to sustain growth through the planning period however additional source capacity is needed to be able to utilize all water rights.

Table E-3 – Projected Instantaneous Water Rights and Source Production Capacity Analysis

Year	Total Instantaneous WR Capacity (gpm)	Maximum Day Demand (gpm)	Instantaneous Water Right Surplus/(Deficit) (gpm)	Reliable Source Production Capacity (gpm)(1)	Reliable Production Capacity Surplus (gpm)
2012	3,668	1,321	2,347	2,195	874
2013	3,668	1,352	2,316	2,195	843
2014	3,668	1,385	2,283	2,195	810
2015	3,668	1,418	2,250	2,195	777
2016	3,668	1,452	2,216	2,195	743
2017	3,668	1,487	2,181	2,195	708
2018	3,668	1,522	2,146	2,195	673
2022	3,668	1,674	1,994	2,195	521
2032	3,668	2,128	1,540	2,195	67

(1) Total source capacity for Infiltration Gallery, Silberhorn Wellfield, and Port Williams Wellfield is 2,810 gpm. DOH reliability measure limits maximum day pumping to reflect pumping for 18 hours per day only.

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Table E-4 – Projected Annual Withdrawal Water Rights Analysis

Year	Maximum Permitted Average Annual Withdrawal (acre-ft.)	Projected Annual Withdrawal Requirement (acre-ft.)	Water Rights Surplus (acre-ft.)
2012	1,850	1,088	762
2013	1,850	1,113	737
2014	1,850	1,140	710
2015	1,850	1,167	683
2016	1,850	1,195	655
2017	1,850	1,223	627
2018	1,850	1,253	597
2022	1,850	1,377	473
2032	1,850	1,747	103

WATER SUPPLY STRATEGY

The City's strategy to meet supply needs in the future consists of: (1) determining a plan for developing additional sources of supply including redevelopment and improvement of the Infiltration Gallery, (2) drilling additional wells at the Port Williams site, (3) drilling a new well at another location in the City, (4) redevelopment of the Silberhorn Wells No. 2 and No. 3, (5) opening discussions with the Department of Ecology to classify some of the existing supplemental water rights at the Port Williams Wellfield as primary rights, and (6) continuing to evaluate the feasibility of becoming a regional provider either through satellite management agreements or purchase of water systems and water rights in the greater Dungeness valley.

INFILTRATION GALLERY

The Infiltration Gallery Ranney well style horizontal collector is currently used at a maximum flow rate of approximately 350 gpm, while the water right is for 718 gpm. Potential improvements include additional collectors and/or a pumping system to overcome the current hydraulic limitations. Challenges to redevelopment of the Infiltration Gallery include DOE requirements in the Port Williams water rights permit, permitting of construction along the river bank, which potentially include Washington Department of Fish and Wildlife Hydraulic Project approval, Clallam County Shoreline Permit, SEPA, U.S. Army Corps of Engineers 404 Wetlands Permit, potential issues with the existing transmission line and seasonal turbidity issues.

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PORT WILLIAMS WELLFIELD

The City's water right for Port Williams Wellfield allows for the drilling of up to five wells and the withdrawal of up to 2,250gpm which would be an increase of 490 gpm of the current maximum withdrawal rate. Wellfield development must be completed by July 1, 2014 per the amended Water Rights Application G2-29239. Challenges to drilling another well at the Port Williams site include limitations in the water rights permit if increased pumping at Port Williams is found to cause reductions in aquifer levels and effects on other water uses in the area. The City will evaluate the use of a ground-level reservoir at the Port Williams Wellfield to mitigate for aquifer decline by providing storage at peak pumping rates.

SILBERHORN WELLFIELD

The total capacity of the three Silberhorn wells is greater than the water right for the source, which is limited to 700 gpm. Wells No. 2 and No. 3 have experienced sanding and capacity issues in recent years. Potential actions to restore the wellfield to optimum production are discussed in the Plan.

REGIONAL PROVIDER STRATEGY

The Plan evaluates the potential for the City of becoming a regional provider either through satellite management agreements or purchase of water systems and water rights in the greater Dungeness valley. There are 17 Group A and Group B water systems within the UGA or immediately adjacent to it. In addition, twenty-two other water systems are located in Clallam County to the north and west of the City. Decisions on whether to acquire other water systems should be made on a case-by-case basis based on the a request of the City to take over the system, whether the system currently meets or can be brought up to City standards and a cost benefit analysis of acquisition and management of the system.

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WATER USE EFFICIENCY AND CONSERVATION PROGRAM

The City must comply with the Water use Efficiency rule (WUE Rule) which is presented in WAC 246-290 Part 8. The City is not currently meeting the WUE Rule that water systems have a distribution system leakage rate less than 10 percent of total finished water production. The Plan includes Water Use

Efficiency Program the City will follow to meet conservation goals. The City will attempt to reduce the equivalent residential unit water use by 10 percent over the next 10 years. Tactics the City's will employ to reach the goal of reducing equivalent residential consumption by 10 percent include, but are not limited to, the additional use of Class A reclaimed water from its Water Reclamation Facility to replace irrigation use of potable water, calibration and replacement of source and service meters, consumer education, evaluate conservation pricing. Additionally, the City plans to reduce DSL to the DOH requirement of 10 percent over the next 6 years by implementing a Water Loss Control Action Plan including budgeting for replacement of asbestos-concrete and galvanized steel mains, water meter calibration and leak detection, and notifying customers about leaks on their property.

CAPITAL IMPROVEMENT PROGRAM

A summary of the City's 6-year CIP is shown in Table E-5 and illustrated in Figure E-1. Projects in the 6-year planning period are an estimated $13,487,300.

Table E-5 – 6-Year Capital Improvement Plan

Project No.	Project	Year	Cost
S-7	Investigate New Water Rights	2013	$300,000
D-3	5th Avenue Water Main	2019	$179,000
D-5	Norman Street and Eunice Street	2019	$4350,000
D-11	Fir Street from North 5th Avenue to North Sequim Avenue	2013 2014 2015 2016 2017	$200,000 $50,000 $50,000 $404,000 $207,000
D-12	Fir Street From North Sequim Avenue to North Brown Road	2017 2018 2019	$182,000 $481,140 $247,860
D-13	Brown Road from East Fir Street to East Washington Street	2016 2017	$63,600 $466,400
D-14	South Sunnyside Avenue from Maple Street to East Prairie Street	2013	$108,000
D-15	East Etta Street from Sequim Avenue to South Sunnyside Avenue	2013 2014	$100,000 $125,000
D-19	Pressure Relief Valves	2015	$90,000
D-22	Washington Harbor Road To Washington Harbor Loop	2019	$303,000

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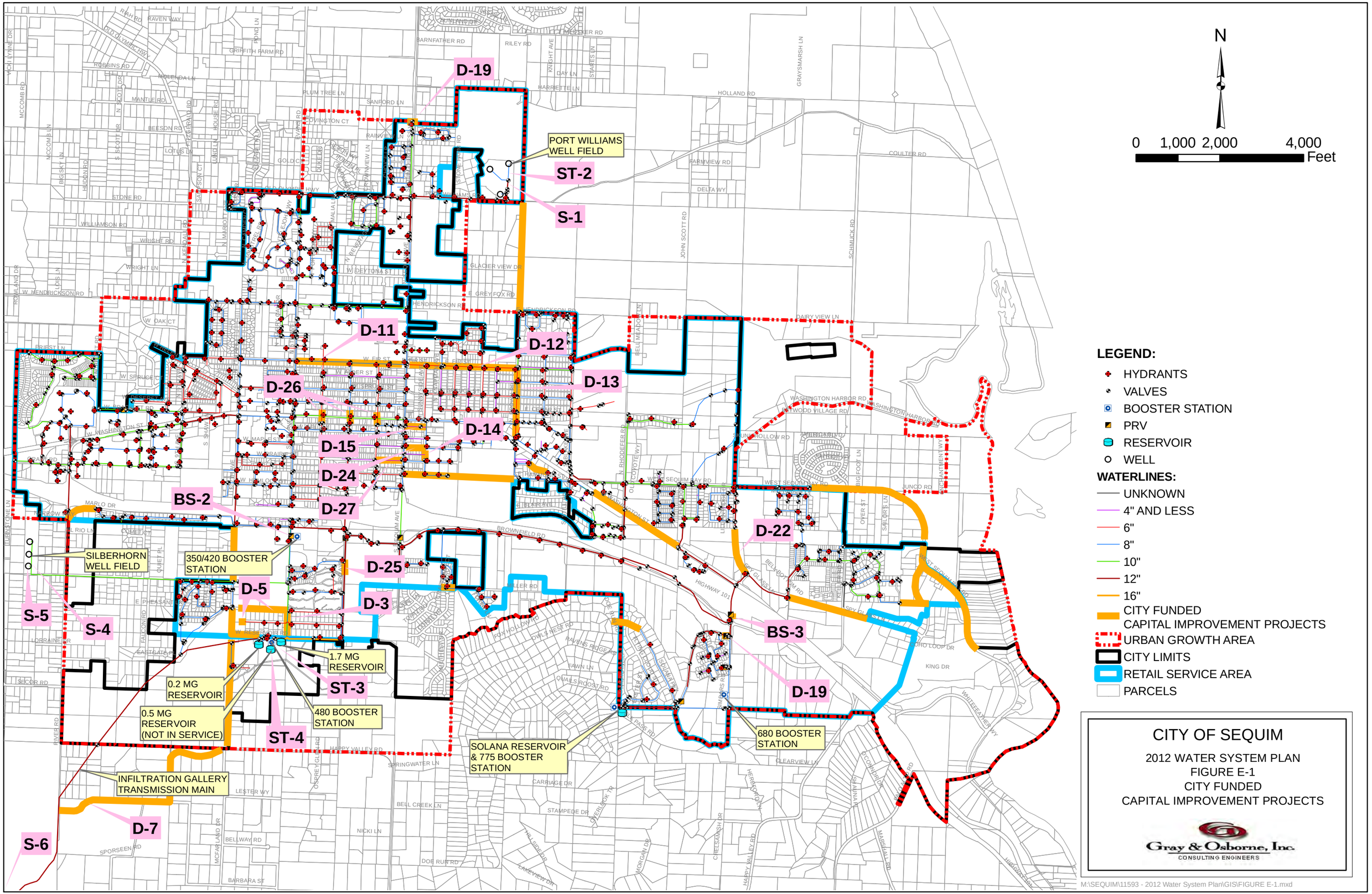

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE E-1
CITY FUNDED
CAPITAL IMPROVEMENT PROJECTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Table E-5 – 6-Year Capital Improvement Plan – (continued)

Project No.	Project	Year	Cost
D-23	Asbestos Cement/Galvanized Iron Water Main Replacement	2013 2014 2015 2016 2017 2018 2019	$200,000 $200,000 $200,000 $200,000 $200,000 $200,000 $1,000,000
D-24	East Maple Street from South Sequim Avenue to South Sunnyside Avenue	2013 2015	$45,000 $139,100
D-25	Connection Across South 3rd Avenue at Sycamore Street	2013	$45,000
D-26	Isolation Valves on Washington Street from 5th to Sequim Avenue	2014 2015	$15,300 $128,000
D-27	West Prairie from South Sequim to South 2nd	2013	$218,000
BS-2	5th and McCurdy Booster Station Improvements	2014 2015	$34,000 $250,000
BS-3	600 gpm Booster Station Simdars Road	2016 2017	$49,800 $365,200
ST-2	Port Williams Reservoir Study	2014	$45,000
ST-3	420 Reservoir Mixing System	2014 2015	$9,700 $71,300
ST-4	Study for Reuse of 500,000-Gallon Reservoir	2014	$25,000
S-1	Port Williams Well No. 4	2014	$730,000
S-2	New Well	2019	$730,000
S-3	Investigate Additional Source of Supply	2015	$50,000
S-4	Study and Redevelop Silberhorn Wells No. 2 and No. 3	2014	$150,000
S-5	Replacement Silberhorn Wells No. 2 and No. 3	2019	$733,000
S-6	Infiltration Gallery Improvements	2017 2018	$79,500 $553,500
MI-1	Portable Generator Load Bank	2013	$25,000
MI-2	SCADA Upgrade Report	2014	$50,000
MI-3	Fixed base Automatic Meter Reading System	2013 2014	$115,000 $115,000
MI-4	New Water Rights	2014 2015 2016 2017 2018	$100,000 $100,000 $100,000 $100,000 $100,000
6-Year Capital Improvement Total			**$13,487,300**

(1) CCI = 5213 per ENR November 2012.
(2) CIP totals only include portion City will fund. Does not include developer projects.

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Chapter 1

WATER SYSTEM DESCRIPTION

INTRODUCTION

In accordance with Washington Administrative Code (WAC) 246-290-100 and the Washington State Department of Health (DOH), water system plans need to be updated every 6 years or more frequently if necessary to reflect the current conditions of the water system. This Plan has been prepared to update the 2008 City of Sequim (the City) Water System Plan, using the DOH Water System Design Manual, December 2009 and the DOH Water System Planning Handbook, April 1997. Copies of the Washington State Department of Health Project Approval Application and Submittal Forms are included in Appendix A.

Please Use this Space to Keep Notes

SYSTEM OWNERSHIP AND MANAGEMENT

The City of Sequim owns and operates a municipal water system which serves the majority of the incorporated City, as well as a portion of unincorporated Clallam County south of the City. The DOH water system identification number for the City is 77620-Y.

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A copy of the Water Facilities Inventory Report (WFI) is included in Appendix B.

The City is governed by a City Manager and a seven member City Council. The City's current mailing address is:

City of Sequim
152 West Cedar Street
Sequim, Washington 98382

Figure 1-1 is a vicinity map of the City. Figure 1-2 shows the water system boundary, the Sequim city limits and the current urban growth area (UGA).

SYSTEM BACKGROUND

WATER SYSTEM HISTORY

The City is located on the Sequim prairie in the northeast portion of Clallam County. The City is situated between the Strait of Juan de Fuca, Sequim Bay, the Dungeness River and the Olympic Mountain Range. Original settlement on the Sequim prairie was by Jamestown/S'Klallam Indians. The first Europeans settled on the prairie in 1853. During this time, logging, farming, and seafood canning were the main industries of the area. Chronic summer droughts, however, plagued the area limiting settlement. The first irrigation system was installed in 1885, utilizing the Dungeness River as a resource. With irrigation came the expansion of grain, root, cattle, and dairy farming. The City was incorporated in 1913 with a population of 300.

The City's first water system, which served several blocks of central Sequim and was fed by a spring, was purchased from J.L. Keeler in 1922. A bond issue was passed by the City in 1929 to bring water from the Dungeness River and build the first reservoir constructed by the City. A second water transmission main was constructed from the reservoir in 1948, and in 1953, another bond issue was passed to construct a second reservoir, an intake line from the Dungeness River, and replacement water lines for the original wood stave water pipe.

A study of the City's water system was completed in 1973. As a result of this study, additional water system improvements were

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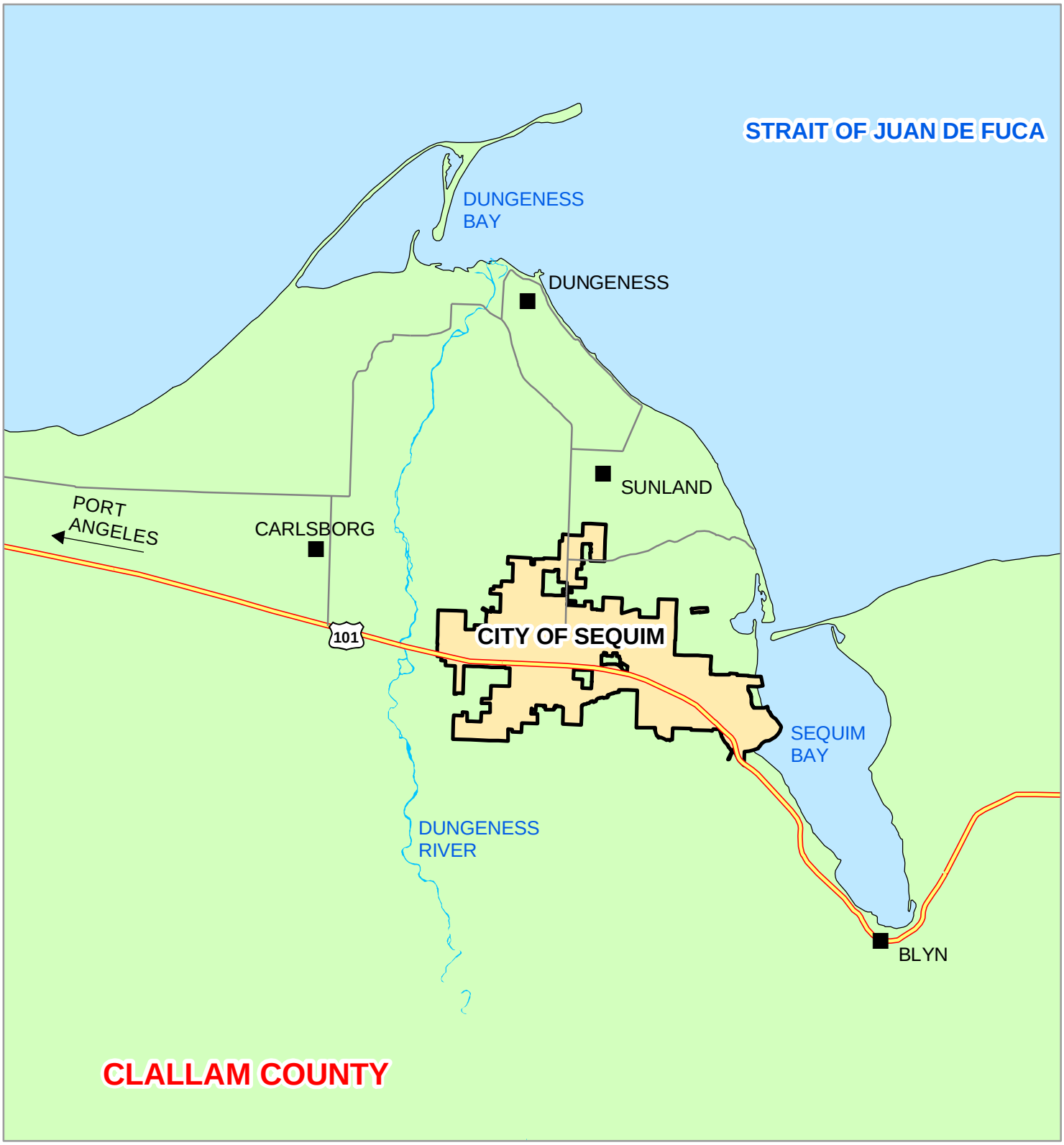

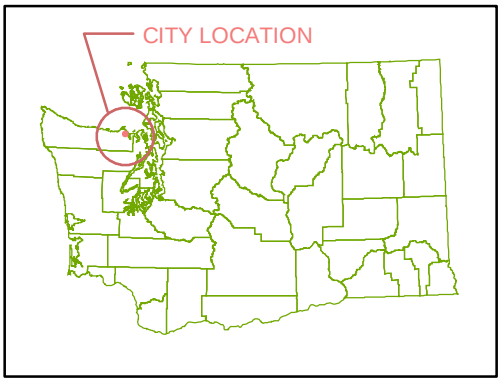

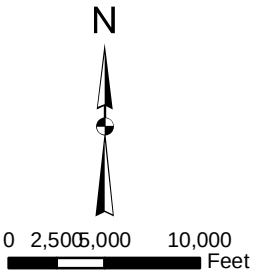

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 1-1
LOCATION MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-1 LOCATION.mxd

made to the City's water system. These improvements included covering the city reservoir, metering connections, and replacing substandard water lines. Another report was completed in 1983 and addressed issues of water quality, water resources, and conservation. Improvements made to the City's water system that were recommended in this report included covering the 500,000-gallon reservoir, development of the Silberhorn Wellfield, installation of a chlorination system in the intake piping, and construction of a new infiltration gallery along the Dungeness River. In 1986, the 200,000-gallon 480 Zone reservoir was constructed and the Silberhorn Wellfield was brought on line. In 1995 the City's 1.7 million-gallon (MG) reservoir was constructed, the Port Williams Well No. 1 was drilled, and the 5th and McCurdy Booster Station was built. In 1998, Port Williams Well No. 2 was drilled and equipped. In 2008 the Solana development was constructed which is served by a 1 MG reservoir and two booster stations. In 2009, a third well was drilled and equipped at the Port Williams Wellfield.

Since 2000, the City expanded the water system to the northwest to serve the new commercial zone along Washington Street, upsized existing water mains in the downtown areas, and improved service with additional water mains for distribution and water quality. The current water system base map is shown on Figure 1-2.

GEOGRAPHY

The Sequim prairie is generally temperate, with an average rainfall over the last 5 years of approximately 16 inches per year. The prairie, which is in the shadow of the Olympic Mountain Range, gently slopes toward the Strait of Juan de Fuca. Topography within the City ranges from approximately 0 to 700 feet above mean sea level (MSL). Figure 1-3 shows the topography of the Sequim area.

The City is located within the Dungeness River, Cassalery Creek, Gierin Creek, Bell Creek and Johnson Creek drainage basins. The Dungeness River is located west of the City and has a basin covering approximately 197 square miles. A series of glacial advances and retreats, interrupted by periods of non-glacial deposition, deposited several hydrogeologic units in the greater Sequim area. Groundwater flow within the area's aquifers generally occurs from south to north-northeast, where it discharges

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into Sequim Bay or the Strait of Juan de Fuca. The City has delineated critical aquifer recharge areas and development regulation in these areas with Sequim Municipal Code Chapter 18.80.100. Virtually the entire Sequim area is designated as a High Aquifer Recharge Area, containing Carlsboro-Puget-Dungeness and Hoypus-Sequim-Agnew soils groups, which are highly permeable.

SOIL CONDITIONS

Figure 1-4 shows the location of the various soil types within the UGA. The majority of the City of Sequim service area is made up of gravelly sandy loams of Sequim or Carlsborg series.

SENSITIVE AREAS

Site sensitive areas within the water service area include those classified as wetlands, seismic hazard areas, landslide hazard areas, flood hazard areas, and water bodies. Site sensitive areas are shown on Figure 1-5. Categories of site sensitive areas are described in further detail below. Development regulations within sensitive areas are included in Sequim Municipal Code Chapter 18.

Erosion Hazard Areas

These areas are especially subject to erosion, if disturbed, and may not be well suited for high-density developments or intensive land uses. Parts of the Bell Hill area and the hills to the north and south of the City's Water Reclamation Facility (WRF) are erosion hazard areas.

Seismic Hazard Areas

Seismic hazard areas are those with low density soils that are more likely to experience greater damage due to seismic-induced subsidence, liquefaction, ground-shaking, or landslides. Seismic hazard areas are regulated mainly with respect to public safety and with the exception of potential mass wasting due to an earthquake. Any water source, storage or distribution facilities in a seismic hazard area must be designed to minimize risk of harm from seismic activity. These hazard areas do not coincide with major water facilities; however, a seismic event could cause considerable damage to water lines in some areas that might experience significant earth movement.

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Flood Hazard Areas

Flood hazard areas are regions adjacent to lakes, rivers, and streams that are prone to flooding during peak runoff periods. Flood hazard areas deserve special attention due to the sensitive nature of their ecosystems as well as the potential for damage to structures located in the floodplain.

Landslide Hazard Areas

Landslide hazard areas include areas potentially subject to risk of land movement due to a combination of geologic, topographic, and hydrologic factors. Specific buffers and building setbacks apply to any development that abuts or contains these areas. The buffers may be reduced based on special studies. With respect to water systems, these development regulations can affect the amount of buildable area (and therefore, impervious surface) and/or reduce the potential risk for landslides and mass wasting that could impact water infrastructure and natural resources. Slide hazards areas are those that are prone to unstable behavior due to steep slopes, lack of vegetation, or unconsolidated soils.

Wetlands

Wetlands are defined as areas that are inundated with water for at least part of the year. Wetlands support valuable and complex ecosystems and consequently development is severely restricted if not prohibited in most wetlands. The National Wetlands Inventory maps identify several small wetlands in the area of the City's UGA.

There are specific buffers and allowable alterations for development within a designated wetland area. There are also requirements for special studies and determinations to be performed to identify and classify wetlands. In general, Clallam County does not allow impacts to regulated wetlands; however, if such impacts are unavoidable, then mitigation measures are required.

Water Bodies

Lakes and streams are classified as sensitive areas due to the variety of plants and animals that they support. The City has designated stream corridor zones which are planning areas with variable width setbacks from the ordinary high water mark elevation of the stream or water course, or from the top of the bank or dike. The primary surface water features within or near the City

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of Sequim water service area are the Strait of Juan de Fuca, Washington Harbor, Bell Creek and the Dungeness River. The Dungeness River flows north past Sequim on the west side of the City.

Fish and Wildlife Habitat

Fish and wildlife habitat is defined as areas which meet the definition of a "Fish and Wildlife Habitat Critical Area" pursuant to WAC 365-190-080(5) as well as Sequim Municipal Code Chapter 18.80 and is essential for maintaining specifically listed species in suitable habitats. Any proposed activity within 300 feet of these areas requires that a habitat assessment be prepared. This assessment is circulated to all the appropriate agencies for review. After review, a Habitat Management Plan may be required to address the project's impacts, provide background information on specific species, and recommend protection and mitigation measures for those species.

After implementation, an assessment and evaluation of the success of the irrigation measures is required. This plan is again circulated to the appropriate agencies for review. Minimum buffers from the critical habitat area may be required. As the main watercourses in the area, maintaining the water quality in Bell Creek and the Dungeness River is of particular concern.

EXISTING SYSTEM

A description of the facilities currently owned and operated by the City is provided in the following sections. Figure 1-2 shows the major water system facilities on a map of the City, and Figure 1-6 is a schematic of water system pressure zones and facilities.

SUPPLY SOURCES AND WATER RIGHTS

The City currently utilizes three sources of supply: the Infiltration Gallery (River Supply), the Silberhorn Wellfield, and the Port Williams Wellfield. The City's sources and water rights are summarized in Table 1-1.

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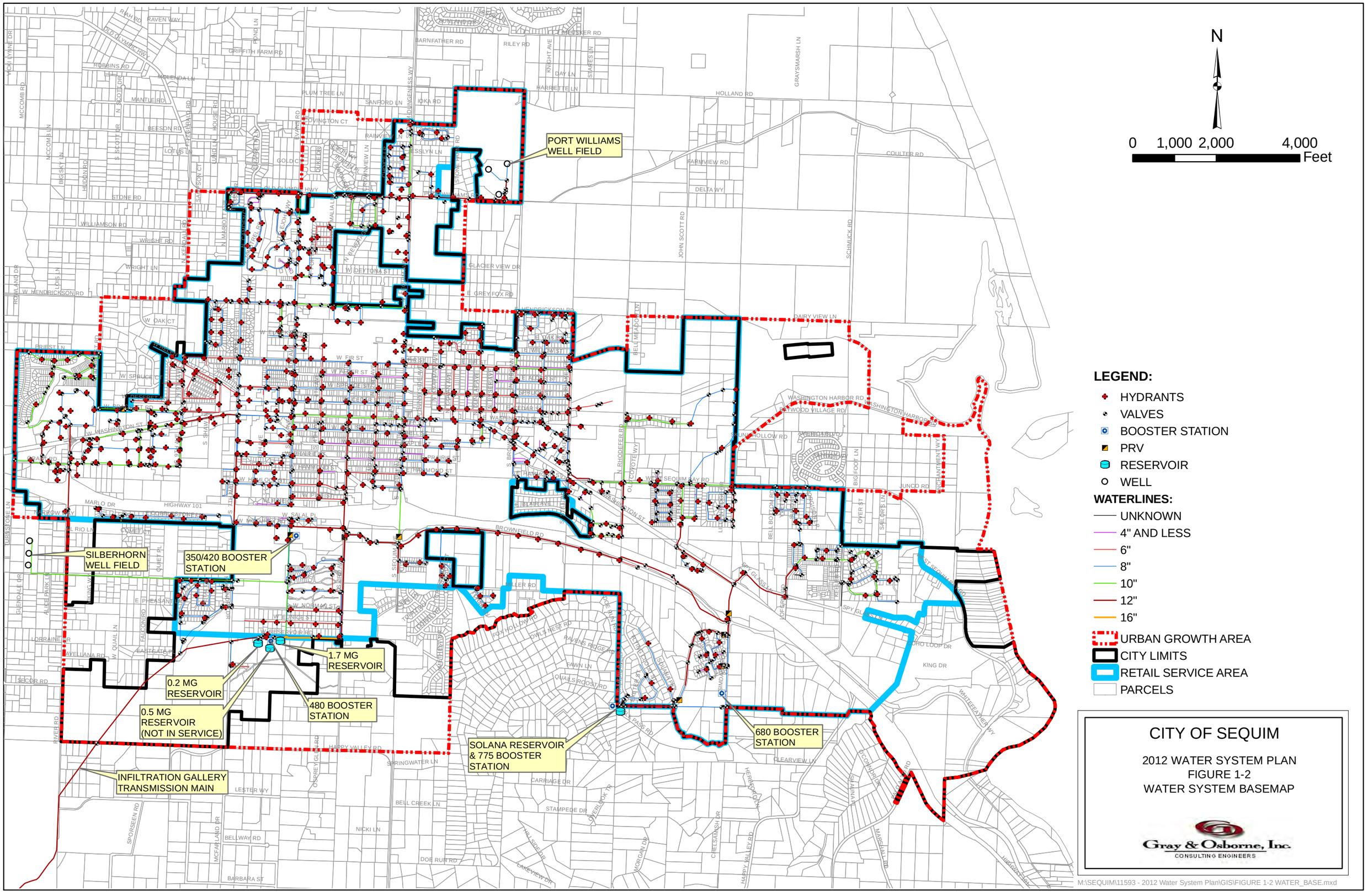
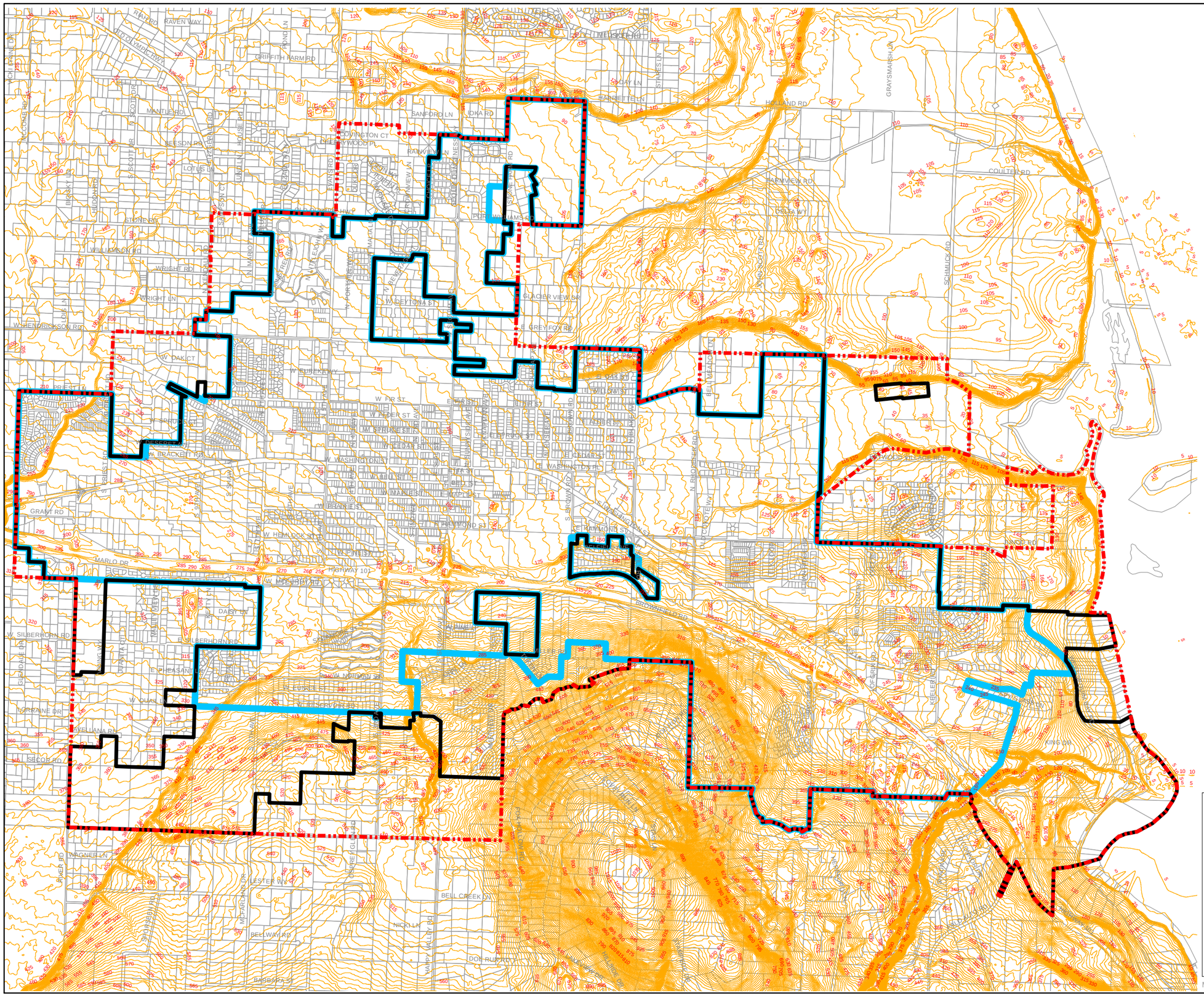
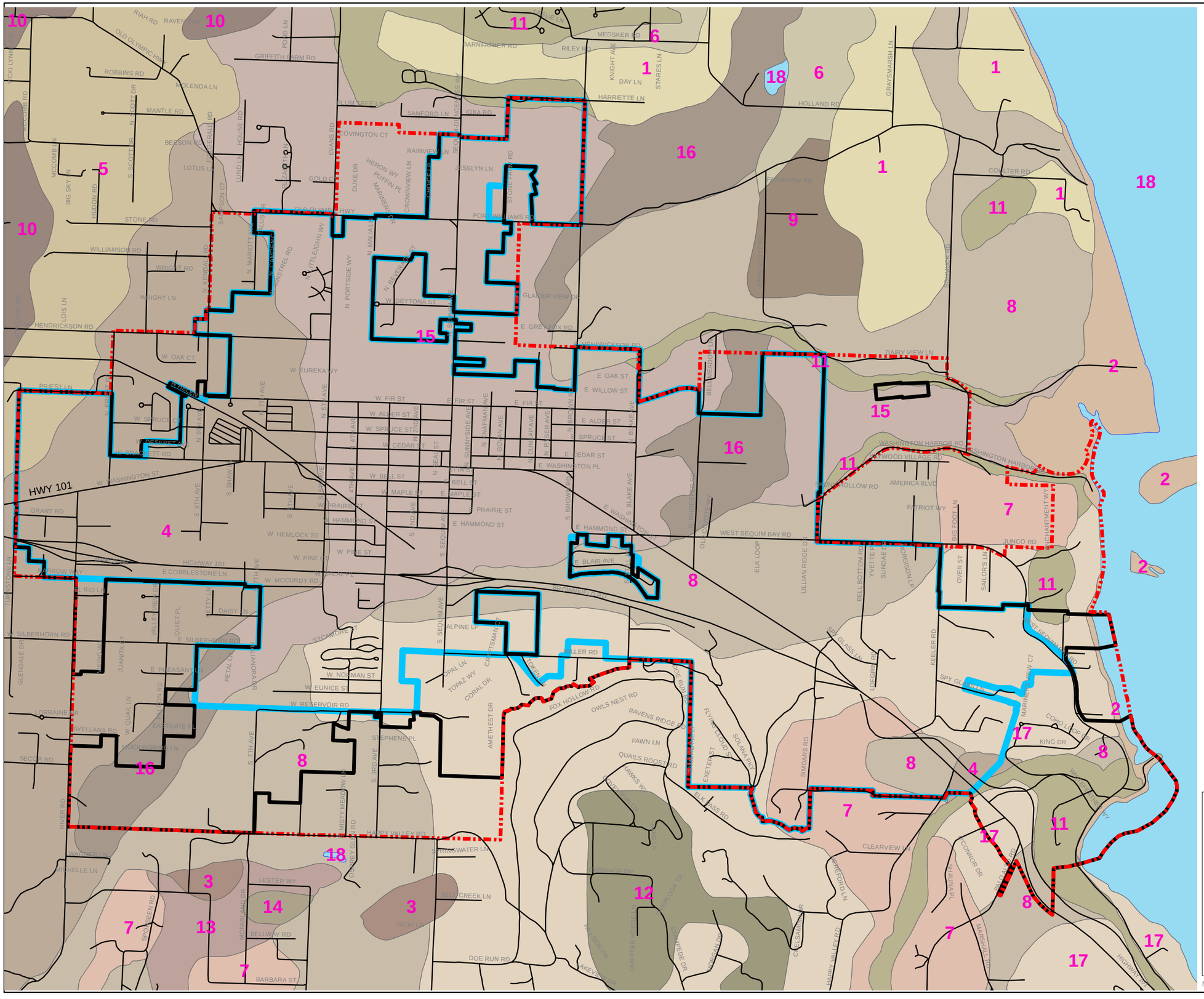

N
0 1,000 2,000 4,000
Feet
PORT WILLIAMS WELL FIELD
SILBERHORN WELL FIELD
350/420 BOOSTER STATION
1.7 MG RESERVOIR
0.2 MG RESERVOIR
0.5 MG RESERVOIR (NOT IN SERVICE)
480 BOOSTER STATION
SOLANA RESERVOIR & 775 BOOSTER STATION
680 BOOSTER STATION
INFILTRATION GALLERY TRANSMISSION MAIN
LEGEND:
HYDRANTS
VALVES
BOOSTER STATION
PRV
RESERVOIR
WELL
WATERLINES:
UNKNOWN
4" AND LESS
6"
8"
10"
12"
16"
URBAN GROWTH AREA
CITY LIMITS
RETAIL SERVICE AREA
PARCELS
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 1-2
WATER SYSTEM BASEMAP
Gray & Osborne, Inc.
CONSULTING ENGINEERS
M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-2 WATER_BASE.mxd


N
0 1,000 2,000 4,000
Feet
LEGEND:
URBAN GROWTH AREA
CITY LIMITS
RETAIL SERVICE AREA
5 FOOT CONTOURS - LIDAR
PARCELS
SOURCE: PUGET SOUND LIDAR CONSORTIUM (PSLC)
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 1-3
TOPOGRAPHY
Gray & Osborne, Inc.
CONSULTING ENGINEERS
M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-3 TOPO.mxd



LEGEND:

- ROADWAYS
- URBAN GROWTH AREA
- CITY LIMITS
- RETAIL SERVICE AREA

SOILS

- 1 AGNEW
- 2 BEACHES
- 3 BELLINGHAM
- 4 CARLSBORG
- 5 CARLSBORG-DUNGENESS-COMPLEX
- 6 CASSOLARY
- 7 CATLA
- 8 CLALLAM
- 9 DICK
- 10 DUNGENESS
- 11 HOYPUS
- 12 LOUELLA
- 13 MCKENNA
- 14 MUKILTEO
- 15 SEQUIM
- 16 SEQUIM-MCKENNA-MUKILTEO-COMPLEX
- 17 YEARY
- 18 WATER

DATA SOURCE:

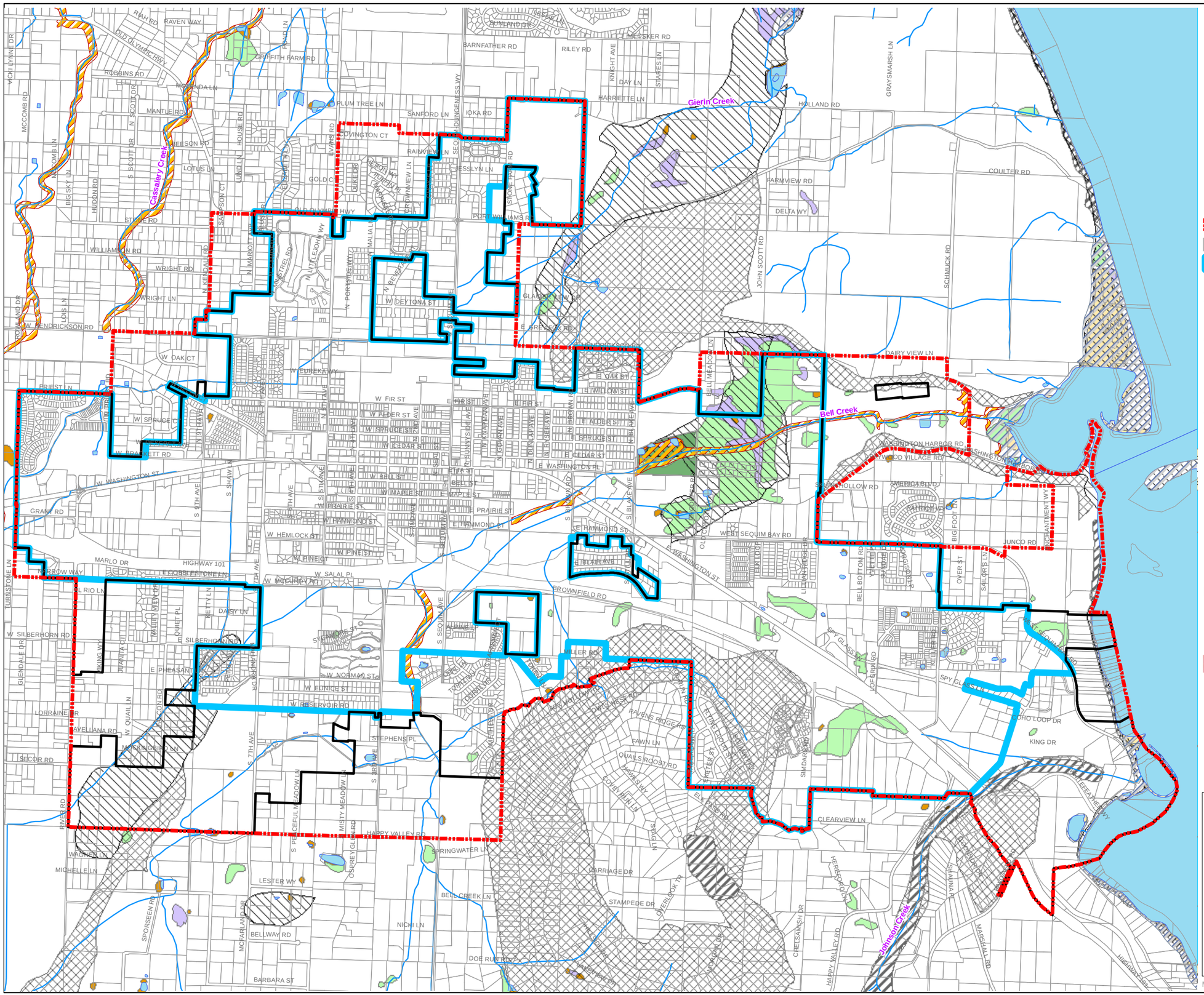
SOIL SURVEY STAFF, NATURAL RESORCES CONSERVATION SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE. SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE FOR CLALLAM COUNTY, WASHINGTON. AVAILABLE ONLINE AT http://soildatamart.nrcs.usda.gov ACCESSED 04/05/12.

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 1-4
SOIL CLASSIFICATION MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-4 SOILS.mxd



0 1,000 2,000 4,000 Feet

LEGEND:

- URBAN GROWTH AREA
- CITY LIMITS
- RETAIL SERVICE AREA
- PARCELS
- RIVERS / CREEKS
- LAKES AND PONDS

CLALLAM COUNTY CRITICAL AREAS:

- Erosion Hazard
- Landslide Hazard
- Seismic Hazard

WETLANDS:

- Freshwater Forested/Shrub Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Estuarine and Marine Wetland
- Riverine
- Estuarine and Marine Deepwater
- Other Freshwater Wetland
- PARK

FEMA FLOOD ZONES:

A - AN AREA INUNDATED BY 100 YEAR FLOODING, FOR WHICH NO BFE'S HAVE BEEN ESTABLISHED

X500 - AN AREA INUNDATED BY 500 YEAR FLOODING; AN AREA INDUNDATED BY 100-YEAR FLOODING WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; OR AN AREA PROTECTED BY LEVEES FROM 100 YEAR FLOODING

DATA SOURCE:

U.S. FISH AND WILDLIFE SERVICE AND F.E.M.A.

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 1-5
SITE SENSITIVE AREAS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-5 SENSITIVE.mxd

Table 1-1 Existing Source Information

Parameter	Dungeness River[1]	Infiltration Gallery	Silberhorn Wellfield	Port Williams Wellfield
DOH Source ID	S01	S01	S02	S05
Number and/or Type of Source(s)	Surface Water	Groundwater Collection System	3 Groundwater Wells	3 Groundwater Wells
Year Installed	N/A	1979	1985 and 2010	1995, 1998 and 2009
Water Right Number	No. 1316, Cert. of Change Vol. 1 pg. 426, Cert. of Change Vol. 1-2 pg. 106	No. 2102, Cert. of Change Vol 1-1 pg. 107	No. G2-23856	No. G2-29239
Water Right Priority Date	May 23, 1924	February 15, 1953	June 12, 1975	June 13, 1995
Annual Water Right (ac-ft)	None specified	1,160	690	1,850[3]
Instantaneous Water Right (gpm)	628[2]	718	700	2,250
Total Installed Capacity (gpm)	N/A	350[4]	780[5]	1,760[6]

(1) Dungeness River surface water intake is not used.
(2) Water right specifies 1.4 cfs.
(3) Supplemental to existing water rights.
(4) Infiltration gallery flows by gravity siphon and is limited by hydraulic constraints to maintain siphon.
(5) Total capacity for all three wells at Silberhorn Wellfield. The total production is limited to 700 gpm by instantaneous water rights.
(6) Total capacity for all three wells at Port Williams Wellfield.

Dungeness River and Infiltration Gallery

The City's original water right was for surface water withdrawal from the Dungeness River. Surface water withdrawals were discontinued in the early 1950s as a result of construction of the Infiltration Gallery. Currently, the City receives water from the Infiltration Gallery and does not take surface water. The Infiltration Gallery consists of a horizontal collector system made of perforated pipe buried in a gravel filter pack under the stream bank of the Dungeness River. The perforated pipe feeds a central collection well and water flows by gravity siphon to the City's 420 Reservoir and distribution system. This type of collection system is known as a Ranney Well. The City was granted a Certificate of Change of Point of Diversion for the Dungeness River water right in 1954 to the same location as the Infiltration Gallery. The Infiltration Gallery has been identified as being

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hydraulically connected to the River but not as groundwater under the influence of surface water. As such, the City is required to disinfect this source by providing a concentration-time (CT) of 6 as described in the treatment section below.

Silberhorn Wellfield

The Silberhorn Wellfield, DOH source number SO2, consists of three wells. Information on the individual wells is presented in Table 1-2. Currently, the City operates the wells on an alternating basis to equalize use. During periods of higher demand the City uses two wells simultaneously. The Silberhorn wells are equipped with 40 hp, 460V, 3 phase submersible pumps which were designed with a pumping capacity of 400 gpm at 306 feet total dynamic head (TDH). The City currently operates each of these wells at a reduced pumping rate of 260 gpm due to aquifer and screen issues. Each Silberhorn well is located in a below grade vault that houses the wellhead and control valve. An onsite control building holds the control equipment, telemetry, chlorination system, and generator. The Silberhorn Wellfield pumps to the City's 1.7 MG reservoir and the 420 Zone. The Silberhorn Wellfield is equipped with a 75 kW standby generator.

Table 1-2 Silberhorn Wellfield

Well Number	DOH Source Number	Development Date	Capacity (gpm)	Depth (feet)
Silberhorn #1	SO6	8/4/1975(1)	260	241
Silberhorn #2	SO7	7/25/1985	260	175
Silberhorn #3	SO9	8/29/1985	260	220

(1) Well #1 redeveloped 3/23/2010.

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Port Williams Wellfield

The Port Williams Wellfield, DOH source number SO5, currently consists of three wells. Information on the individual wells is presented in Table 1-3. Each well has a 100 hp, 480V, 3 phase submersible pump which was designed with a pumping capacity of approximately 600 gpm at 570 feet TDH. Currently, the City operates the wells on an alternating basis. During periods of high demand, all three wells will operate simultaneously.

The City's water right permit (refer to Chapter 3 for more discussion of water rights) allows for the drilling of up to five wells at the Port Williams Wellfield. The facilities are constructed

such that future wells will pump through the Control Building and will be connected to the 12-inch water main located on Port Williams Road. The Control Building houses the control equipment, telemetry, chlorination equipment, and flow meter. An on-site 200 kW generator is located outside the Control Building. Each well is equipped with an individual flow meter and pump control valve. The wells operate according to the water level in the 1.7 MG reservoir or by pressure in the 350 Zone. The wells pump directly to the 350 Zone. In order to supply the 1.7 MG Reservoir and the 420 Zone, the Port Williams Wellfield operates in tandem with the 5th and McCurdy Booster Station. When the Port Williams Wells are called to operate, the 5th and McCurdy Booster Station is activated. If pressures in the 350 Zone are sufficient, a flow control valve at the booster station opens to allow excess flow from the 350 Zone to be pumped to the 420 Zone and into the reservoir. Total withdrawal from the Port Williams Wellfield is limited to the customer demand in the 350 Zone and the capacity of the 5th and McCurdy Booster Station. Further discussion of operation of the Port Williams Wellfield and the 5th and McCurdy Booster Station is provided later in this chapter.

Table 1-3 Port Williams Wellfield

Well Number	DOH Source Number	Effective Date(1)	Capacity (gpm)	Depth (feet)
Port Williams #1	SO3	4/12/1996	600	420
Port Williams #2	SO4	5/21/1999	600	379
Port Williams #3	SO8	6/23/2009	560	381

(1) Source: DOH Sentry database.

TREATMENT

All three of the City's sources are chlorinated. The Port Williams Wellfield utilizes 12 percent sodium hypochlorite which is injected at the Control Building. Each well has a dedicated reciprocating positive displacement-type injection pump which is called to operate when the well is called to run.

The Silberhorn Wellfield utilizes 12 percent sodium hypochlorite which is injected at the on-site Control Building. The single injection pump is called to operate when one of the wells is called to run. The injection rate must be manually adjusted if the number

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of wells operating is changed and the rate of flow increases or decreases.

The Infiltration Gallery utilizes 12 percent sodium hypochlorite which is injected at the Infiltration Gallery Control Building. The hypochlorite pump is a reciprocating positive displacement-type pump which must be manually adjusted for changes in flow rate.

DOH has determined that the Infiltration Gallery source is considered a groundwater source that is hydraulically connected to the surface waters of the Dungeness River. Consequently, the City must provide sufficient residual disinfectant concentration (C) and contact time (T), such that the product of C and T, known as CT, equals a minimum of 6 as required by WAC 246-290-451. A CT of 6 is provided in the transmission main from the chlorination injection point at the infiltration gallery before the first customer. An analysis of the capacity to provide CT for the Infiltration Gallery is provided in Chapter 3 – System Analysis.

PRESSURE ZONES

The City's water system is divided into six pressure zones to provide adequate service to the customers throughout the service area. The hydraulic grade lines (HGL) of the zones are labeled 350, 420, 480, 500, 680, and 775, which refer to elevations of the HGL above sea level. The HGLs of the 420, 480, and 680 Zones are set by reservoirs. The HGL of the 775 Zone is set by a booster station. The HGLs of the 350 and 500 Zones are set by pressure reducing valve (PRV) stations. All six pressures zones can be seen on Figure 1-6.

The 350 Zone is located in the northern portion of the City's service area and is the largest zone by area. The grade of this zone is set by PRVs from the 420 Zone and by the well pumps at the Port Williams Wellfield.

The 420 Zone spans the width of the City's service area just south of the 350 Zone. The grade of this zone is set by the 420 Reservoir. Water is supplied to the 420 Zone and Reservoir by the Silberhorn Wellfield and the Infiltration Gallery. Supply can also be provided by booster pumps from the Port Williams Wellfield in the 350 Zone or from the 500 Zone via PRVs.

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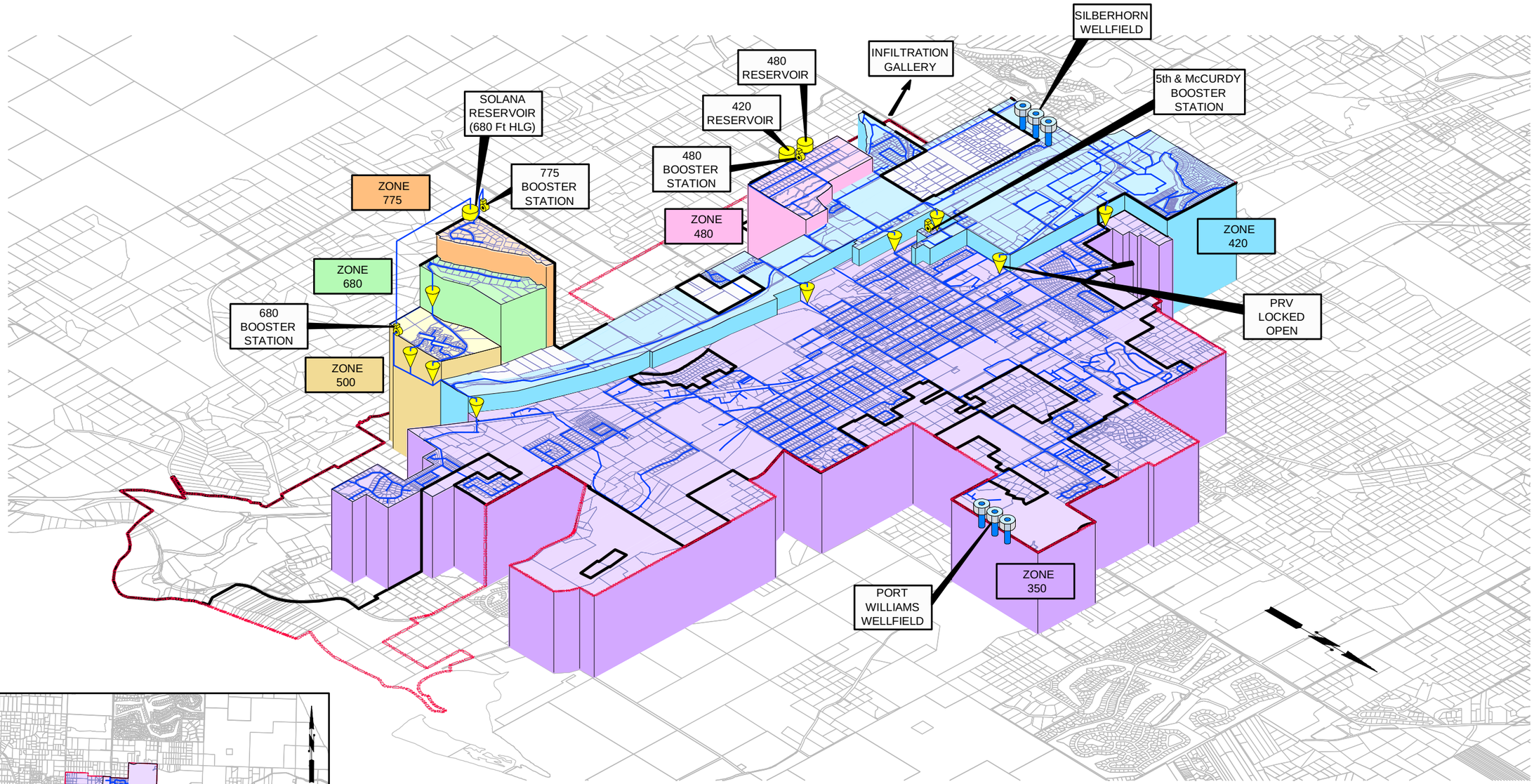

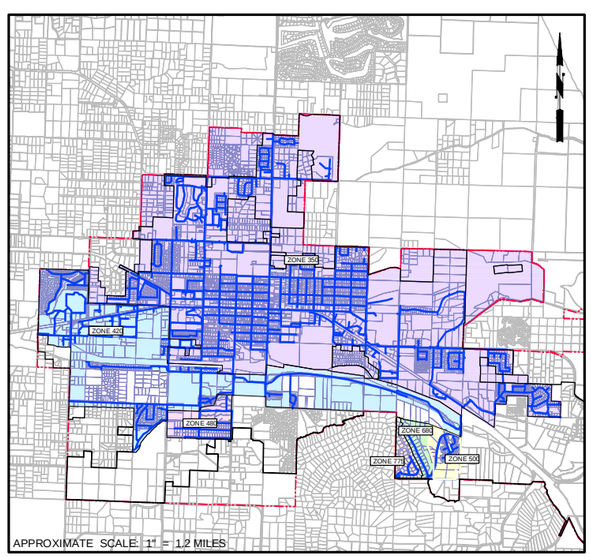

SOURCES	CAPACITY (gpm)	ZONE
Port Williams 1	600	350
Port Williams 2	600	350
Port Williams 3	560	350
Silberhorn 1	260	420
Silberhorn 2	260	420
Silberhorn 3	260	420
Infiltration Gallery	350	420

STORAGE FACILITY	CAPACITY (G)	HGL (ft)
420 Reservoir	1,700,000	420
480 Reservooir	200,000	480
Solana Reservoir	1,000,000	680

LEGEND

- RESERVOIR
- WELL
- BOOSTER STATION
- PRV
- WATER MAIN
- URBAN GROWTH AREA
- CITY LIMITS

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 1-6
WATER SYSTEM SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 WATER SYSTEM PLAN\FIGURE\3D SCHEMATIC\3D SCHEMATIC-2012 REBUILD-6.DWG, LAYOUT2, 8/9/2012 8:48:14 AM, PDF-XCHANGE FOR ACROPLOT PRO (TEMPORARY).PC3, BY: P MARSHA

The 480 Zone is located in the south-central portion of the service area. The HGL is set by the 480 Reservoir, which is supplied by the 480 Booster Station from the 420 Zone. The zone is isolated from the 420 Zone by closed gate valves.

The 500, 680, and 775 Zones are located in the southeast portion of the City and serve the Solana development. Two booster stations, a reservoir, and multiple PRVs were constructed in association with this development. The 680 Zone Booster Station pumps from the 420 Zone to the 680 Zone and the Solana Reservoir. The 775 Booster Station pumps from the 680 Zone to the 775 Zone. The 500 Zone is supplied by a PRV from the 680 Zone.

PRV Stations

The City's water system is equipped with nine PRV stations that allow water to enter lower pressures zones from higher pressure zones. The majority of these stations are equipped with two valves of different sizes. The smaller valve is set to open first and provide for small or moderate demands. The larger valve is set to open if a large demand such as a fire occurs and the smaller valve cannot provide sufficient flow. Further discussion of the City's PRVs is included in Chapter 6, Operations and Maintenance.

Storage

The City currently owns and operates three reservoirs totaling 2.9 MG of active storage. The City also has a 0.5 MG ground level reservoir that is currently inactive. This reservoir would require significant rehabilitation prior to any future use. The 420 Reservoir has a capacity of 1.7 MG and serves the 420 Zone. The 480 Reservoir has a capacity of 0.2 MG and serves the 480 Zone. The Solana Reservoir has a capacity of 1 MG and serves the 680 Zone. The 480 and 420 Reservoirs, along with the 480 Booster Station and the out of service 0.5 MG reservoir are located on the same site. Table 1-4 summarizes the City's reservoirs.

The 420 Reservoir is supplied with water from the Silberhorn Wellfield and the infiltration gallery. Water in this reservoir provides storage for the 420 Zone and also provides water to the 350 Zone through PRVs. It also supplies water to the 480 Booster Station, which feeds the 0.2 MG Reservoir and the 480 Zone.

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The Solana Reservoir is served by the 680 Booster Station, which was constructed as a part of the Solana development. The Solana Reservoir provides storage for the 680 Zone, serves the 775 Zone by a booster station and serves the 500 Zone, 420 Zone and 350 Zone by cascading PRVs.

Table 1-4 System Reservoir Information

Name	Material	Construction Date	Overflow Elevation (ft)	Diameter (ft)	Height (ft)	Volume (gal)
0.2 MG 480 Reservoir	Concrete	1986	481	26	51	200,000
1.7 MG 420 Reservoir	Steel	1995	420	100	29	1,700,000
1.0 MG 680 Solana Reservoir	Steel	2008	680	100	18	1,000,000
					Total	2,900,000

BOOSTER STATIONS

The City currently owns and operates four booster stations. These stations are the 480 Booster Station, the 5th and McCurdy Booster Station, the 680 Booster Station and the 775 Booster Station. The City's booster stations are used to move water between pressure zones. Table 1-5 summarizes the City's booster stations.

The 480 Booster Station is located at the 420 Reservoir site and pumps water from the 420 Reservoir to the 480 Reservoir and the 480 Zone. This booster station contains two centrifugal close-coupled 5 hp pumps each, with a pumping capacity of 150 gpm at 86 feet TDH.

The City's 5th and McCurdy Booster Station is located near the corner of 5th Avenue and McCurdy Street. The 5th and McCurdy Booster Station pumps water from the 350 Zone to the 420 Zone. The booster station has a single 10 hp, 480V, 3 phase submersible pump mounted with a pitless adaptor. The station's pumping capacity is 300 gpm at 95 feet TDH. The 5th and McCurdy Booster Station is used when supply from the Port Williams Wellfield exceeds the demands in the 350 Zone. The booster station allows excess supply to be stored in the 420 reservoir or used in the 420 Zone. A pump control valve controls the booster pump, and maintains a set pressure in the lower zone by opening and throttling to maintain the lower zone pressure. The booster station is called to operate when the Port Williams Wellfield is

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called, however, if the PRVs at 5th Avenue and McCurdy Street are open allowing flow from the upper zone to the lower zone, the booster pump will not run.

The City's 680 Booster Station is located on Simdars Road and was constructed to supply the Solana development. The 680 Booster Station pumps water from the 420 Zone to the 680 Reservoir. It is equipped with three vertical multistage booster pumps, each with a capacity of 225 gpm at 377 TDH.

The City's 775 Booster Station is located on the Solana Reservoir Site and supplies the 775 Zone. It is equipped with one low flow domestic pump, one high flow domestic pump and two fire pumps.

Table 1-5 System Booster Station Information

Name	From Zone	To Zone	Capacity	Head	Motor hp	Standby Power
5th and McCurdy Booster Station	350	420	300 gpm	95 ft	10 hp	None
480 Booster Station	420	480	150 gpm	86 ft	5 hp	Diesel Standby Generator
			150 gpm(1)	86 ft	5 hp	
680 Booster Station	420	680	225 gpm	377 ft	30 hp	Propane Standby Generator
			225 gpm	377 ft	30 hp	
			225 gpm(1)	377 ft	30 hp	
775 Booster Station	680	775	37 gpm	130 ft	2 hp	Propane Standby Generator
			255 gpm	130 ft	15 hp	
			1000 gpm	130 ft	50 hp	
			1000 gpm(1)	130 ft	50 hp	

(1) Standby pump.

INTERTIES

The City water system currently has no interties with other water purveyors. Potential interties will be investigated and developed when possible with bordering water purveyors. Interties can provide systems with redundant supply if a system's sources are out of service.

Potential interties are possible with the Callam County PUD and with the Marina Water System. The City has identified CIP projects that will allow interconnection between the systems. For

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the PUD, a connection is anticipated in the Solana area which will allow the City to serve the Miller Road area as well as the Emerald Highlands area. This will required the wheeling of water through the PUD system. Interties with PUD will be negotiated per the 1995 Agreement between the City and PUD. For the Marina Water System, a future intertie is anticipated when water mains from the City reach the boundary of the Marina System. The Marina Water System's Water System Plan anticipates connections along West Sequim Bay Road and along Washington Harbor Loop.

DISTRIBUTION SYSTEM

The City distribution and transmission system consists of approximately 341,500 lineal feet of pipe, ranging in size from 2-inch to 16-inch in diameter.

Table 1-6 System Pipe Lengths and Size(1)

Pipe Diameter (inches)	Approximate Length of Pipe in System (lineal ft.)
4 inch and smaller	17,000
6 inch	59,800
8 inch	141,700
10 inch	56,400
12 inch	64,800
16 inch	1,800
Total	**341,500**

(1) Date: July 2012. Source: City of Sequim GIS.

ADJACENT PURVEYORS

The City's adjacent water purveyors are shown on Figure 1-7. Table 1-7 summarizes the names and pertinent water system information for these systems and is followed by descriptions of each system. The City's adjacent purveyors include both Group A and Group B systems. The DOH classifies public water systems as Group A if they serve more than 15 connections, or 25 or more people per day for 60 or more days per year. The DOH classifies systems which serve less as Group B.

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Table 1-7 Adjacent Water Purveyor Information

Water System Name	DOH ID	Current Connections	Source Capacity (gpm)	Storage Capacity (gal)	In City/ UGA/ Outside UGA
Battelle NW Marine Lab	10351	3	100	26,000	UGA
Baywood Village Mobile Home Park	36754	52	14	10,000	Outside UGA
Deytona	19184	28	72	0	UGA
Flauras Acres HOA	25600	53	115	0	UGA
Happy Valley Estates	30975	16	42	65,000	Outside UGA
Huffman Water System	00805	13	20	27,000	Outside UGA
Lee Water Company	46658	71	230	22,030	Outside UGA
Palo Verde	02315	16	70	0	UGA
PUD Evergreen	24181	626	405	444,000	City/UGA/ Outside UGA
Sequim Bay Resort and Marina (Wayne)	36421	25	120	150,000	City
Sequim Elks Lodge #2642	03645	22	50	0	City
Still Road Water System	19689	10	30	0	UGA
Sun Meadows HOA	04511	115	245	130,000	Outside UGA
Sunland Water District	85260	851	1,100	240,000	Outside UGA
Trowbridge Court Condo Association	00339	16	60	0	UGA
Vista water System	58144	91	527	80,000	UGA
West Sequim Bay	54192	138	138	60,000	Outside UGA

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Battelle Northwest Marine Lab

The Battelle Northwest Marine Lab (Battelle) water system is a Group A system that serves the Pacific Northwest National Laboratory's Sequim Marine Research Operations facility. The system is currently located outside of the city limits but within the City's UGA. Battelle is a nonprofit research institute and operator of the Pacific Northwest National Laboratory for the Department

of Energy. Battelle owns approximately 100 acres including upland and waterfront areas. The campus currently consists of 7 developed acres supporting approximately 50,000 square feet of laboratory, office, and storage space divided between the main building on the upper campus and the waterfront buildings. The facility currently employs approximately 100 people. According to the Clallam County Comprehensive Plan, the Campus Master Plan for the facility identifies potential future expansions of 180,000 to 240,000 square feet and an additional 200 to 300 employees over a 10- to 20-year timeframe.

Fresh water for the facility is currently provided by an on-site artesian well with a capacity of approximately 100 gpm. The water is pumped to a 125,000-gallon wood stave reservoir on the upland portion of the property. Fresh water is currently used for both process and domestic purposes, with process usage, which is primarily for laboratory purposes, accounting for approximately 98 percent of the total fresh water usage.

Baywood Village Mobile Home Park Water System

The Baywood Village Mobile Home Park water system is a Group A system that serves an area located outside of the City's UGA to the east of the City. The system serves 52 connections. The system is served by one well, which has a capacity of approximately 14 gpm, and the system has a storage capacity of approximately 10,000 gallons.

Clallam County PUD No. 1 Evergreen Water System

The Clallam County PUD No. 1 (PUD) operates five water systems, one of which is the Evergreen Water System located south of the City's water service area. The Evergreen Water System service area, which includes areas inside and outside of the City's UGA and city limits, is shown in Figure 1-7. The Evergreen Water System was formed in 1993 by combining three smaller water systems: the Highland Hills Water System, the Del-Hur Happy Valley Estates II, and the Loma Vista Water System. The Highland Hills and Del-Hur Happy Valley Estates II water systems served the Bell Hill area. The Loma Vista water system is located on Silberhorn Road.

The service area is divided into eight pressure zones. The existing system consists of six wells, four concrete reservoirs, four booster stations, and transmission and distribution system piping which

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mainly consists of 4-, 6-, and 8-inch-diameter pipe. The total source capacity of the Evergreen water system's wells is approximately 920 gpm. Two of the Evergreen water system's other wells have had high manganese levels and are only used during emergencies. The total storage capacity of the system is 444,000 gallons.

The Evergreen water system also includes water service to the Emerald Highlands subdivision. Section 7 of the 1995 Agreement between the City and the PUD states that these improvements are owned by the City, and until such time as the City has infrastructure to provide water to this development, the PUD shall use these water mains to provide water service to the subdivision. The PUD is responsible for operation and maintenance of these water mains until they no longer serve the subdivision. The Agreement includes a procedure for payment of severance costs and connection fees upon the City providing service to the subdivision. A copy of the 1995 Agreement is provided in Appendix C.

Flauras Acres Homeowners Association Water System

The Flauras Acres Homeowners Association water system is a Group A community system which serves approximately 50 residential connections. The system's service area is within the City's UGA but currently outside the city limits southeast of the City core. The service area population of the water system is estimated to be approximately 150. The Association owns three wells, two of which are used only as emergency sources. The primary well has a capacity of approximately 115 gpm and is treated with rapid sand filtration. The water system currently has no storage capacity.

Happy Valley Estates Water System

The Happy Valley Estates water system is a Group A system that serves approximately sixteen residential connections. The system's service area is located outside of the City's UGA southeast of the City. The system is served by two wells, which have capacities of approximately 42 gpm and 35 gpm. The smaller well is only used seasonally. Storage is provided by a 65,000-gallon reservoir.

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Huffman Water System

The Huffman water system is a Group B system that serves approximately thirteen connections, providing service to an area which encompasses 22 parcels of land. The system's service area is located outside of the City's UGA southeast of the City. The system is served by one well, which has a capacity of approximately 18 gpm. Storage is provided by a 26,150-gallon reservoir. A pressure tank regulates pressures in the system and signals the booster pumps. All pipe in the existing distribution system is PVC.

Lee Water Company

The Lee Water Company is located outside of the City's UGA northwest of the City and is made up of the Golden Eagle and the Sunway Park water systems. Source for the water system is provided by three wells with a combined capacity of approximately 135 gpm. Chlorination is provided at the three wells, the system's storage consists of an 18,000-gallon concrete reservoir, and the distribution system consists mainly of 6-inch asbestos-cement and PVC pipe. The water system serves a total of 71 connections, all of which are single-family residential. Sources for the system are currently not metered, and only 34 service connections are metered. The Lee Water Company does not anticipate any growth due to lack of developable property in the vicinity.

Palo Verde Water System

The Palo Verde water system is a group A system that serves an area located outside of the city limits but within the western portion of the City's UGA. The system serves 16 connections. The system is served by one well, which has a capacity of approximately 70 gpm. Palo Verde system is not currently approved by the Department of Health to serve additional connections.

Sequim Bay Resort and Marina Water System

The Sequim Bay Resort and Marina (Marina) water system, which is currently owned by Wayne Enterprises, is located within the city limits on the southeast side of the City.

The water system has three types of service connections: the John Wayne Marina, the Sequim Bay Resort, and single-family

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residences. The John Wayne Marina is a 300 slip Marina, which currently has 30 residents that live aboard boats full time. The Sequim Bay resort contains 40 RV hookups, restrooms with showers, a small laundry, a caretaker's residence, an office, and eight cabins. Approximately 25 single-family residences are connected to the distribution lines from the existing reservoir. The water system source is provided by two wells and storage is provided by a 150,000-gallon reservoir. A booster pump station serves the system's upper pressure zone.

The Marina water system anticipates significant expansion in the future. Current plans for the properties in the system's service area include a resort community, which will include a hotel, a lodge, retail commercial space, multifamily residences, and single-family residences.

Sequim Elks Water System

The Sequim Elks water system is a Group A system that serves an single parcel located in the northern portion of the City within the city limits. The system serves approximately 22 connections, including RV hookups and a meeting building with an office. The system is served by one well, which has a capacity of approximately 50 gpm.

Still Road Water System

The Still Road Water System is a Group B system that serves approximately ten residential connections and has a service area population of approximately 20. The system's service area is within the City's UGA but outside the current city limits southeast of the city core. This system's DOH water system identification number is 19689. The water system's source is provided by one chlorinated well with a capacity of 30 gpm. The water system currently has no storage capacity.

Sun Meadows HOA Water System

The Sun Meadows HOA water system is a Group A system that serves an area located outside of the City's UGA to the east of the City. The system serves 115 connections. The system is served by one well, which has a capacity of approximately 240 gpm, and the system has a storage capacity of approximately 130,000 gallons.

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SunLand Water District

SunLand Water District is a Group A system that serves an area located outside of the City's UGA to the north of the City. The system serves 851 connections. The system is served by two wells, with a total capacity of approximately 1,100 gpm, and the system has a storage capacity of approximately 240,000 gallons. The system serves a residential area with a golf course.

Trowbridge Court Condo Association Water System

The Trowbridge Court Condo Association water system is a Group A system that serves an area located outside of the city limits but within the northern portion of the City's UGA. The system serves 16 connections. The system is served by one well, which has a capacity of approximately 60 gpm.

Vista Water System

The Vista Water System is a Group A water system located in the northern part of the City's UGA, but is outside the current city limits. The Vista water system is owned by Olympic Vista Development, Inc. The water system, which was originally called North Olympic Vista water system, was purchased from R&R Enterprises in 1991. The water system serves a total of 91 connections, all of which are single-family residential. Source for the water system is provided by two wells, each with capacities of 360 gpm. However, water rights limitations restrict instantaneous withdrawal to 152 gpm for either well and 33 acre-feet per year annual withdrawal. A 77,000-gallon concrete storage reservoir was built in 1993. The system is pressurized by two 1,000-gallon hydropneumatic tanks and two 750 gpm booster pumps. Emergency pumping is provided by a diesel powered 2,000 gpm fire flow pump. The distribution system mainly consists of 8-inch-diameter PVC pipe. Water rights are currently the restricting factor which might limit expansion. No water treatment is currently needed, however, chlorination facilities have been installed in the pump house and chlorination can be performed should the need arise.

West Sequim Bay Water System

The West Sequim Bay water system is a Group A system that serves a residential area located outside of the City's UGA to the southeast of the City. The system serves 138 connections. The system is served by two wells, which have a combined capacity of

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approximately 96 gpm, and the system has a storage capacity of approximately 60,000 gallons.

REGIONAL PURVEYORS

Several water purveyors serve the areas of unincorporated Clallam County to the north and west of the City. Figure 1-8 is a map showing the regional purveyors. Table 1-8 gives the names and pertinent water system information for these systems. Additional information on regional purveyors is included in Appendix J.

Table 1-8 Regional Water Purveyor Information

Water System Name	DOH ID	Current Connections	Source Capacity (gpm)	Storage Capacity (gal)
Brandt Point	16190	28	53	16,500
Carlsborg Mobile Estates	00029	53	80	15,500
Dungeness Bay Plat	20300	161	247	99,000
Dungeness Beach	20350	82	107	N/A
Dungeness Beach Plat McAlmond Farm	33662	14	55	630
Dungeness Golf Course and Mt Vista	20453	60	800	5,000
Dungeness Heights	20425	131	610	79,000
Dungeness Meadows	20445	198	180	56,000
Elwha Place HOA	01581	26	150	N/A
Estates	08166	335	800	175,000
Forest Ridge	25949	30	75	30,000
Green Acres Mobile Home Park	29358	49	185	N/A
Jamestown on Wilcox Lane	06344	44	85	N/A
Kevca Water	29496	40	60	1,000
Madrona Ridge	50085	28	200	50,000
Mains Farm	50400	158	168	45,000
Meadowbrook Village	10774	26	50	N/A
Olympic View	05151	16	45	525
Parkwood Mobile Home Comm.	02699	210	320	55,000
PUD Carlsborg	00307	237	320	340,000
Sunland Shores	85257	53	145	N/A
Woodland Heights	98182	45	171	1,500

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SERVICE AREA

In accordance with the Washington State Municipal Water Law (MWL), the City is required to designate a retail service area

within which it has a duty to serve all customers, and if appropriate, also designate a future service area and a wholesale service area.

The City currently serves customers within its city limits, with the exception of areas served by either the PUD, Sequim Elks Lodge 2642, or by the Marina Water System. In the future the City plans to serve is its current UGA boundaries as well as some adjacent areas outside the current UGA which it is logical for the City to serve. In addition, future service may be provided by the City to areas outside the UGA currently served by other water purveyors. A map of service areas for the City can be found on Figure 1-7. A description of these areas is detailed in the following section.

RETAIL SERVICE AREA

The City acknowledges that it has a duty to serve all new connections within its designated retail service area. The retail service area must include the existing service area and areas where new service will be provided. The City defines the extent of its retail service area as the current city limits less the areas currently served by the PUD through agreement, the service areas of the Marina Water System and the Sequim Elks Lodge 2642. The City and PUD have an Intergovernmental Water Service Area Agreement that defines policies for service between the two water systems. Appendix C contains the Intergovernmental Water Service Area Agreement.

While the City has a duty to serve new connections within the Retail Service Area, there are five threshold factors that must be met prior to providing service. These are:

1. The City has sufficient water rights to provide service.
2. The City has sufficient capacity to serve water in a safe and reliable manner.
3. The service request is consistent with adopted local plans and development regulations.
4. Service can be provided in a timely and reasonable manner.
5. Service can be provided in accordance with City policies, specifications, and standards.

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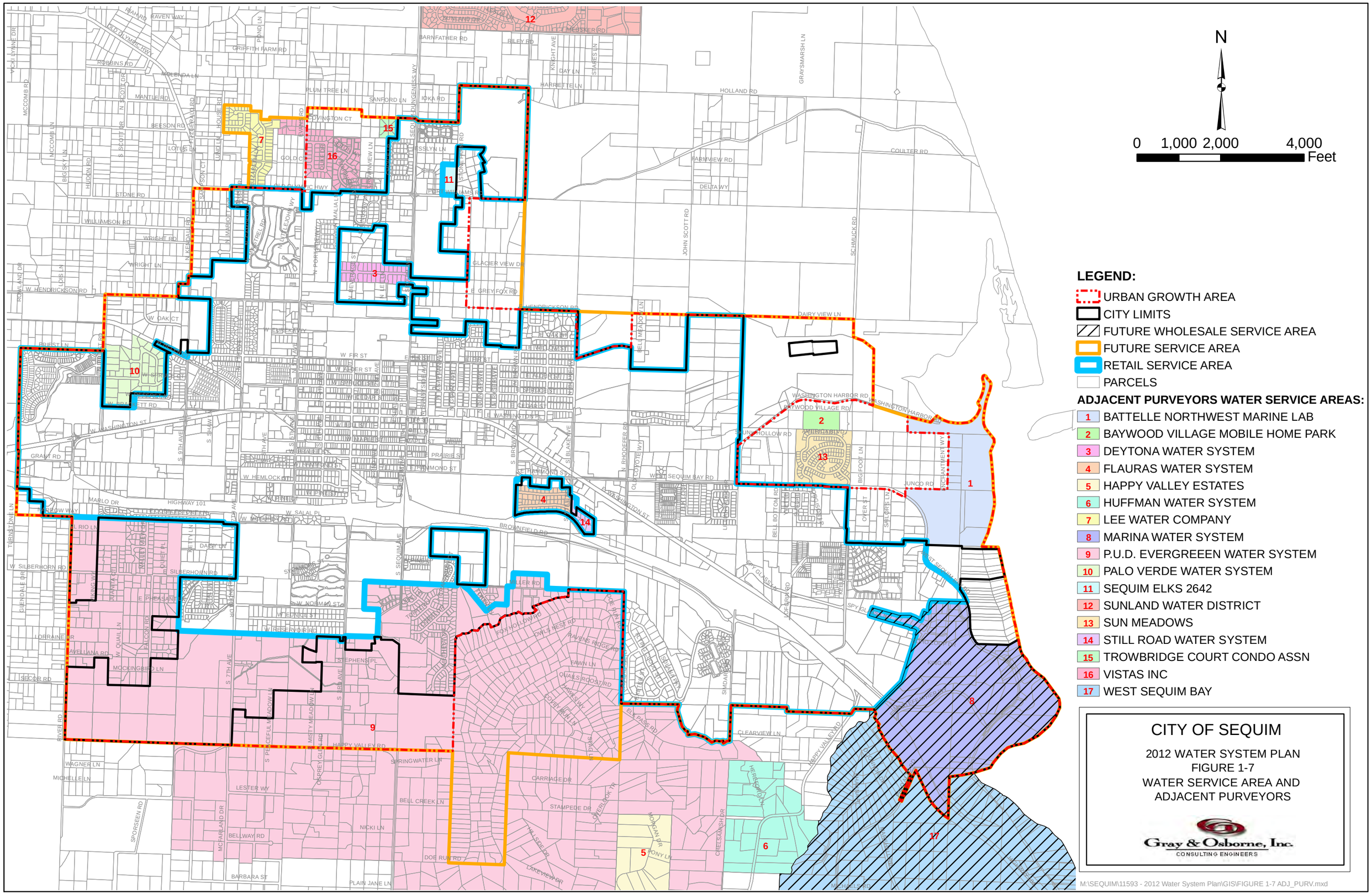
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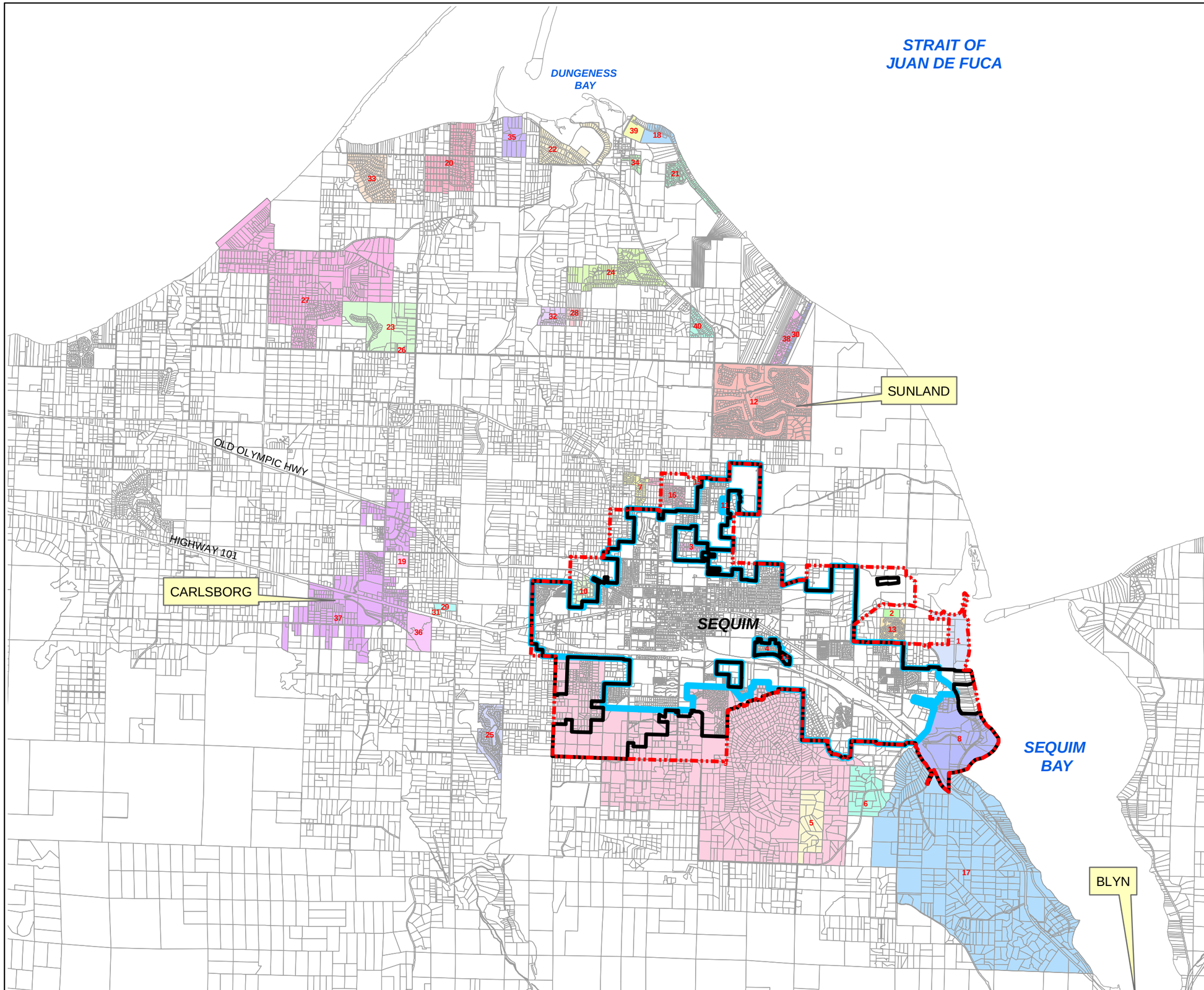
LEGEND:
URBAN GROWTH AREA
CITY LIMITS
FUTURE WHOLESALE SERVICE AREA
FUTURE SERVICE AREA
RETAIL SERVICE AREA
PARCELS
ADJACENT PURVEYORS WATER SERVICE AREAS:
1 BATTELLE NORTHWEST MARINE LAB
2 BAYWOOD VILLAGE MOBILE HOME PARK
3 DEYTONA WATER SYSTEM
4 FLAURAS WATER SYSTEM
5 HAPPY VALLEY ESTATES
6 HUFFMAN WATER SYSTEM
7 LEE WATER COMPANY
8 MARINA WATER SYSTEM
9 P.U.D. EVERGREEEN WATER SYSTEM
10 PALO VERDE WATER SYSTEM
11 SEQUIM ELKS 2642
12 SUNLAND WATER DISTRICT
13 SUN MEADOWS
14 STILL ROAD WATER SYSTEM
15 TROWBRIDGE COURT CONDO ASSN
16 VISTAS INC
17 WEST SEQUIM BAY
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 1-7
WATER SERVICE AREA AND
ADJACENT PURVEYORS
Gray & Osborne, Inc.
CONSULTING ENGINEERS
M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-7 ADJ_PURV.mxd



LEGEND:

- URBAN GROWTH AREA
- CITY LIMITS
- RETAIL SERVICE AREA
- PARCELS
- 1 BATTELLE NORTHWEST MARINE LAB
- 2 BAYWOOD VILLAGE MOBILE HOME PARK
- 3 DEYTONA WATER SYSTEM
- 4 FLAURAS WATER SYSTEM
- 5 HAPPY VALLEY ESTATES
- 6 HUFFMAN WATER SYSTEM
- 7 LEE WATER COMPANY
- 8 MARINA WATER SYSTEM
- 9 P.U.D. EVERGREEEN WATER SYSTEM
- 10 PALO VERDE WATER SYSTEM
- 11 SEQUIM ELKS 2642
- 12 SUNLAND WATER DISTRICT
- 13 SUN MEADOWS
- 14 STILL ROAD WATER SYSTEM
- 15 TROWBRIDGE COURT CONDO ASSN
- 16 VISTAS INC
- 17 WEST SEQUIM BAY

REGIONAL PURVEYORS:

- 18 BRANDT POINT
- 19 CARLSBORG MOBILE ESTATES
- 20 DUNGENESS BAY PLAT
- 21 DUNGENESS BEACH
- 22 DUNGENESS BEACH PLAT MCALMOND FARM
- 23 DUNGENESS GOLF COURSE AND MT VISTA
- 24 DUNGENESS HEIGHTS
- 25 DUNGENESS MEADOWS
- 26 ELWHA PLACE HOMEOWNERS ASSN
- 27 ESTATES INC
- 28 FOREST RIDGE
- 29 GREEN ACRES MOBILE HOME PARK
- 30 JAMESTOWN ON WILCOX LANE
- 31 KEVCA WATER
- 32 MADRONA RIDGE HOMEOWNERS
- 33 MAINS FARM PROPERTY OWNERS
- 34 MEADOWBROOK VILLAGE
- 35 OLYMPIC VIEW
- 36 PARKWOOD MOBILE HOME COMMUNITY
- 37 P.U.D. CARLSBORG WATER SYSTEM
- 38 SUNLAND SHORES INC
- 39 THREE CRABS RESTAURANT
- 40 WOODLAND HEIGHTS

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 1-8
REGIONAL PURVEYORS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-8 REGIONAL_PURV.mxd

FUTURE SERVICE AREA

The City's future service area includes the UGA and adjacent areas where the City may provide logical service in the future if the UGA is expanded. The City intends to provide water service to new developments within the UGA in areas that are not served by other purveyors. The UGA boundary extends beyond the city limits in many locations surrounding the City. Portions of the UGA areas outside of the current city limits are served by the PUD. Several smaller water systems also serve within the UGA but outside the city limits. The City may acquire water systems when the area they serve becomes annexed to the City.

Service to the City's future service area will be governed by the 1995 Agreement with the PUD states that "as areas are annexed into the City during the term of this Agreement, the service area boundary shall be reviewed by representatives of each party hereto, and appropriate adjustments made." The Agreement also states that as areas where the PUD currently does not serve are annexed into the City, the City will decide whether to provide service or will authorize the PUD to do so in the future. In addition, this agreement states that the City has the option to give notice to the PUD of the City's intent to assume service of areas serviced by the PUD within the city limits existing at the date of the agreement.

Decisions on whether to acquire other water systems will be made on a case-by-case basis at the request of the water system. For areas not served by the PUD, adoption of this Water System Plan defines the following guidelines the City will apply in deciding whether to acquire existing water systems:

- Acquisition must be requested by the water system, the Washington State Department of Health, or the Clallam County Health Department.
- The water system must meet the City's standards. If improvements are required in order to meet the City's standards, they will be funded by the water system requesting acquisition.
- A hydraulic analysis, funded by the water system requesting acquisition, must be completed to further identify any required improvements, and this

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hydraulic analysis may result in the need for the water system requesting acquisition to finance improvements to the City of Sequim's water system.

- Payment of the City's General Facilities Charge is required.
- Annexation into the City is required if applicable.

Specific provisions for acquiring existing water systems are included in the draft Satellite Water System Program (Appendix D). For areas served by the PUD, the provisions of the 1995 Agreement shall apply.

WHOLESALE SERVICE AREA

A wholesale service area is defined as an area where a water purveyor provides water to other water purveyors through an intertie. The City does not currently provide wholesale service to any other water systems. However, in the future there may be the opportunity to provide wholesale service to other systems through future interties. The Marina Water System and the West Sequim Bay Water System has been identified as potential wholesale customers. The City and the Marina Water System have the potential for a future intertie when City water mains reach the Marina System boundary. At that time the City and the Marina Water System may choose to implement a wholesale water contract wherein the City could sell water through an intertie. The City currently has no plans to intertie directly with West Sequim Bay, but it may elect to wheel water through the Marina System to provide wholesale service to West Sequim Bay at a future date. Wheeling water means to transfer water through another water system's infrastructure.

SERVICE AREA AGREEMENTS

In addition to the service area acquisition procedure described above, the 1995 Agreement describes the wholesaling and wheeling of water between the City and PUD, purchase prices for transfers of facilities between the City and PUD, and standards for PUD service within the City's existing city limits and UGA. The Agreement may be terminated by either party after the tenth year of the Agreement and at 5-year intervals thereafter.

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The City also has an interlocal agreement and service extension review program with Clallam County to ensure orderly development of the unincorporated Sequim Urban Growth Area. Appendix C contains a copy of the Agreement with Clallam County.

ZONING AND FUTURE LAND USE

Existing zoning within the city limits and optimum land use within the UGA are presented in Tables 1-9 and 1-10, respectively. Zoning and land use are shown in Figures 1-9 and 1-10, respectively. This data was obtained from the City's Zoning and Land Use maps, effective July 25, 2011.

Table 1-9 City of Sequim Zoning Classifications Summary(1)

Zoning Classification	Total (acres)	Percent of Total
Single Family Residential	1,859	45.4%
Multi-Family Residential	385	9.4%
Commercial	424	10.3%
Mixed Use	392	9.6%
Public Facilities	392	9.6%
Agricultural Conservancy	40	1.0%
ROW/Streets	607	14.8%
Total	**4,100**	**100.0%**

(1) Source: City of Sequim Official Zoning Map revised by Ordinance 2011-016, effective July 25, 2011. A copy of this map is provided in Appendix D.

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Table 1-10 City of Sequim Optimum Land Use Classifications Summary(1)

Land Use Classification	Total (acres)	Percent of Total
Single Family Residential	2,781	51.8%
Multi-Family Residential	491	9.1%
Commercial	533	9.9%
Mixed Use	393	7.3%
Public Facilities	428	8.0%
Agricultural Conservancy	40	0.7%
ROW/Streets	705	13.1%
Total	**5,370**	**100.0%**

(1) Source: City of Sequim Optimum Land Use Map revised by Ordinance 2011-016, effective July 25, 2011. A copy of this map is provided in Figure 1-10.

FUTURE CITY GROWTH

The City has identified two specific areas where future growth is anticipated to occur. These include the east side of the system along West Sequim Bay Road from Whitefeather Way north to the Battelle property. Development to the south of Whitefeather Way will depend upon the buildout of the Marina Water System. The other growth area is the City Core area where future commercial development is anticipated. This area is bounded to the south by Highway 101, to the north by Fir Street and on the east and west by River Road and Simdars Road respectively. The City's map of preliminary plats along with the future growth areas is presented on Figure 1-11.

SERVICE AREA POLICIES AND CONDITIONS OF SERVICE

The City's 2006 Comprehensive Plan Update and the City of Sequim Municipal Code (SMC) identifies policies related to the City's water system. The DOH has established a list of policies that should be addressed in a water system comprehensive plan. Table 1-11 provides a listing of these policies, definitions, associated City policies, and sources.

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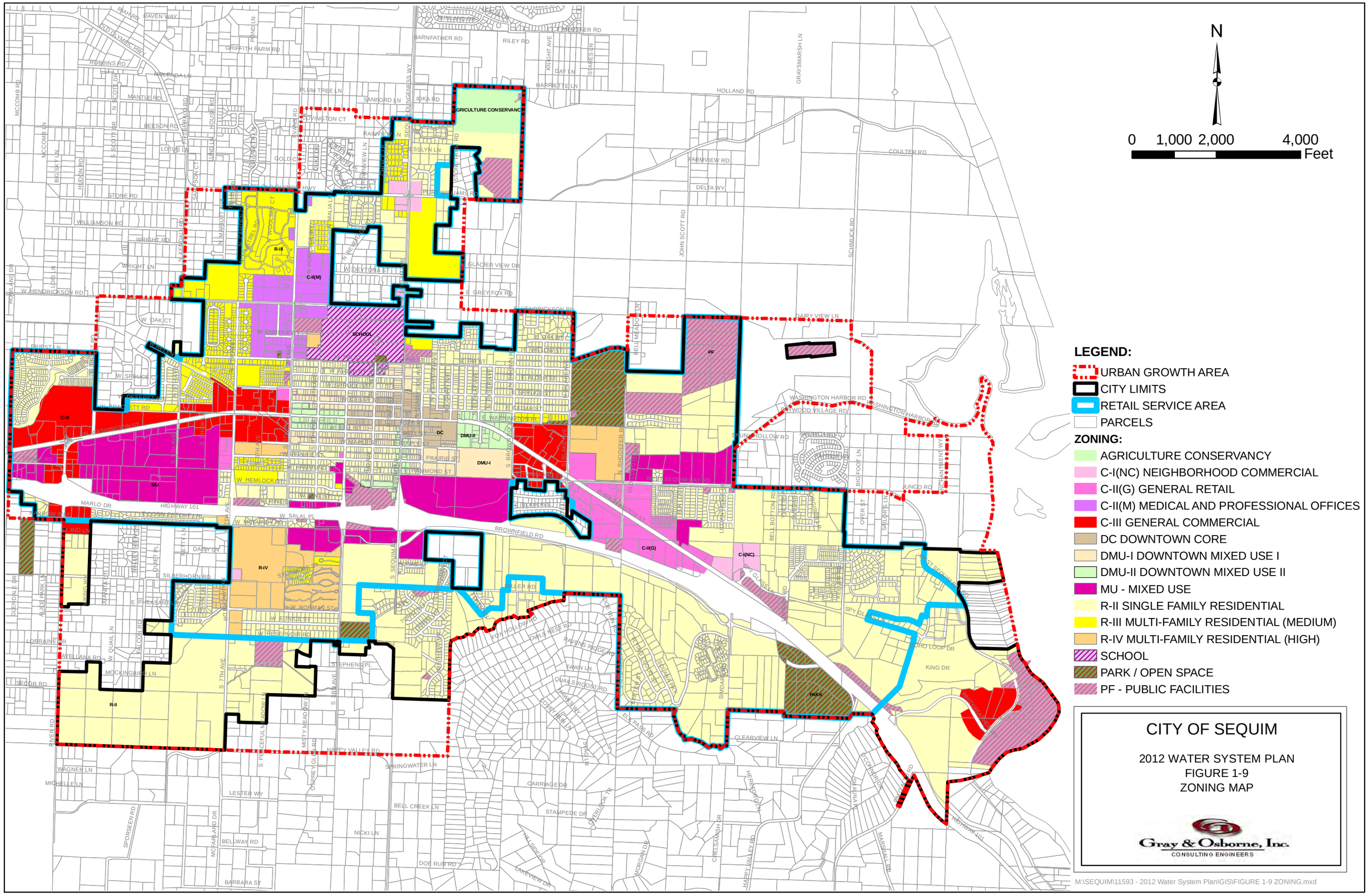
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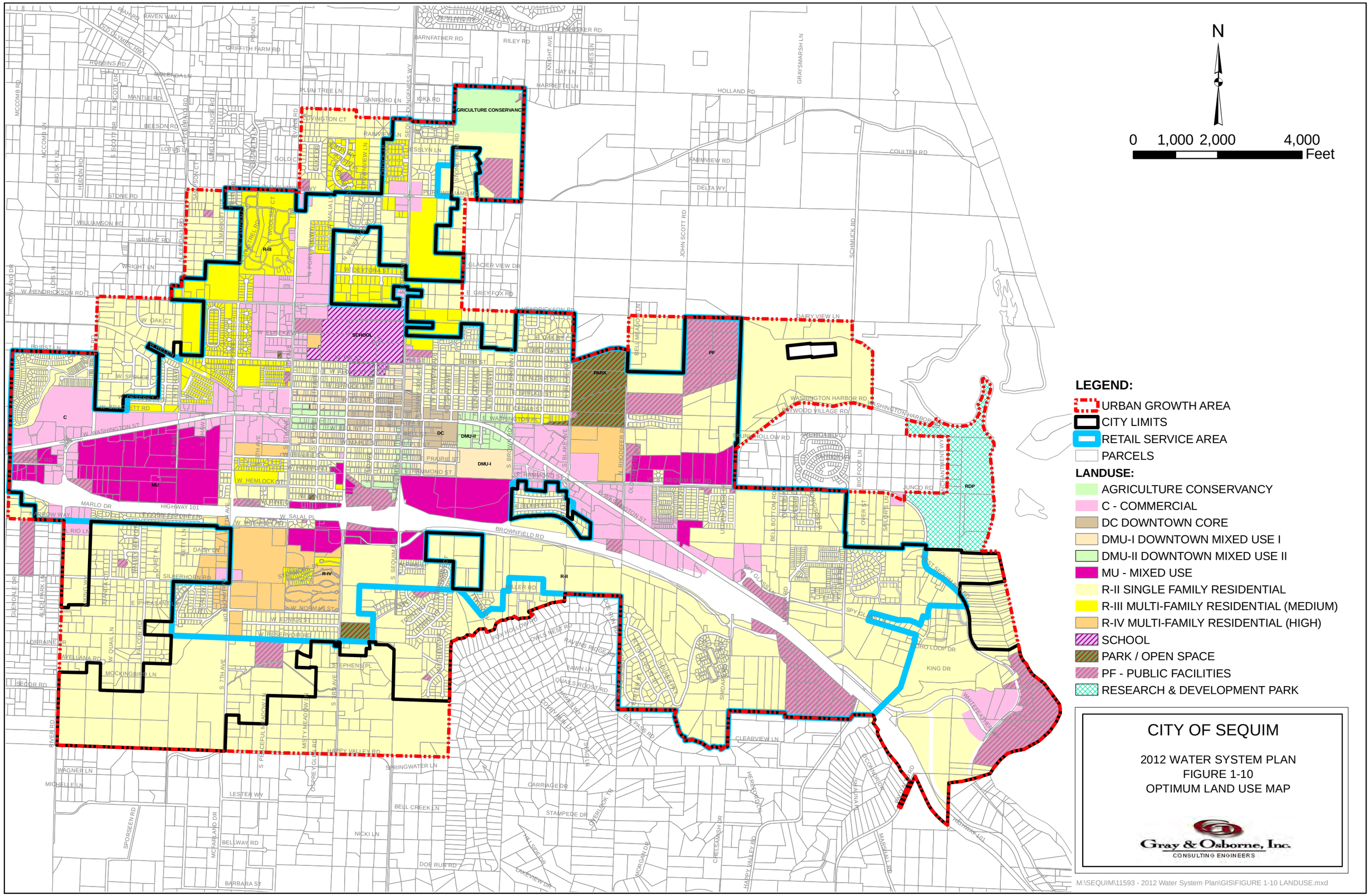
LEGEND:
URBAN GROWTH AREA
CITY LIMITS
RETAIL SERVICE AREA
PARCELS
ZONING:
AGRICULTURE CONSERVANCY
C-I(NC) NEIGHBORHOOD COMMERCIAL
C-II(G) GENERAL RETAIL
C-II(M) MEDICAL AND PROFESSIONAL OFFICES
C-III GENERAL COMMERCIAL
DC DOWNTOWN CORE
DMU-I DOWNTOWN MIXED USE I
DMU-II DOWNTOWN MIXED USE II
MU - MIXED USE
R-II SINGLE FAMILY RESIDENTIAL
R-III MULTI-FAMILY RESIDENTIAL (MEDIUM)
R-IV MULTI-FAMILY RESIDENTIAL (HIGH)
SCHOOL
PARK / OPEN SPACE
PF - PUBLIC FACILITIES
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 1-9
ZONING MAP
Gray & Osborne, Inc.
CONSULTING ENGINEERS
M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-9 ZONING.mxd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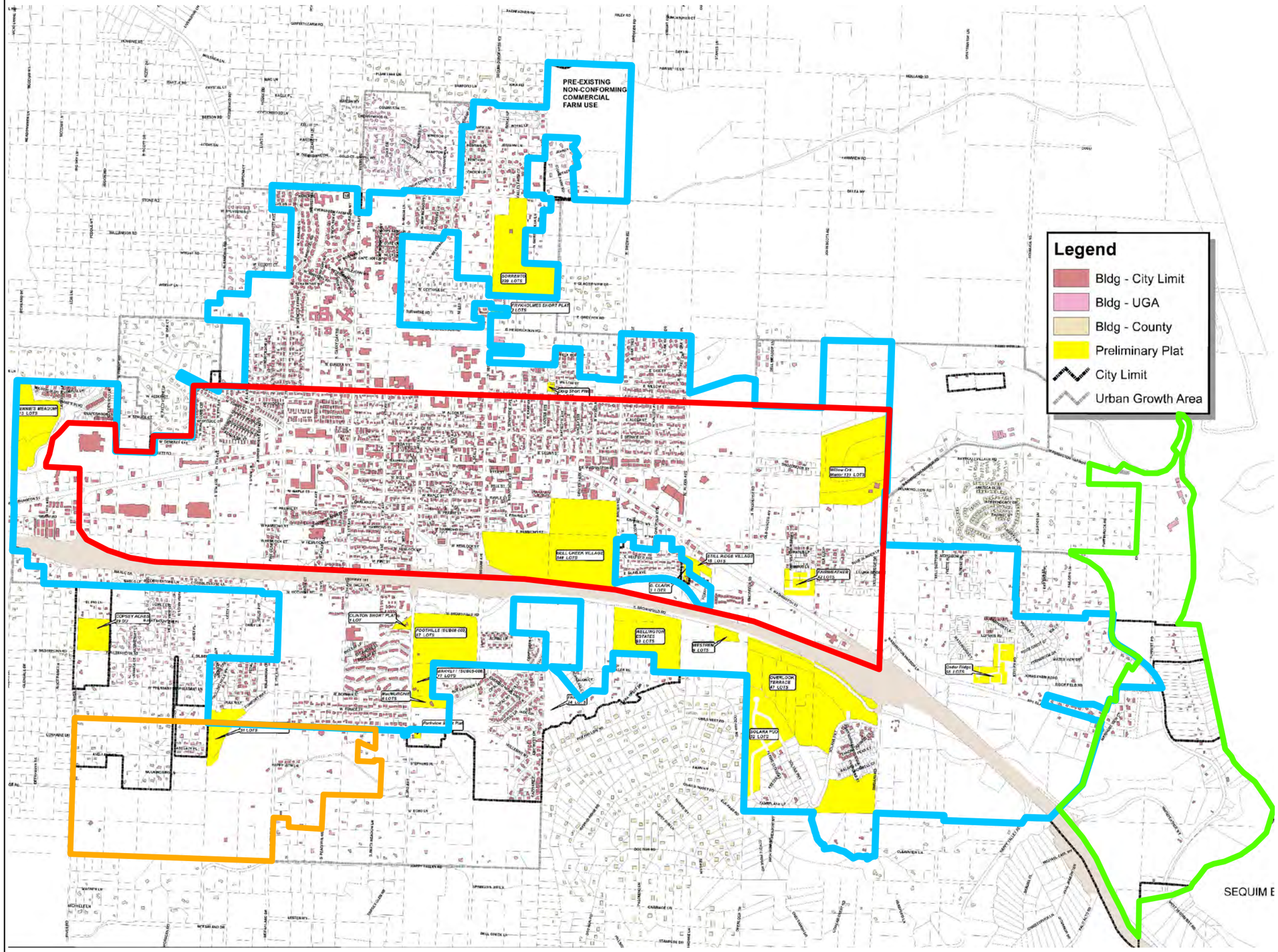
CITY LIMITS
RETAIL SERVICE AREA
PARCELS
LANDUSE:
AGRICULTURE CONSERVANCY
C - COMMERCIAL
DC DOWNTOWN CORE
DMU-I DOWNTOWN MIXED USE I
DMU-II DOWNTOWN MIXED USE II
MU - MIXED USE
R-II SINGLE FAMILY RESIDENTIAL
R-III MULTI-FAMILY RESIDENTIAL (MEDIUM)
R-IV MULTI-FAMILY RESIDENTIAL (HIGH)
SCHOOL
PARK / OPEN SPACE
PF - PUBLIC FACILITIES
RESEARCH & DEVELOPMENT PARK
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 1-10
OPTIMUM LAND USE MAP
Gray & Osborne, Inc.
CONSULTING ENGINEERS
M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-10 LANDUSE.mxd



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Legend

- Bldg - City Limit
- Bldg - UGA
- Bldg - County
- Preliminary Plat
- City Limit
- Urban Growth Area

LEGEND:

- RETAIL SERVICE AREA
- CITY CORE DEVELOPMENT AREA
- SOUTHEAST DEVELOPMENT AREA
- SOUTHWEST DEVELOPMENT AREA

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 1-11
ANTICIPATED GROWTH AREAS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 1-11 GROWTH AREAS.mxd

Table 1-11 City of Sequim Service Area Policies

Policy Name	Policy Description	City Policy	Source
Wholesaling of Water	Conditions which must be met to obtain a wholesale agreement included in the conditions of service for wholesaling of water.	Not currently applicable, but allowable with PUD in future per 1995 Agreement with PUD. Would require development of a new interlocal agreement for wholesale with other purveyors.	2012 Water System Plan, 1995 Sequim/PUD Agreement
Wheeling of Water	Conditions met for water wheeled to another system, i.e., compatible water quality, engineering, etc.	Wheeling will be considered between Sequim and PUD per the 1995 Agreement. This would require the development of a wheeling agreement between the systems following the wheeling principals of the 1995 agreement. Wheeling with other purveyors, such as the Marina Water System and the West Sequim Bay Water System will be governed by new agreements specific to those arrangements.	2012 Water System Plan, 1995 Sequim/PUD Agreement
Intertie Policy	Construction of interties between systems requires DOH approval and an intertie agreement between connected systems.	The 1995 Agreement provides for the development of interties between PUD and the City if determined to be in both system's best interests as determined by written concurrence. Interties with other purveyors would require development of new agreements.	2012 Water System Plan, 1995 Sequim/PUD Agreement

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Table 1-11 – (continued) City of Sequim Service Area Policies

Policy Name	Policy Description	City Policy	Source
Annexation Policy	How city annexation relates to the provision of water service.	Annexation or no-protest agreement required to connect to system. If City annexes area with existing PUD customer, City has discretion whether to require connection. Assume ownership of the water system infrastructure serving the property upon annexation unless provided otherwise by an existing contract for services.	SMC 13.72.025; 1995 Sequim/PUD Agreement
Direct Connection	Connection of new developments directly to existing water system.	All new developments within the city limits and UGA shall connect to the existing City or PUD water system.	2012 Water System Plan; 1995 Sequim/PUD Agreement
Satellite System Management Policy	Ownership, service and assistance provided to systems not directly connected to the City's water system.	The City will not allow satellite systems within the City's UGA. The City may consider providing satellite management for systems outside the UGA if the conditions of the City's Satellite Management Policy are met.	City of Sequim Draft Satellite Management Program, Appendix D
Surcharge for Outside Customers	City's surcharge for customers outside corporate limits.	Customers outside city limits pay a 50% surcharge on monthly water rates.	SMC Chapter 13.72 and 13.84.040
Design and Performance Standards Policy	Minimum design and performance standards for new development.	All development shall conform to the City's Streets and Utilities Development Regulations and Design Standards.	City of Sequim Utilities Development Regulations are included in Appendix E. City Design Standards are included in Appendix F.

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Table 1-11 – (continued) City of Sequim Service Area Policies

Policy Name	Policy Description	City Policy	Source
Urban Growth Areas	Responsibility of service is provided in UGA, how provided, and how financed.	Water service will be available and service extensions allowed to customers outside the city limits and within the UGA if development meets the land use plan density requirements, and development is consistent with land use policies and requirements of the City's Comprehensive Plan; Costs of water system extensions associated with new development shall be paid for by the developers.	2012 Water System Plan; SMC Chapter 13.72.025
Late-Comer Agreements	Policy on allowing latecomer agreements for those who propose to extend the water system, and provisions of pay back.	Evaluated on a case-by-case basis.	2012 Water System Plan; SMC 13.72.025F and 13.98
Oversizing Policy	City provides funds to install larger than needed facilities to allow for future development, if needed.	Evaluated on a case-by-case basis.	2012 Water System Plan
Cross-Connection Control Program	Policy on regulations of cross-connections, including steps taken if a cross-connection is discovered.	See Appendix F	City of Sequim Cross Connection Control Program, SMC 13.120

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Table 1-11 – (continued) City of Sequim Service Area Policies

Policy Name	Policy Description	City Policy	Source
Extension Policy	Policy regarding extension of the system, including identity of responsible party. Design standards and payment included in conditions of service.	Plans for extensions must be approved by the City. All costs of line extensions are paid by the user, including construction, inspection, and city costs. Extensions of service in city limits and UGA have priority over extensions outside UGA except in cases of risk to public health.	SMC Chapter 13.72.025, 13.76.010 and 13.100
Duty To Serve	Per Municipal Water Law the City has a requirement to provide service within the retail service area.	Retail service area is defined and five threshold criteria must be met before service can be provided.	2012 Water System Plan
Connection Fees and General Facilities Charges	Connection fees and general facilities charges are collected when new connections to the system are made to cover the value of existing infrastructure.	The City sets connection fees and general facilities charges by ordinance based on financial analysis.	SMC Chapter 13.72

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APPLICATIONS FOR NEW SERVICE

Applications for new water service from the City must meet the City's requirements as outlined in Sequim Municipal Code (SMC) Chapter 13.12. The applicant is required to submit an application in writing that contains the required information including the location of the property, the owner of the property, the address of the party paying the water bill, the size of service necessary and the purpose for which the water will be used. The applicant's service will be reviewed per the five threshold criteria presented for retail service and the City will make a determination to accept or reject the application within 30 days. If an application is rejected the applicant can appeal that decision to the City Council.

Transfer of Water between WRIAs

For the purposes of regulating water use, Ecology has divided the state into 62 areas know as Water Resource Inventory Areas (WRIAs). These areas are hydrologically defined basins in which provide a context for regulation of surface and ground water. The UGA of the City of Sequim is located primarily in WRIA No. 18 (Elwha/Dungeness) with a small part in the east located in WRIA No. 17 (Quilcene/Snow). Generally, WRIAs are hydrologically isolated from each other. Currently regulations are pending for a portion of WRIA 18 in the form of the Dungeness Water Rule. This rule will affect how water appropriations are assigned and close many surface water bodies to new consumptive uses.

Generally, the City's water sources and uses are all located within WRIA No. 18. However, as future growth occurs in the eastern portion of the service area the City's water service area will span the WRIA boundary. Additionally, the City is investigating the prospects of acquiring the Marina Water System, which is located in WRIA 17. There is currently no known limitation to transferring water through a water system between two WRIAs. The City, as a municipal water supply agency, defines its water rights place of use as its approved service area.

RELATED PLANNING DOCUMENTS

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

City of Sequim, City of Sequim Official Zoning Map, July 2011
This document was used to obtain the City's current Zoning designations.

City of Sequim, City of Sequim Optimum Land Use Map, July 2011
This document was used to obtain the City's current Optimum Land Use designations.

Northwestern Territories, Inc., Sequim Bay Resort & Marina Water System, Water System Plan, Draft Version, June 2011
This document provides information on the Sequim Bay Resort and Marina Water System (Resort and Marina

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System). This water system plan provides descriptions of the existing system as well as future expansion plans. The plan is written to account for the eventual transfer of water system ownership over to the City of Sequim. The Resort and Marina System is owned by the John Wayne Family and is described in further detail in the adjacent purveyors section.

CH2M Hill, Inc., Public Utility District No. 1 of Clallam County Water System Plan, September 2010
This document provides information on the Clallam County PUD No. 1 Evergreen Water System. This water system plan provides descriptions of the existing system as well as future expansion plans.

Pacific Groundwater Group, Construction, Testing and Recommended Operation Port Williams Well #3, March 2008
This document presents a completion report for the third well at the Port Williams Wellfield. It includes information such as well logs, aquifer testing, well yield assessment and recommended well operation.

Gray & Osborne, Inc., City of Sequim Water System Plan, March 2007
This document presents the City's last Water System Plan. Much of the reference documentation in the current Plan was taken from the March 2007 Water System Plan.

City of Sequim, City of Sequim Comprehensive Plan Update, 2006
This document was used to obtain the City's Urban Growth Area boundary and Optimum Land Use Map.

Gray & Osborne, Inc., City of Sequim Wastewater Plan, 2006
This document presents the planning efforts for the City's wastewater facilities for the future. The City has a Class A Water Reclamation Facility that provides irrigation water to the various facilities throughout the City.

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Gray & Osborne, Inc., <u>Water System Improvements 1999, Operation and Maintenance Guides, Vol. I</u>, 1999
This document provides operation and maintenance information for Port Williams Wells No. 1 and No. 2, the 5th and McCurdy Booster Station, the 1.7 MG reservoir, and the 3rd Avenue PRV Station. A general operations description, Port Williams well logs, short-term water use permit for Port Williams Well No. 1 and Well No. 2, and product information are provided.

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Chapter 2
BASIC PLANNING DATA

INTRODUCTION

Basic planning data essential for the assessment of the City's water demands are presented in this chapter. Information is included regarding historical growth and water demands, population projections based on growth rates established in the City's Draft 2012 Comprehensive Plan, and water demand projections. Information presented is used to evaluate the condition of the existing system and determine future needs based on foreseeable demographic trends for the next 20 years.

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EXISTING SERVICES, POPULATION, AND WATER DEMAND

TOTAL SERVICE CONNECTIONS

The City's total number of active service connections as of 2011 was approximately 2,193. These connections represented 4,099 total units. Historical connections and units data are presented in Tables 2-1 and 2-2, respectively. The irrigation category was added to the billing system in March 2011.

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Previously, irrigation connections were included in the totals for commercial and public. There were also a number of irrigation connections that were not included in the previous totals. Accurate analysis of trends in historical water service connections and units is complicated by the recategorization of significant numbers of units in the last 4 years.

Table 2-1 City of Sequim Active Service Connections

Category	2007	2008	2009	2010	2011
Single-Family Residential	1,612	1,645	1,648	1,656	1,652
Multifamily Residential	43	50	48	48	51
Commercial	360	382	386	388	341
Hotel, Motel and RV Park	9	10	11	11	11
Public	29	30	32	33	22
Irrigation(1)	N/A	N/A	N/A	N/A	116
Total	**2,053**	**2,117**	**2,125**	**2,136**	**2,193**

(1) Irrigation category created in 2011 reclassified from public and commercial.

Table 2-2 City of Sequim Units

Category	2007	2008	2009	2010	2011
Single-Family Residential(1)	1,647	1,688 (3)	1,866 (3)	1,861	1,862
Multifamily Residential(2)	1,091	1,267 (3)	1,129 (3)	1,140	1,158
Commercial	538	540	543	552	498
Hotel, Motel and RV Park	305	365	443	443	443
Public	29	30	32	33	22
Irrigation(4)	N/A	N/A	N/A	N/A	116
Total	**3,610**	**3,890**	**4,013**	**4,029**	**4,099**

(1) Single-family residential units include duplexes.
(2) Multifamily residential units include any residential facility with three or more units.
(3) Between 2008 and 2009, the Sherwood Village area was recategorized from multifamily to single-family.
(4) Irrigation category created in 2011.

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Historical Residential Population

The City's population, as measured by the 2010 Census, was 6,606 people. The City's water system serves the majority of population within the city limits. Some areas within the city limits are served by either PUD or the Marina Water System. The City has an Interlocal Agreement for service with PUD that allows for transfer of service area between the two systems. The Marina Water System Water System Plan anticipates the eventual transfer

of the Marina Water System to the City Sequim. For the purposes of this analysis the residential population in 2010 of the City of Sequim's water system will be assumed to be equal to the 2010 Census population. The 2000 Census reported the City's population at 4,334 people. The average annual growth rate between 2000 and 2010 was 4.3 percent. This growth includes both new development and annexation of new areas into the City.

HISTORICAL WATER USE

Water production and use within the City of Sequim are metered and monitored. Water production data is collected from source meters daily, and reported on a monthly basis. The City's service meters are read monthly.

Production History

Table 2-3 presents the City's source production history for 2007 through 2011. Figure 2-1 illustrates the City's historical production.

Total source production has shown a general decreasing trend over the last 6 years, with the exception of 2009, which was an exceptionally high water use year. During this time, the City's use of their sources has changed as well with significantly increased usage of the Infiltration Gallery and decreased usage of the Silberhorn Wellfield. This may be due to decreasing yields from Silberhorn due to aquifer levels and screen issues. Since the Infiltration Gallery flows by gravity and requires no pumping, the City has reason to maximize flow from this source. Port Williams has had more consistent usage than the other two sources, but has still shown lower usage in recent years. This may be due to increased usage of the Infiltration Gallery source to provide the bulk of the flow with Port Williams providing peak supply.

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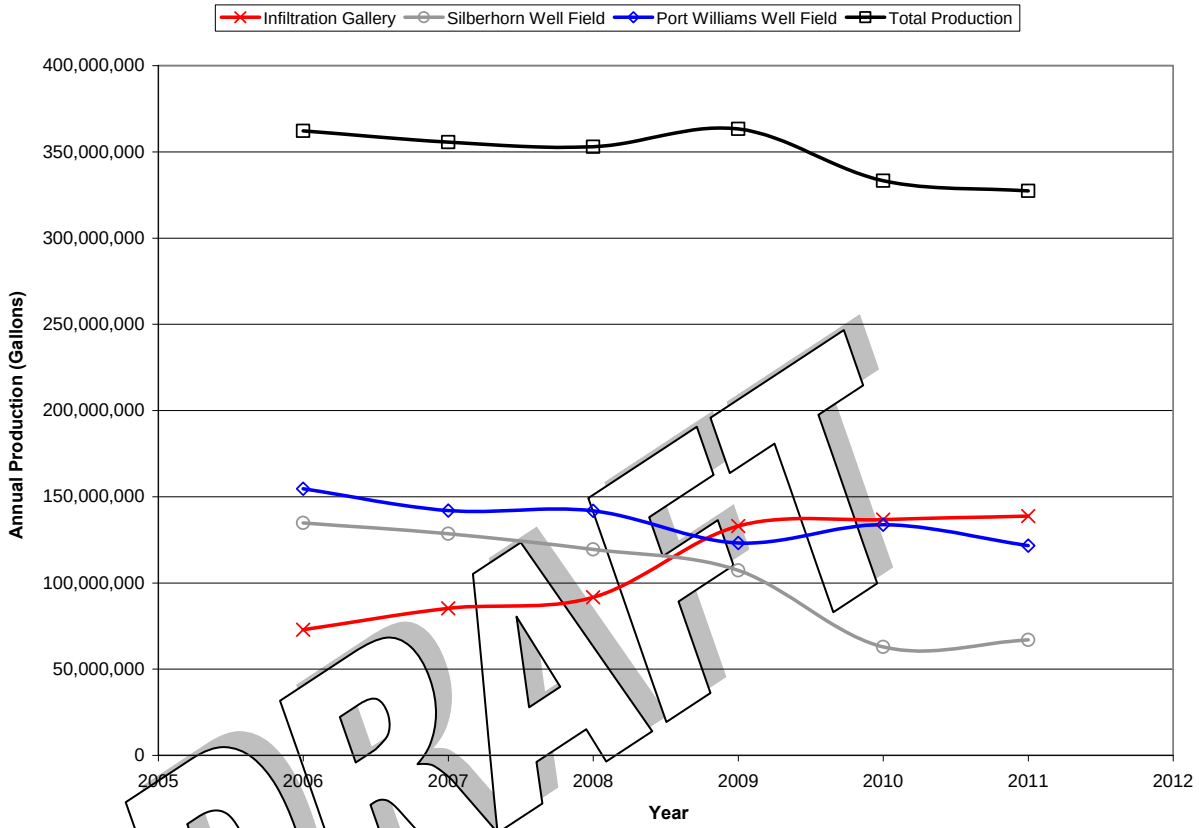
Table 2-3 Metered Water Production

Year	Annual Production (gallons)			
	Infiltration Gallery	Silberhorn Wellfield	Port Williams Wellfield	Total
2007	85,212,000	128,456,000	141,957,800	**355,625,800**
2008	91,678,000	119,431,000	141,816,800	**352,925,800**
2009	132,995,000	107,285,000	123,040,000	**363,320,000**
2010	136,718,000	62,778,000	133,680,600	**333,176,600**
2011	138,738,000	66,964,000	121,563,300	**327,265,300**

Figure 2-1 Annual Production by Source



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The average and maximum day production for the City's sources for 2007 through 2011 is shown in Table 2-4. Average day is determined by dividing the total production for the year by the number of days in the year. Maximum day production numbers are obtained from the daily production records from the City's

sources. The ratio of maximum day production to average day production is also shown. The ratio of maximum day production to average day production will be used to predict future maximum day demands. To be conservative, the maximum calculated ratio of 2.2 will be used for water demand projections.

Table 2-4 Maximum Day Production (Gallons per Day)

Year	Max Day	Max Day Production	Average Day Production	MDD/ADD Ratio
2007	July 17, 2007	2,117,100	974,300	2.2
2008	September 1, 2008	1,971,300	966,900	2.0
2009	July 30, 2009	2,146,000	995,400	2.2
2010	August 16, 2010	1,922,900	912,800	2.1
2011	August 6, 2011	1,688,300	896,600	1.9
			Average Ratio	2.1
			Assumed Ratio	**2.2**

Consumption History

The City's total water consumption for years 2007 through 2011, based on customer meter data, is presented in Table 2-5. This data was collected from records provided from the City's billing system. Water use is broken down by customer class as defined by the City's rate structure. Reuse totals are included in the table, and total consumption of the water system is shown both with and without reuse water used by water system customers. The reuse water included on customer bill records is produced by the City's Water Reclamation Facility and supplied to various irrigators in the City. The City's water consumption has been generally steady, with 2009 being the highest usage year.

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Table 2-5 Consumption by Customer Class (Gallons per Year)

Customer Category	2007	2008	2009	2010	2011
Single-Family Residential	98,703,941	98,628,056	118,610,652	108,543,469	100,830,871
Multifamily Residential	50,476,207	55,183,535	44,242,704	45,365,564	45,312,172
Commercial(1)	99,841,252	102,196,285	117,540,855	100,318,514	65,913,610
Hotel, Motel and RV Park	7,677,300	7,479,058	9,839,775	10,305,577	9,542,887
Public(1)	19,114,841	19,561,756	21,549,947	16,526,005	8,511,125
Irrigation(1)	N/A	N/A	N/A	N/A	38,989,141
Total Usage without Reuse	**275,813,541**	**283,048,690**	**311,783,933**	**281,059,130**	**269,099,807**
Reuse	3,997,918	3,245,400	4,811,143	5,089,497	5,601,046
Total Usage with Reuse	**279,811,459**	**286,294,090**	**316,595,077**	**286,148,627**	**274,700,853**

(1) For years 2007 through 2010 Irrigation usage was included in Commercial and Public customer classes.

Seasonal Users and Seasonal Usage Variability

The total number of users served by a water system typically varies throughout the year as residents go on vacations or visit second homes and visitors stay for business or vacation. The variability in residents was quantified by analyzing the water usage records provided by the City. To develop an estimate of the number of seasonal residents the records were searched for accounts that had very low usage during the months of December, January, and February. This is considered to be indicative of the number of seasonal users, residents who move to a second home during the winter months, or so-called "snowbirds." For the years 2010 and 2011 the estimated number of customers that could be considered seasonal users is approximately 80 connections or 4.5 percent of single-family customers. This number was consistent with data on standby customers provided by the City. The variability in seasonal demand that can be attributed to the seasonal user population is considered negligible for this analysis.

The variability of visitors is quantified by examining water usage records and hotel occupancy data compiled by the City. Monthly hotel occupancy rates were collected by the City for the year 2011. Rates varied from a peak in July of approximately 70 percent occupancy to a low of 14 percent occupancy in January. Using the total current number of hotel, motel and RV units this works out to an occupancy range of 313 units to 63 units.

Water system demands typically follow a seasonal curve with water use being highest in summer months and lowest in winter months. Monthly consumption by customer class is illustrated in

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Figure 2-2 and summarized in Table 2-6. As illustrated by the figure, consumption for single-family shows a large peak in the summer months, while the commercial, public and hotel, motel and RV Park customer classifications show significantly less seasonal variability. The seasonal change in single-family residential consumption follows very closely with the consumption in the irrigation customer class which indicates that the summer peak in single family is likely the result of increased irrigation.

Figure 2-2 2011 Monthly Consumption by Customer Class

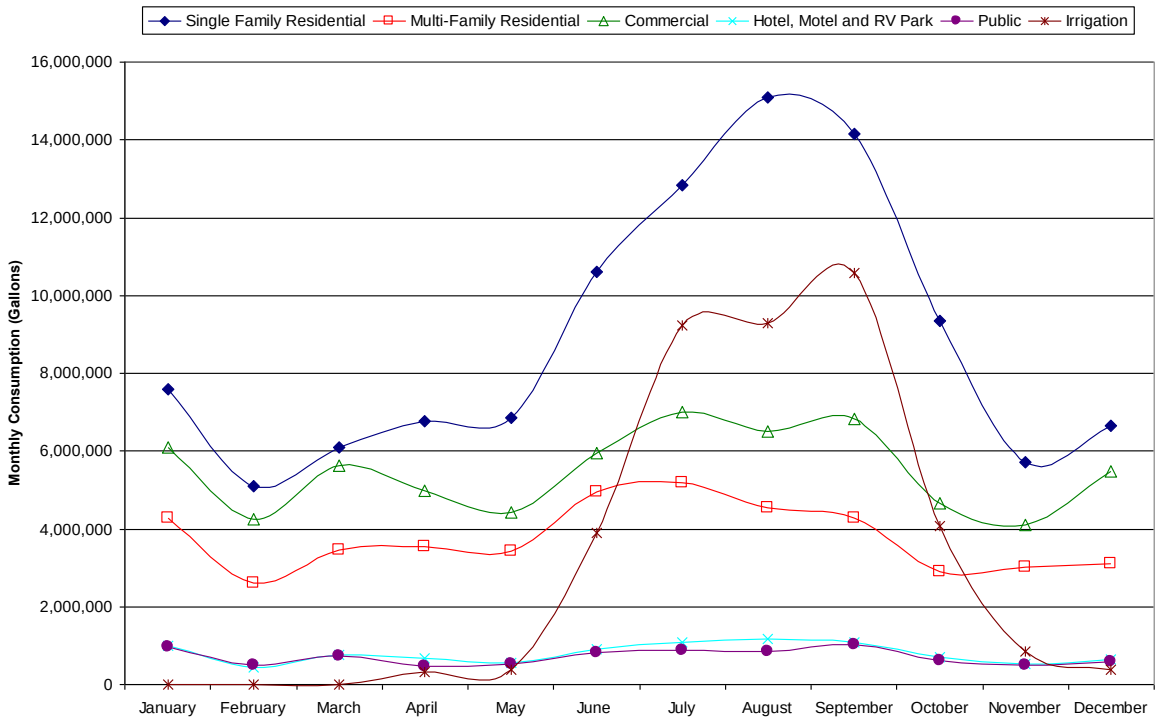

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Table 2-6 2011 Summary of Monthly Consumption

Month	Single-Family Residential (gallons)	Multifamily Residential (gallons)	Comm., Public, HMRV (gallons)	Irrigation (gallons)	Total Consumption (gallons)
January	7,586,238	4,292,705	8,046,909	—(1)	19,925,852
February	5,112,019	2,604,125	5,182,638	—(1)	12,898,781
March	6,101,825	3,447,936	7,134,207	—(1)	16,683,968
April	6,771,023	3,544,144	6,143,833	313,300	16,772,299
May	6,852,323	3,421,883	5,524,908	386,746	16,185,860
June	10,613,709	4,946,202	7,688,812	3,906,393	27,155,115
July	12,831,364	5,181,074	8,942,430	9,223,446	36,178,314
August	15,097,849	4,556,599	8,551,084	9,285,291	37,490,822
September	14,162,602	4,291,770	8,924,381	10,583,878	37,962,631
October	9,361,459	2,915,293	5,976,483	4,073,989	22,327,224
November	5,708,429	3,007,304	5,131,422	846,609	14,693,764
December	6,650,535	3,103,138	6,720,518	369,490	16,843,681
Total	**106,849,376**	**45,312,172**	**83,967,623**	**38,989,141**	**269,099,807**

(1) Irrigation category created after March 2011.

Distribution System Leakage

Distribution System Leakage (DSL) is defined as the difference between total source production and authorized consumption. DSL includes any water loss due to leaks, unauthorized uses such as illegal service connections, accounting errors, inaccurate source and customer meters, and water leaving the system for unmetered usage such as flushing of mains, fire flows, and use by unmetered services. The City maintains records of flushing and other unbilled water usage. These uses, if credibly estimated, can be included in the total of authorized consumption.

Table 2-7 presents the City's DSL rate for years 2007 through 2011. State regulations establish a standard for distribution system leakage of 10 percent or less based on a rolling 3-year average for compliance with the Water Use Efficiency Rule. The City currently has a 3-year rolling average DSL of 14.9 percent. As this is over the maximum of 10 percent the City will be required to implement a Water Loss Action Control Plan to document efforts to reduce leakage and meet the requirement. Water Use Efficiency and the City's conservation plan are discussed in additional detail as a part of Chapter 4-Water Use Efficiency. In general, the City's DSL has decreased over the last 5 years. This may be due to the

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City's ongoing leak detection program as well as improved billing of irrigation usage.

Table 2-7 Distribution System Leakage

Year	Total Production (gallons)	Billed Consumption (gallons)	Unmetered Usage(1) (gallons)	DSL(2) (gallons)	DSL (percent)	3-year Rolling Average (percent)
2007	355,625,800	275,813,541	—	79,812,259	22.4%	—
2008	352,925,800	283,048,690	—	69,877,110	19.8%	—
2009	363,320,000	311,783,933	3,082,420	48,453,647	13.3%	18.5%
2010	333,176,600	281,059,130	665,954	51,451,516	15.4%	16.2%
2011	327,265,300	275,118,312	382,862	51,764,126	15.8%	14.9%

(1) Unmetered usage as recorded by City Staff, starting in 2009.
(2) DSL = Total Production – (Billed Consumption + Unmetered Usage).

Equivalent Residential Units

Use of Equivalent Residential Units (ERUs) is a way to express water use by non-residential customers as an equivalent number of residential customers. ERUs are calculated by dividing the total volume of water utilized in the single-family customer class by the total number of single-family residential (SFR) connections. This number estimates the average single-family residential water use. The volume of water used by other customer classes can then be divided by the average single-family residential water use to determine the number of ERUs utilized by the other customer classes. The City's value of the ERU for the years 2007 through 2011 is presented in Table 2-8. The City's ERU value was highest in 2009 and has decreased since then.

A summary of water consumption and estimated number of ERUs for each of the City's customer categories is presented in Table 2-9. A ratio of water use for each customer category per unit compared with the SFR ERU value is presented in Table 2-10. This table illustrates that for residential categories multifamily units use significantly less water per unit than single-family.

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Table 2-8 Equivalent Residential Units

Year	SFR Consumption (gpd)	SFR Units[1]	ERU (gpd/unit)
2007	270,422	1,647	164
2008	270,214	1,688	160
2009	324,961	1,866	174
2010	297,379	1,861	160
2011	292,738	1,862	157
		Average ERU	163

(1) SFR units include duplexes.

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Table 2-9 Total Number of Equivalent Residential Units

Year	Single-Family	Multifamily		Commercial		Hotel, Motel, RV Park		Public		Irrigation		DSL[2]		Total
	ERUs[1]	(gpd)	ERUs	(gpd)	ERUs	(gpd)	ERUs	(gpd)	ERUs	(gpd)	ERUs	(gpd)	ERUs	ERUs
2007	1,647	138,291	843	273,538	1,668	21,034	128	52,369	319	N/A	N/A	218,664	1,333	5,938
2008	1,688	151,188	945	279,990	1,750	20,491	128	53,594	335	N/A	N/A	191,444	1,197	6,043
2009	1,866	121,213	697	322,030	1,851	26,958	155	59,041	339	N/A	N/A	132,750	763	5,671
2010	1,861	124,289	777	274,845	1,718	28,234	176	45,277	283	N/A	N/A	140,963	881	5,696
2011	1,862	124,143	791	180,585	1,150[3]	26,145	167	23,318	149[3]	106,820	680	141,820	903	5,702

(1) ERUs are calculated based on the annual ERU values presented in Table 2-8.
(2) DSL based on volume from Table 2-7.
(3) Decrease in ERUs is due to the recategorization of some commercial and public connections to irrigation.

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Table 2-10 ERUs per Units by Class

Year	Multifamily Residential	Commercial	Hotel, Motel, RV Park	Public	Irrigation
2007	0.77	3.76	0.42	12.27	N/A
2008	0.87	3.25	0.42	11.55	N/A
2009	0.55	3.43	0.42	11.30	N/A
2010	0.69	3.16	0.40	8.84	N/A
2011	0.69	2.08	0.38	4.52	5.86

FUTURE POPULATION AND WATER DEMANDS

PROJECTED POPULATION

Water System Plan projections are based on the 6-year and the 20-year planning period. The existing population of Sequim was estimated to be 6,606 in 2010, according to the most recent US Census. The analysis in this chapter assumes a more modest growth rate of 2 percent for the Sequim UGA, as compared with the 5 percent growth rate used in the previous Plan. This growth rate takes into account the current economic conditions and the limited growth in new customers in the past years. Based on previous planning estimates in 2009 there were approximately 2,000 persons outside the city limits in the unincorporated UGA that are currently not served by the Sequim water system. This population is assumed to grow at the same rate as the City. An annexation rate of 4 percent is assumed for areas of the UGA outside the current city limits.

Population growth for the City's Retail Service Area depends on many dynamic factors that are difficult to quantify. These include the real estate market, regional economics, and service area expansions. Estimates beyond the 6-year planning period often differ from the eventual actual growth due to all these factors. For the City of Sequim, a number of factors complicate the long-term planning horizon. These include the lack of hard regional boundaries, potential acquisition of neighboring water systems, and the uncertainty of future development. For this reason, a total buildout population for the City is not presented and this Plan

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considers only the 6-year and 20-year planning periods. Table 2-11 shows the projected service area population.

Table 2-11 Water Service Area Projected Population

Year	Projected Service Area Population[(1)]
2010	6,606
2011	6,821
2012	7,043
2013	7,270
2014	7,504
2015	7,744
2016	7,990
2017	8,244
2018	8,505
2022	9,620
2032	12,989

(1) Sum of City population and annexed unincorporated UGA.

WATER DEMAND PROJECTIONS

In order to project water demands, it is conservatively assumed that water demand within the existing system boundaries will increase at a rate equivalent to the population growth rate. However, during this time period the City is also anticipated to annex more of the UGA at a rate of 4 percent per year. As the UGA is primarily residential, for the purposes of water use projections a separate growth rate for single-family water use of 3 percent was calculated based on population growth and annexation. This accounts for the addition of single-family homes within the UGA but outside the current city limits. The projected average daily demand for the City from is shown in Table 2-12.

For conservative planning purposes, the City's distribution system leakage is assumed to be constant at the current 3-year rolling average level of 14.9 percent. Projected water usage with conservation is discussed in Chapter 4.

Projected peak hour production is derived from Equation 5-1 in the DOH Water System Design Manual. The equation and variables associated with it are as follows:

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

PHD = Peak Hourly Demand (gallons per minute, gpm)
C = Coefficient Associated with Ranges of ERUs
N = Number of Service Connections, ERUs
F = Factor Associated with Ranges of ERUs
MDD = Maximum Day Demand (gpd/ERU)

From the DOH Design Manual, the C value is 1.6 and the F value is 225. The MDD value is 359 gpd/ERU which is based on the average MDD/ADD ratio of 2.2 and the average value of 163 gpd/ERU from Table 2-8. The N value varies depending on the projected number of ERUs for each year. For the year 2012 the PHD/MDD ratio is 1.61.

Table 2-12 Projected Production without Conservation

Year	Population	ERU(1)	Average Daily Demand(2) (gallons)	Distribution System Leakage(3) (gallons)	Total Average Daily Production (gallons)	Maximum Daily Production(4) (gallons)	Peak Hour Production(5) (gpm)
2012	7,043	4,914	800,917	139,849	940,766	1,901,866	2,131
2013	7,270	5,031	820,061	143,192	963,253	1,947,326	2,180
2014	7,504	5,151	839,682	146,618	986,300	1,993,919	2,231
2015	7,744	5,275	859,793	150,129	1,009,922	2,041,673	2,282
2016	7,990	5,401	880,404	153,728	1,034,132	2,090,618	2,335
2017	8,244	5,531	901,531	157,417	1,058,948	2,140,785	2,390
2018	8,505	5,664	923,186	161,198	1,084,384	2,192,206	2,445
2022	9,620	6,229	1,015,365	177,294	1,192,659	2,411,097	2,682
2032	12,989	7,915	1,290,207	225,284	1,515,491	3,063,740	3,388

(1) Projected ERUs based on the current calculated number of ERUs, the single-family growth rate of 3 percent and the system growth rate of 2 percent.
(2) Based on an average ERU value of 163 gpd/ERU.
(3) Based on current DSL rate of 14.9 percent.
(4) Maximum Daily Production is calculated with a peaking factor, (2.2 * ADD) +DSL.
(5) Peak Hour Production is calculated from PHD from Equation 5-3 in the DOH Water System Design Manual with DSL added.

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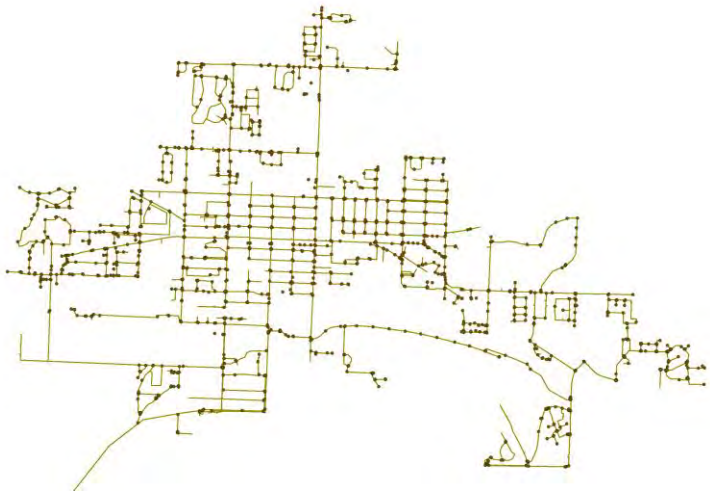
Chapter 3
SYSTEM ANALYSIS



INTRODUCTION

Water system planning includes a careful analysis of a water utility's ability to meet minimum level of service standards for existing and future customers. In this chapter, design standards are presented that identify criteria that are applicable to the City's water system. A facility analysis then compares existing system facilities to these design standards. Based on this comparison, water system deficiencies are identified. Project costs and a prioritization of recommended improvements are presented in Chapter 8 – Capital Improvement Program.

Please Use this Space to Keep Notes

SYSTEM DESIGN AND CONSTRUCTION STANDARDS

The City has adopted system design and construction standards. These standards are summarized in the following sections.

DESIGN AND CONSTRUCTION STANDARDS

Design and construction standards and specifications set forth the material and construction requirements that contractors, developers, and the City must follow when constructing water

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system facility improvements. Design and construction standards and specifications for the City are included in Appendix F.

GENERAL FACILITY STANDARDS

Performance and design criteria typically address the sizing and reliability requirements for water system sources, storage, distribution, and fire flow. WAC 246-290 contains general criteria and standards that must be followed in development of public water systems. In addition, Washington State Department of Health (DOH) has published its *2009 Water System Design Manual* that provides specific guidance for water system design.

Average Day, Maximum Day and Peak Hour Demands

Average Day Demand (ADD) is determined from annual metered production data from City sources and is the average daily usage within the distribution system for a given year. Maximum Day Demand (MDD) is determined based on the highest daily usage from City sources and is the highest daily usage within the distribution system for a given year. For projections, MDD is assumed to equal the ADD times a peaking factor of 2.2 as discussed in Chapter 2. ADD and MDD are determined from production records and as such historical values for each include distribution system leakage.

Peak Hour Demand (PHD) is determined using the method presented in the *2009 Water System Design Manual*. PHD equals MDD times a peaking factor by using Eq 5-3 from the DOH Water System Design Manual. The equation is described in Chapter 2.

Minimum System Pressure

The system should be designed to maintain a minimum of 30 psi in the distribution system during peak hour demand and 20 psi dueing fire flow conditions during maximum day demands. However, a system pressure of 45 psi is desirable during peak hour demands to meet customer expectations.

Minimum Pipe Size

The diameter of transmission mains shall be determined by hydraulic analysis. Minimum water main sizes are as follows:

- 8-inch minimum when serving fire hydrants,

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- 6-inch minimum may be used in localized conditions where fire hydrants are served by looped water mains, subject to City approval.

Fire Flow Standard

The City has adopted the 2009 International Fire Code as the minimum fire flow standard. Fire flow must be provided while maintaining 20 psi at all service connections with operation, equalizing, and fire suppression storage volumes depleted. For general planning purposes, fire flow requirements are determined to be 3,000 gpm for 3 hours for commercial development and 1,000 gpm for 1 hour for residential development.

Valve and Hydrant Spacing

Sufficient valving should be installed to put the minimum number of customers out of service when water is turned off for maintenance or repair. The maximum distance between valves is 1,000 feet and the City's goal is to install or maintain valves at the middle and ends of every City block, or every 450 feet, whichever is smaller. Fire hydrants on laterals should be provided with their own auxiliary gate valve. Fire hydrants should not be located more than 600 feet apart in single family residential areas and no more than 300 feet apart in all other areas (SMC 17.48.060).

Source Capacity and Reliability

Water systems must be designed such that source capacity is sufficient to meet MDD. Additionally, DOH recommends the following source reliability measures in order to maintain source capacity sufficient to meet:

- MDD with 18 hours of pumping
- MDD plus capacity to replenish fire suppression storage in 72 hours
- ADD with largest source out of service.

Storage Volumes

Storage volumes are based on Chapter 9 of the DOH Water System Design Manual. The total available storage volume must be greater than the sum of:

- Operational Storage (OS) – volume sufficient to prevent excessive pump cycling and maintain water

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quality. For the City this volume is defined as 10 percent of total storage to provide sufficient water turnover in storage facilities.

- Equalizing Storage (ES) – volume sufficient to meet periodic peak demands based on the formula ES = (PHD – Q_S) * 150, where PHD equals the peak hour demand and Q_S equals the total source capacity.
- Standby Storage (SB) – volume sufficient to provide twice the average day demand minus source production capacity with the largest source out of service based on the formula SB = (2 days)* (ADD - t_m * (Q_S - Q_L)), where ADD equals average day demand, t_m equals time sources are pumped, Q_S equal total source capacity and Q_L equal the capacity of the largest source.
- Fire Suppression Storage (FSS) – volume equal to the maximum adopted fire flow rate times the fire flow duration.
- Dead Storage (D) – Volume of storage that is unusable. This is often the volume required to meet minimum pressures within the distribution system.

The City has adopted a policy of nesting standby and fire suppression storage. This allows for excluding either the SB or FSS storage component form the total required storage capacity, whichever is smaller.

System Reliability

The City has adopted the following system reliability standards:

- All water mains will be looped where feasible
- Water main velocities will not exceed 10 feet per second at maximum day demand with fire flows
- Storage facilities will have high and low level alarms
- Standby power provisions will be available at all major pumping facilities

WATER QUALITY STANDARDS

Water quality standards for the City are published by DOH as a part of WAC 246-290. The City's water quality results can be

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found in Appendix G. The City's water quality monitoring and reporting system is discussed in Chapter 6, O&M. The only test that was above the State Reporting Level (SRL) was nitrate. These results were 1.66 mg/L for the Silberhorn Wellfield and non-detected for the Port Williams Wellfield.

The City took 20 lead and copper samples in June 2010, all samples were below the Action Level for lead and copper.

SYSTEM ANALYSIS

SOURCE OF SUPPLY ANALYSIS

A description of the City's sources of supply are given in Chapter 1 – System Description. According to the *2009 Department of Health Water System Design Manual*, source production capacity must be sufficient to supply maximum day demands. Additionally, maximum day and average day daily demands must comply with the maximum instantaneous and maximum annual withdrawal limitations of associated water rights.

Water Rights Analysis

The City holds certificated water rights for three sources, which include a surface water right for the Dungeness River and ground water rights for the Infiltration Gallery and the Silberhorn Wellfield. The City holds a water right permit for the Port Williams Wellfield. Table 3-1 is a summary of the City's existing water rights and documentation is included in Appendix H.

Surface water from the Dungeness River was the original water source for the City. The City holds a surface water right certificate for the Dungeness River dating from 1924. In 1953 the City applied for and was granted a ground water certificate for the use of an infiltration gallery adjacent to the Dungeness River. It is not explicitly stated in the original water rights certificates that this certificate was issued as a replacement for the surface water right. Since the City does not take surface water directly from the Dungeness River the City only counts the groundwater right towards meeting system demands. The City holds a ground water certificate for the Silberhorn Wellfield which has a priority date of 1975. This right allows for three wells and is additive to the previous rights.

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In addition to the certificated water rights, listed above, the City holds a water right permit for the Port Williams Wellfield. The maximum annual withdrawal water rights for the Port Williams Wellfield are supplemental to the City's existing water rights. This means that on an annual basis, the City cannot exceed the maximum allowable withdrawal of 1,850 acre-ft. for any combination of sources used. Supplemental rights allow use of a source, but do not increase the total amount of water that can be used on an annual basis. The instantaneous water right of Port Williams can be used at any time and is not supplemental. Permit G2-29239 allows for up to five wells at the Port Williams Wellfield, with provisions that include the following:

- Groundwater withdrawals at the Port Williams Wellfield shall be managed so that there are no long-term (i.e., year to year) declines in groundwater levels within the pumped (USGS Unit 5) or overlying (USGS Units 1 and 3) aquifers.

- Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or in-stream resources.

- Prior to issuance of a water right certificate, the City must submit a completion report demonstrating the actual sustainable production of the Port Williams Wellfield.

- If senior water users are impaired, the City shall reduce its withdrawals at the Port Williams Wellfield to allow impaired users to exercise the full extent of their water rights.

- The City shall implement conservation measures as described by their current conservation plan.

- The City shall gradually eliminate use of surface water from the Dungeness River, except as an emergency back-up source.

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- The wellfield development must be complete by July 1, 2014 and water must be put to full use by July 1, 2015.

The City will continue discussions with the Department of Ecology regarding its water rights as Department of Ecology policies change, additional sources are developed at the Port Williams Wellfield, and as use of the Infiltration Gallery and Silberhorn Wellfield changes. In particular, the City's water right for the Port Williams Wellfield is supplemental to existing rights, including the water right for the Infiltration Gallery. The City must ensure that if the Infiltration Gallery is unused for an extended period, that no primary rights are relinquished. The Revised Code of Washington (RCW) 90.14.140(2)(d) states that water rights claimed for municipal supply are exempt from relinquishment. Therefore, the City's primary water rights cannot be relinquished even if they are unused for greater than 5 years. When the City certificates its water right for the Port Williams Wellfield, it will discuss the feasibility of issuing the Port Williams Water Rights as Primary, with the Silberhorn and Infiltration Gallery rights as supplemental.

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Table 3-1 City of Sequim Water Rights

Source	Water Right Number	Type of Source	Priority Date	Maximum instantaneous Withdrawal (gpm)	Maximum annual Withdrawal (acre-ft.)
Dungeness River(1)	Certificate No. 1316 Certificate of Change, Vol. I, pg. 426 Certificate of Change, Vol. I-2, pg. 106,	Surface Water	May 23, 1924 May 24, 1954 Sept. 26, 1979	628(2)	None Specified
Infiltration Gallery	Certificate No. 2102 Certificate of Change, Vol. I-1, p. 107	Groundwater	Feb. 15, 1953 Sept. 26, 1979	718	1,160
Silberhorn Wellfield	Certificate No. G2-23856	Groundwater	June 12, 1975	700	690
Port Williams Wellfield	Permit No. G2-29239	Groundwater	June 13, 1995	2,250	--(3)
Total Allowable					**1,850**

(1) Dungeness River water recharges the Infiltration Gallery intake. Water from this source does not directly enter the distribution system. This water right is not additive with the City's other rights.
(2) Water rights specify 1.4 cfs.
(3) Supplemental to existing water rights.

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Table 3-2 compares the current total production capacities for the City's sources with associated maximum instantaneous withdrawal limitations of associated water rights. The Infiltration Gallery flows by gravity siphon and is currently limited by hydraulics at the collector. The current maximum production rate uses less than half of the instantaneous water right. The Silberhorn Wellfield is equipped with three wells with well pumps that are capable of up to 400 gpm. Due to constraints resulting from drawdown of the aquifer and restrictions in the well screens the City currently operates the wells at a reduced capacity of 260 gpm each to prevent overpumping the wells and drawing air into the pumps. At the City's current flow setting the wells will exceed the water right if all three wells are pumped simultaneously. The Port Williams Wellfield is equipped with three wells with capacities of approximately 600 gpm each. Due to the influence that the wells have on each other the total capacity with three wells running is approximately 1,760 gpm. As shown, the current total production rate of all of the City's sources is in compliance with the total water rights.

Table 3-2 Instantaneous Water Rights Analysis

Source	Maximum Instantaneous Withdrawal Limitations of Water Rights (gpm)	Current Maximum Production Capacity (gpm)	Surplus/(Deficit) (gpm)
Infiltration Gallery	718	350(1)	368
Silberhorn Wellfield	700	780(2)	(80)
Port Williams Wellfield	2,250	1,760(3)	490
Total	3,668	2,890	778

(1) Water from the infiltration gallery flows by gravity to the system.
(2) Current capacity for three wells at the Silberhorn Wellfield exceed the current water right.
(3) Current capacity for three installed wells at Port Williams Wellfield.

Table 3-3 compares the maximum permitted average annual withdrawal limitations associated with each of the City's sources with the actual annual production of each of these sources for years 2007 through 2011. As shown, all of the City's sources were in compliance with the maximum permitted average annual withdrawal limitations of the associated water rights.

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Table 3-3 Average Annual Withdrawal Water Rights Analysis

Source	Max Annual Withdrawal (acre-ft.)	Annual Production (acre-ft.)				
		2007	2008	2009	2010	2011
Infiltration Gallery	1,160	262	281	408	420	426
Silberhorn Wellfield	690	394	367	329	193	206
Port Williams Wellfield	-(1)	436	435	378	410	373
Total	**1,850**	**1,091**	**1,083**	**1,115**	**1,022**	**1,004**

(1) Annual withdrawal limit of 1,850 acre-ft from Port Williams is supplemental to existing water rights.

Table 3-4 compares the maximum permitted instantaneous withdrawal limitations of the City's water rights with projected maximum daily demand production requirements for the City through the year 2032. The City's water rights provide sufficient instantaneous withdrawal to meet the forecasted demands through the 20-year planning period. The City's sources, however, do not have the capacity to supply the entire instantaneous water right.

Table 3-4 Projected Instantaneous Water Rights Analysis

Year	Total Instantaneous WR Capacity (gpm)	Maximum Day Demand (gpm)	Instantaneous Water Right Surplus/(Deficit) (gpm)
2012	3,668	1,321	2,347
2013	3,668	1,352	2,316
2014	3,668	1,385	2,283
2015	3,668	1,418	2,250
2016	3,668	1,452	2,216
2017	3,668	1,487	2,181
2018	3,668	1,522	2,146
2022	3,668	1,674	1,994
2032	3,668	2,128	1,540

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Table 3-5 compares the maximum permitted average annual withdrawal limitations of the City's water rights with projected average daily production requirements for the City through the year 2032. The projected annual withdrawal requirement is the total projected day demand from Chapter 2, converted to units of acre-feet per year. Analysis of annual water rights indicate that the City will be approaching their annual limits at the 20-year planning period. There is sufficient capacity to meet the 20-year requirement.

Table 3-5 Projected Annual Withdrawal Water Rights Analysis

Year	Maximum Permitted Average Annual Withdrawal (acre – ft.)	Projected Annual Withdrawal Requirement (acre-ft.)	Water Rights Surplus (acre-ft.)
2012	1,850	1,088	762
2013	1,850	1,113	737
2014	1,850	1,140	710
2015	1,850	1,167	683
2016	1,850	1,195	655
2017	1,850	1,223	627
2018	1,850	1,253	597
2022	1,850	1,377	473
2032	1,850	1,747	103

Source Production Capacity Analysis

Descriptions of the City's sources of supply are given in Chapter 1. The total production capacity of the City's sources is 2,810 gpm which is based on the Infiltration Gallery, the Silberhorn Wellfield and the Port Williams Wellfield operating simultaneously. The total capacity of the three Silberhorn wells is greater than the water right for that source, therefore; the total production from Silberhorn is limited to 700 gpm for this analysis. The DOH Design Manual recommends a reliability measure of limiting the max day pumping to reflect pumping for only 18 hours per day. For the City's sources this results in a capacity of 2,195 gpm. As the infiltration gallery flows by gravity it is assumed to run 24 hours per day. Table 3-6 compares the total production capacity of the sources as well as the reliable source capacity with projected maximum day production requirements through the year 2032.

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Table 3-6 Source Production Capacity Analysis

Year	Total Production Capacity (gpm)(1)	Reliable Source Production Capacity (gpm)(2)	Maximum Day Production Requirement (gpm)	Total Production Capacity Surplus (gpm)	Reliable Production Capacity Surplus (gpm)
2012	2,810	2,195	1,321	1,489	874
2013	2,810	2,195	1,352	1,458	843
2014	2,810	2,195	1,385	1,425	810
2015	2,810	2,195	1,418	1,392	777
2016	2,810	2,195	1,452	1,358	743
2017	2,810	2,195	1,487	1,323	708
2018	2,810	2,195	1,522	1,288	673
2022	2,810	2,195	1,674	1,136	521
2032	2,810	2,195	2,128	682	67

(1) Total source capacity as presented in Table 3-2, but with Silberhorn Wellfield capacity reduced to the water rights limit of 700 gpm.

(2) Reliable source capacity reduces the capacity of the Silberhorn and Port Williams Wellfields to represent 18 hour per day pumping.

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As shown in Table 3-6, the City has sufficient source production capacity to meet projected peak day requirements through the 20-year planning period in both cases.

As mentioned earlier, DOH presents water source capacity reliability measures in the Water System Design Manual. These include the ability to meet MDD while replenishing fire flow storage in 72 hours, the ability to meet MDD while pumping only 18 hours per day and the ability to meet ADD with the largest source out of service. For the City's fire suppression storage requirements the 72 hour replenishment is 125 gpm. Using the City's pumped sources only 18 hours per day reduces the total production capacity to 2,195 gpm.

The 18 hour per day pumping recommendation is more conservative for the City's system.

The City's potential for increasing production capacity under their current water rights include the installation of an additional well at the Port Williams Wellfield or the redevelopment and improvement of the Infiltration Gallery to increase production. A new well at Port Williams would likely be designed with a

capacity of 600 gpm, similar to the previous three wells. The City's water right permit for Port Williams Wellfield allows for the drilling of up to five wells and the withdrawal of up to 2,250 gpm which would be an increase of 490 gpm over the current maximum withdrawal rate. The City, however, may be limited by the requirements of the water rights permit if increased pumping at Port Williams is found to cause reductions in aquifer levels and effects on other water uses in the area. The City currently monitors well levels at numerous sites in the Port Williams area and reports levels to Department of Ecology. At this time no guidance has been given to the City in regards to the ability to develop Port Williams to the full permit water right.

The other potential for additional source capacity under the current water rights is redevelopment and improvement of the Infiltration Gallery. The Infiltration Gallery is currently used at a maximum flow rate of approximately 350 gpm, while the water right is for 718 gpm, leaving an additional 368 gpm of water right capacity unused. The Infiltration Gallery utilizes a Ranney well style horizontal collector which is located in the bank of the Dungeness River. This source currently flows by gravity siphon to the City's 420 Reservoir. Potential improvements include additional collectors and/or a pumping system to overcome the current hydraulic limitations. Challenges to this include DOE requirements in the Port Williams water rights permit, permitting of construction along the river bank, potential issues with the existing 12-inch asbestos cement (AC) transmission line and seasonal turbidity issues with the infiltration gallery source. The water rights permit issues is that one of the requirements in the Port Williams permit was to discontinue use of the Infiltration Gallery. Expanding source capacity from the Infiltration Gallery would run counter to this requirement. However, if aquifer level issues at Port Williams reduce the final capacity available under that right, the City may have a case for expansion of the Infiltration Gallery capacity.

Based on total instantaneous water rights (not installed capacity), the City has the water rights to produce 3,668 gpm (5.2 MG) if all water rights are installed to their capacities.

Source Water Quality Analysis

Water quality from the Silberhorn and Port Williams Wellfields and the Dungeness River Infiltration Gallery meets all current

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regulatory requirements. Water quality results can be found in Appendix G.

Source Water Treatment Analysis

The City's Infiltration Gallery Source has been determined to be a groundwater that is hydraulically connected to surface water. As such the City is required to maintain treatment of this source through contact time with chlorine. Adequate treatment is measured by the provided CT or the product of residual disinfection concentration (C) and contact time (T). For a groundwater source that is hydraulically connected to surface water the required CT is 6. The City provides CT in the transmission main from the Infiltration Gallery to the 1.7 MG 420 Reservoir. To account for future connections to the transmission main this analysis will count only the length of the transmission main from the Infiltration Gallery to the City's current UGA. An analysis of CT determined that at the total instantaneous water rights flow rate the Infiltration Gallery transmission main provides a CT of 17 at the UGA boundary. This is well in excess of the required 6. The City's use of the Infiltration Gallery is limited by water rights and physical capacity of the facility and will not be limited by providing treatment. Calculations of CT are provided in Appendix H.

STORAGE ANALYSIS

Storage requirements for the City of Sequim are determined according to the *2009 Department of Health Water System Design Manual*. The storage requirements are based on the sum of the following:

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

No unusable (dead) storage needs to be subtracted from the total volume of each of the City's reservoirs since all areas of the City can achieve 30 psi for the peak hour scenarios and 20 psi for fire flow scenarios. This storage analysis includes three reservoirs; the 1.7 MG 420 Reservoir, the 0.2 MG 480 Reservoir and the 1 MG Solana Reservoir. The 0.5 MG reservoir is currently inactive and not included in the storage analysis. The required storage

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component volumes along with the storage analysis is presented in Table 3-7.

Operational Storage

Operational storage is typically defined as the volume of the reservoir devoted to supplying the water system under normal operating conditions while the source(s) of supply are in "off" status. This volume is dependent upon the sensitivity of the reservoir level sensors and the tank configuration necessary to prevent excessive cycling of source pump motors. As the City's water system has multiple sources and reservoirs that can be operated in varying ways selecting a percentage of total storage volume to be used as operational storage provides the most flexibility for operations. For the City's system, operational storage is assumed to be 10-percent of the total available storage which provides sufficient volume for control of sources as well as acceptable water turnover in the reservoirs.

Equalizing Storage

Equalizing storage is typically used to meet diurnal demands which exceed the average daily and maximum day demands. The volume of equalizing storage required depends on peak system demands, the magnitude of diurnal water system demand variations, 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.

Equalizing storage is calculated using the following equation:

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

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

Peak hour demands are as presented in Table 2-12. Total source capacity is as presented in Table 3-6.

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

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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.

Standby storage is calculated using the following equation:

V_{SB} = 2[ADD - 1440 minutes (Q_S-Q_L)]

V_{SB} = Required standby storage component (gallons)
ADD = Average daily demand for the design year (gallons) excluding irrigation
Q_S = Total source of supply capacity (gpm)
Q_L = Largest source of supply capacity (gpm)

In no case, however, shall the standby storage volume (in gallons) be less than 200 times the number of ERUs.

Fire Suppression Storage

Fire suppression storage is provided to ensure that the volume of water required for fighting fires is available when necessary. Fire suppression storage also reduces the impact of firefighting 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 psi.

Fire suppression storage is calculated using the following equation:

V_{FSS} = NFF*T

V_{FSS} = Required fire suppression storage component (gallons)
NFF = Needed fire flow (gpm)
T = Duration (minutes)

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Table 3-7 Total Storage Capacity Analysis (gallons)

Year	Storage Available(1)	Operational Storage(2)	Equalizing Storage	Standby Storage(3)	Fire Suppression Storage(4)	Storage Required(5)	Surplus/ Deficit
2012	2,900,000	290,000	0	1,019,236	540,000	1,309,236	1,590,764
2013	2,900,000	290,000	0	1,043,456	540,000	1,333,456	1,566,544
2014	2,900,000	290,000	0	1,068,276	540,000	1,358,276	1,541,724
2015	2,900,000	290,000	0	1,093,711	540,000	1,383,711	1,516,289
2016	2,900,000	290,000	0	1,119,777	540,000	1,409,777	1,490,223
2017	2,900,000	290,000	0	1,146,489	540,000	1,436,489	1,463,511
2018	2,900,000	290,000	0	1,173,866	540,000	1,463,866	1,436,134
2022	2,900,000	290,000	0	1,290,360	540,000	1,580,360	1,319,640
2032	2,900,000	290,000	97,974	1,637,337	540,000	2,025,311	874,689

(1) Includes the existing 420 Reservoir (1.7 MG), the 480 Reservoir (0.2 MG), and the Solana Reservoir (1 MG).
(2) Calculated as 10 percent of the available storage.
(3) Standby storage calculated from the DOH Water System Design Manual Eq 9-3 or the minimum amount of standby storage required is the number of ERUs x 200 gallons/ERU. The larger calculated amount of standby storage is used.
(4) Fire flow storage based on 180 minutes x 3,000 gpm.
(5) Fire suppression storage and standby storage have been nested. The largest value is used for the calculation at required storage.

As shown in Table 3-7, the City has adequate storage capacity through approximately 2032. The City is considering building an additional reservoir in the southwest portion of the system as the service area is extended and will evaluate the feasibility of constructing a ground level reservoir in the 350 Zone as discussed in further detail in Chapter 8 – Capital Improvement Plan.

Table 3-8 is the storage analysis for the 480 Zone that is served by the 0.2 MG Reservoir. The 480 Zone is served exclusively by the 0.2 MG Reservoir and the 480 Zone Booster Station, therefore; it must be analyzed individually. The other reservoirs are more interconnected and can serve the whole system through PRVs. As of 2012 the 480 Zone serves approximately 151 ERUs and for this analysis it is assumed to grow at a rate of 2 percent.

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Table 3-8 480 Zone Storage Capacity Analysis (0.2 MG)

Year	Storage Available(1)	Operational Storage(2)	Equalizing Storage(3)	Standby Storage(4)	Fire Suppression Storage(5)	Storage Required(6)	Surplus/ Deficit
2012	200,000	20,000	0	48,600	60,000	80,000	120,000
2013	200,000	20,000	0	49,600	60,000	80,000	120,000
2014	200,000	20,000	0	50,600	60,000	80,000	120,000
2015	200,000	20,000	0	51,500	60,000	80,000	120,000
2016	200,000	20,000	0	52,500	60,000	80,000	120,000
2017	200,000	20,000	0	53,800	60,000	80,000	120,000
2018	200,000	20,000	0	54,700	60,000	80,000	120,000
2022	200,000	20,000	0	59,200	60,000	80,000	120,000
2032	200,000	20,000	0	72,100	60,000	92,100	107,900

(1) Includes the 480 Reservoir (0.2 MG).
(2) Calculated as 10 percent of the available storage.
(3) Equalizing storage not required because 480 Zone Booster Station capacity was higher than the projected peak hour demand.
(4) Standby storage required is 2(ADD) as the 480 Booster Station is the only source.
(5) Fire suppression storage based on 60 minutes x 1,000 gpm.
(6) Fire suppression and standby storage have been nested. The largest value is used for the calculation of required storage.

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WATER SYSTEM RELIABILITY ANALYSIS

SOURCE RELIABILITY ANALYSIS

The City's three sources of water are the Dungeness River Infiltration Gallery, the Silberhorn Wellfield and the Port Williams Wellfield. Each of these sites have their own individual supply reliability concerns that will affect their ability to provide supply in the future.

Dungeness River Infiltration Gallery

The Infiltration Gallery is the City's oldest source and has been in use since the 1950s. As described previously this source consists of horizontal collectors installed near the banks of the Dungeness River to form a Ranney Well. Water from the Infiltration Gallery flows by gravity siphon to the 1.7 MG 420 Reservoir. This source is normally operated continuously at a flow rate of approximately 350 gpm. The water rights for this source allows up to 700 gpm instantaneous withdrawal and 718 acre-ft per year annual withdrawal. The production of this source depends on the level and turbidity of the Dungeness River. If the river level is too low and flow out of the well is set too high the siphon can be lost and the source stops flowing. Additionally, if turbidity levels in the

river are high, normally occurring during the winter rains spring snow melt season, the City will have to shut the source down until turbidity levels return to normal. Based on production data provide by the City the percentage of days where the Infiltration Gallery source had to be turned off varied between 26 percent and 11 percent with an average of 15 percent. In order to withdrawal the entire annual water right of 718 acre-ft per year the City will need to withdrawal at least 525 gpm from the Infiltration Gallery, accounting for the days where the source cannot be used. Improvements to this source to increase capacity are included in Chapter 8 – Capital Improvement Program.

Future use of the Infiltration Gallery source is also dependent on the stipulations of the City's Water Rights permit for the Port Williams Wellfield. A provision of that permit states the City shall gradually eliminate use of surface water from the Dungeness River, except as an emergency back-up source. The effect of this provision has yet to be seen as up to this point the City has received no guidance from the Department of Ecology on an acceptable level of usage from the Infiltration Gallery. It is also unknown if the wording of the provision in regards to "surface water" would really affect the City as direct surface water withdrawal from the river was discontinued long ago and the Infiltration Gallery is technically a groundwater source.

The Silberhorn Wellfield

The Silberhorn Wellfield is the City's second oldest source and has been used since the mid 1970s. It is made up of three wells completed into the upper aquifer. Each well has a design capacity of 400 gpm, but the City currently operates the wells at 260 gpm due to infiltration of fine particles through the well screen (sanding) and aquifer level issues. Water from the Silberhorn Wellfield is delivered into the 420 Zone. The Water Rights for this source allows up to 700 gpm instantaneous withdrawal and 690 acre-ft per year annual withdrawal. Silberhorn Well No. 1 was rescreened and redeveloped in 2010. Wells No. 2 and No. 3 have not been redeveloped since they were installed in 1985.

Aquifer levels for the Silberhorn Wellfield are a primary concern for the future reliability of the source. Aquifer levels around the Silberhorn Wellfield are measured monthly and were analyzed as a part of the City's 2008 Monitoring report, prepared by PGG and published December 2009. Long term trends for the upper aquifer

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in the Silberhorn area have shown steady levels from 1993 to 1997, a decline from 1998 to 2004 and a reduced level of decline from 2004 to 2008. Total declines have been 15 to 20 feet. Similar declines have been seen in wells up to a mile away. At the Silberhorn Wells, long-term variations in pumping do not correlate well with variations in water level. The water level in the shallow aquifer seems to be more associated with recharge from irrigation ditches than it does with seasonal variation in pumping. As of 2007, the Silberhorn gross withdrawal of water was 0.35 mgd. It is estimated that a reduction in groundwater recharge around Silberhorn has declined by 0.38 mgd from the lining of irrigation ditches. Data collected from the Silberhorn Wells since the publication of the 2008 monitoring report show aquifer levels staying relatively constant for the last few years.

Future use of the Silberhorn Wellfield will depend on the condition of the existing wells and on future aquifer conditions. The Capital Improvement Plan includes a project to complete an in-depth study of the capacity of the wells and aquifer and to redevelop the wells if necessary. Also included is a potential project to drill new wells at the Silberhorn site if it is not feasible to redevelop them.

The Port Williams Wellfield

The Port Williams Wellfield is the City's newest source and was first developed in the mid 1990s. The Wellfield is currently equipped with 3 wells with capacities of approximately 600 gpm each. Water from the Port Williams Wellfield is delivered to the 350 Zone. The Water Rights permit for this source allows up to 2,250 gpm instantaneous withdrawal and up to 1,850 acre-ft per year annual withdrawal, supplemental to the City's other water rights. This means that the total water rights limit from all of the City's sources cannot exceed 1,850 acre-ft per year. The water rights permit allows the drilling of up to five wells.

Development of the Port Williams Wellfield water rights permit has been contingent upon a settlement agreement between the City, Department of Ecology and Graysmarsh Farm. The agreement requires that the Port Williams wells as well as several other wells in the surrounding area be monitored on an annual basis for declines in water level. The agreement sets several "triggers" for declines in aquifer levels that, if reached, would notify Ecology and they would be required to issue a response. The "triggers" are 10 feet for the middle aquifer and 35 to 50 feet for the lower

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aquifer. The average declines observed so far are 9.7 feet and 9.8 feet for the middle and lower aquifers, respectively. When it was developed the 10-foot trigger for the middle aquifer was considered conservative and was through to be not likely to be reached. The average decline for the middle aquifer is 9.7 feet but due to annual variation, the decline has exceeded 10 feet some years. The monitoring of Port Williams started in 1996 when pumping was initiated. The water level in the middle aquifer declined from 1996 to 2001/2003 and then stabilized. Since they have stabilized, there has been a slight rise in water level which likely corresponds to a reduction in withdrawal after heavy pumping in 2001 and 2002. Lower aquifer levels exhibit a strong 10-foot seasonal fluctuation that corresponds with variations in pumping. The middle aquifer also exhibits a 5-foot seasonal fluctuation in water level that corresponds to seasonal variation in pumping. Drawdowns of the water level at the Port Williams Wellfield are similar to those predicted with the 2008 Groundwater Flow Model developed for the P.C. 6 report. The model predicted drawdowns of 5 feet at the Graysmarsh Well #8 but a decline of 0.8 feet was observed from 1997 to 2007. This difference could be due to aquifer heterogeneity or due to leakage from the other aquifer layers that satisfy the Port Williams withdrawal before it propagates to Graysmarsh well. To date no guidance has been provided by the Department of Ecology regarding further actions to be taken about exceeding the 10-foot trigger in the middle aquifer. Potential actions that may be required are listed in the settlement agreement. Ecology may consider the following alternatives:

- Cease or reduce withdrawals authorized under the permit;
- Modify the data collection-monitoring program;
- Undertake additional data collection-monitoring;
- Provide a "physical solution" to alleviate the declines, changes or flow conditions;
- Perform a combination of one or more of the above; or
- Take no additional action.

Future increases in withdrawal from the Port Williams Wellfield will likely require to the City to take action to address declining reservoir levels and potential impacts to Graysmarsh. Potential actions that could allow more water to be withdrawn from Port Williams include further study to clarify potential impacts of

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increased pumping or a mitigation strategy that would alleviate impacts on Graysmarsh if any occur.

One possibility to address declining groundwater levels as well as operational control at the Port Williams Wellfield would be construction of a below grade reservoir or other storage facility. A below grade reservoir could provide storage that helps meet peak water demands and alleviates drastic fluctuations in groundwater levels during high demand summer periods. The reservoir could also potentially be connected to the water system infrastructure in a manner that would increase functional redundancy for City customers, and increase operational efficiency for the water system staff. A preliminary investigation of the underground reservoir concept, the impacts to water system operation, and potential affect on groundwater levels indicated that the required volume of the reservoir would be unfeasible and not cost effective. However, a more thorough investigation should be completed should the City wish to further pursue the idea of providing below grade storage at the Port Williams Wellfield.

AQUIFER MONITORING PROGRAM

Use of the Silberhorn and Port Williams Wellfields is dependent on aquifer drawdown. The City monitors aquifer levels on a monthly basis at the locations listed below. In most cases, static levels are recorded, but if the well pump is operating, the drawdown may be recorded instead and is noted. The City began monthly measurements at these locations in January 1996 and monitors the data to document changes in aquifer levels. Appendix L includes a map of monitoring sites and example data sheets.

- Silberhorn Wellfield – Well 1
- Silberhorn Wellfield – Well 2
- Silberhorn Wellfield – Well 3
- D & K Rentals Well (52 River Road)
- Wynne Well (165 River Road)
- Moyle Well (131 West Silberhorn)
- D.O.T. Well (261 River Road)
- Simmons Well (304/308 River Road)
- Bagley Well (143 Aslan Drive)
- Wray Well (32 Crown View Lane)
- Ryan Well (130 Port Williams Road)

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- Elks Well (143 Port Williams Road)
- Stone Irrigation Well (301 Port Williams Road)
- Port Williams Wellfield – Well 1
- Port Williams Wellfield – Well 2
- Graysmarsh Well (256 Holland Road)
- Willis Well (90 John Scott Well)
- USGS Zone 1 Monitoring Well (702 Port Williams Road - South) (weekly readings)
- USGS Zone 3 Monitoring Well (702 Port Williams Road - North) (weekly readings)

Results of monitoring are compiled in reports prepared by Pacific Groundwater Group.

WATER RIGHTS ADEQUACY

As discussed in the Water Rights Analysis, the City's water rights are sufficient for the 20-year planning period. However, given the uncertainty in predicting future water use and the uncertainty in future source capacity the City should explore options for obtaining additional water rights. The City plans to annex areas outside of the city limits and within the City's current UGA.

The City will continue to evaluate the feasibility of becoming a regional supplier through satellite management or purchase of water system and their water rights throughout the Dungeness Valley.

The City's instantaneous water rights capacity is 3,668 gpm (5.2 MG). Currently, the City has 2,810 gpm of source capacity installed. The City is currently planning the installation of an additional well at Port Williams. This well is anticipated to be 600 gpm. This will bring the installed capacity up to 3,410 gpm.

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FACILITY RELIABILITY

The reliability of the City's water system facilities is typically provided through redundancy. The following paragraphs describe the reliability of the source production facilities, reservoirs, and water mains.

Source Reliability

The City has three sources of supply including the Infiltration Gallery, the Silberhorn Wellfield and the Port Williams Wellfield.

The Infiltration Gallery flows by gravity and would not be affected by a power outage. The Silberhorn Wellfield has a 75 kW generator and sufficient fuel to provide backup service for 24 hours. However, the chlorination pump for this source is not currently equipped with standby power. During a power outage City staff must use a portable generator. The Port Williams Wellfield has a 200 kW generator that is capable of operating up to two wells simultaneously.

Storage

The City has three reservoirs totaling 2.9 MG that serve the 420, 480 and 680 Zones. All zones except for the 775 Zone can be served by the City's reservoirs.

Booster Stations

The City has four booster stations. Three of these stations move water from lower zones to higher zones in order to fill the City's reservoirs. The fourth station (775 Booster Station) provides pressure and flow to a closed zone. Reliability of booster stations must account for both failures of utility power and of mechanical problems with pumps. For a booster station to be considered reliable it must have both standby power and redundant pumps.

The 480 Zone booster station contains two pumps to provide redundancy, and is equipped with an emergency generator. This zone is also served by the 480 Reservoir.

The 5th and McCurdy Booster Station, which pumps from the 350 Zone to the 420 Zone, contains only one pump and does not have emergency power. However, the 420 Zone is also supplied by the 420 Reservoir and PRVs from the Solana Reservoir.

The City's 775 Zone is supplied by a booster station equipped with redundant pumps and is equipped with a backup generator. The 775 Zone Booster Station is the sole source for the 775 Zone.

The City's 680 Zone booster station contains three pumps, one of which is redundant, and a generator. The 680 Zone is also served by the Solana Reservoir.

Treatment

A discussion of the City's treatment facilities is included in Chapter 1 – System Description. The City maintains spare parts

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for disinfection facilities and relies on source of supply redundancy to provide disinfection reliability. In the event of a power outage the backup generators at Port Williams and Silberhorn Wellfields maintain the function of the chlorine pumps. For the Infiltration Gallery a mobile generator must be brought to the site. DOH has recommended that the City install a permanent battery backup or generator at the site to ensure adequate treatment at all times.

The City has identified issues with water age and lack of turnover in the Solana Reservoir. High water age results in a low chlorine residual in water being withdrawn from the reservoir. This is an issue because the City's system is required to maintain a chlorine residual to prevent contamination. This is due to a number of factors. One issue is that the infrastructure in the Solana area was designed for growth that has not yet occurred in the area. Currently, there are many vacant properties and water demands are insufficient to promote good turnover. The second issue is that the Solana area is located at a dead end with supply coming from a single direction. The current system layout means that water reaching Solana has likely spent time in the 420 Reservoir increasing its age.

HYDRAULIC MODELING PROGRAM

The City's existing water system has been analyzed using Innovyze's InfoWater hydraulic modeling program to identify areas of the distribution system that are deficient in flow and pressure. In addition, the hydraulic model was used to analyze the effects of the proposed improvements on the water system.

MODEL DEVELOPMENT

In order to create a realistic representation of the City's water system, the model has been created using the City's GIS based water system base map and information obtained from the City. A map detailing existing pipes and nodes is included in Appendix K, along with a hydraulic model results. Existing system demands have been determined for the City from production data, and have been distributed throughout the system nodes.

MODEL CALIBRATION

In order to verify the accuracy of the hydraulic model, field testing is needed. The calibration process involves comparing model

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generated results with field measurements. This is done by performing hydrant flow tests on the water system. Calibration of the model is necessary to assign accurate pipe roughness factors, discover erroneous network connections, and verify settings of pressure reducing valve stations.

CALIBRATION PROCEDURE

The InfoWater hydraulic model of the City's water system was calibrated using data obtained from fire hydrant tests at various locations throughout the water system. Four fire hydrant tests were conducted with the assistance of City's personnel in late June 2012. During these tests, static and residual pressures were recorded as a fire hydrant was opened and flowed. Field results were used to calibrate the hydraulic model by verifying pipe type and size, and adjusting roughness coefficients.

Table 3-9 Hydrant Testing Locations

Test No.	Pressure Zone	Testing Location
1	350	First Baptist Church-1323 Sequim-Dungeness Way
2	350	Jones Farm Road and Ridgefield Road
3	500	Solana, Overland Street and Pear Court
4	420	Marlo Drive

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For each hydrant test, the hydraulic model was used to generate static pressure with normal demands and residual pressure at the measured hydrant flow rate. The total system demand at the time of the hydrant tests was assigned based production records. Model output is generated at points in the model equivalent to the locations of the hydrant tests.

Model output for static pressure is generated by running the model at average system demands. Model output for residual pressure is generated at each model hydrant test point by placing an added demand equal to the measured residual discharge and recording the resulting pressure.

The system pressures and pipe flow rates determined in the hydraulic analysis are highly dependent on the friction loss characteristics established for each pipe. Adjustments to assumptions of friction loss are made until the hydraulic model replicates the measured field conditions. Hazen-Williams

C-factors between 100 and 130 are used throughout the system. These friction factors are typical values for most pipes and are generally conservative. However, the friction factors for the pipe also compensates for system losses through valves and pipe fittings.

CALIBRATION RESULTS

The model output is produced for both static pressure and residual pressure. The values measured in the hydrant flow tests are compared to the model output values in Table 3-10.

Table 3-10 Calibration Testing Results

Test No.	Flow (gpm)	Static Pressure (psi)			Residual Pressure (psi)			ΔS – ΔR(1)(2)
		Field	Model	Δ	Field	Model	Δ	
1	1,300	104	107	3	90	87	-3	-6
2	1,100	68	71	3	55	56	1	-2
3	1,500	110	111	1	98	101	3	2
4	800	50	50	0	32	30	-2	-2

(1) Difference in field and modeled static pressure minus difference in field and modeled residual pressure.

(2) The difference between field and model for this location was higher than at other locations. However, the model results are anticipated to be conservative for fire flow as modeled residual pressure is lower than the field.

Calibration of the hydraulic model produced results that varied from 0 to 3 psi of actual field test data for static pressure. Modeled residual pressures are within 3 psi of the measured residual pressures in all cases. The value of ΔS – ΔR represents the absolute error in model calibration.

MODEL SIMULATION AND RESULTS

MODEL INPUTS AND SETUP

Both peak hour demand and fire flow scenarios were modeled and were based on the projected demands developed in Chapter 2. For the peak hour scenarios, the forecast peak hour demands were assigned to system nodes, and reservoir levels were set based on the depletion of operational and equalizing storage. For the fire flow scenarios, the max day demands were assigned to system nodes and reservoir levels were set based on the depletion of operation, equalizing and fire suppression storage. Reservoir levels for modeling scenarios are shown in Table 3-11.

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Table 3-11 Hydraulic Model Reservoirs Levels

Peak Hour Scenarios	2012 Level (ft)	2018 Level (ft)	2032 Level (ft)
0.2 MG 480 Reservoir	45.90	45.90	45.90
1.7 MG 420 Reservoir	26.10	26.10	25.05
1.0 MG 680 Reservoir	16.20	16.20	15.58
Fire Flow Scenarios	**2012 Level (ft)**	**2018 Level (ft)**	**2032 Level (ft)**
0.2 MG 480 Reservoir	30.79	30.79	30.79
1.7 MG 420 Reservoir	20.31	20.31	19.26
1.0 MG 680 Reservoir	12.80	12.80	12.18

Peak Hour Demand

According to *2009 Water System Design Manual* and WAC 246-290-230, 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 was modeled for 2012, 2018, and 2032 peak hour demand conditions. For these scenarios, the City's distribution system was able to maintain pressures of 30 psi system wide.

Future system expansion has the potential to span beyond the limits of what can be served by the existing pressure zones. A majority of the areas the City would bring into its system can be adequately served by the City's existing reservoirs. However, this is not the case with the addition of services in the southwest region of the current city limits or UGA. The City's reservoirs are not at a sufficient elevation to serve these areas under DOH requirements. The City would be required to build additional storage in this area at a sufficient elevation to provide peak hour demands and the minimum pressure of 30 psi. The approximate base elevation of the reservoir should be 500 feet above sea level based on USGS topographic maps for the area.

Appendix K includes a copy of the output file for the 2032 peak hour demand scenario and the pipe and node map.

Available Fire Flows

WAC 246-290-230 states, "If fire flow is to be provided, the distribution system shall also provide maximum day demand (MDD) plus the required fire flow at a pressure of at least 20 psi at

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all points throughout the distribution system, and under the condition where the designed volume of fire suppression and equalizing storage has been depleted." A 3,000 gpm fire flow has been utilized in this model for non-residential areas and a 1,000 gpm fire flow was used for residential areas.

This Plan outlines system improvements required to meet these standards that, at this time, exceed the fire flow standards established by City ordinance. The City has adopted the Uniform Fire Code (UFC) by ordinance, which identifies minimum fire flow requirements of 1,500 gpm for commercial areas and 1,000 gpm for residential areas. Table 3-12 lists the available fire flow for the City's existing system under 2032 maximum day demands.

Table 3-12 Existing System Fire Flows (2032 Maximum Day Demand)

Node(s)	Location	Land Use	Zone	Recommended Fire Flow at 20 psi System Wide (gpm)	Available Fire Flow at 20 psi System Wide (gpm)
J1840	Costco	Mixed Use	420	3,000	**2,700**
J1178	Walmart	C-III Commercial	420	3,000	**2,600**
J2224	Sequim Middle and High Schools	School	350	3,000	4,800
J2348	Safeway	C-III Commercial	350	3,000	3,800
J860	Bell Creek Plaza	C-III Commercial	350	3,000	3,100
J726	Sherwood Manor	C-II Commercial	350	3,000	3,600
J1102	Landmark Mall	C-III Commercial	350	3,000	4,300
J2144	Holiday Inn, E. Washington Street	C-III Commercial	350	3,000	**1,800**
J1980	E. Hammond Street Future Development	Mixed Use	350	3,000	**2,100**
J2522	480 Pressure Zone	R-II Residential	480	1,000	**500**
J2084	480 Pressure Zone	R-IV Residential	480	1,000	**900**
J2024	420 Pressure Zone	R-II Residential	420	1,000	**900**
J336	350 Pressure Zone, West Side	R-II Residential	350	1,000	1,300
J1878	350 Pressure Zone, East Side	R-II Residential	350	1,000	1,900

(1) Bold denotes a fire flow deficiency as compared to the design standard. In all cases, fire flows in commercial areas exceed UFC minimum fire flow requirement of 1,500 gpm for commercial structures.

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As shown in Table 3-12, the water system meets the recommended fire flow design standard throughout the majority of the water

system. However, the East Washington Street area, the 420 Zone north of Highway 101, the residential area in the 480 Zone, and a residential portion of the 420 Zone, do not meet the design standards under 2032 peak day demand and fire flow conditions.

RECOMMENDED SYSTEM IMPROVEMENTS

Distribution system improvements are recommended for the 6-year and 20-year planning periods. Descriptions, locations and costs of the Capital Improvement Projects are provided in Chapter 8. Project financing is discussed in Chapter 9.

Fire Flow Deficiencies

As shown in Table 3-12, several areas of the system have fire flow deficiencies as defined by the City's design standards. For non-residential areas the deficiencies are located in the 420 Zone north of Highway 101, East Washington St and the Mixed-Use zone on East Hammond Street. In all cases these areas meet the minimum UFC requirement of 1,500 gpm. Projects are proposed to address all these deficiencies include CIP projects D-1, D-8, D-13 and D-28.

Locations throughout the 480 Zone are also deficient in fire flow as well as any residual area of the 420 Zone. In order to meet the fire flow requirement of 1,000 gpm for this residential area, improvements D-3, D-4, D-5 and D-16 are recommended to loop the existing water lines.

Service Area Expansion in the Southwest

In addition to the recommended improvements outlined above, the City plans to provide water service to the area in the southwest portion of the service area in the future. These improvements will consist of a new reservoir on 7th Avenue south of the City's existing 420 and 480 reservoirs. The City will also build a booster station to provide water to this reservoir. In addition, PRV stations will be required in order for this storage to be usable in other areas of the water system and an additional waterline will be required in order to get this water to and from the distribution system. These projects are covered by improvements D-6, D-7, ST-1, and BS-1.

Service Area Expansion to the East

In addition to the area to the southwest, another area within the UGA with significant opportunities for growth is located to the east of downtown and north of Highway 101. The water

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distribution mains for these areas will involve connecting the north and south portions of the system from West Sequim Bay Road to Washington Street. A project to provide water to this area would consist of extending waterlines along West Sequim Bay Road and Washington Harbor Loop. These projects could serve the Battelle Research Facility as well as connection with the Marina Water System. These projects are shown as improvements D-9, D-10, D-17 and D-22.

AVAILABLE FIRE FLOWS WITH RECOMMENDED IMPROVEMENTS

Projected year 2018 fire flows, incorporating the improvements outlined above and as described in Chapter 8, are summarized in Table 3-13. These projects are also sufficient to provide the transmission backbone for fire flows to the City within the 20-year planning period. However, as the City develops the hydraulic model should be revisited to verify that the system still has the ability to meet the requirements in the *2009 Water System Design Manual*. Chapter 8 presents a recommended set of improvements to meet source, storage and distribution/fire flow needs, and contains a summary of the recommended project costs.

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Table 3-13 Available Fire Flows With Recommended Improvements (2032 Maximum Day Demand)

Node(s)	Location	Land Use	Zone	Recommended Fire Flow at 20 psi System Wide (gpm)	Available Fire Flow at 20 psi System Wide (gpm)
J1840	Costco	Mixed Use	420	3,000	3,200
J1178	Walmart	C-III Commercial	420	3,000	2,900
J2224	Sequim Middle and High Schools	School	350	3,000	5,600
J2348	Safeway	C-III Commercial	350	3,000	4,000
J860	Bell Creek Plaza	C-III Commercial	350	3,000	5,400
J726	Sherwood Manor	C-II Commercial	350	3,000	4,300
J1102	Landmark Mall	C-III Commercial	350	3,000	4,600
J2144	Holiday Inn, E. Washington Street	C-III Commercial	350	3,000	3,500
J1980	East Hammond Street Future Development	Mixed Use	350	3,000	6,000
J2522	480 Zone	R-II Residential	480	1,000	1,600
J2084	480 Zone	R-IV Residential	480	1,000	1,100
J2024	420 Zone	R-II Residential	420	1,000	2,400
J336	350 Zone, West Side	R-II Residential	350	1,000	1,300
J1878	350 Zone, East Side	R-II Residential	350	1,000	2,000

WATER SYSTEM DEFICIENCIES

SOURCE OF SUPPLY

The City has sufficient annual and instantaneous water rights to supply water to the city limits and annexed UGA if the growth in the system occurs as anticipated throughout 2032. The City's annual water right limit will be the first restriction reached outside the 20-year planning period.

The City will investigate the possibility of obtaining water rights from existing purveyors in the City's UGA that may be annexed during the planning horizon. The City should also open discussions with the Department of Ecology in attempt to classify some of the existing supplemental water rights at the Port Williams Wellfield as primary. The City will continue to evaluate the feasibility of becoming a regional provider either through satellite management agreements or purchase of water systems and water rights in the greater Dungeness Valley. These projects are

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discussed in further detail in Chapter 8 – Capital Improvement Plan.

STORAGE

With the construction of the 1.0 MG Solana Reservoir, the City will have sufficient storage through the 20-year planning period. Depending on development, the City plans to build a new reservoir south of the existing 1.7 MG Reservoir in order to provide additional storage for the future expansion of the system to the southwest. This additional storage is proposed in order to serve future connections. These projects are also described in further detail in Chapter 8 – Capital Improvement Plan.

WATER AGE

It is recommended that further analysis be performed using a water age model to confirm the reason for the low chlorine residual the City is experiencing in Solana.

Potential solutions to this problem include operational changes the City can make that promote turnover in the water main along Brownfield Road. This might include increased usage of the Simdars Road PRV. The installation of a booster station at Simdars Road would improve chlorine residual by supplying the Solana area more directly from the Port Williams Wellfield in the 350 Zone.

DISTRIBUTION SYSTEM

The operation of a municipal water system involves dynamic interactions between various water system components, including source, storage, and distribution system facilities. In addition to normal diurnal demands, infrequent demand events, such as fires, can create significant stress on a municipal water system.

Analysis of the distribution system revealed several areas with fire flow deficiencies. These included non-residential areas located in the 420 Zone north of Highway 101, East Washington Street and the mixed use zone on East Hammond Street. These non-residential locations met the UFC requirement of 1,500 gpm, but do not meet the City's planning requirement of 3,000 gpm. Residential fire flow deficiencies were found in the 480 Zone as well as a residential area of the 420 Zone. CIP projects are proposed that resolve these deficiencies through upsizing water mains and increasing loops.

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SANITARY SURVEY

The City's most recent DOH Sanitary Survey was completed in July 2012. A sanitary survey is an inspection, performed by DOH personnel, that assesses a water system's compliance with health regulations. This survey identified no significant deficiencies in the system. The survey makes the following suggestions: backup power for the chlorination system at the Infiltration Gallery, various screening improvements to drains and vents of the reservoirs, implementation of the cross connection control program and development of a wellhead protection program for the Infiltration Gallery. Backup power for the Infiltration Gallery will be investigated as a part of project S-6, Infiltration Galley Improvements. City staff plans to make screening improvements and implement the cross connection control program. A wellhead protection program for the Infiltration Gallery is discussed in Chapter 5 – Wellhead Protection Program of this Plan.

SYSTEM CAPACITY SUMMARY

Table 3-14 summarizes the source and storage capacity in terms of ERUs and indicates the year in which the capacity is projected to be exceeded. The projected number of ERUs in 2032 is 7,915. Based on the analysis, the first limitation to the system will be system annual water rights.

Table 3-14 System Capacity Summary

Capacity Parameter	Capacity (ERUs)
Source Capacity Max Day	11,284
Water Rights – Annual	10,133
Water Rights – Instantaneous	14,729
Storage Capacity	11,550
Distribution	>7,915

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Chapter 4
WATER USE EFFICIENCY

OBJECTIVE

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

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WATER USE EFFICIENCY PLANNING REQUIREMENTS

The Washington Legislature passed the Water Use Efficiency Act of 1989 (43.20.230 RCW), which directs DOH to develop procedures and guidelines relating to water use efficiency. In response to this mandate, Department of Ecology (Ecology), the Washington Water Utilities Council, and Department of Health (DOH) jointly published a document titled *Conservation Planning Requirements* in 1994. In 2003, the Municipal Water Supply – Efficiency Requirements Act (Municipal Water Law) was passed as Engrossed Second House Bill 1338 and amended the RCW to require additional conservation measures. The Municipal Water Law, among other things, directed DOH to develop the Water Use Efficiency Rule (WUE Rule), which was adopted in October 2006. WUE rule requirements are presented in WAC 246-290 Part 8.

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The WUE Rule is outlined and compliance guidance is provided in the *Water Use Efficiency Guidebook* (Third Edition), published January 2011 by the Washington State DOH. Conservation and efficiency programs developed in compliance with the WUE rule are required by DOH and by Ecology as part of a public water system water right application. Conservation must be evaluated and implemented as an alternate source of supply before state agencies approve applications for new or expanded water rights.

The WUE Rule sets stringent requirements for public water purveyors. The WUE Rule is comprised of four sections:

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

DISTRIBUTION SYSTEM LEAKAGE

The WUE Rule requires that water distribution systems have a distribution system leakage (DSL) rate less than 10 percent of total finished water production. Compliance with the 10 percent requirement is determined based on a three-year rolling average. Distribution system leakage is defined as the difference between total water production and authorized consumption. Authorized consumption is the volume of water authorized for use by the water system. This includes metered water consumption by customers and known or credibly estimated unbilled or unmetered uses as well. Unmetered authorized consumption may include uses such as cleaning of reservoirs, fire fighting, and system flushing.

As shown in Table 4-1 the City's current 3-year rolling average Distribution System Leakage is currently 14.9 percent for years 2009-2011. This is above the 10 percent maximum allowable leakage required by the WUE rule. To remain in compliance the City will need to develop a water loss action control plan. The details of the City's water loss action control plan are discussed later in this Chapter.

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Table 4-1 Distribution System Leakage

Year	Total Production Gallons	Authorized Consumption[1] Gallons	DSL Gallons	DSL Percent	3-year Rolling Average Percent
2007	355,625,800	275,813,541	79,812,259	22.4%	-
2008	352,925,800	283,048,690	69,877,110	19.8%	-
2009	363,320,000	314,866,353	48,453,647	13.3%	18.5%
2010	333,176,600	281,725,084	51,451,516	15.4%	16.2%
2011	327,265,300	275,501,174	51,764,126	15.8%	14.9%

(1) Includes other unmetered authorized consumption not included in billed water consumption as estimated by City staff.

WATER USE DATA COLLECTION

Collection of water use data is critical to ensuring efficient use of water resources. Water use data allows the water system to calculate leakage, forecast demands, identify areas of potential efficient water use, evaluate success of existing WUE program, describe the water supply characteristics and aid in water management decision making. The water use data and water demand forecasts for the City are presented in Chapter 2 of this Plan. All City sources of supply and all customer services are metered.

A summary of the City's water use data collection for each type of required data is presented in Table 4-2.

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Table 4-2 Summary of Water Use Data Collection

Required Data Type	Frequency of Collection	Comments
Source of Supply Meter Readings	Monthly and Annual Totals	Meter readings collected daily and reported monthly and annually
Import from Emergency Interties	Not Applicable	Currently no emergency interties exist
Export from Emergency Interties	Not Applicable	Currently no emergency interties exist
Wholesale Water Purchased	Not Applicable	No wholesale water is purchased
Wholesale Water Sold	Not Applicable	No wholesale water is sold
Peak Day, Peak Month	Annually	Determined from source production records
Distribution System Leakage	Annually	Calculated from City customer billing records and source meter records (See Chapter 2). City to compile data on an annual basis.
Unmetered, Unbilled Authorized Uses	Annually	Calculated from City records of flushing, testing and construction uses
Customer Service Meter Readings	Monthly	Information from City billing records
Population Served	Annually	See Population Projections in Chapter 2
Economic Data	As Required	Water rates are set by City Ordinance
Conservation Data	Annually	Per capita water usage

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HISTORICAL WATER CONSERVATION PROGRAM

Conservation has been a constant concern for the Dungeness Peninsula. The City of Sequim's conservation program has been modified over the years based on new State regulations. The City's 1995 Water System Plan developed a water conservation program based on the 1994 *Conservation Planning Requirements*. The 1995 Plan indicated that the 20-year conservation goal is a 15 percent reduction in average yearly demand and a 20 percent reduction in peak day demand. These goals remained the same in the 2000 Water Comprehensive Plan. The City's 2008 Water System Comprehensive Plan updated the existing conservation

program to include the changes made when Municipal Water Law was implemented. The goal presented in the 2008 Plan was the reduction of the water system's ERU by 10 percent over a 10-year period. This was to be accomplished partly by increasing utilization of reclaimed water produced at the City's Water Reclamation Facility. In 2005, the last year of historical data for the previous Plan, the ERU value was 195 gpd/unit. In 2010, 5 years into the previous conservation plan, the ERU value was 160 gpd/units. This represents an 18 percent reduction and exceeds the goals of the 2008 Plan.

NEW WATER USE EFFICIENCY PROGRAM

Under the WUE Rule, the City's governing body must set water use efficiency goals and measure progress each year toward meeting these goals. Goals must include a measurable outcome, address water supply or demand characteristics, and include an implementation schedule.

WATER USE EFFICIENCY GOALS

As shown earlier in this Chapter, the City has met and exceeded its conservation goals set forth in the 2008 Water System Plan. The City has proposed additional conservation goals for this plan. As a demand site goal, the City will attempt to reduce the ERU value by 10 percent over the next 10 years. The City's primary tactic for reaching this goal is the additional use of Class A reclaimed water from its Water Reclamation Facility to replace irrigation use of potable water.

As a supply side goal the City will plan to reduce DSL to the DOH requirement of 10 percent over the next 6 years. This will be a reduction of approximately 1 percent DSL per year.

WUE MEASURES

The WUE Rule requires the evaluation or implementation of water use efficiency measures to help meet the WUE goals. The WUE Guidebook lists several measures that must be implemented (Mandatory Implementation) or must be evaluated (Mandatory Evaluation) and provides a list of measures that can be counted as supplemental measures in the WUE Program. WAC 246-290-810 identifies the minimum number of water use efficiency measures that must be evaluated based on system size. The City currently serves approximately 2,200 connections which puts it in the 1,000

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to 2,499 connection category which must implement five supplementary measures.

Implement Source Meters, Service Meters and Meter Calibration (Mandatory Implementation)

Source meters are installed at all of the City's water sources and service meters are installed for all of the City's customers. The City has constructed a reclaimed water system that pumps Class A reclaimed water to the City for reuse. The City has converted a large portion of their currently unmetered water use to reclaimed water, thereby reducing the amount of unaccounted for water from the City's potable water system.

The City has a meter replacement program to ensure that older service meters are replaced before they begin registering water use inaccurately. The City calibrates source meters regularly and calibrates service meters as needed.

Implement Program Promotion and Customer Education (Mandatory Implementation)

The City currently uses paper bills to collect funds due. Bills are mailed monthly and include information on historical use, and ways to save water and energy. Bills also include changes for wastewater production, if applicable. The City does provide information on conservation on their website and at City Hall.

In the City's annual Water Quality report, conservation tips are provided to the customers. These provide instructions on simple ways that customers can reduce their daily water consumption. A copy of the most recent Water Quality report can be found in Appendix G.

Implement a Water Loss Control Action Plan to Control Leakage (Mandatory Implementation if DSL >10 percent)

The City's current 3-year rolling average DSL is 14.9 percent which does not meet the 10 percent DSL requirement. As such, the City must implement a Water Loss Control Action Plan (WLCAP) to remain in compliance. The City's current DSL rate of 14.9 percent puts it in the category of system with greater than 10 percent but less than 20 percent DSL. For this category the WLCAP must implement the following actions:

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1. Assess data accuracy, and
2. Assess data collection methods and errors.

Evaluate Conservation Pricing (Mandatory Evaluation, Supplementary Implementation)

The WUE rule requires that systems evaluate a rate structure that encourages conservation. If the City implements a conservation rate structure, if can be counted as a supplementary measures. The City currently has an inclined block water rate structure that is discussed in further detail in Chapter 9 – Financial Program. The City's base charge does not include any water usage. For residential customers, the first 800 cubic feet (cf) of water is sold at $0.00779/cf, and water consumption over 800 cf/month is sold at $0.02309/ccf. Other customer types have similar rate structures. The current rate structure was adopted by City Ordinance 2007-020. This rate structure encourages conservation and applies to four customer classes, which counts as four supplementary measures.

Bills Showing Consumption History (Supplementary)

The City's current software allows past water usage to be shown on the current water bill so customers can see how their water usage compares to previous billing cycles. This measure applies to four customer classes, which counts as four supplementary measures.

Evaluate Reclaimed Water (Mandatory Evaluation, Supplementary Implementation)

As mentioned previously, the City has installed a reclaimed water system that pumps Class A reclaimed water to the City for reuse. The City's *2008 Water Reclamation Facility Expansion Engineering Report (2008 Engineering Report)* projects an average annual flow of 2.0 mgd of reclaimed water based on 2025 design criteria. The City's primary uses of reclaimed water are for the City Shop, the Reuse Demonstration Site at Carrie Blake Park, and augmentation of Bell Creek stream flows. Future projects for reclaimed water use are discussed in the City's *2008 Engineering Report* and include various aquifer recharge areas, additional augmentation of Bell Creek, and augmentation of Gierin Creek.

In 2006, the City used approximately 20 percent of its reuse water for projects around the City which averaged approximately

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120,000 gpd. During the next 6 years the City will explore water reuse in other parts of the water system. Reclaimed water was mainly used by the Water Reclamation Facility (WRF) and for other proejcts by the City (dust control, vehicle washing, etc.). As the City has implemented reclaimed water and is putting that water to use this can be counted as a supplementary measure.

Notifying Customers About Leaks on Their Property (Supplementary)

The City currently educates customers on a number of topics which include how to identify leaks within their homes and on their property. Unusually high bills are flagged by the billing system and notices are sent to customers. With the planned implementation of the automatic meter reading system this process will be further automated as the meter will be equipped to monitor for leakage and inform the City. This policy counts as a supplementary measure.

The WUE rule requires systems of the City's size to implement at least 5 supplementary measures. The City implements 10 supplementary measures. A summary of the City's supplementary water use efficiency measures is provided in Table 4-3.

Table 4-3 Supplementary Water Conservation Measures

Implemented Measure	Number of Supplementary Measures Counted
Conservation Pricing	4
Bills Showing Consumption History	4
Reclaimed Water	1
Customer Notifications of Leaks	1
Total City Supplementary Measures	**10**
DOH Required Measures	5

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The City plans to meet their WUE Goals listed above. To do this the City will implement the WUE Measures detailed in this chapter. Anticipated water savings for the City's conservation goals are presented in Table 4-4. Within the next six years the City's conservation program is projected to reduce the average day demand by approximately 150,000 gallons.

Table 4-4 Water Use With Conservation

Without Conservation					With Conservation				Projected Savings	
Year	ERU Value (gpd)	DSL (%)	Average Daily Production(1)	Max. Day Production(2)	WUE Goal ERU Value (gpd)	WUE Goal DSL (%)	Average Daily Production(1)	Max. Day Production(2)	Average Day Savings (gpd)	Max. Day Savings (gpd)
2012	163	14.9%	976,119	1,972,932	163	14.9%	976,119	1,972,932	0	0
2013	163	14.9%	999,315	2,019,815	161	13.9%	975,589	1,983,568	23,726	36,247
2014	163	14.9%	1,023,085	2,067,859	159	12.9%	975,063	1,994,198	48,022	73,661
2015	163	14.9%	1,047,444	2,117,093	157	11.9%	974,533	2,004,809	72,911	112,285
2016	163	14.9%	1,072,407	2,167,548	155	10.9%	973,992	2,015,385	98,415	152,164
2017	163	14.9%	1,097,989	2,219,256	153	9.9%	973,434	2,025,912	124,555	193,344
2018	163	14.9%	1,124,208	2,272,249	151	8.9%	972,853	2,036,375	151,355	235,873
2022	163	14.9%	1,235,773	2,497,745	149	8.9%	1,055,234	2,208,815	180,540	288,930
2032	163	14.9%	1,568,072	3,169,388	149	8.9%	1,338,986	2,802,765	229,087	366,623

(1) Average Daily Production includes DSL.
(2) Max Daily Production calculated using peak day factor of 2.2 and includes DSL.

WATER LOSS CONTROL ACTION PLAN

The City's current 3-year rolling average DSL rate is greater than 10 percent. In order to remain in compliance with the Water Use Efficiency Rule the City will need to develop and implement a water loss control action plan. (WLCAP). A WLCAP involves taking certain actions to assess and correct leakage that the water system is experiencing. The level of action to be taken is dependent on the level of leakage. The City's current DSL rate puts it in a category of water systems with greater than 10 and less than 20 percent DSL that require the City to take the following actions:

1. Assess data accuracy,
2. Assess data collection methods and errors.

The DOH Water Use Efficiency Guidebook presents the following actions as water loss control methods that might reduce DSL:

- Conduct a water audit (such as the IWA Water Audit);
- Conduct a leak detection survey;
- Repair leaky storage tanks;
- Calibrate or replace meters;

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- Synchronize production and consumption meter reading schedules;
- Develop a schedule and budget for replacing old distribution lines;
- Control theft of water.

Some of these actions are already performed by the City as a part of their existing water conservation program or normal O&M. The City currently performs annual leak detection surveys as a part of the operation and maintenance of the system. Leaks are repaired whenever found and the City budgets money annually for both leak detection and leak repair. The City's storage tanks are in good condition and are inspected regularly. The City's 500,000-gallon concrete reservoir, which was suspected to be leaking, has been taken out of service. Meters are calibrated and replaced as necessary depending on size. The City is currently undertaking a number of CIP projects to replace water mains which includes $200,000 per year for the replacement of asbestos cement (AC) water mains. AC water mains are brittle and prone to leakage. Water theft is not considered to be a significant source of DSL at this time.

Mandatory WLCAP Actions and Water Audit

For the City's DSL category the required actions for a WLCAP are to assess data accuracy and to assess data collection methods and errors. Data accuracy for the City depends on both source meters and customer meters. The City's source meters are regularly calibrated and are kept in good condition. Customer meters are currently calibrated as requested. As a part of the WLCAP the city will consider testing a subset of the customer meters in the system to measure accuracy. Data collection methods and errors can affect the DSL rate if data is being lost or inaccurately recorded from system meters.

Source meters are read daily by utility staff who record the data on the computer. Customer meters are currently read monthly with a touch read system. The touch read system transmits meter readings digitally through an inductive coupling from the meter to a reading device. The data from this reading device is then downloaded to the City's computer system. Touch read systems remove some of the errors in meter reading associated with manual reading such as typos and difficulty seeing the register. To further

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improve the ease and reliability of meter reading the City is planning to implement an automatic meter reading system which will collect meter readings wirelessly.

Access to customer water usage data is currently provided through the City's billing system. With the current billing system output of data is cumbersome and can give inconsistent results. One particular issue is billing adjustments where the volume of water sold is credited due to a customer leak adjustment. The City should keep a clear record of the actual volume that flows through customer meters for use in calculating DSL. The City is in the process of moving to a new billing system which should give them better data accessibility. It is anticipated that the new automatic meter reading system and the new billing system will reduce the City's data collection errors.

WLCAP Summary

The City's current DSL rate is above the 10 percent limit allowed by DOH. As such the City is required to take actions to assess data accuracy, and data collection methods and errors. The City monitors the accuracy of source and distribution meters and may take further action to test customer meters in the future. The City's current meter reading and billing systems are in the process of being upgraded which will improve the ease of data collection and reduce errors.

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Chapter 5

SOURCE PROTECTION PROGRAM

INTRODUCTION

Groundwater supplies can be susceptible to contamination from surface sources such as underground storage tanks, pesticides, accidental spills, and nitrates from septic systems or leaking wastewater collection pipes. To protect groundwater supplies, the U.S. Environmental Protection Agency (EPA) and Department of Health (DOH) require all Group A public water systems to develop a wellhead protection program as a component of their water system plans. A Group A public water system is defined as a public water system which serves more than 25 people or 15 connections. Individual private wells are regulated by Clallam County and do not need to develop wellhead protection programs or delineate wellhead protection areas. A successful wellhead protection program or plan consists of a number of components which must be developed before it can be fully implemented. The major components of the plan are described below and form the basis of the chapter that follows.

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- **Aquifer Susceptibility.** Describes the results of aquifer susceptibility assessments or the City's sources. Susceptibility reflects the possibility for contamination of a water source.

- **Delineated Wellhead Protection Areas (WHPA).** WHPAs are based on available hydrogeological information, including an assessment of susceptibility to contamination.

- **Inventory of Potential Contaminant Sources.** The inventory contains information of all known and identifiable potential contaminant sources within each wellhead protection area.

- **Spill Response Plan.** This plan contains documentation of spill response coordination with local first responders (HAZMAT team, fire, military police, etc.).

- **Contingency Plans.** Alternate sources of drinking water are identified in the event of source contamination.

- **Wellhead Protection Area Management Plan.** This plan is used to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.

RELATED HYDROLOGICAL DOCUMENTS

The hydrological basis of the Sequim Wellhead Protection Program is based primarily on information contained in several reports and hydrogeological investigations including:

- Pacific Groundwater Group, *Hydrogeologic Characterization and New Wellfield Location*, 1995

- Pacific Groundwater Group, *Hydrogeologic Evaluation and Wellfield Analysis, City of Sequim Stone Well #1*, 1995

- Pacific Groundwater Group, *Silberhorn Wellfield Hydraulic Evaluation and Yield Analysis*, 1996

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- Pacific Groundwater Group, *Installation, Testing, and Recommended Operation, City of Sequim Port Williams Well #2*, 1998

- United States Geological Service, *Hydrogeologic Assessment of the Sequim Dungeness Area, Clallam County, Washington*, 1999,

- Pacific Groundwater Group, *Construction, Testing and Recommended Operation Port Williams Well #3*, March 2008,

- Pacific Groundwater Group, *City of Sequim 2008 Hydrologic Monitoring Report*, December 2009.

AQUIFER SUSCEPTIBILITY

Completion of a susceptibility assessment is an important initial step in selecting appropriate delineation methods to define wellhead protection area boundaries. Completion of the susceptibility assessment and submittal to DOH allows for a susceptibility ranking. Sources that receive low susceptibility ratings may receive susceptibility waivers from DOH to reduce the amount of required monitoring for organic contaminants. Table 5-1 contains the susceptibility and vulnerability ratings for the Sequim sources.

Table 5-1 Sequim Source Susceptibility and Vulnerability Ratings

Source	DOH Source #	Susceptibility	Vulnerability
Dungeness River Infiltration Gallery	S01	High	Low
Silberhorn Wellfield	S02	Low	Low
Port Williams Wellfield	S03	Low	Low

Susceptibility ratings reflect the susceptibility of a water source to contamination from a variety of contaminant sources. The susceptibility rating is dependent on factors such as well construction, hydrogeological conditions, and distances to known or suspected contaminant sources. Drinking water wells and springs vary in their susceptibility to contaminants released at the surface. Wells with poor construction or improper surface seals have increased susceptibility to contaminant migration into the saturated zone of the well. Wells located in unconfined aquifers

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(commonly the shallowest aquifer encountered) typically have a higher susceptibility rating than wells which draw water from confined aquifers.

Vulnerability ratings are specific to pesticide contamination. The vulnerability ratings are somewhat dependent on land use characteristics and reflect regional pesticide use and application practices.

DUNGENESS RIVER SUSCEPTIBILITY

The Dungeness River has high susceptibility to be contaminated because of hydraulic connectivity with the river. Land use is thus important because there can be point source discharges or agricultural runoff that could potentially contaminate the river. The vulnerability of the river is low because there are no major contamination sources upstream. The infiltration gallery is on a parcel of land that is zoned residential and owned by the City of Sequim. The City owns a total of 21.2 acres of land surrounding the Dungeness River at or upstream of the infiltration gallery. Other state agencies such as the Department of Fish and Wildlife (DFWS) and the Department of Natural Resources (DNR), own 675.59 acres upstream of the Infiltration Gallery parcel. Other private owners or ownership groups are located upstream that may affect watershed water quality. There are septic systems located near the infiltration gallery but these do not affect the City, as they are downstream of the infiltration gallery.

The majority of the land upstream of the infiltration gallery is owned by state entities (DNR or DFWS) or part of the Olympic National Forest or Olympic National Park. The national forest and park protect the river from its source to the boundary of the national forest. Currently, these parcels are undeveloped but if future development were to occur, the following are some of the approved and conditional land uses allowed for land zoned commercial forest:

- Agriculture;
- Industrial land uses;
- Timber harvesting;
- Mineral extraction;
- Single-family residency (at a density of one dwelling per 80 acres);

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- Asphalt plants;
- Outdoor shooting range; and
- Research facilities.

If any of these facilities are proposed upstream, their impact on water quality should be investigated.

DUNGENESS RIVER WATERSHED PROTECTION

Protecting the Dungeness watershed is an important aspect to protecting the sources of drinking water. Almost the entire river and watershed upstream of the infiltration gallery is protected by the Olympic National Forest and Olympic National Park, so protection for the watershed is provided by the federal protection of these lands. The infiltration gallery has the highest susceptibility to contamination, but protection of lands upstream by the national forest reduces the risk. Dungeness River watershed is shown in Figure 5-1, while owners of state and private land within the watershed are shown in Figure 5-2. This figure illustrates the path of the Dungeness River upstream of the infiltration gallery as well as land ownerships between the infiltration gallery and the national forest boundary.

DUNGENESS RIVER MANAGEMENT TEAM

The Dungeness River Management Team (DRMT) is a partnership of individuals and stakeholders in the Dungeness Watershed who are working together to develop and pursue implementation of locally based, long-term solutions to watershed management issues. The Team has operated since the late 1980s, with active participation from residents and other partners and stakeholders in coordinating locally based, long-term solutions to water quantity, water quality, flood control, forest management, salmon recovery and other critical watershed issues. Because the Dungeness basin represents the east side of Watershed Resources Area 18 (WRIA 18), one of 16 basins in the state listed as critical for low flows, the DRMT also serves as the East WRIA 18 watershed council, promoting flow restoration and wise water use.

This team has gathered information on the Dungeness watershed that affects the City's infiltration gallery and should be used as a resource with identifying potential risks to watershed source water quality and land development decisions.

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WELLHEAD PROTECTION AREA DELINEATION

The purpose of a delineation is to estimate the areas capable of contributing contaminants to the well production source. These areas are referred to as zones of contribution (ZOCs) and provide a basis for focusing a community's groundwater protection efforts. The following sections summarize the local hydrogeology, the methods used for the Sequim source delineations for the Port Williams and Silberhorn Wellfields, and the resulting ZOCs.

LOCAL HYDROGEOLOGY

Sequim is generally underlain by six defined aquifer units. From shallowest too deepest, they are:

- **Unit 1:** The upper unit, commonly referred to as the "shallow aquifer," consists of sand and gravel and generally lies within the upper 50 to 200 feet, although some thicknesses of over 250 feet have been observed. The upper portion of this unit is unsaturated. Where saturated, the lower portion of the aquifer acts as an unconfined aquifer. Potential well yields range from a few tens of gallons per minute (gpm) to over 1,000 gpm. The Silberhorn wells are completed in this unit.

- **Unit 2:** The second unit, commonly referred to as the "upper confining bed," consists of silt, clay, and fine sand that acts as an aquitard or a layer that resists the flow of water. It is generally about 30- to 110-feet thick. Some higher-permeability materials lie within this unit that are capable of supplying domestic quantities of water (a few gpm).

- **Unit 3:** The third unit, commonly referred to as the "middle aquifer," is a confined aquifer which consists of sands and gravels and is typically 10- to 70-feet thick. It generally lies within 100 to 300 feet below ground surface and is entirely

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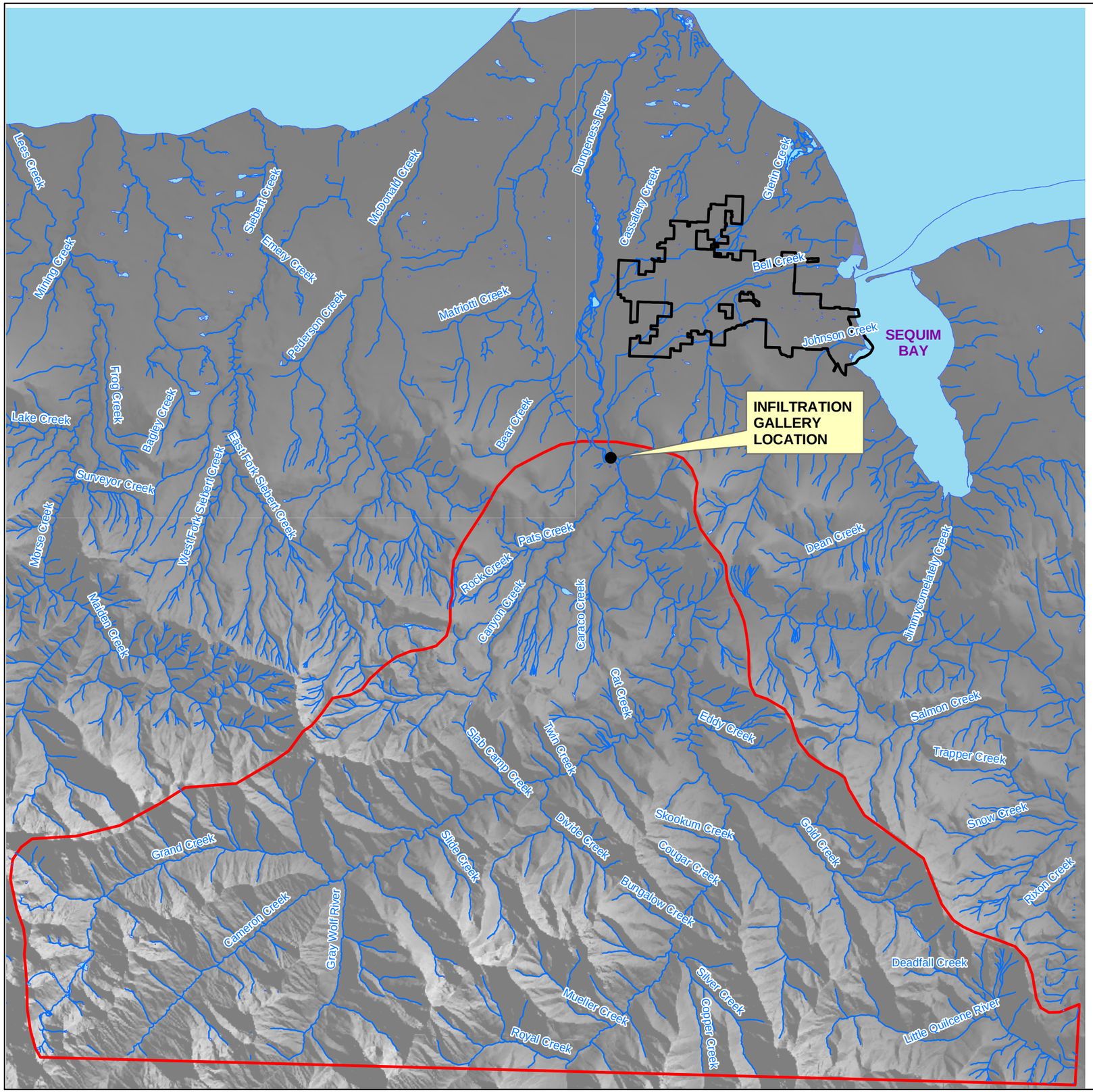
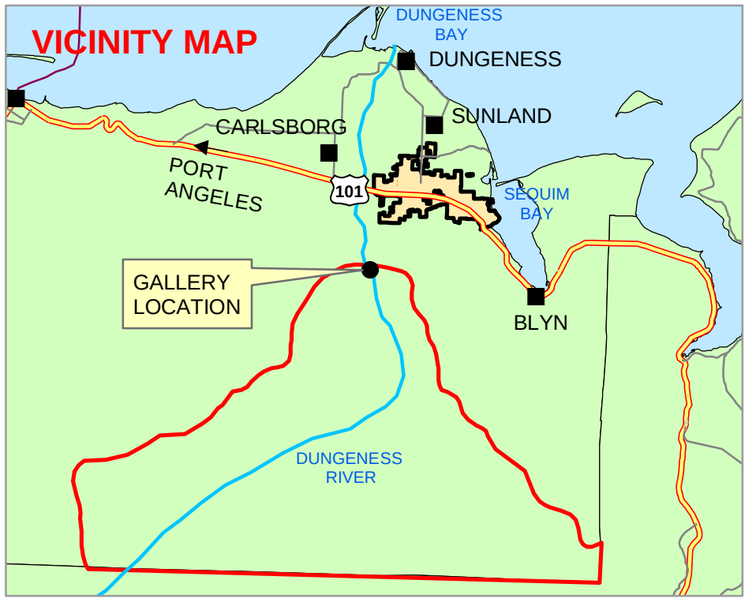


N

0 10,000 20,000 Feet



LEGEND:

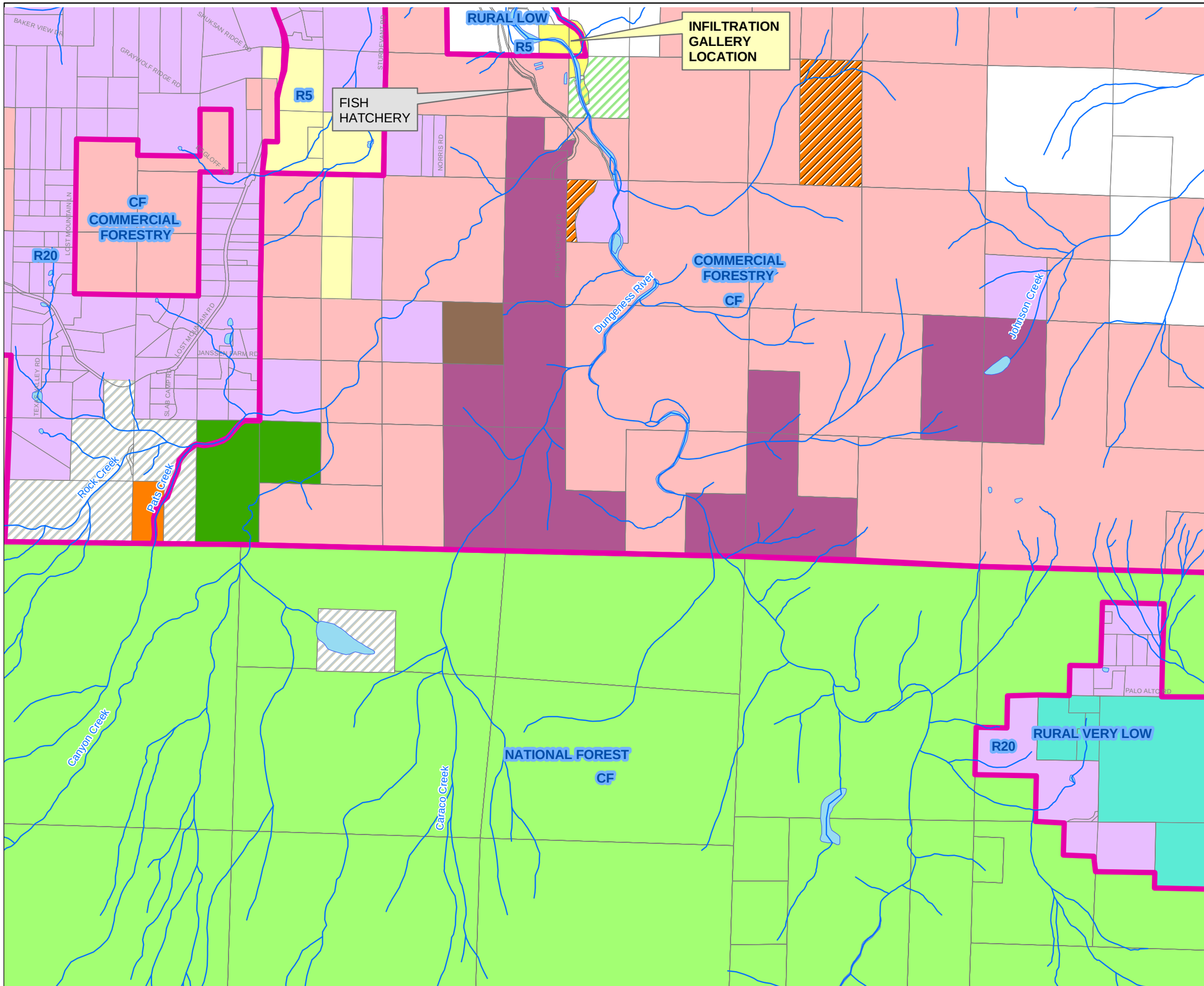
- CITY LIMITS
- RIVERS / CREEKS
- WATER
- WATERSHED

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 5-1
INFILTRATION GALLERY
WATERSHED PROTECTION AREA

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 5-1 WATERSHED.mxd



N

0 1,000 2,000 4,000 Feet

LEGEND:

- RIVERS / CREEKS
- WATER
- ZONING BOUNDARY
- PRIVATE OWNERSHIP

LAND OWNERSHIP:

- CITY
- STATE \ DNR
- OLYMPIC NATIONAL FOREST
- GREEN CROW TIMBER
- PENINSULA LONG RIFLES INC
- ALBERT HALLER FOUNDATION
- CEDAR LANE TRUST
- MANKE FAMILY RESOURCES
- DNR \ DFWS
- JLCG LLC - TIMBER CO
- RD MERRILL CO
- CDR RANCH INC
- OTHER PRIVATE / PRIVATE RESIDENCE

CITY OF SEQUIM

2012 WATER SYSTEM PLAN
FIGURE 5-2
LAND OWNERSHIP WITHIN
THE INFILTRATION GALLERY
WATERSHED PROTECTION AREA

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 5-2 INFILTRATION.mxd

saturated. Potential well yields from Unit 3 range from a few tens of gpm to 1,000 gpm.

- **Unit 4:** The forth unit, commonly referred to as the "lower confining bed," consists of till and interbedded clay, silt, and fine sand that acts as an aquitard. The thickness of this unit varies broadly from between 10- to 300-feet thick with 100 feet being typical.

- **Unit 5:** The fifth unit, commonly referred to as the "lower aquifer," is a confined aquifer which consists of sand within thin lenses of sand and gravel, silt and clay. The thickness of this unit varies from 10 to 180 feet with 90 feet being typical. The fifth unit is present in the northern and eastern portions of the peninsula where bedrock is deeper. The top of Unit 5 generally lies within 300 to 400 feet of ground. Potential well yields in Unit 5 range from a few tens to over 1,000 gpm. The Port William wells are completed in this unit.

- **Unit 6:** The sixth unit, commonly referred to as the "undifferentiated deposits," includes both aquitard and aquifer material. Little is known about Unit 6 as few wells are completed into it. In areas it reaches a thickness of 1,000 feet. During the installation of Port Williams Well #3 boring was continued past the lower aquifer into the undifferentiated deposits. Water bearing zones were encountered but potential productivity was lower than the lower aquifer unit.

The above descriptions were taken from *Construction, Testing, and Recommended Operation, Port Williams Well #3, City of Sequim, Washington* (PGG, 2008). Characterization of the regional hydrogeology was performed by the USGS and presented in *Hydrogeologic Assessment of the Sequim Dungeness Area, Clallam County, Washington* (Thomas et al., USGS, 1999).

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RECHARGE AND DISCHARGE ZONES

Recharge to the various aquifer units is dependent on several factors including inflow from uplands, precipitation recharge, irrigation leakage recharge, and river and creek leakage recharge. A model created by the U.S. Geological Survey in the early 1980s estimates the quantities of recharge for the aquifers in the vicinity of Sequim and the Dungeness River valley. Table 5-2 summarizes the results of the USGS model for inflow to the aquifer systems.

Table 5-2 Aquifer Recharge Components

Inflow Component	Flow in Cubic Feet per Second (March, 1979)	Percentage of Total Inflow
Inflow from Uplands	15.2	18.5%
Precipitation Recharge	15.1	18.4%
Irrigation Leakage(1)	32.3	39.4%
River and Creek Leakage	19.4	23.7%
Total	**82.0**	**100%**

(1) Irrigation leakage since 1979 will have decreased due to lining of ditches.

These results do not make a distinction between aquifer units and in which aquifer the recharge is greatest. However, several assumptions based on the nature of the aquifers can be made. For all three components except inflow from uplands, it is expected that the recharge impacts would be greatest on the shallowest aquifer (Unit 1), the aquifer closest to the ground surface. The deeper aquifers (Units 3 and 5) would tend to be recharged by upland inflow and by overlying aquifers. The model calculated that the net flow between aquifers in March 1979 was 27.7 cfs from Unit 1 to Unit 3 and 8.8 cfs from Unit 3 to Unit 5.

Discharge from the aquifers is predominately to marine waters with smaller components of discharge to creeks and pumping. The model predicted that approximately 83.4 percent of total outflow is to marine waters with roughly 60 percent of the outflow to marine waters coming from Unit 1. Approximately 16.5 percent of the total outflow is net leakage to creeks and other surface water bodies. Only 0.1 percent of the total outflow from the aquifers in March 1979 was attributed to pumping.

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WELLHEAD PROTECTION ZONES

Introduction

A WHPA is defined as the surface and subsurface area surrounding a groundwater source through which potential contamination can travel and eventually reach the source. In the State of Washington, WHPAs are based on ZOCs which are derived from the time of travel required for a contaminant to move from the point of introduction into the water bearing formation to the source. The Washington Wellhead Protection Program requires a WHPA to be subdivided into five zones which include:

- A sanitary control zone of at least 100 feet, unless engineering justification supports a smaller area (WAC 246-290-135). No source of contamination may be constructed, stored, disposed of, or applied within the sanitary control zone without the permission of DOH and the water purveyor.

- Three primary zones based on 1-, 5-, and 10-year time of travel boundaries. These zones are referred to as the ZOC of the WHPA. (e.g., ZOC_1 – 1-year zone of contribution).

- One buffer zone (if necessary) extending from ZOC_{10} to a groundwater divide and highlighting areas where the aquifer may be particularly susceptible or vulnerable to contamination.

The ZOC_{10} defines the boundary of the WHPA and defines the area to be inventoried and managed to reduce the risk of contamination.

Delineation Methods

There are four general delineation methods acceptable to DOH to determine ZOCs and WHPAs.

1. Calculated Fixed Radius (CFR)
2. Analytical Models
3. Hydrogeologic Mapping
4. Numerical Flow/Transport Models

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In general, there is an increase in complexity and required input data moving down the list. However, the increase in input data and complexity generally results in greater accuracy. The CFR method is the minimum acceptable interim method of delineation for public water systems with between 100 and 1,000 connections. There are two scenarios under which the water system would be expected to upgrade their initial delineation: (1) the susceptibility assessment indicates that the system is highly susceptible, or (2) there are irregular or steep groundwater gradients in the vicinity of the well. If either of these two conditions exists, the public water supply would be expected to upgrade the initial delineation to an analytical or groundwater flow model within 5 years.

An analytical model requires basic hydrogeological information including the direction of groundwater flow, gradient, and certain physical characteristics of the aquifer. These physical characteristics include the aquifer thickness, the rate at which the aquifer will transmit water (transmissivity), and whether the aquifer is confined or unconfined.

A numeric model requires significantly more data than the other methods. In numerical modeling, a grid is superimposed over the study area. Each square in the grid, called a cell, is characterized by physical parameters which are estimated from data collected from a variety of sources. The sources may include well logs, geologic and hydrogeologic maps, geophysical data, groundwater elevation data, stream flow discharge, and meteorological data. The parameters used to define the hydrogeological characteristics of each cell in the study area include identification of the vertical relationship of each aquifer and confining layer, the transmissivity of each aquifer, the thickness of the fine grained materials which separate the aquifers, the annual recharge, the connection between surface water and groundwater, the relationship between the model area and the areas surrounding it (boundary conditions), and lastly, the location and pumping rates of wells. The numeric method generates more accurate results than the CFR or analytical methods, but is relatively costly to develop. Consequently, numeric models are most commonly used by large utilities with complex aquifers that have the resources to collect the extensive model input data required.

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WHPA Delineations

Since the City has more than 1,000 connections, DOH requires the use of analytical models or better. An analytical model was used to delineate the WHPAs for the Port Williams and Silberhorn wells. Since the Silberhorn and Port Williams wells are a part of a defined wellfield, a WHPA was defined for each wellfield instead of separate WHPAs for individual wells. The model used was the two-dimensional analytic groundwater flow model TWODAN developed by Fitts GeoSolutions of Scarborough, Maine. Modeling for Silberhorn was performed during the previous water system plan and modeling for Port Williams was performed for the development of the third well. In both cases modeling was performed by Gray & Osborne, Inc.

Aquifer Properties

The aquifer properties were determined from a series of hydrogeological reports performed by the U.S. Geological Survey and Pacific Groundwater as listed earlier in the chapter. A summary of hydrogeological properties used in the analytical model for the Port Williams and Silberhorn Wellfields is contained in Table 5-3.

Table 5-3 Port Williams and Silberhorn Wellfields Hydrogeological Properties Used in TWODAN Model

Parameter	Port Williams	Silberhorn
Groundwater Flow Direction	Northeasterly	Northerly
Hydraulic Gradient	0.010	0.010
Aquifer Thickness	88 ft	100 ft
Transmissivity	4,100 ft^2/d	7,500 ft^2/d
Pumping Rate	1,690 gpm (1)	300 gpm

(1) Modeling for the Port Williams Wellfield was performed during the development of the third well with the pumping rate based on the sustainable flow with all three wells operating. This flow rate is higher than the City's annual water right for this wellfield and therefore the ZOCs for Port Williams are highly conservative.

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Pumping Rates

The City maintains three water sources with a total annual permitted withdrawal of 1,850 acre-feet/year (1,147 gpm of constant continuous withdrawal). The average annual demand at the 20-year planning horizon is approximately 1,100 gpm. Analytical modeling was performed for the Silberhorn Wellfield during the previous Water System Plan. Analytical modeling

was performed for Port Williams Wellfield during the development of the third well. The pumping rates used for these analyses are conservative for the purposes of this Plan, but this is acceptable because these rates provide additional assurance of wellhead protection. For a conservative delineation, a pumping rate of 1,690 gpm was used for the Port Williams Wellfield for the TWODAN model. The Silberhorn Wellfield was modeled at an annual average flow of 300 gpm.

Modeling Results

The results of the TWODAN modeling are graphically represented in Figure 5-2. Figure 5-2 illustrates the 6-month, 1-, 5-, and 10-year ZOC for the Port Williams and Silberhorn Wellfields. The 6-month ZOCs for each wellfield, which are required by 1999 revisions to the WAC, have been extrapolated from the 1-year ZOC. The 10-year ZOC defines the total wellhead protection area for each wellfield. The shapes of the WHPAs as delineated by the TWODAN model differ primarily due to aquifer properties. The Port Williams WHPA is somewhat oval in shape which is largely a function of relatively low transmissivity as compared to the Silberhorn Wellfield. The Silberhorn WHPA is relatively long and narrow due to a relatively high aquifer transmissivity and relatively steep gradient. It should be noted that model results are strictly a function of model input. Actual geologic conditions may differ from the conditions used for modeling purposes. Consequently, the City should be aware of activities in the vicinity of the delineation, as nearby sources of contamination may pose a potential threat.

Increasing the pumping rate on either WHPA widens the WHPA more than lengthening it. As pumping is increased the aquifer supplies water to the wellhead radially from the surrounding aquifer, not just along the center axis of the WHPA.

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INVENTORY OF POTENTIAL CONTAMINANT SOURCES

An essential element of wellhead protection is an inventory of all potential sources of groundwater contamination in and around the delineated wellhead protection areas. The purpose of the inventory is to identify past, present, and proposed activities that may pose a threat to a source.

Other purposes for maintaining an inventory of potential contaminant sources are to help plan management strategies, establish a mailing list to notify potential contaminant sources located within the wellhead protection areas and notification of agencies regarding inventory findings. An accurate description of inventory data sources is also necessary and can be used to update the plan as required in WAC 246-290-135.

POTENTIAL CONTAMINANT SOURCES

Within a wellhead protection zone, there are many diverse activities that may contaminate an aquifer and potentially prevent its use as a viable drinking water source. It is important that these activities are properly inventoried and, if necessary, regulated to prevent degradation of groundwater quality. Relevant activities and sources include:

- Industrial and Commercial Activity
- Hazardous Materials Storage
- Agricultural Activities
- Underground Storage Tanks
- Septic Systems
- Dry Wells
- Stormwater
- Accidental Spill
- Confirmed or Suspected Contamination sites

A discussion of these practices and their potential effects on groundwater, and the regulatory requirements which may apply are included in the following sections.

Industrial and Commercial Activity

Industrial and commercial activity poses a potential threat to groundwater quality due to the potential use of hazardous materials within these areas. Examples include gasoline service stations and auto repair shops (petroleum fuels, heavy metals), dry cleaners (dry cleaning solvents), printers and publishers (solvents, inks, and dyes), and metal plating shops (cyanides and heavy metals). Typically, industrial or commercial activity may be regulated by the State but only for industry/commercial specific functions; however, there are no general industrial or commercial regulations regarding potential wellhead

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contamination. One option for a municipality to avoid having these types of activities located within WHPAs is through zoning and land use designation prohibiting industrial or commercial development within WHPAs.

Hazardous Material Storage

Hazardous material storage is a specific function of industrial/commercial activity. On the federal level, hazardous material storage and use is regulated through the Resource Conservation and Recovery Act (RCRA). At the state level, these activities are regulated by Ecology's Dangerous Waste Regulations (WAC 173-303). The state maintains a database of dangerous waste generators which can be searched by city. The phone number for the Ecology Southwestern Regional Office's Hazardous Waste and Toxics Reduction Program is (360) 407-6300. However, small quantity (less than 220 pounds) dangerous waste generators are not included in the database.

Agricultural Activity

Agricultural activity can be a concern due to the potential for bacteriological and nitrate contamination. There is also a potential for contamination by agricultural chemicals such as pesticides and herbicides. Agricultural businesses can help minimize the potential by managing animal wastes and by proper application and disposal of agricultural chemicals. RCW 90.64 – *Dairy Waste Management* specifies that dairy farms with more than 700 confined mature dairy cows or 200 mature dairy cows whose wastes are discharged to navigable, surface, or ground waters are required to complete dairy waste plans that specify how the dairy farm manages its wastes. However, most programs involving agricultural activity are voluntary and may be administered by the State Conservation Commission or the Natural Resource Conservation Service not by the water purveyor. Municipalities that work with these organizations have the opportunity to educate farmers regarding the potential impacts of the farmers' agricultural practices on the WHPA.

Underground Storage Tanks

Underground storage tanks (USTs) and leaking underground storage tanks (LUSTs) are a significant threat to groundwater quality. The majority of petroleum products stored in USTs are less dense than water and tend to migrate to the top of an aquifer (or water surface in an unconfined aquifer) when released in the

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vadose (unsaturated) zone or in groundwater. Petroleum products and their impurities tend to be rather mobile in aquifers with generally increasing mobility with decreasing organic content in soils. The lightest hydrocarbons (e.g., gasoline) with the highest solubility in water exhibit the greatest amount of petroleum contaminant movement. The U.S. EPA estimates that 35 percent of all USTs are leaking. The most common causes of leaks are structural failure, corrosion, improper fittings, and improper installation.

Ecology regulates USTs under WAC 173-360. The regulations require that tank owners and operators of underground storage tanks comply with the following sections of the regulations:

- Notification, reporting, and record keeping;
- Performance standards and operating closure requirements;
- Registration and licensing; and
- Financial responsibility.

The WAC allows a number of exemptions including tanks whose capacity is 110 gallons or less, farm and residential tanks with less than 1,100 gallons, heating oil tanks less than 1,100 gallons per premises, and septic tanks.

Owners and operators of all existing nonexempt USTs must have a permit from Ecology. A valid permit is a requirement for delivery of regulated substances and must be updated annually. As a condition of the permit, the owner must have completed the following requirements:

- An assessment of the tank condition by an Ecology-licensed tank service provider.
- Replacement of leaking tanks and site cleanup.
- Installation of leak detection devices.

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- Proof of insurance to compensate a third party in the event of bodily injury or property damage stemming from a leaking tank. One million dollars of insurance is required for petroleum marketing facilities.

By 1998, all existing nonexempt USTs were required to provide cathodic protection and spill and overflow containment in addition to the above requirements.

Installation and replacement of USTs must meet the specifications and performance and design standards listed in the WAC. Ecology follows the federal UST guidelines, which at this time do not require double-walled tanks.

UST inspections are performed by Ecology primarily through the information developed in the permitting process. Although routine annual inspections are not performed, Ecology inspectors prioritize sites considered potentially hazardous. Technical assistance visits are also conducted at the request of the owner/operators.

Ecology maintains a database of all permitted USTs in the state, as required by the RCRA Subtitle I. The database provides the site name and address, tank identification number, date of installation, size, tank status, and the substance stored on the site. An additional database maintained by Ecology contains information about known LUSTs and remediated LUSTs. Both databases are updated twice a year.

Septic Systems

Contaminants associated with septic tank effluent include pathogenic organisms, toxic substances, and various nitrogen compounds including ammonia and nitrate which are highly soluble in water. Most septic drain fields discharge effluent to the unsaturated zone above unconfined aquifers. Contaminants from drain fields can percolate to the saturated zone and contaminate groundwater supplies. Septic tanks within Clallam County are regulated by the Clallam County Department of Environmental Health.

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Dry Wells

Dry wells discharge water directly into soils and are only used in areas with highly permeable soils. They have historically been used as a method of discharging stormwater from stormwater collection systems. Dry wells can serve as a conduit to groundwater for contaminants contained in stormwater such as metals and petroleum byproducts.

Stormwater

Stormwater can contain many chemicals derived from road runoff. These include heavy metals such as lead, chromium, and zinc; oil and grease; pathogens; nutrients; and petroleum byproducts. Typically, the concerns regarding stormwater are related to the impacts on surface water. However, groundwater can also be adversely affected by stormwater. The City of Sequim has adopted the Department of Ecology Stormwater Manual. The Manual establishes stormwater control measures including flow quantities and characteristics and minimum acceptable stormwater treatment practices.

Accidental Spills

Accidental spills or releases of contaminants can potentially impact groundwater supplies. Potential sources of spills and leaks include USTs, accidents, and poor disposal practices. U.S. Highway 101 is a potential source of hazardous materials and it passes through the lower portion of the 10-year ZOC.

The first responder to spill incidents is the Clallam County Fire District No. 3. The Fire District team is responsible for containment and cleanup of the hazardous material. Under the terms of the City's emergency management plan, the Fire District may contact the City's Public Works Department to request additional assistance to respond to major spills.

Confirmed and Suspected Contamination Sites

Under the Model Toxics Control Act Cleanup Regulation (WAC 173-340), Ecology is responsible for ensuring that all hazardous waste sites are properly remediated. This includes confirmed and suspected sites of contamination as well as LUSTs. A separate inventory for each, which includes the status of cleanup efforts, is maintained by Ecology. Ecology conducts and initial site investigation within 90 days of learning of a potentially contaminated site. If this investigation shows that

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remedial action is required, the site will appear on the Confirmed and Suspected Contaminated Sites Report. The sites are also given a Washington Ranking Code BIN number between 1 and 5, with 1 indicating the greatest assessed risk to human health and the environment and 5 indicating the least. The contaminant type and the affected media, such as groundwater, are also noted. Once the remedial action has been completed, Ecology's Toxics Cleanup Program determines if the site can be removed from the list.

POTENTIAL CONTAMINANT INVENTORIES

The inventory of potential contaminant sources was compiled using information supplied by the City of Sequim, searches of Department of Ecology databases, and searches of Clallam County Department of Environmental Health databases.

INDUSTRIAL AND COMMERCIAL ACTIVITY

There is very little industrial activity in the City or in the vicinity of the WHPAs for the Port Williams and Silberhorn Wellfields. The main commercial district is along both sides of Washington Street which runs east and west through the City (Figure 1-10). This district is within the WHPA for the Port Williams Wellfield. The Silberhorn Wellfield does not have any industrial or commercial activity within its WHPA.

NITRATE CONTAMINATION

Nitrate contamination of groundwater is a considerable concern for the Dungeness Peninsula and the City of Sequim's water sources. A study by the USGS in 1996 investigated the possible nitrogen sources and nitrogen concentrations in the Sequim-Dungeness area. The results of this study were compared to previous studies from 1980 and 1992 to identify if and how concentrations have changed over time. The results suggest that the primary sources of nitrogen input into the groundwater are from residential fertilizers (24 percent), septic systems (21 percent), mineralization of soil organic matter (20 percent), agricultural fertilizers (20 percent), and dairy farms (8 percent). Because the annual loading for each source was calculated based on many assumptions and poorly characterized parameters for this region, the exact amount of nitrate from each source is still under. However, the primary sources of nitrogen input into groundwater are believed to be those listed above. For

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example, agricultural fertilizers are hard to characterize since they are usually not bought from local sources and the amount applied varies by crop type and farmer. It is also notable that a dairy facility is located in the 5-year zone of contribution for the Port Williams Wellfield, just a block outside of the 1-year zone of contribution.

Land use appears to play an important role in determining nitrate concentrations in shallow groundwater. The median nitrate concentration in the shallow aquifer for residential land use is 1.3 mg/L, 0.55 mg/L for agricultural areas, and 0.12 mg/L for natural grasslands and forests. Statistical tests were used to evaluate if there was a significant increase in nitrate concentration from the study in 1980 to the studies in 1992 and 1996 and from 1992 to 1996. Nitrate concentrations were found to significantly increase from 1980 to 1992 and 1980 to 1996, but not from 1992 to 1996. The median nitrate concentration in 1980 was 0.37 mg/L, in 1992 it was 0.55 mg/L, and in 1996 it was 0.46 mg/L. The area which had the highest increase in concentration from 1980 to 1996 was located east of the Dungeness River, north of Bell Creek, and north of Highway 101. Of the groundwater samples collected, 42 percent had greater than a 1.0 mg/L increase in nitrate concentration. The area west of the Dungeness River, east of McDonald Creek, and north of Highway 101 only had 8 percent of the samples increase by more than 1.0 mg/L. The sources of the increase in nitrate concentrations are unknown. Some speculate that because groundwater levels have decreased during the period from 1980 to 1996 there is less dilution and higher concentrations. This decrease in groundwater level is likely from a 30 percent decrease in irrigation diversions by farmers that have historically recharged the groundwater.

Historically, the City of Sequim's wells have been monitored for nitrate and City is in compliance with the MCL. Monitoring has shown an increase in nitrate for the Silberhorn Wellfield from the early to mid-1990s. Nitrate levels at these wells have since stabilized and currently range from 1 to 1.8 mg/L.

Nitrate levels in the Port Williams Wellfield have been generally consistent, with levels less than 1 mg/L. Although the City does not currently have issues with nitrate levels in its wells, it is evident that nitrate levels in many wells in the area are

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increasing. The City should continue monitoring nitrate levels as well as tracking year-to-year changes to determine trends. From the studies performed, it is evident that a significant source of nitrate contamination of groundwater in the region is septic systems. The City's wellhead protection areas include areas with septic systems as well as areas that are served by City sewer. Properties within the City are generally sewered, while many residences outside city limits are on septic tanks.

SEPTIC SYSTEMS

Tax parcel ID numbers for those parcels which were located within the 10-year ZOC for the Port Williams and Silberhorn Wellfields were submitted to the Clallam County Department of Environmental Health in Port Angeles. The Department identified those parcels which contained a permitted septic tank. The Department also identified parcels with single-family residences that were present before 1985, the first year of the septic tank permit program. GIS data with the locations of the parcels of land that have known septic systems was obtained and used with the ZOC GIS data to locate how many septic systems are within each ZOC.

There are a total of 189 septic systems located within the Port Williams 10-year ZOC. There are a total of 55 septic tank systems located within the Silberhorn 10-year ZOC. A summary of septic systems in each ZOC is presented in Table 5-4.

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Table 5-4 Septic Systems within Wellfield ZOCs

Source	ZOC	Number of Septic Systems
Silberhorn Wellfield	6-month	6
Silberhorn Wellfield	1-year	14
Silberhorn Wellfield	5-year	55
Silberhorn Wellfield	10-year	55
Port Williams Wellfield	6-month	11
Port Williams Wellfield	1-year	29
Port Williams Wellfield	5-year	165
Port Williams Wellfield	10-year	189

Nitrate data also shows that the Silberhorn Wellfield has consistently higher nitrate readings than the Port Williams Wellfield. The wells at Silberhorn are completed in the shallow aquifer, which is more susceptible to septic system contamination.

Dangerous Waste Generators

A search of the Ecology database for dangerous waste generators within the WHPA returned a list of 27 hazardous waste reporting facilities. All of the facilities are located within the 10-year or 5-year ZOCs of the Port Williams Wellfield and there are no facilities within the WHPA for the Silberhorn Wellfield. A copy of the Ecology database search results is included in Appendix L.

Underground Storage Tanks

A search of the Ecology databases for USTs and LUSTs in and around the City returned a list of 12 current and/or cleaned up LUSTs and 36 operational USTs. Some of the LUSTs and USTs within city limits are located within the 10-year ZOC of the Port Williams Wellfield while none are within the Silberhorn WHPA. A copy of the Ecology database search results is included in Appendix L.

Individual Private Wells

Improperly installed or sealed private drinking wells can also be a potential contamination source. A contaminant that is introduced to an improperly sealed well can leak into the groundwater table and influence the City's wellheads. Private wells are regulated by Clallam County Environmental Health Services and Ecology. A summary of numbers of private wells in each ZOC is presented in Table 5-5.

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Table 5-5 Private Wells within Wellfield ZOCs

Source	ZOC	Number of Private Wells
Silberhorn Wellfield	6-month	16 wells
Silberhorn Wellfield	1-year	43 wells
Silberhorn Wellfield	5-year	76 wells
Silberhorn Wellfield	10-year	77 wells
Port Williams Wellfield	6-month	13 wells
Port Williams Wellfield	1-year	26 wells
Port Williams Wellfield	5-year	108 wells
Port Williams Wellfield	10-year	127 wells

POTENTIAL CONTAMINANT SUMMARY

A summary of all of the potential contamination sources in each ZOC is presented in Table 5-6. The locations and distribution of potential contaminant sources are shown in Figure 5-3.

Table 5-6 Summary of Potential Contaminate Sources within Wellfield ZOCs

Source	ZOC	Potential Contaminant Sources				
		Private Wells	Septic Tanks	UST/ LUST	Hazardous Waste	Dairy Farm
Silberhorn Wellfield	6-month	16	6	0	0	0
Silberhorn Wellfield	1-year	43	14	0	0	0
Silberhorn Wellfield	5-years	76	55	0	0	0
Silberhorn Wellfield	10-years	77	55	0	0	0
Port Williams Wellfield	6-month	13	11	0	0	0
Port Williams Wellfield	1-year	26	29	0	0	0
Port Williams Wellfield	5-years	108	165	1	3	1
Port Williams Wellfield	10-years	127	189	24	24	1

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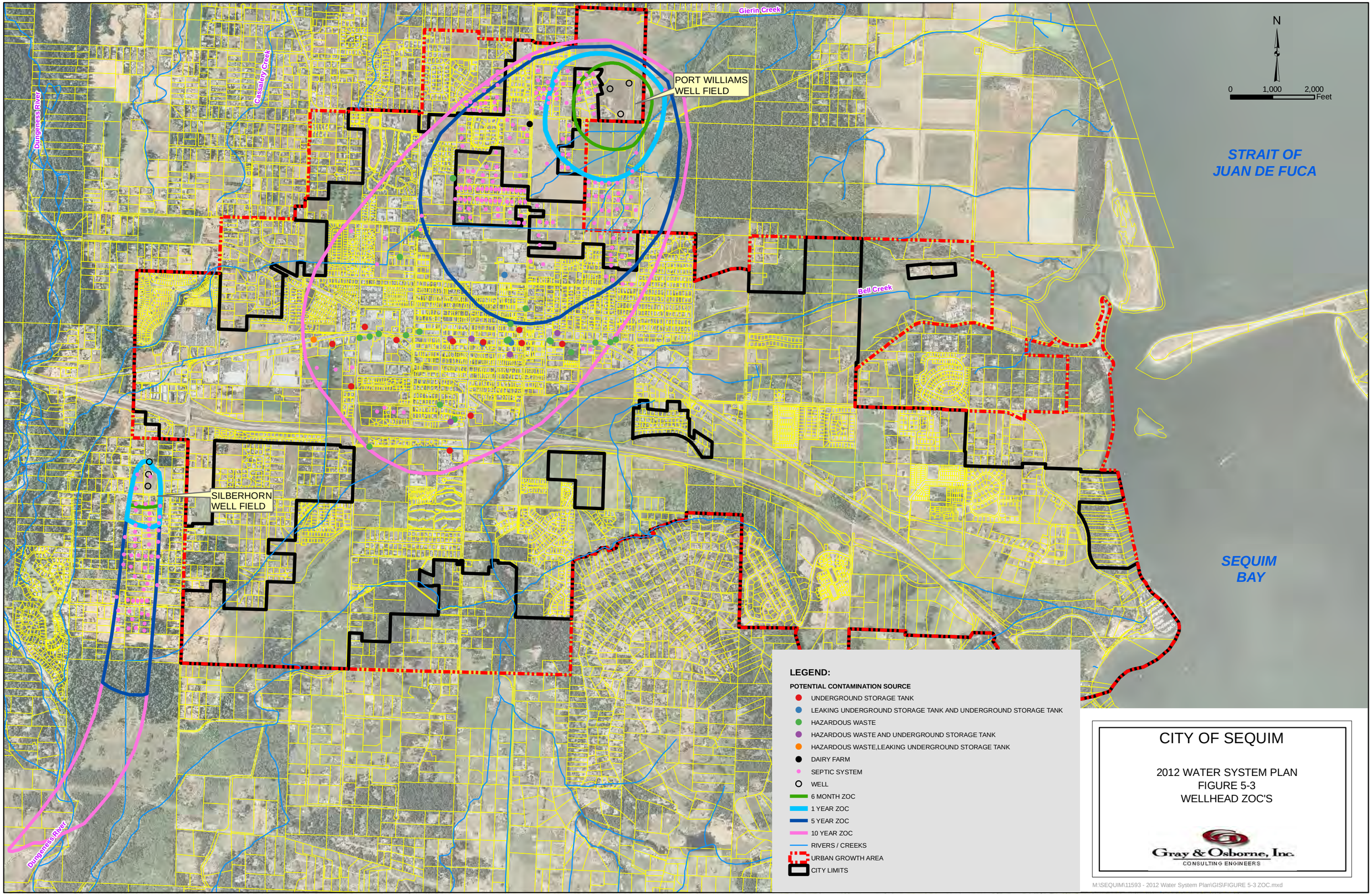
SPILL RESPONSE

Spill response is an important part of both an emergency management plan and a wellhead protection program. The release of hazardous materials in a wellhead protection area can create problems other than the initial contamination of the soil and surface water. If the release to an aquifer occurs in source's ZOC, there is the possibility that the contaminants will migrate to the source and contaminate it. Planning for spill response should


Gierin Creek
Dungeness River
Cassalery Creek
PORT WILLIAMS
WELL FIELD
Bell Creek
SILBERHORN
WELL FIELD
Dungeness River
N
0
1,000
2,000
Feet
STRAIT OF
JUAN DE FUCA
SEQUIM
BAY
LEGEND:
POTENTIAL CONTAMINATION SOURCE
UNDERGROUND STORAGE TANK
LEAKING UNDERGROUND STORAGE TANK AND UNDERGROUND STORAGE TANK
HAZARDOUS WASTE
HAZARDOUS WASTE AND UNDERGROUND STORAGE TANK
HAZARDOUS WASTE,LEAKING UNDERGROUND STORAGE TANK
DAIRY FARM
SEPTIC SYSTEM
WELL
6 MONTH ZOC
1 YEAR ZOC
5 YEAR ZOC
10 YEAR ZOC
RIVERS / CREEKS
URBAN GROWTH AREA
CITY LIMITS
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 5-3
WELLHEAD ZOC'S
Gray & Osborne, Inc.
CONSULTING ENGINEERS
M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 5-3 ZOC.mxd

reflect the needs and concerns of the City while maintaining groundwater quality.

SPILL RESPONSE PROGRAMS

The City maintains an emergency response plan that contains procedures for responding to hazardous materials spills within the City. The first responder to spill incidents is the Clallam County Fire District No. 3. When spills or incidents are too large for the Fire District alone the Fire District may contact the City's Public Works Department to request additional assistance.

CONTINGENCY PLANNING

Contingency planning is an important component of a wellhead protection program, however, planning alone cannot account for unanticipated incidents. The City has a great deal of flexibility with three reliable sources. Each source is capable of supplying a significant portion of the City's current and future demands individually. Additionally, all of the sources draw from significantly different water bearing formations. The Infiltration Gallery is recharged directly from the Dungeness River, the Silberhorn Wellfield draws from Unit 1 (shallow aquifer), and the Port Williams Wellfield draws from Unit 5 (deep aquifer). It is highly unlikely that a contamination event would occur that would impact more than one of these sources simultaneously. Table 5-7 summarizes the planned capacity of the City's water sources in the year 2018 at the end of the 6-year planning horizon.

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Table 5-7 Water Source Capacity vs. Year 2018 Average Daily Demand

Source	Capacity (gpm) (1)	Maximum Instantaneous Water Right (gpm)	ADD Year 2012 (gpm)	Capacity Meets Year 2018 ADD?
Port Williams	1,760	2,250	753	Yes
Infiltration Gallery	350	718	753	No
Silberhorn	700(2)	700	753	No

(1) Reliable capacity for each pumped source is with largest pump out of service.
(2) Silberhorn Wellfield is limited by instantaneous water right. Total pumping capacity is 700 gpm.

Table 5-7 indicates that the only source that could meet average day demand in 2018 by itself is the Port Williams Wellfield.

However, if any one source was unusable, the other two could easily meet average day demand. In an emergency the City could restrict irrigation and other uses to reduce daily water usage from exceeding average day demands.

MANAGEMENT PLAN

The management of the Port Williams Wellfield will be accomplished by controlling the type and amount of growth in the WHPA. The Port Williams Wellfield and WHPA are within the City's 20-year Urban Growth Area (UGA) boundary which allows the City greater control regarding land use. The WHPA area is zoned for residential use only with minor commercial use and no industrial use allowed.

The Silberhorn WHPA is outside of the City's UGA boundaries. The area is residential and agricultural and, as described earlier, is characterized by single-family residences with septic tank systems. Although the City does not have direct control of the area, the City plans on notifying the septic tank property owners within the WHPA of their location within the WHPA. This notification will include recommendations for good septic tank maintenance and practices and provide contacts information for the City and the Clallam County Department of Environmental Health. The City will also alert the Department of Environmental Health with the list of septic systems that are within the Silberhorn Wellfield ZOC.

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Chapter 6

OPERATION AND MAINTENANCE PROGRAM

WATER SYSTEM MANAGEMENT AND PERSONNEL

The City of Sequim is governed by a City Manager and seven member City Council. Water system staff include a Public Works Director, Utilities Manager and five Water Distribution Managers. The City's Public Works Director is Paul Haines, the Utilities Manager is Pete Tjemsland and the lead operator is Marty Hogoboom, Water Distribution Manager 3. The contact number for the City's public works office is (360) 683-4908. The City's emergency phone number is (360) 912-7059. The operator number and certification status of City water utility staff is detailed below in Table 6-1.

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Table 6-1 Water Operations Staff Certifications

Name	Operator #	Position	Certification	CCS(1)
Arnold "Pete" Tjemsland	007599	Utilities Manager	WDM-2	Yes
Marty Hogoboom	006224	Lead Operator	WDM-3	Yes
Doug Bridges	008160	Water Operator	WDM-3	Yes
James McBride	006700	WWTP Operator	WDM-2	Yes
Kevin Hergert	012320	Water Operator	WDM-1	No
Allan Chrisman	004672	WWTP Operator	WDM-2	Yes

(1) Cross-Connection Control Specialist.

PROFESSIONAL GROWTH REQUIREMENTS

In order to maintain expertise for the various grades of operator certification, Washington State requires that all certified operators complete not less than three Continuing Education Units (CEU) within each 3-year period. Programs sponsored by both Washington Environmental Training Resources Center (WETRC) and the American Waterworks Association (AWWA) Pacific Northwest Subsection are the most popular source of CEUs for certified operators in Washington State.

Besides providing CEUs, operator training is an important component in maintaining a safe and reliable water system. At a minimum, all personnel performing water system related duties will receive training in the following areas.

- Basic Water Testing
- Water Works Hydraulics
- PRV Operation and Maintenance
- Record Keeping
- Meter Reading
- Meter Installation and Maintenance
- Fire Hydrant Maintenance
- Sodium Hypochlorite Safety
- Sodium Hypochlorite Equipment Installation and Maintenance
- Confined space
- Trenching and shoring
- Traffic Flagging
- Asbestos cement pipe safety

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- Cross-Connection Control

The City's certified operators all complete CEUs on a regular basis. All certified operators have received training for confined space, trenching and shoring, traffic flagging, asbestos cement (AC) pipe safety, and cross connection control.

SYSTEM OPERATION AND CONTROL

MAJOR SYSTEM COMPONENTS

The locations of the major system components are shown on Figure 1-2.

The City currently utilizes three major sources of supply: the Infiltration Gallery, the Silberhorn Wellfield, and the Port Williams Wellfield. The Infiltration Gallery, which is a series of perforated interception pipe lines buried under the bank of the Dungeness River, is operated at a constant supply rate of 350 gpm as turbidity levels allow. The Infiltration Gallery also consists of a collection well, a chlorination unit, and a 12-inch transmission line with valves. The system is operated by a siphon which is primed by a diaphragm air pump. The chlorinator uses 12-percent sodium hypochlorite and is operated manually. The chlorinator continues to operate as long as the Infiltration Gallery is flowing. When the Infiltration Gallery is shut down, the chlorination unit is shut off automatically. Sodium hypochlorite is injected into the water main at the control building. The Infiltration Gallery feeds the City's 1.7 MG reservoir.

The Silberhorn Wellfield consists of three wells. The City currently utilizes all three of the wells, however, a maximum of two wells are used of one time due to water rights constraints. The City operates each well at a maximum pumping rate of 260 gpm due to aquifer and screen limitations. Chlorination is provided by 12-percent bulk hypochlorite is injected into the water main at the control building. The injection pump is triggered to come on when a pump is called. Flow from Silberhorn is measured by a flow meter in the control building. Water from the Silberhorn Wellfield is delivered to the City's 1.7 MG reservoir and the 420 pressure zone. The Silberhorn Wellfield is equipped with a standby generator.

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The Port Williams Wellfield currently consists of three wells, each designed for a pumping capacity of 560 to 600 gpm. A total of up to five wells may be drilled at the Port Williams site per the water rights permit. All wells in the Port Williams Wellfield are proposed to pump through the Control Building and be connected to the 12-inch water main located on Port Williams Road. Each well is equipped with a flow meter, and the total flow from all wells is measured with the flow meter in the Control Building. Sodium hypochlorite is injected into the water main in the Control Building to provide chlorine disinfection of the system. The existing wells can be operated together based on the water level in the 1.7 MG reservoir or by drop of pressure at the Control Building. The wells are programmed to alternate on each pump cycle during normal operation. During high demands multiple wells will operate based on pressure in the 350 Zone. The wells pump directly to the 350 Zone. The Port Williams Wellfield is equipped with a standby generator.

The City has six hydraulic pressure zones in order to maintain reasonable pressures (minimum and maximum) within each zone. The hydraulic grade lines (HGL) of the zones are labeled 350, 420, 480, 500, 680 and 775, which refer to the elevation above sea level of the HGL in the zone. The HGLs of the 420, 480 and 680 Zones are set by reservoirs. The HGL of the 775 Zone is set by a booster station. The HGLs of the 350 and 500 Zones are set by pressure reducing valve (PRV) stations.

The lower zone has been designed to operate at an HGL of 350. The lower zone HGL can be varied to meet the desired operational pressures within the area by adjusting the pressure reducing valves between the 420 and 350 Zones. The 420 Zone contains the 1.7 MG reservoir. The overflow level of the 1.7 MG reservoir is 420 feet.

The 480 Zone is served by the 480 Zone Booster Station and 0.2 MG reservoir on Reservoir Road. This system is isolated from the other zones by closed gate valves.

When a Port Williams well is pumping and does not provide all of the supply required for the 350 Zone, or if the well has not been called, the PRV at 5th Avenue and McCurdy Street will open to allow water to flow from the 1.7 MG 420 Reservoir to the lower zone and the PRV will modulate to maintain the set hydraulic

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gradient for the zone. If the Port Williams well is pumping more than required to meet demands in the 350 Zone, the booster station at 5th Avenue and McCurdy Street will be enabled to start under certain conditions and pump water to the 1.7 MG reservoir.

The 500, 680, and 775 Zones are located in the southeast portion of the City and serve the Solana Development. Two booster stations, a reservoir, and multiple PRVs were constructed in association with this development. The 680 Zone Booster Station pumps from the 420 Zone to the 680 Zone and the 1.0 MG Solana Reservoir. The 775 Booster Station pumps from the 680 Zone to the 775 Zone. The 500 Zone is supplied by PRV from the 680 Zone.

PREVENTIVE MAINTENANCE PROGRAM

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. The routine maintenance procedures for each system component are described below.

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 impossible 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. The City of Sequim currently cleans their reservoirs on approximately 5-year intervals. Reservoir levels are monitored daily.

Distribution System Valve and Hydrant Maintenance

The City implemented a distribution valve exercising program. Valves that do not close tight are removed, repaired or replaced. An important aspect of distribution system valve maintenance is to ensure distribution valves are completely open. A partially closed

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valve can seriously reduce peak day operation and fire flow supply. Distribution valves and fire hydrants are operated annually. Sample maintenance reporting forms are included in Appendix N.

Pressure reducing valves (PRVs) control flow from higher zones into lower zones. The City records the upstream and downstream pressure across PRVs. To test the PRV function a downstream fire hydrant is opened to make sure the valves are operating properly.

Dead-End Water Lines

Dead-end water lines are susceptible to water quality problems and must be flushed regularly to remove stagnant water and debris which may have been deposited. Flushing of all dead end mains to maintain water quality is accomplished twice each year or more often if water quality complaints occur.

Meters

Accurate water metering is an essential financial and conservation component of water system infrastructure. A substantial amount of revenue may be lost through inaccurate metering of customer accounts. Without accurate master or source meter readings, the water utility cannot determine (lost and unaccounted for water) distribution system leakage volumes. Service meters, including all residential and commercial customer meters, are calibrated and/or replaced according to the following schedule:

- 3/4-inch and 1-inch meters are tested every 10 years and replaced, if necessary. Replacement is recommended if it is cheaper to replace meters than to test and if necessary, repair meters.
- 2-inch through 4-inch meters are tested and calibrated every 3 to 5 years.
- 4-inch and larger meters are tested and calibrated every 1 to 3 years.

Inventory of Materials

The City maintains an inventory of parts and supplies including the materials needed to make emergency repairs. At a minimum, the materials maintained in the inventory are the materials necessary

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to repair leaks for every size and type of pipe in the system. Spare valves in sizes 8-inch and smaller are included in this inventory.

Operation and Maintenance Schedule

Table 6-2 lists the frequency of normal maintenance and operations activities.

Table 6-2 City of Sequim Operations and Maintenance

Operation and Maintenance	Frequency
Drain and Clean Reservoirs	Every 5 years
Monitoring Reservoir Levels	Daily
Distribution System Valve Exercising	Annually
Hydrant Exercising	Annually
PRV Inspection	Every 6 months, repair as needed
Service Meter calibration	Variable, depending on meter size
Flushing Dead-End Water Mains	Every 6 months or as needed
Commercial Meter Readings	Monthly
Residential Meter Readings	Bimonthly

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. In addition, the City has prepared a vulnerability assessment and an emergency response plan as required by law. These are on file for use by the City and are not included in this Plan for security purposes.

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.

Water System Personnel Emergency Call-Up List

Mr. Paul Haines is the City of Sequim's Public Works Director . Mr. Haines is in charge of initiating emergency response procedures and ensuring that customers and emergency response agencies are notified.

Table 6-3 is an emergency phone list for the City.

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Table 6-3 Emergency Phone List

Agency/Group	Contact	Phone Number
Fire/Police	--	911
Public Works Director	Paul Haines	360-683-4908
Utility Manager	Pete Tjemsland	360-683-4908
Utility Operator Cross-Connection Specialist	Marty Hogoboom	360-683-4908
City Shop	--	360-681-3449
Contractor	George Dickinson	360-683-8332
Contractor	We Dig It	360-683-8031
Contractor	Primo Construction	360-683-5447 or 360-457-5708
Contractor	Lakeside	360-452-7803
Contractor	Jordan Excavating	360-452-3270
Plumbing Supplies	Bill's Plumbing Supplies	360-683-4638 or 360-452-9084
Plumbing Supplies	Clallam Coop	360-683-4111
Pipe/Fitting Suppliers	Noel Smarr HD Supply	480-947-9831 360-536-1234
Pipe/Fitting Suppliers	H.D. Fowler	206-863-8600
Pipe/Fitting Suppliers	Western Utilities	800-772-6004
Telemetry Repair and Installation	S&B, Inc.	425-644-1700
Systems Integration	TSI	425-775-5696
Control Valve and Maintenance Repair	G.C. Systems, Inc.	253-939-8322
Testing Lab	Twiss Lab	360-779-5141
Testing Lab	Laucks, Inc.	206-767-5060
Testing Lab	Water Management Laboratories	253-531-3121
Washington State Dept. of Health	SW Regional Office	360-236-3030
Clallam County	Emergency Services	360-417-2305
Clallam County	Public Health	360-417-2274
P.U.D.	--	360-452-9771
State Wide One-Call	Utility Locates	800-424-5555
Gray & Osborne, Inc.	Seattle Number	206-284-0860
Department of Ecology – Spill Response	--	360-407-6300

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Bacteriological Presence Detection Procedure

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 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. A suggested boil water notice is included in Appendix I. WAC 246-290-320 requires water utilities to follow specific procedures in the event coliform bacteria are detected in the water system. These procedures are outlined in Figure 6-1.

IOC/VOC/SOC and Inorganic Chemical/Physical Characteristics Detection Procedures

A procedure to comply with DOH requirements in the event of an inorganic chemical/physical characteristic (IOC), volatile organic chemical (VOC) or synthetic organic chemical (SOC) detection is presented in Figure 6-2.

Power Failure

Various types of weather can cause loss of power, such as wind, lightning, freezing rain, and snow. The Silberhorn and Port Williams Wellfields have emergency power supplies that meet the minimum requirements of Section 5.B.6 Power Considerations of the Sizing Guidelines for Public Water Supplies and can be considered a non-interrupted power source. The Silberhorn Wellfield has a 75 kWH generator and sufficient fuel to provide back-up service for 24 hours. The Port Williams Wellfield has a 200 kWh generator which can operate the two wells simultaneously. The Infiltration Gallery feeds the water system by gravity and flow would not be affected in the event of a power failure. However, the treatment system at the Infiltration Gallery is dependent on power to operate and would require a temporary generator to function.

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Severe Earthquake

Table 6-4 details the City's response to a severe earthquake.

Table 6-4 Severe Earthquake Response

System Component	Action
Wells and PRVs: Wells may have lost power and PRVs may be damaged	• Repair/manipulate wells as needed to continue supply of water to system • Check PRVs for damage
Distribution System: Distribution and transmission mains may be broken	• Isolate broken sections and repair
Reservoir: Reservoir may be leaking or structurally damaged 1.7 MG reservoir has a seismic valve which will close in the event of an earthquake	• Check reservoir for structural damage and drain if in danger of bursting • Check reservoir for cracks and leaks, and seal or drain as required

Severe Snowstorm

Heavy snowfall may bring motor vehicle traffic to a standstill. Employees may not be able to reach problem area. Table 6-5 details the City's response to a severe snowstorm.

Table 6-5 Severe Snowstorm Response

System Component	Action
Distribution System: Transportation to monitor system and make repairs will be limited	• Plow streets if necessary and if equipment is available • Have chains and other snow gear ready for maintenance equipment and vehicles • Valve locations will be kept current and made available for maintenance personnel
Reservoir: No immediate effect. Snow may prevent access.	• Vehicle access not possible

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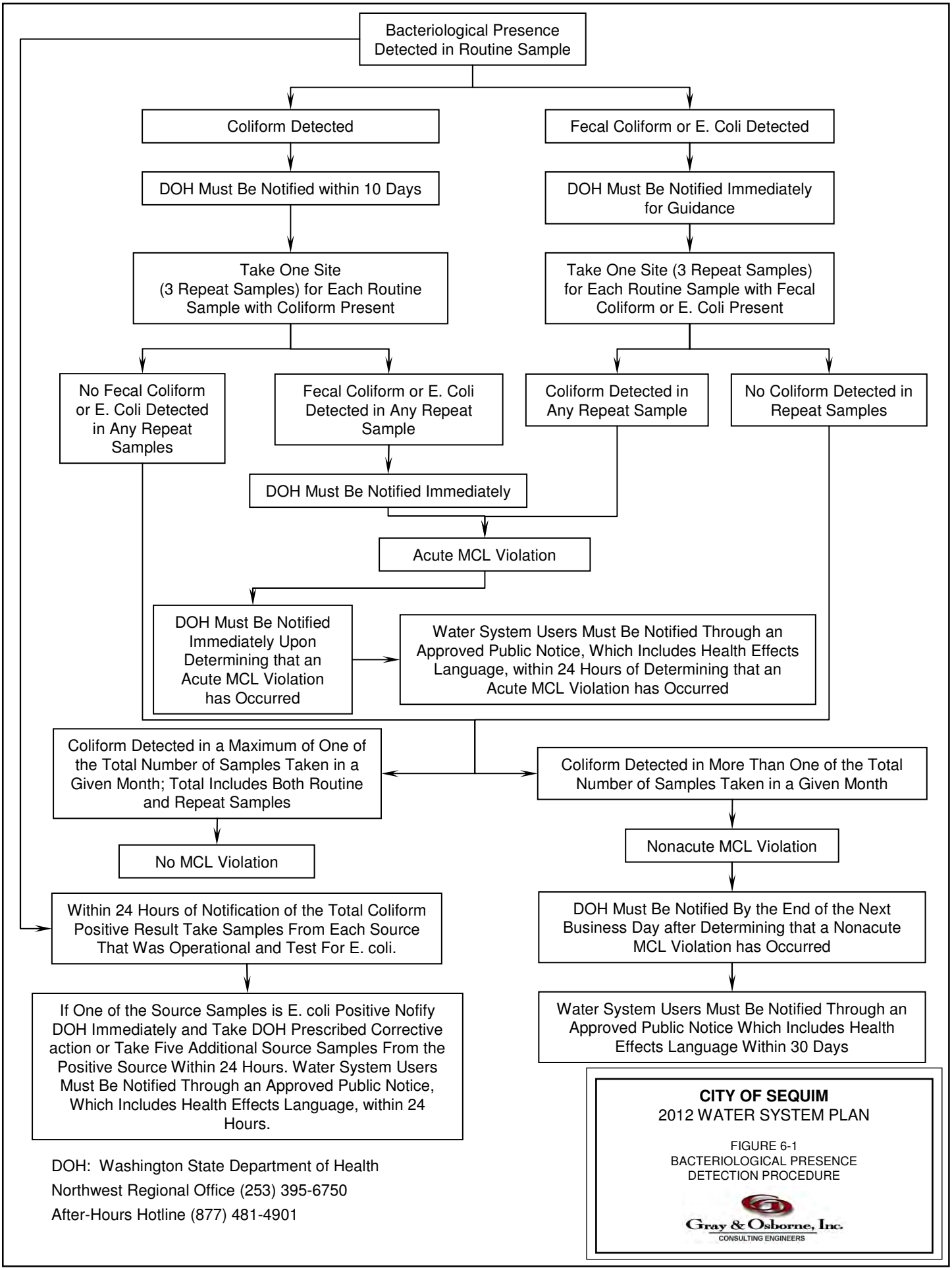
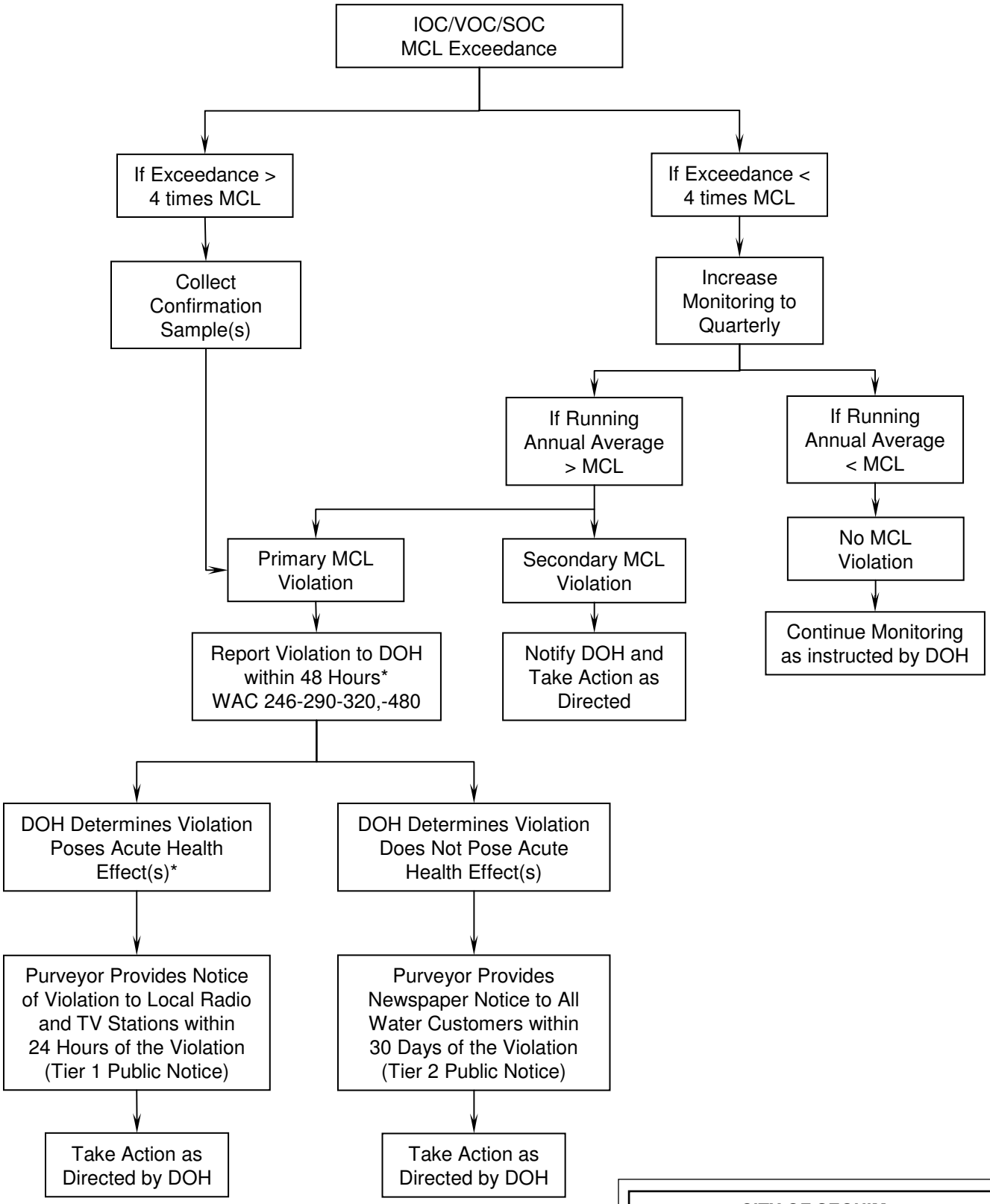

Bacteriological Presence Detected in Routine Sample
Coliform Detected
Fecal Coliform or E. Coli Detected
DOH Must Be Notified within 10 Days
DOH Must Be Notified Immediately for Guidance
Take One Site (3 Repeat Samples) for Each Routine Sample with Coliform Present
Take One Site (3 Repeat Samples) for Each Routine Sample with Fecal Coliform or E. Coli Present
No Fecal Coliform or E. Coli Detected in Any Repeat Samples
Fecal Coliform or E. Coli Detected in Any Repeat Sample
Coliform Detected in Any Repeat Sample
No Coliform Detected in Repeat Samples
DOH Must Be Notified Immediately
Acute MCL Violation
DOH Must Be Notified Immediately Upon Determining that an Acute MCL Violation has Occurred
Water System Users Must Be Notified Through an Approved Public Notice, Which Includes Health Effects Language, within 24 Hours of Determining that an Acute MCL Violation has Occurred
Coliform Detected in a Maximum of One of the Total Number of Samples Taken in a Given Month; Total Includes Both Routine and Repeat Samples
Coliform Detected in More Than One of the Total Number of Samples Taken in a Given Month
No MCL Violation
Nonacute MCL Violation
Within 24 Hours of Notification of the Total Coliform Positive Result Take Samples From Each Source That Was Operational and Test For E. coli.
DOH Must Be Notified By the End of the Next Business Day after Determining that a Nonacute MCL Violation has Occurred
If One of the Source Samples is E. coli Positive Nofify DOH Immediately and Take DOH Prescribed Corrective action or Take Five Additional Source Samples From the Positive Source Within 24 Hours. Water System Users Must Be Notified Through an Approved Public Notice, Which Includes Health Effects Language, within 24 Hours.
Water System Users Must Be Notified Through an Approved Public Notice Which Includes Health Effects Language Within 30 Days
DOH: Washington State Department of Health
Northwest Regional Office (253) 395-6750
After-Hours Hotline (877) 481-4901
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 6-1
BACTERIOLOGICAL PRESENCE DETECTION PROCEDURE
Gray & Osborne, Inc.
CONSULTING ENGINEERS



* A violation of the 10.0 mg/L nitrate MCL constitutes an acute health effect concern. DOH must be notified immediately upon violation of the nitrate MCL.

DOH: Washington State Department of Health

WAC: Washington Administrative Code

CITY OF SEQUIM
2012 WATER SYSTEM PLAN

FIGURE 6-2
IOC/VOC/SOC
DETECTION PROCEDURE

Gray & Osborne, Inc.
CONSULTING ENGINEERS

High Water and Flooding

Heavy snow melt and/or rains cause the water level to rise and reach a flood level. Table 6-6 details the City's response to high water and flooding.

Table 6-6 Water and Flooding Response

System Component	Action
Distribution System	Check chlorine residuals throughout distribution system
Reservoir: No effect. Reservoir is above flood level	No action is necessary

Contamination of Water Supply

Contamination of water supply for such items as main breaks or pollution from an isolated source. Table 6-7 details the City's response to contamination of the water system.

Table 6-7 Contamination of the Water System

Distribution System Contamination
• Close valves if possible to isolate source
• Repair and or remove source of pollution
• Flush previously contaminated section and test until free of contamination prior to resumption of use
Reservoir Contamination
• Resample to confirm contamination
• Check distribution system for presence of contamination
• Isolate reservoir from system
• 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.
• Consider disinfecting reservoir if bacteriological standards are exceeded. Follow AWWA Standards.

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CROSS-CONNECTION CONTROL PROGRAM

The City's cross-connection control program establishes minimum standards for the City to protect the public potable water supply from possible contamination due cross connections. The Program addresses authority, responsibility, requirements, administrative procedures, minimum requirements, record keeping, and standard forms and letters. A copy of the City's cross-connection control manual is included in Appendix J.

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Chapter 7

WATER SYSTEM DESIGN AND CONSTRUCTION STANDARDS

This chapter summarizes developer standards, design criteria, and municipal code requirements for the City of Sequim water system. Title 13, Division I of the City's municipal code outlines statutes regarding water system, use, and regulation. A summary of these sections are provided below while a copy of the associated municipal code is included in Appendix K.

Following the summary of the City's municipal code standards regarding the water system, Clallam County Code Title 13 regulations are summarized. In addition, water system design standards and requirements developed by the Department of Health (DOH) are outlined. The City's municipal code and the current version of the DOH "Water System Design Manual" will be used in the design of future water collection system improvements to ensure successful operation of the collection system and the safety and health of residents in the City.

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Water system developer standards are located in Appendix F, and are also included in the associated stand-alone document that can be used by developers for informational purposes during water project execution.

CITY OF SEQUIM MUNICIPAL CODE STANDARDS REGARDING WATER SYSTEM

13.04 – Administration and Enforcement

This chapter outlines the authority of the City to decide any questions that may arise from the code that is not fully covered by the provisions. This chapter outlines the City's rights to amend and add to the codes, and/or ordinances with regards to water systems and to set rates as necessary or expedient. It also states the penalties for failure to comply with the regulations set forth in the municipal code with regard to the water system.

13.08 – Definitions

This chapter outlines the legal definitions for terms associated with the water system within the City's jurisdiction.

13.12 – Application for Service

This chapter outlines the requirements for prospective customers who wish to connect to the water system. This section states the required information that must be provided to the City and specifies that the application is merely a written request and does not in itself bind the City to provide service.

13.16 – Water Service Regulations

This chapter outlines the contract between the City and water customers after the application for service is accepted. This section states that the application shall be considered a contract once the applicant is connected to the system and that the applicant agrees to abide by the rates, rules and regulations of the water system. Addition contracts may be entered into between the City and a customer to supply large or unusual water requirements. This section also states that the water rates, rules and regulations are subject to change by the City without notice, that customers shall notify the City of their plans to vacate the premises and that

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water supplied can only be used for the purpose stated in the application for service.

13.20 – Water System Regulations

This chapter discusses regulations relating to interference with the water system, tampering, use of fire hydrants, access to premises for inspection and responsibilities of service. This section includes the following:

- Prohibits unauthorized attachment or detachment of service lines from the City's water mains;
- Prohibits customers from using or tampering with any valve or curb stop owned by the City;
- Requires customer to install their own shutoff valve on their service line;
- Prohibits unauthorized persons from tampering with the City's fire hydrants;
- Defines the process for access by the utility to any premises for the inspection of pipes and fixtures as well as the manner in which the utilities are being used;
- Specifies that the City is not liable for any loss or damage caused by the customer's water system;
- Specifies that no connection can be made between a private water system and the City's water system;
- Specifies that the City will exercise reasonable diligence in supplying water continuously to customers;
- Specifies that the City shall have the right to suspend water service temporarily for the purpose of making repairs and improvements;
- Specifies that the City reserved the right to, during a shortage of supply, provide water in a preferential manner from a standpoint of public convenience and necessity.

13.24 – Water Meter

This chapter specifies that the City read meters monthly and that bills for water will be based on consumption to the nearest 100 cubic feet.

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13.72 – Installation and Connection Fees

This chapter outlines the installation and connection fees for both municipal sewer and water systems, general facility charges for both sewer and water systems, and the collection of fees.

13.76 – Fees for Connection to Mains

This chapter states that "In addition to the connection charges set forth in other chapters of this division, persons or firms connecting to water or sewer mains constructed at the sole cost of the City and not pursuant to local improvement district bonds or through developer funding, shall pay the actual cost of the construction of the main serving the applicant's property, plus 10 percent as overhead for city administration unless such charges have been paid under other provisions of the code."

13.84 – Water Rates and Charges

This chapter outlines current water rates and charges, potential reduction in charges for certain facilities, and the capacity for the Public Works Director to adopt procedures "necessary for the efficient and equitable administration of the residential volume-based sewer rate structure."

13.92 – Water Shut-Off, Reconnection (Turn-On) and Water Standby Charges

This chapter establishes one time water shut-off and reconnection fees, as well as, monthly water standby charges.

13.98 – Developer Reimbursement Collection Agreements

The aim of this chapter is to "establish a uniform methodology and process for the administration of reimbursement contracts applied for after June 1, 2010, for developers in circumstances where a developer uses private funds to construct a public utility and/or street system improvement(s) and desires to be compensated by property owners benefited by the improvements."

Legal authority and various administrative topics regarding the developer, the City, the funding agency and the implementation of a contract are discussed.

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13.100 – Utility Extensions

This chapter discusses specific requirements of the developer and the City when extensions to City owned utility pipes are made. Topics include approval of plans, costs, connection testing, permits, transfer of title, conformance with ordinances and penalties for violation of associated regulations.

13.112 – Reclaimed Water

This chapter discusses the use of reclaimed water within the City of Sequim. Important definitions are listed, acceptable uses are outlined, and rates for reclaimed water use are shown. Also included in this chapter is the designation of authority for reclaimed water, and inspection and connection policies.

DEPARTMENT OF HEALTH WATER SYSTEM DESIGN MANUAL

Requirements from the DOH Water System Design Manual published December 2009 are presented in Chapter 3.

DEVELOPER STANDARDS

The developer standards which contain written regulations and requirements, standard design drawings for water and sewer system components, and sample forms for such items as permits applications, contracts, cost estimates, and easement applications can be found in Appendix F. This information is also provided as a stand-alone document which can be used by developers during planning and design of new water system projects.

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Chapter 8

CAPITAL IMPROVEMENT PLAN

INTRODUCTION

This Chapter presents the Capital Improvement Plan (CIP) for the 6-year and 20-year planning periods. Individual project descriptions and preliminary project cost estimates for the proposed projects are provided in Appendix L. Figure 8-1 shows the locations of proposed distribution, storage and source improvements in the 6-year improvement plan.

Other projects may arise, in the future, which are not identified as part of the City's CIP. Such projects may be deemed necessary for ensuring water quality, preserving emergency water supply, accommodating transportation improvements proposed by other agencies, or addressing unforeseen problems with the City's water system. Due to budgetary constraints, the completion of these projects may require that the proposed completion date for projects in the CIP be rescheduled. The City retains the flexibility to reschedule proposed projects and to expand or reduce the scope of proposed projects, as best determined by the City Staff and Council when new information becomes available. Each capital improvement project should be reevaluated to consider the most recent planning efforts as the proposed completion date for the project approaches.

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IDENTIFICATION OF SYSTEM IMPROVEMENTS

PROPOSED BOOSTER STATION IMPROVEMENTS

1. **Project Name:** Construction of a 500 gpm Booster Station and PRVs
   Project Number: BS-1
   Estimated Cost: $471,000
   Proposed Design Year: 2019
   Proposed Construction Year: 2019

   Project Description: This project will provide the City the ability to pump water into the proposed 2.5 MG Reservoir. Water from the system, the Silberhorn Wellfield, or the Infiltration Gallery will be pumped through this booster station to the 2.5 MG Reservoir. The booster station will be located at the intersection of Reservoir Road and 7th Avenue. The construction will consist of a booster station that will provide 500 gpm to the 2.5 MG reservoir constructed at the intersection of 7th Avenue and Happy Valley Road. In addition, a PRV station will be constructed at the proposed booster station location and another PRV station will be constructed near the Silberhorn Wellfield in order to supply the water from the 7th Avenue Reservoir back to the lower zones. It is anticipated this project will be developer funded.

2. **Project Name:** 5th and McCurdy Booster Station Improvements
   Project Number: BS-2
   Estimated Cost: $284,000
   Proposed Design Year: 2014
   Proposed Construction Year: 2015

   Project Description: This project will expand the capacity of the 5th and McCurdy Booster Station to allow the City to transfer more water from the Port Williams Wellfield in the 350 Zone to the 420 Reservoir. The City is currently limited to a maximum of 300 gpm by the existing pump. In addition, with only a single pump the City does not have reliable capacity at the 5th and McCurdy Booster Station. It

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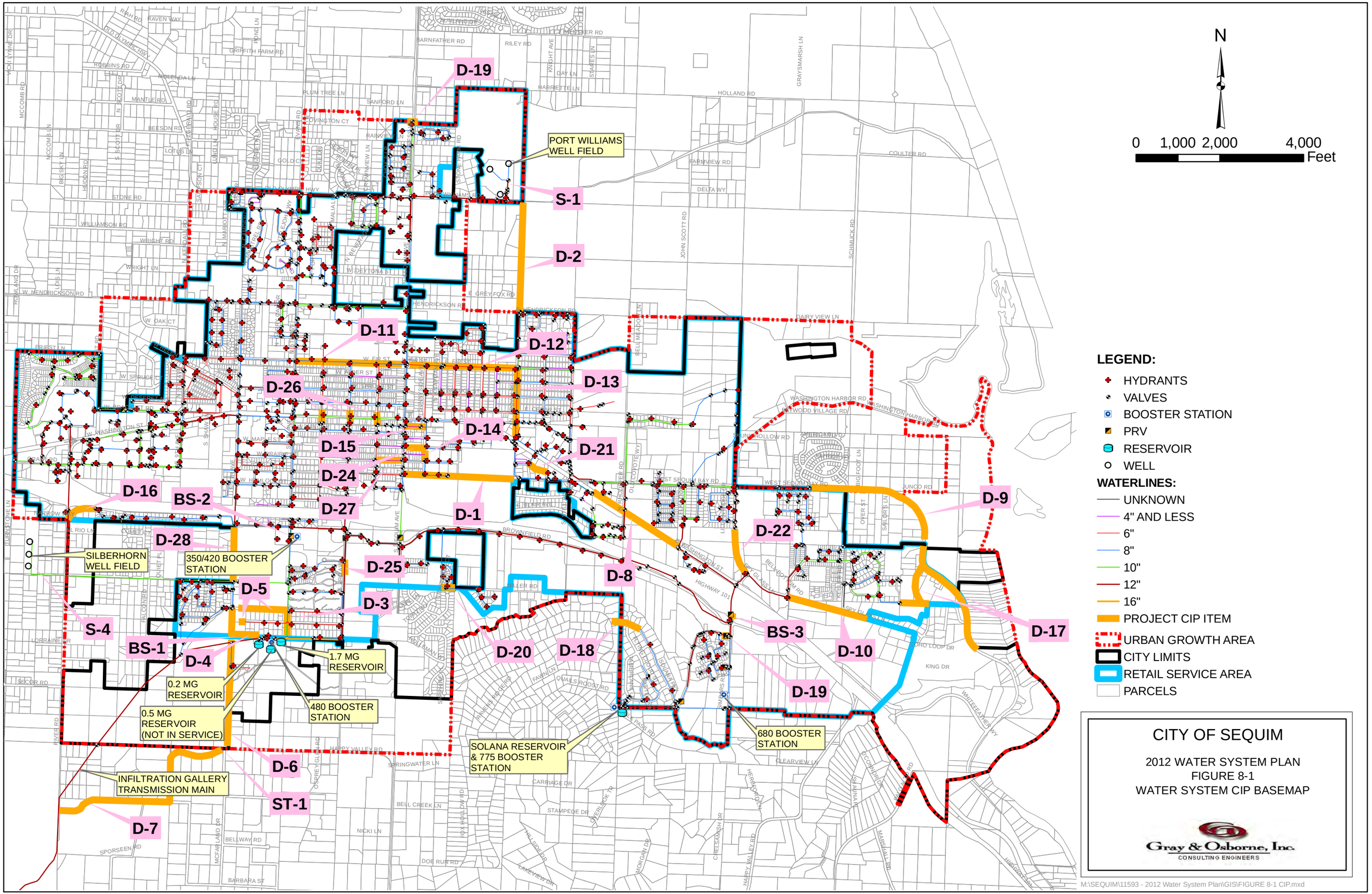
N
0 1,000 2,000 4,000
Feet
D-19
PORT WILLIAMS WELL FIELD
S-1
D-2
D-11
D-12
D-13
D-26
D-14
D-15
D-21
D-24
D-16
BS-2
D-27
D-1
D-9
D-22
D-28
SILBERHORN WELL FIELD
350/420 BOOSTER STATION
D-25
D-8
D-5
D-3
S-4
BS-1
D-4
1.7 MG RESERVOIR
0.2 MG RESERVOIR
0.5 MG RESERVOIR (NOT IN SERVICE)
480 BOOSTER STATION
D-20
D-18
BS-3
D-10
D-17
D-19
680 BOOSTER STATION
SOLANA RESERVOIR & 775 BOOSTER STATION
INFILTRATION GALLERY TRANSMISSION MAIN
D-6
ST-1
D-7
LEGEND:
HYDRANTS
VALVES
BOOSTER STATION
PRV
RESERVOIR
WELL
WATERLINES:
UNKNOWN
4" AND LESS
6"
8"
10"
12"
16"
PROJECT CIP ITEM
URBAN GROWTH AREA
CITY LIMITS
RETAIL SERVICE AREA
PARCELS
CITY OF SEQUIM
2012 WATER SYSTEM PLAN
FIGURE 8-1
WATER SYSTEM CIP BASEMAP
Gray & Osborne, Inc.
CONSULTING ENGINEERS
M:\SEQUIM\11593 - 2012 Water System Plan\GIS\FIGURE 8-1 CIP.mxd

is proposed to expand the station with two additional booster pumps with pitless adaptors similar to the existing pump. This will provide a total reliable capacity of 600 gpm. Site improvements will include electrical controls for pumps and a standby generator.

3. **Project Name:** Simdars Road Booster Station
Project Number: BS-3
Estimated Cost: $415,000
Proposed Design Year: 2016
Proposed Construction Year: 2017

Project Description: This project will provide the City with additional capacity to transfer water from the Port Williams Wellfield in the 350 Zone into the 420 Zone. This project would be located near the PRV station located adjacent to Simdars Road. The proposed Simdars Road Boooster Station would have a reliable capacity of 600 gpm with three pitless booster pumps with capacities of 300 gpm each. The booster station would provide redundant supply to the Solana area, which is currently served only by a single line along Brownfield Road. This project would also improve water quality in the Solana Reservoir by allowing the City to deliver water more directly from the Port Williams Wellfield.

PROPOSED STORAGE IMPROVEMENTS

1. **Project Name:** Happy Valley Reservoir
Project Number: ST-1
Estimated Cost: $3,494,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: The previous water system plan determined that City will require an additional 2.3 MG of storage in the 20-year planning horizon to meet growth projections. The current plan has determined that given revised growth rates and lower water usage, additional storage will not be required for the 20-year planning period. However, if the City wishes to expand service into the southwest corner of the City that is currently served by the PUD and is at a higher elevation than the rest of the

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system a new pressure zone would be required and a new reservoir would be needed in order to provide sufficient pressures and fire flow to this area. In addition, this storage will also be available to the rest of the system and provide storage for growth in other parts of the system. The construction will consist of a 2.5 MG Reservoir located near the intersection of 7th Avenue and Happy Valley Road.

2. **Project Name:** Port Williams Reservoir Study
Project Number: ST-2
Estimated Cost: $45,000
Proposed Design Year: 2014

Project Description: This project proposes to study the feasibility of constructing a ground level reservoir at the site of the Port Williams Wellfield. The construction of this reservoir has been proposed as a method for mitigating aquifer declines near the Port Williams Wellfield by providing storage to reduce peak rate pumping. The conceptual idea for the Port Williams Reservoir is that it would operate below the hydraulic grade of the 350 Zone and would serve the distribution system with a booster station. As a part of this project the Port Williams Wells would be equipped with variable frequency drives (VFDs) to allow continuous low rate operation during the day to fill the reservoir. Variable system demands would then be served by the reservoir booster station. This study would investigate both the engineering feasibility and costs of this reservoir as well as investigating the effects on aquifer levels of a continuous, lower rate pumping. Integration into providing storage for future regional service will also be studied. It is anticipated that this reservoir would be 2 to 4 MG in capacity.

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3. **Project Name:** 1.7 MG Reservoir Mixing System
Project Number: ST-3
Estimated Cost: $81,000
Proposed Design Year: 2014
Proposed Construction Year: 2015

Project Description: The City is investigating the possibility of adding a mixing system to the 1.7 MG Reservoir to prevent thermal stratification of stored water and maintain consistent turn over. This would improve water quality and reliability by ensuring a more consistent chlorine residual in water withdrawn from the reservoir. The mixing system would consist of a submersible electric mixer mounted to the bottom of the reservoir as well as necessary electrical and control systems.

4. **Project Name:** Study for Reuse of 500,000 Gallon Reservoir
Project Number: ST-4
Estimated Cost: $25,000
Proposed Design Year: 2014

Project Description: The City will commission a study on potential uses for currently unused 500,000 gallon reservoir that is located on the site of the 420 Reservoir. The existing reservoir is a partially buried concrete reservoir with a floating cover. The existing reservoir is known to have significant leaks and has an overflow elevation below the 1.7 MG Reservoir. Potential uses that will be studied include, but are not limited to, rehabilitation of the existing reservoir with operation below system grade, construction of a new reservoir on the site of the existing reservoir and use of the existing reservoir for storage of reclaimed water.

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PROPOSED SOURCE IMPROVEMENTS

1. **Project Name:** Port Williams Well No. 4
   Project Number: S-1
   Estimated Cost: $730,000
   Proposed Design Year: 2014
   Proposed Construction Year: 2014

   Project Description: The City plans to drill and develop a fourth well at the Port Williams Well Field. This project is part of the development of the Port Williams Well Field described in the City's water right permit for the Wellfield, which indicates that the City has until 2014 to complete the installation of up to five wells.

2. **Project Name:** New Well
   Project Number: S-2
   Estimated Cost: $730,000
   Proposed Design Year: 2019
   Proposed Construction Year: 2019

   Project Description: The City plans to drill and develop an additional well within the water system. The exact location of the well is not known at this time. This cost does not include the acquisition if land and will be a separate cost item near the time of construction. This project is scheduled to be completed in 2018 and a preliminary project cost is $730,000.

3. **Project Name:** Investigate Additional Source of Supply
   Project Number: S-3
   Estimated Cost: $50,000
   Proposed Design Year: 2015

   Project Description: In addition to the proposed 4th well at Port Williams, the City will need additional sources of supply to meet the proposed growth in the system over the 20-year planning period. The City will study the feasibility to acquire water rights from systems that currently fall within its UGA but not within its City limits as the City may annex these areas into the City during the 20-year planning horizon. In addition, the Port Williams annual water rights quantity is currently a supplemental water

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right. The City will investigate converting these to primary rights.

4. **Project Name:** Study and Redevelopment of Silberhorn Wells No. 2 and No. 3
Project Number: S-4
Estimated Cost: $150,000
Proposed Design Year: 2014
Proposed Construction Year: 2014

Project Description: The City's Silberhorn Wells No. 2 and No. 3 were constructed in 1985 and have been experiencing sanding and capacity issues in recent years. It is proposed to improve these wells to regain capacity in the wellfield. The full scope of actions taken under this item will be determined by video inspection of the existing well to determine the source of sanding issues and a hydrogeological study of the aquifer condition. This study will determine the long term reliable capacity from the Silberhorn Wellfield and will recommend potential course of action. Potential actions taken include performing redevelopment on the wells to improve capacity, installing a new screen within the exiting screen or drilling the wells deeper into the aquifer. Work on the wells will be performed one at a time so the City maintains two functional Silberhorn wells at all times.

5. **Project Name:** Replacement of Silberhorn Wells No. 2 and No. 3
Project Number: S-5
Estimated Cost: $733,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: Depending on the findings of Project S-4 it may be necessary to entirely replace the existing wells. These wells would be located on the existing site and the existing wells would be abandoned or converted into monitoring wells. Any new wells that are drilled will need to comply with DOH design guidelines that will not allow construction of the wellheads in underground vaults similar

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to the existing wells. The new wells will need to be installed in well houses or with pitless adaptors.

6. **Project Name:** Infiltration Gallery Improvements
Project Number: S-6
Estimated Cost: $663,000
Proposed Design Year: 2017
Proposed Construction Year: 2018

Project Description: The City's Infiltration Gallery source flows by gravity siphon to the 1.7 MG Reservoir. The current instantaneous yield from the source is approximately half of the amount allowed by the water right. This project would improve capacity of the Infiltration Gallery by redeveloping the horizontal collectors and installing three 350 gpm pumps to allow reliable withdrawals up to the water right limit. This project will also include installation of a generator on-site and other site improvements. Before construction or design of this project a study would be needed to determine the feasibility of the improvements.

7. **Project Name:** Water Capacity Improvements
Project Number: S-7
Estimated Cost: $300,000
Proposed Design Year: 2013-2018

Project Description: The City plans to investigate the purchase of additional water rights capacity to meet future demands. The quantity purchased will depend on availability and price of water rights available to the City.

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PROPOSED MISCELLANEOUS IMPROVEMENTS

1. **Project Name:** Portable Generator Load Bank
Project Number: MI-1
Estimated Cost: $25,000
Proposed Design Year: 2013

Project Description: The City will acquire a trailer mounted portable load bank so that standby generators on City water and wastewater facilities can be tested under load. This load bank will have a capacity of 400 kW to

provide sufficient capacity to test the 200 kW standby generator at Port Williams Wellfield and provide extra capacity for future generators. The cost of this project will be shared between the Water and Wastewater Utilities.

2. **Project Name:** SCADA System Upgrade Report
Project Number: MI-2
Estimated Cost: $50,000
Proposed Design Year: 2014

Project Description: The City is in the process of upgrading the Water and Wastewater Utility SCADA system. This report will inventory the existing SCADA and telemetry of the Water and Wastewater System, develop a plan for an integrated system and develop cost estimates for the required work. The Report will study various possible methods of communications with remote sites including, fiber optics, cellular and integration with a future Automatic Meter Infrastructure network. The Report will also lay out options for operator access and location of the Master Control Center.

3. **Project Name:** Fixed Based Automatic Meter Reading System
Project Number: MI-3
Estimated Cost: $115,000
Proposed Design Year: 2013 and 2014

Project Description: This project will develop a fixed base automatic meter reading system that will provide near real-time usage data for the City's water connections. The City has selected a Sensus brand system and will implement installation of the system over several years. The cost estimate presented above represents the water utility's share of fixed base automatic meter reading system cost and will be applied to both 2013 and 2014, or through implementation.

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NOTE: These projects (M-1 through M-6) are included as economic development and allowcations in the budgeting spreadsheet.

Proposed Operation and Maintenance Improvements

The proposed operation and maintenance projects are discussed in the following section. Additional discussion regarding the operation and maintenance improvements can be found in Chapter 6 – Operation & Maintenance Program.

1. **Project Name:** Leak Detection Survey
   Project Number: M-1
   Estimated Cost: $5,000 to $10,000
   Proposed Year: Every 3 years

   Project Description: The City will continue performing leak detection surveys every 3 to 5 years.

2. **Project Name:** Water Main Replacement/Leak Repair
   Project Number: M-2
   Estimated Cost: $20,000
   Proposed Year: Annual

   Project Description: The City will implement a pipe leak repair program to repair or replace those pipes identified in the leak detection survey. For planning purposes, the City is budgeting $20,000 per year for pipe leak repair and replacement.

3. **Project Name:** Hydrant Updgrades
   Project Number: M-3
   Estimated Cost: $50,000
   Proposed Year: Annual

   Project Description: The City is budgeting $50,000 per year to replace old hydrants.

4. **Project Name:** Vehicles
   Project Number: M-4
   Estimated Cost: $10,000 to $15,000
   Proposed Year: Annual

   Project Description: The City is budgeting annual expenditures between $10,000 and $15,000 for vehicles.

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5. **Project Name:** Cross Connection Control Device Inventory
Project Number: M-5
Estimated Cost: $10,000 to $15,000
Proposed Year: Annual

Project Description: The City's water system has a significant number of backflow prevention devices that need to be inventoried as a part of the Cross Connection Control Program. This project will involve City staff visiting each device and creating records for each device in the City's SEMS Utility Management Software. City staff will also identify which connections are high or severe hazard and ensure that proper cross connection control devices are in place.

6. **Project Name:** Large Control Valve Service
Project Number: M-6
Estimated Cost: $5,000
Proposed Year: Annual

Project Description: The City is budgeting an annual expenditure of $5,000 for parts and labor to rebuild large hydraulically operated control valves in the system. These include PRVs and altitude valves.

PROPOSED DISTRIBUTION SYSTEM IMPROVEMENTS

Transmission and distribution system improvements and prioritization are based on the results of the H2ONet hydraulic analysis, planned system expansion, the age and type of existing lines, and repair/replacement needs identified by the City. In practice, the priority of these projects will also be influenced by system expansion, fire flow requirements for existing and new commercial development, and the location of sewer and/or street improvements. Recommended transmission and distribution projects are discussed in the following section and summarized in the tables at the end of this Chapter.

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1. **Project Name:** Hammond Street Water Main
   Project Number: D-1
   Estimated Cost: $873,000
   Proposed Design Year: 2013
   Proposed Construction Year: 2013

   Project Description: This project will provide fire flow to a new mixed use development to the south as well as improve east-west transmission in the system. The construction will consist of approximately 2,800 LF of 12-inch water main along East Hammond Street from South Sequim Avenue to South Brown Road. It is anticipated this project will be developer funded.

2. **Project Name:** Brown Road Water Main
   Project Number: D-2
   Estimated Cost: $855,000
   Proposed Design Year: 2019
   Proposed Construction Year: 2019

   Project Description: This project will provide additional capacity for the system to serve the east portion of the service area and provide additional transmission capacity to the system from the Port Williams Wellfield. The construction will consist of approximately 2,600 LF of 12-inch water main along Brown Road from Port Williams Road to Hendrickson Road.

3. **Project Name:** 5th Avenue Water Main
   Project Number: D-3
   Estimated Cost: $179,000
   Proposed Design Year: 2019
   Proposed Construction Year: 2019

   Project Description: This project will loop the piping in the 480 Zone and provide fire flow in the area. The areas that will be served by this water main improvement cannot currently meet the required 1,000 gpm fire flow. The construction will consist of approximately 650 LF of 8-inch water main along 5th Avenue from West Reservoir Road to West Norman Street.

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4. **Project Name:** Reservoir Road and 7th Avenue Water Main
Project Number: D-4
Estimated Cost: $534,000
Proposed Design Year: 2016
Proposed Construction Year: 2017

Project Description: This project will provide additional flow into the 480 Zone and the lower zones. The area served by these improvements cannot currently meet the required 1,000 gpm fire flow. The construction will consist of approximately 1,400 LF of 12-inch water main from the 480 Reservoir along Reservoir Road to 7th Avenue and along 7th Avenue to Norman Street. In addition, a PRV station will be installed to allow flow into the lower zones. It is anticipated that this project will be developer funded.

5. **Project Name:** Norman Street and Eunice Street Water Main
Project Number: D-5
Estimated Cost: $435,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: This project will loop the piping in the 480 Zone and provide fire flow in the area. The area served by these improvements cannot currently meet the required 1,000 gpm fire flow. The construction will consist of approximately 1,650 LF of 8-inch water main along Norman Street and Eunice Street, to loop existing water mains in the 480 Zone. This project will connect with the water line proposed in project D-4.

6. **Project Name:** 7th Avenue Water Main
Project Number: D-6
Estimated Cost: $818,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: When the City constructs project ST-1, Happy Valley Reservoir, in the southwest portion of the system the City will need to provide a water main in

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order to move water to and from the reservoir site. Construction will consist of approximately 2,700 LF of 12-inch water main along 7th Avenue from Happy Valley Road to Reservoir Road. The exact alignment of this project may be modified if a more desirable location for project ST-1 is found. It is anticipated that this project will be developer funded.

7. **Project Name:** Happy Valley Road Water Main
Project Number: D-7
Estimated Cost: $1,145,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: When the City constructs project ST-1 in the southwest portion of the system to meet future storage needs, the City must construct a waterline to supply water from the Infiltration Gallery site. The construction will consist of approximately 5,000 LF of 8-inch water main along Happy Valley Road from River Road to 7th Avenue. It is anticipated that this project will be developer funded.

8. **Project Name:** Washington Water Main
Project Number: D-8
Estimated Cost: $759,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: The area in the southeast of the City has been identified for significant future growth and additional transmission capacity will be needed to serve this area. This project will be a developer extension as growth occurs. The construction will consist of approximately 2,500 LF of 12-inch water main from West Sequim Bay Road south to the existing water mains on Washington Street. It is anticipated that this project will be developer funded.

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9. **Project Name:** West Sequim Bay Road to Battelle Parcel Water Main
Project Number: D-9
Estimated Cost: $1,015,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: This project will be a developer extension to provide additional supply to the Battelle Marine Research Lab as it expands. The construction will consist of approximately 3,500 LF of 12-inch water main along West Sequim Bay Road from Morgison Loop to the southern edge of the Battelle Parcel. This line will be sized to allow for future connections in the eastern portion of the system. It is anticipated that this project will be partially funded by grants. This project will coincide with a sewer CIP project along the same alignment.

10. **Project Name:** Washington Harbor Loop Water Main
Project Number: D-10
Estimated Cost: $1,140,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: This project will complete the loop to new development in the eastern portion of the water system. This project is contingent on development in this area and will be a developer extension. The construction will consist of approximately 1,350 LF of 12-inch water main along Washington Harbor Loop from Lofgren Road to Keeler Road. This project will connect to an existing main along Washington Harbor Loop owned by the Marina Water System. It is anticipated that this project will be developer funded.

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11. **Project Name:** Water Main along West Fir Street from North 5th Avenue to North Sequim Avenue
Project Number: D-11
Estimated Cost: $911,000
Proposed Project Year: 2013-2017

Project Description: This project will replace an existing 8-inch AC line and provide additional capacity. Construction will consist of approximately 2,650 LF of 10-inch water main along West Fir Street from North 5th Avenue to North Sequim Avenue. This project is phased to lessen the impact to City residents and to spread costs evenly over several years.

12. **Project Name:** Water Main along East Fir Street from North Sequim Avenue to North Brown Road
Project Number: D-12
Estimated Cost: $729,000
Proposed Design Year: 2017
Proposed Construction Year: 2017-2019

Project Description: This project will replace an existing 6-inch AC line and provide additional capacity. Construction will consist of approximately 2,650 LF of 10-inch water main along East Fir Street from North Sequim Avenue to North Brown Street.

13. **Project Name:** Water Main along Brown Road from East Fir Street to East Washington Street
Project Number: D-13
Estimated Cost: $530,000
Proposed Design Year: 2016
Proposed Construction Year: 2017

Project Description: This project will improve fire flow to commercial developments in the city center. Construction will consist of approximately 1,800 LF of 12-inch water main along Brown Road from East Fir Street to East Washington Street. It is anticipated that this project will be developer funded.

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14. **Project Name:** Water Main along South Sunnyside Avenue from East Maple Street to East Prairie Street
Project Number: D-14
Estimated Cost: $108,000
Proposed Design Year: 2013
Proposed Construction Year: 2013

Project Description: This project will complete a loop along South Sunnyside Avenue. Construction will consist of approximately 350 LF of 8-inch water main along South Sunnyside Avenue from East Maple Street to East Prairie Street.

15. **Project Name:** Water Main along East Etta Street from South Sequim Avenue to South Sunnyside Avenue
Project Number: D-15
Estimated Cost: $225,000
Proposed Design Year: 2013
Proposed Construction Year: 2014

Project Description: This project will complete a loop along East Etta Street. Construction will consist of approximately 550 LF of 8-inch water main along East Etta Street from South Sequim Avenue to South Sunnyside Avenue.

16. **Project Name:** Water Main along Marlo Drive from the End of the Existing Main to River Road
Project Number: D-16
Estimated Cost: $246,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: This project will complete a loop to improve fire flows on a long 8-inch dead end line. Construction will consist of approximately 900 LF of 8-inch water main along Marlo Drive from the end of the existing main to River Road. This project will be completed as a developer extension. It is anticipated that this project will be developer funded.

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17. **Project Name:** Water Main along West Sequim Bay Road from Battelle to Connect with Marina Water System
Project Number: D-17
Estimated Cost: $708,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: This project will be a developer extension as development occurs. The construction will consist of approximately 4,000 LF of 12-inch water main and 500 LF of 8-inch water main. A 12-inch water main will be constructed along West Sequim Bay Road from the Battelle Parcel to connect with the Existing Marina Water System Main. A 12-inch loop will be constructed through the Mariner's Outlook Subdivision which will be connected with an 8-inch extension from Water View Drive. This project will intertie with the Marina Water System and include a pressure reducing valve to supply the Marina System's lower zone. It is anticipated that this project will be developer funded.

18. **Project Name:** Service of Emerald Highlands
Project Number: D-18
Estimated Cost: $194,000
Proposed Design Year: 2014
Proposed Construction Year: 2015

Project Description: This project will make modifications to the water system to allow the City to provide service to the Emerald Highlands Subdivision, which is currently served by agreement with Clallam County PUD No. 1. The City may serve the Emerald Highlands Subdivision from the Solana Reservoir by wheeling water through a portion of the PUD system. This will involve a connection from the City's 680 Zone at Solana Parkway and Flying Cloud Street to the PUD system at the corner of Fox Hollow Road and Doe Run Road. Fox Hollow Road would be isolated from the rest of the PUD system by closed valves at Doe Run Road and at the existing connection to Emerald Highlands. Fox Hollow Road is currently served by the

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PUD 790 Zone and pressures would be decreased by approximately 48 psi. Pressures in this area are generally greater than 100 psi and there would still be sufficient pressure with service from the 680 Zone. This change would also allow the City to serve customers along Miller Road that are currently served by PUD. Per the service agreement the PUD would retain the infrastructure and customers outside of the Sequim city limits and the City would wheel water through this infrastructure. Water usage by PUD customers would be billed as wholesale water sold to PUD. Proposed construction for this project will include approximately 800 LF of 8-inch water main to connect the 680 Zone to the PUD system.

19. **Project Name:** Pressure Relief Valves
Project Number: D-19
Estimated Cost: $90,000
Proposed Design Year: 2015
Proposed Construction Year: 2015

Project Description: This project will construct pressure relief valve stations in the 500 Zone, 420 Zone and in the 350 Zone to provide protection from overpressure if a PRV from an upper zone is stuck open. Exact locations of these stations will be determined during design, but it is anticipated that they will be located near the lowest elevation points in each zone except for the 420 Zone where the relief station will be located at the Reservoir site.

20. **Project Name:** Craftsman Court Pressure Reducing Valve
Project Number: D-20
Estimated Cost: $50,000
Proposed Design Year: 2015
Proposed Construction Year: 2015

Project Description: This project will construct pressure reducing valve station between the water main on Miller Road and Craftsman Court. This project will provide and intertie between Miller Road, which will be served by the PUD system and the City's system.

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21. **Project Name:** Water Main along From South Lee Chatsfield to Espeth Way
Project Number: D-21
Estimated Cost: $149,000
Proposed Design Year: 2019+
Proposed Construction Year: 2019+

Project Description: This project will construct approximately 500 LF of 8-inch water line to connect South Lee Chatfield Avenue to Espeth Way to provide additional looping to that area. It is anticipated that this project will be developer funded.

22. **Project Name:** Water Main along From Washington Harbor Road to Washington Harbor Loop
Project Number: D-22
Estimated Cost: $303,000
Proposed Design Year: 2019
Proposed Construction Year: 2019

Project Description: This project will construct approximately 1,000 lf of 12-inch water line to connect Washington Harbor Road to Washington Harbor Loop to provide additional looping in that area.

23. **Project Name:** Asbestos Cement/Galvanized Iron Water Main Replacement and Pipe Oversizing
Project Number: D-23
Estimated Cost: $350,000
Proposed Project Year: 2013-2019

Project Description: This project is an annual allotment to replace undersized or failing AC and galvanized water mains throughout the distribution system with more durable and appropriately sized piping.

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24. **Project Name:** Water Main along East Maple Street from South Sequim Avenue to South Sunnyside Avenue
Project Number: D-24
Estimated Cost: $158,000
Proposed Design Year: 2014
Proposed Construction Year: 2015

Project Description: This project will complete a loop along East Maple Street and allow the City to abandon an undersized line in an alley which currently provides service. Construction will consist of approximately 500 LF of 8-inch water main along East Maple Street from South Sequim Avenue to South Sunnyside Avenue.

25. **Project Name:** Water Main Connection across South 3rd Avenue at Sycamore Street
Project Number: D-25
Estimated Cost: $45,000
Proposed Design Year: 2013
Proposed Construction Year: 2013

Project Description: This project will complete a loop by connecting an existing 8-inch main along Sycamore Street to the 12-inch main on South 3rd Avenue. This project will include a wet-tap on the 12-inch main on South 3rd Avenue.

26. **Project Name:** Isolation Valves on Washington Street from 5th Avenue to Sequim Avenue
Project Number: D-26
Estimated Cost: $143,000
Proposed Design Year: 2014
Proposed Construction Year: 2015

Project Description: This project will add isolation valves to three intersections along Washington Street. If work must be done on the water main along Washington Street the entire street from 5th Avenue to Sequim Avenue must be shut down. This project will add four-way valve clusters to 4th Avenue, 3rd Avenue and 2nd Avenue. 8-inch valves will be installed on cross streets to allow future upsizing of 6-inch mains. Project cost estimate includes

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only asphalt patch repair and not complete overlay of intersections.

27. **Project Name:** Water Main along West Prairie Street from South Sequim Avenue to South 2nd Avenue
Project Number: D-27
Estimated Cost: $218,000
Proposed Design Year: 2013
Proposed Construction Year: 2013

Project Description: This project will replace an undersized line along West Prairie Street. Construction will consist of approximately 660 LF of 8-inch water main along West Prairie Street from South Sequim Avenue to South 2nd Avenue.

28. **Project Name:** Water Main along South 7th Avenue from Silberhorn Rd to McCurdy Road
Project Number: D-28
Estimated Cost: $411,000
Proposed Design Year: 2019+
Proposed Construction Year: 2019+

Project Description: This project will install a new water main along South 7th Avenue to provide additional fire flow capacity to the commercial areas of the 420 Zone north of Highway 101. Construction will consist of approximately 1,350 LF of 12-inch water main along South 7th Avenue from Silberhorn Road to McCurdy Road.

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PROJECT COST ESTIMATES

Cost estimates have been prepared for the projects listed in this CIP. These estimates are presented in 2012 dollars with a 20 percent contingency and a 25 percent engineering and administrative cost. Detailed cost estimates are provided in Appendix L. Tables 8-1 through 8-6 list the various CIP projects. Totals include all costs associated with a project. If a project is recurring, then the cost for each year is included in the total cost estimate.

Table 8-1 Booster Station Improvement Projects

Project No.	Project Description	Construction Year	Estimated Cost	Funding Source
BS-1	Upper Zone Booster Station	2019	$471,000	Developer
BS-2	5th and McCurdy Booster Station Improvements	2015	$284,000	Water Utility
BS-3	Simdars Road Booster Station	2017	$415,000	Water Utility
Total			**$1,170,000**	**--**

Table 8-2 Storage Improvement Projects

Project No.	Project Description	Additional Storage Capacity (MG)	Construction Year	Estimated Project Cost	Funding Source
ST-1	Happy Valley Reservoir	2.5 MG	2019	$3,494,000(1)	Water Utility
ST-2	Port Williams Reservoir Study	2 to 4 MG	2014	$45,000	Water Utility
ST-3	420 Reservoir Mixing System	-	2015	$81,000	Water Utility
ST-4	Study for Reuse of 500,000-Gallon Reservoir	-	2014	$25,000	Water Utility
Total				**$3,645,000**	**-**

(1) Cost determined by G&O Reservoir Cost Curve found in Cost Estimate Appendix.

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Table 8-3 Source Improvement Projects

Project No.	Project Description	Pumping Capacity (gpm)	Construction Year	Estimated Project Cost	Funding Source
S-1	Port Williams Well No.4	600	2014	$730,000	Water Utility
S-2	New Well	600	2019	$730,000	Water Utility
S-3	Investigate Additional Source of Supply	N/A	2015	$50,000	Water Utility
S-4	Study and Redevelopment of Silberhorn Wells No. 2 and No. 3	N/A	2014	$150,000	Water Utility
S-5	Replacement of Silberhorn Wells No. 2 and No. 3	700	2019	$733,000	Water Utility
S-6	Infiltration Gallery Improvements	700	2018	$633,000	Water Utility
S-7	Water Capacity Improvements	N/A	2014-2018	$300,000 Annually	Water Utility
Total				**$4,526,000**	**-**

Table 8-4 Miscellaneous Improvement Projects

Project No.	Project Description	Construction Year	Estimated Project Cost	Funding Source
MI-1	Portable Generator Load Bank	2013	$25,000	Water / Sewer Utility
MI-2	SCADA System Upgrade Report	2014	$50,000	Water / Sewer Utility
MI-3	Fixed Based Automatic Meter Reading System	2013 and 2014	$115,000	Water Utility
Total			**$305,000**	**-**

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Table 8-5 Operation and Maintenance Improvement Projects

Project No.	Project Description	Construction Year	Estimated Cost	Funding Source
M-1	Leak Detection Survey	Every 3 years	$5,000	Water Rates
M-2	Pipe Leak Repair/ Replacement	Annually	$20,000	Water Rates
M-3	Hydrant Upgrades	Annually	$50,000	Water Rates
M-4	Vehicles	Annually	$10 –$15,000	Water Rates
M-5	Cross Connection Control Device Inventory	Annually	$10 –$15,000	Water Rates
M-6	Large Control Valve Service	Annually	$5,000	Water Rates
Total			**$580,000**	**-**

Table 8-6 Distribution System Projects(1)

Project No.	Project Description	Pipe Size (inches)	Pipe Length (LF)	Construction Year	Estimated Project Cost	Funding Source
D-1	Hammond Street Water Main	12	2,800	2013	$873,000	Developer
D-2	Brown Road Water Main	12	2,600	2019	$855,000	Water Utility
D-3	5th Avenue Water Main	8	650	2019	$179,000	Water Utility
D-4	Reservoir Road and 7th Avenue Water Main	12	1,400	2017	$534,000	Water Utility
D-5	Norman Street and Eunice Street	8	1,650	2019	$435,000	Developer
D-6	7th Avenue Water Main	12	2,700	2019	$818,000	Developer
D-7	Happy Valley Road	8	5,000	2019	$1,145,000	Water Utility
D-8	Washington Street Water Main	12	2,500	2019	$759,000	Developer
D-9	West Sequim Bay Water Main	12	3,500	2019	$1,015,000	Water Utility/ Grant
D-10	Spy Glass Lane Water Main	12	1,350	2019	$1,140,000	Developer
D-11	Fir Street from North 5th Avenue to North Sequim Avenue	10	2,650	2014-2017	$911,000	Water Utility
D-12	Fir Street from North Sequim Avenue to North Brown Road	10	2,650	2017-2019	$729,000	Water Utility

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Table 8-6 Distribution System Projects[1] – (continued)

Project No.	Project Description	Pipe Size (inches)	Pipe Length (LF)	Construction Year	Estimated Project Cost	Funding Source
D-13	Brown Road from East Fir Street to East Washington Street	12	1,800	2017	$530,000	Developer
D-14	South Sunnyside Avenue from East Maple Street to East Prairie Street	8	350	2013	$108,000	Water Utility
D-15	East Etta Street from South Sequim Avenue to South Sunnyside Avenue	8	550	2014	$225,000	Water Utility
D-16	Marlo Drive West from the End of the Existing Main to River Road	8	900	2019	$246,000	Developer
D-17	West Sequim Bay Road from Battelle to Connect with Marina Water System	8/12	500/ 4,000	2019	$708,000	Developer
D-18	Service of Emerald Highlands	8	800	2015	$194,000	Water Utility
D-19	Pressure Relief Valves	-	-	2015	$90,000	Water Utility
D-20	Craftsman Court Pressure Reducing Valve Station	-	-	2015	$50,000	Water Utility
D-21	South Lee Chatsfield to Espeth Way	8	500	2019+	$149,000	Developer
D-22	Washington Harbour Road to Washington Harbor Loop	12	1,000	2019	$303,000	Developer
D-23	Asbestos Cement/Galvanized Iron Water Main Replacement	-	-	Annual	$350,000	Water Utility
D-24	East Maple Street from South Sequim Avenue to South Sunnyside Avenue	8	500	2015	$158,000	Water Utility
D-25	Connection across South 3rd Avenue at Sycamore Street	8	50	2013	$45,000	Water Utility
D-26	Isolation Valves on Washington Street from 5th Avenue to Sequim Avenue	-	-	2015	$143,000	Water Utility

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Table 8-6 Distribution System Projects[1] – (continued)

Project No.	Project Description	Pipe Size (inches)	Pipe Length (LF)	Construction Year	Estimated Project Cost	Funding Source
D-27	West Prarie Street from South Sequim Avenue to South 2nd Avenue	8	660	2013	$218,000	Water Utility
D-28	South 7th Avenue from Silberhorn Road to McCurdy Road	12	1,350	2019+	$411,000	Water Utility
Total					**$15,071,000**	**-**

SCHEDULE OF PROJECTS

Table 8-7 shows a proposed schedule for projects in the 6- and 20-year planning period.

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Table 8-7 Capital Improvement Project Schedule

Proj. No.	Description	2013	2014	2015	2016	2017	2018	2019	Sum
BS-1	500 gpm BS and PRVs	-	-	-	-	-	-	$471,000	**$471,000**
BS-2	5th and McCurdy BS Improvements	-	$34,000	$250,000	-	-	-	-	**$284,000**
BS-3	600 gpm BS at Simdars Road	-	-	-	$49,800	$365,200	-	-	**$415,000**
ST-1	Happy Valley Reservoir	-	-	-	-	-	-	$3,494,000	**$3,494,000**
ST-2	Port Williams Reservoir Study	-	$45,000	$-	-	-	-	-	**$45,000**
ST-3	420 Reservoir Mixing System	-	$9,700	$71,300	-	-	-	-	**$81,000**
ST-4	Study for Reuse of 500,000-Gallon Reservoir	-	$25,000	-	-	-	-	-	**$25,000**
S-1	Port Williams Well No. 4	-	$730,000	-	-	-	-	-	**$730,000**
S-2	New Well	-	-	-	-	-	-	$730,000	**$730,000**
S-3	Investigate Additional Source of Supply	-	-	$50,000	-	-	-	-	**$50,000**
S-4	Study and Redevelop Wells 2 and 3	-	$150,000	-	-	-	-	-	**$150,000**
S-5	Replacement Wells 2 and 3	-	-	-	-	-	-	$733,000	**$733,000**
S-6	Infiltration Gallery Improvements	-	-	-		$,500	$553,500	-	**$633,000**
S-7	Investigate New Water Rights	$300,000	-	-	-	-	-	-	**$300,000**
MI-1	Portable Generator Load Bank	$25,000	-	-	-	-	-	-	**$25,000**
MI-2	SCADA Upgrade Report	-	$50,000	-	-	-	-	-	**$50,000**
MI-3	Fixed Base Automatic Meter Reading System	$115,000	$115,000	-	-	-	-	-	**$230,000**
D-1	Hammond Street WM	$873,000	-	-	-	-	-	-	**$873,000**
D-2	Brown Road WM	-	-	-	-	-	-	$855,000	**$855,000**
D-3	5th Avenue WM	-	-	-	-	-	-	$179,000	**$179,000**
D-4	Reservoir Road and 7th Avenue WM	-	-	-	$64,000	$470,000	-	-	**$534,000**
D-5	Norman Street and Eunice Street Improvements	-	-	-	-	-	-	$435,000	**$435,000**
D-6	7th Avenue WM	-	-	-	-	-	-	$818,000	**$818,000**
D-7	Happy Valley Road Improvements	-	-	-	-	-	-	$1,145,000	**$1,145,000**
D-8	Washington Street WM	-	-	-	-	-	-	$759,000	**$759,000**
D-9	West Sequim Bay WM	-	-	-	-	-	-	$1,015,000	**$1,015,000**

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Table 8-7 Capital Improvement Project Schedule – (continued)

Proj. No.	Description	2013	2014	2015	2016	2017	2018	2019	Sum
D-10	Washington Harbor Loop WM	-	-	-	-	-	-	$1,140,000	**$1,140,000**
D-11	Fir Street from North 5th Avenue to North Sequim Avenue	$200,000	$50,000	$50,000	$404,000	$207,000	-	-	**$911,000**
D-12	Fir Street from North Sequim Avenue to North Brown Road	-	-	-	-	$182,000	$481,140	$247,861	**$911,001**
D-13	Brown Road from East Fir Street to East Washington Street	-	-	-	$63,600	$466,400	-	-	**$530,000**
D-14	South Sunnyside Avenue from Maple Street to East Prairie Street	$108,000	-	-	-	-	-	-	**$108,000**
D-15	East Etta Street from Sequim Avenue to South Sunnyside Avenue	$100,000	$125,000	-	-	-	-	-	**$225,000**
D-16	Marlo Drive West from existing main to River Road	-	-	-	-	-	-	$246,000	**$246,000**
D-17	West Sequim Bay Road from Battelle	-	-	-	-	-	-	$708,000	**$708,000**
D-18	Emerald Highlands Service	-	$23,200	$170,800	-	-	-	-	**$194,000**
D-19	Pressure Relief Valves	-	-	$90,000	-	-	-	-	**$90,000**
D-20	Craftsman Court PRV Station	-	-	$50,000	-	-	-	-	**$50,000**
D-21	South Lee Chatsfield to Espeth Way	-	-	-	-	-	-	$149,000	**$149,000**
D-22	Washington Harbour Road to Washington Harbor Loop	-	-	-	-	-	-	$303,000	**$303,000**
D-23	Asbestos Cement/Galvanized Iron WM Replacement and Oversizing	$350,000	$350,000	$350,000	$350,000	$350,000	$350,000	$1,150,000	**$3,250,000**
D-24	East Maple Street from South Sequim Avenue to South Sunnyside Avenue	-	$18,900	$139,100	-	-	-	-	**$158,000**
D-25	Connection across South 3rd Avenue at Sycamore Street	$45,000	-	-	-	-	-	-	**$45,000**
D-26	Isolation Valves on Washington Street from 5th Avenue to Sequim Avenue	-	$15,300	$128,000	-	-	-	-	**$143,300**

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Table 8-7 Capital Improvement Project Schedule – (continued)

Proj. No.	Description	2013	2014	2015	2016	2017	2018	2019	Sum
D-27	West Prairie from South Sequim to South 2nd Avenue	$218,000	-	-	-	-	-	-	**$218,000**
D-28	South 7th Avenue from Silberhorn to McCurdy	-	-	-	-	-	-	$411,100	**$411,100**
-	Economic Development	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$1,000,000	**$1,600,000**
-	Complete Meter Replacement	$50,000	-	-	-	-	-	-	**$50,000**
-	Meters Sherwood Complex	$100,000	-	-	-	-	-	-	**$100,000**
-	New Water Rights	-	$100,000	$100,000	$100,000	$100,000	$100,000	-	**$500,000**
-	Allocations	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$2,000,000	**$3,200,000**
Total		**$2,784,000**	**$2,141,100**	**$1,749,200**	**$1,331,400**	**$2,520,100**	**$1,784,640**	**$17,988,961**	**$30,299,401**

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APPENDIX A

WASHINGTON STATE DOH PROJECT APPROVAL APPLICATION AND SUBMITTAL FORM

APPENDIX B

WATER FACILITIES INVENTORY FORM

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 07/01/2011
Printed: 1/19/2012
WFI Printed For: On-Demand
Submission Reason: Source Update

RETURN TO: Southwest Regional Office, PO Box 47823, Olympia, WA, 98504

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
77620 Y	SEQUIM, CITY OF	CLALLAM	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 005285
ARNOLD "PETE" P. TJEMSLAND [UTILITIES MANAGER] 152 WEST CEDAR STREET SEQUIM, WA 98382-3317	SEQUIM, CITY OF ARNOLD "PETE" P. TJEMSLAND 152 WEST CEDAR STREET SEQUIM, WA 98382-3317	TITLE: UTILITIES MANAGER
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) 683-4908 x607	Owner Daytime Phone: (360) 683-4908
Primary Contact Mobile/Cell Phone: (360) 912-0256	Owner Mobile/Cell Phone: (360) 912-7068
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax: | E-mail: ptjem@sequimwa.gov	Owner Fax Phone: | E-mail: ptjem@ci.sequim.wa.us

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	[x] Residential
[x] Commercial / Business	[ ] Industrial	[x] School
[x] Day Care	[x] Licensed Residential Facility	[ ] Temporary Farm Worker
[x] Food Service/Food Permit	[x] Lodging	[x] Other (church, fire station, etc.):
[x] 1,000 or more person event for 2 or more days per year	[x] 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	3,175,000

- 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
77620 Y	SEQUIM, CITY OF	CLALLAM	A	Comm

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT								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	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	Dungeness River CT6 Required									X			X		Y		X						550	NE NW	12	29N	04W
S02	SH WF (S06, 07, 09)			X								X			Y		X					132	1227	NW NW	25	30N	04W
S03	PT WMS WELL #1 WW AAF397				X							X			Y	X						417	600	SE NW	17	30N	03W
S04	PT WMS WELL #2 AEH961 WW 12"				X							X			Y	X						282	600	SE NW	17	30N	03W
S05	PT WMS WF (S03, 04, 08)			X								X			Y		X					275	1795	SE NW	17	30N	03W
S06	SH WELL #2 WW 10"				X							X			Y	X						148	351	NW NW	25	30N	04W
S07	SH WELL #3 WW 10"				X							X			Y	X						132	476	NW NW	25	30N	04W
S08	PT WMS WELL #3 BAM402 10"				X							X			Y	X						275	560	NW SE	17	30N	03W
S09	SH WELL #1 WW AAF388				X							X			Y		X					190	400	NE NW	25	30N	04W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
77620 Y	SEQUIM, CITY OF	CLALLAM	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	3228	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	1809		
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	246		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	1419		
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)	282	282	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	244	244	
28. TOTAL SERVICE CONNECTIONS		3754	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 5409

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?	610	852	1108	1451	1886	2593	6062	4790	2466	1410	822	540
B. How many days per month is water accessible to the public?	31	28	31	30	31	30	31	31	30	31	30	31

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?	6499	6499	6499	6499	6499	6499	4012	4012	6312	6312	6312	6432
B. How many days per month are they present?	31	28	31	30	31	30	31	31	30	31	30	31

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	10	10	10	10	10	10	10	10	10	10	10	10

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: _____

WS ID	WS Name
77620	SEQUIM, CITY OF

Total WFI Printed: 1

APPENDIX C

WATER SYSTEM AGREEMENTS

INTERGOVERNMENTAL WATER SERVICE AREA AGREEMENT

This AGREEMENT is made and entered into this 21ST day of JUNE, 19 95, by and between the City of Sequim, Washington, hereinafter called the "City," and the Public Utility District No. 1 of Clallam County, Washington, hereinafter called the "District."

WITNESSETH that:

WHEREAS, the City and the District concur that the elimination and avoidance of duplicate water system facilities would be in the best interests of their rate-paying customers; and

WHEREAS, the laws of the State of Washington, specifically Chapter 54.48 RCW and RCW 35A.14.900, contain language governing agreements between utilities regarding service territories and acquisition of facilities; and

WHEREAS, City and District representatives have met and reached an agreement on water service areas;

NOW, THEREFORE, IT IS AGREED between the parties hereto as follows:

1. Service Area Boundary:

1.1 The water service area boundary between the City and the District shall be as shown on Exhibit "A" attached hereto and made a part of this Agreement. Each utility shall have the exclusive right to provide water service to facilities lying within their respective service territories.

1.2 As areas are annexed into the City during the term of this Agreement, the service area boundary shall be reviewed by representatives of each party hereto, and appropriate adjustments made to Exhibit "A."

2. Powers:

The District shall have the right and authority to enter over, under, along, across, and upon the City rights-of-way and/or easements in accordance with the water service area boundary described in Section 1.1 and future revisions thereto. This right and authority shall be for the purpose of construction, extension, connection, repair, maintenance,

operation, and removal of facilities as authorized herein in conformity with such City, State, and Federal codes, regulations, and standards, as now enacted or hereafter amended, governing such facilities, and as further provided in Section 10.1 of this Agreement for conformance with City Standards.

3. Termination of Agreement:

After the tenth year of this Agreement and at five-year intervals thereafter, either party to this Agreement may terminate the Agreement by giving the other party written notice at least one hundred eighty (180) days before the end of the tenth year or the end of any five-year period thereafter.

4. Changes to the Agreement:

Changes in the terms and conditions of this Agreement may be made at any time upon the mutual written consent of both parties, provided, however, that revisions to Exhibit "A" as necessitated by annexations have already been agreed upon herein. Either party desiring a change shall give the other party ninety (90) days written notice. The notice shall contain the desired changes and a full explanation of the reasons for the changes. If, at the end of the 90-day period, the parties hereto cannot mutually agree to the proposed changes, the Agreement shall remain unchanged.

5. Annexations and Purchase of Certain Facilities:

5.1 Intent to Serve New Areas: As areas where District water facilities do not exist are annexed into the City, the City will decide whether to provide service to customers in the annexed area by constructing facilities or authorizing the District, if it so chooses, to plan facilities for service.

5.2 Intent to Purchase: Within sixty (60) days of the effective date of annexation of areas that are served by the District, the City will advise the District if the City intends to provide water service to the customers in the annexed area, and the date the City proposes to purchase any District facilities in the annexed area. The purchase price will be in accordance with Section 8 of this Agreement.

5.3 City Assumes District Service: The City may, at its option, give notice to the District of the City's intent to assume service of areas serviced by the District within the City limits existing at the date of this agreement and purchase any District facilities. The purchase price will be in accordance with Section 8 of this Agreement.

6. Exclusion:

All existing and future District transmission lines, major distribution feeder lines, and reservoirs as described and shown on Exhibit "A" attached hereto, and as further amended, and made a part of this Agreement, are excluded from the terms and conditions of this Agreement unless purchased in their entirety. These lines may be repaired, replaced, expanded, and upgraded to a higher capacity at any future date without regard to this Agreement.

7. Emerald Highlands Subdivision: The District and the City acknowledge that the Emerald Highlands developer has paid for installation of water mains as shown on Exhibit D. These water mains have been deeded to the City by the Emerald Highlands developer at no cost to the City. Until such time as the City has infrastructure to provide water to this development, the District shall utilize these water mains to provide water to the customers of the Emerald Highlands development. The City shall have the option to assume service responsibility to the customers within Emerald Highlands for the sole amount of severance costs (see Exhibit B). The serving utility is responsible for operation and maintenance of the water mains. Should the City exercise this option prior to May 21, 2013, the City agrees to collect the District's customary hookup fees from new customers within Emerald Highlands and forward those funds to the District. After May 21, 2013, under this option, the District will no longer collect hookup fees.

8. Purchase Formulas:

The purchase price for transfers from the District to the City shall be established pursuant to Sections 8.1 and 8.2 of

this Agreement. The meaning of the terms used in Sections 8.1 and 8.2 is set forth on Exhibit "B," attached hereto and made a part of this Agreement.

8.1 Purchase Price for Transfer of Facilities with Customers: The purchase price shall be the lesser of: a) the cost for the City to serve plus severance costs, or b) compensation based on five (5) years of net revenue plus plant value plus severance costs.

8.2 Purchase Price for Transfer of Customers Only: In situations where transfer of customers occurs with no transfer of facilities, the purchase price shall be compensation based on five (5) years of net revenue plus severance costs. (Note Section 7 exception.)

9. Water Sale and Interconnection:

The District and the City agree that in certain situations either party may provide wholesale water to the other party. This will be accommodated after completion of an agreement between the parties for interconnection conditions and water sales rate.

The parties also agree that system interconnection may be determined to be in the parties' best interests and, therefore, allowed upon written concurrence.

10. District Service Within Existing City Limits and City's Urban Growth Limits:

10.1 City Standards: Facilities constructed within the City limits and the City's urban growth limits as set forth on Exhibit "A" are to be constructed to at least the standards adopted by the City. City shall review and approve all construction plans prior to construction.

10.2 City Facilities: Facilities constructed by developers to serve areas within the City limits shall be conveyed to and owned by the City.

10.3 District Facilities: Facilities constructed by the District utilizing their own funds to provide service to District customers within the existing City limits and the City's urban growth limits shall be owned by the District.

10.4 Operation and Maintenance: The District shall be responsible to operate and maintain City-owned facilities that the District utilizes to provide water to District customers within the existing City limits, except for a wheeling agreement.

11. Wheeling Agreements:

The City and the District acknowledge that there may be certain groups of their customers located where extension of their lines would be uneconomic and duplicative of the other party's facilities.

Recognizing potential benefits to rate-paying customers, the District and City hereby agree to consider transporting water through their facilities for the other party upon request and subject to an appropriate wheeling agreement(s). Each wheeling agreement will specify the conditions and charges for this service utilizing the Wheeling Principles set forth in Exhibit "C." The parties will strive for a simple formula for wheeling charges that recognizes cost factors and utility standards. Either party may deny a request for wheeling services.

12. Hold Harmless:

The City agrees, upon completion of the transfer of service area and water facilities in accordance with this Agreement, to indemnify, defend, and hold harmless the District and its officials, employees, and agents, from and against any and all claims for damages or any other relief due to property damage, personal injury, or any other form of loss arising from accidents or injuries occurring after the date of the transfer. The City agrees to accept facilities as is with no warranty as to condition or suitability for use by the City except as otherwise provided in this Section.

The District agrees, upon completion of the transfer of service area and water facilities referenced above, to indemnify, defend, and hold harmless the City, its officials, employees, and agents, from and against any and all claims for damages or any other relief due to property damage, personal injury, or any other form of loss arising from accidents or injuries occurring

prior to the date of the transfer or occurring as a result of defects.

13. Authority:

Each party warrants that the undersigned representative has full and complete legal authority to sign for it and to commit it to the performance of the agreements set forth herein.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly signed and executed in two counterparts as of the day and year first above written.

ATTEST:

Michael McInnes, General Manager
PUBLIC UTILITY DISTRICT NO. 1
OF CLALLAM COUNTY

ATTEST:

CITY OF SEQUIM

EXHIBIT "B"

DEFINITIONS OF PURCHASE TERMS:

COST FOR PURCHASING PARTY TO SERVE - The estimated cost to install the necessary distribution facilities to serve the customers to be transferred at purchasing party's current construction standards and conditions.

PLANT VALUE - Current replacement cost using existing unit costs for all system facilities multiplied by the salvage factor.

Salvage Factor:

Age (Years)	Salvage Factor
1 - 3	1.00
4 - 6	0.85
7 - 11	0.65
12 - 16	0.56
17 - 21	0.51
22 - 26	0.47
27 - 31	0.43
32 +	0.35

SEVERANCE COSTS - All costs associated with transfer of customers including but not limited to removing interconnecting piping, facilities, and meters and administrative costs.

NET REVENUE - To determine net revenue, system net revenue is determined as follows, using the most recent audited financial statements:

Operating Revenue (Income Statement)
Less Purchased Water Cost (if applicable)
Less Distribution Maintenance Expenses
Less General Taxes (Income Statement)
Annual System Net Revenue

Five (5) years of net revenue is determined as follows:

$$\frac{\text{Annual System Net Revenue}}{\text{Annual System Operating Revenue}} \times \text{Transferred Customer Revenue} \times 5 \text{ years}$$

The Transferred Customer Revenue in the above calculation shall be based on such customers' usage during the most recent twelve (12) months, multiplied by the retail rate in effect for such customers at the time of transfer.

EXHIBIT "C"

WHEELING PRINCIPLES:

It is the intention of the parties that wheeling services will be granted to the requesting party when sufficient capacity exists for such service and that the party granting such service shall be fully compensated for the wheeling services provided.

1. Definitions:

"Party 1" - The utility requesting wheeling services.

"Party 2" - The utility providing wheeling services.

"Rated capacity" - The available flow in gallons per minute, so as not to adversely impact existing service connections.

"Peak load" - The highest daily average computed on a monthly basis multiplied by 2.5.

"Necessary facilities" - The facilities such as water mains, valves, pumps, meters, and pressure reducing valves that are necessary to provide service to Party 1's customers.

2. Term of Agreements:

Individual "Wheeling Agreements" shall have a term of twenty-five (25) years.

3. Termination of Agreements:

Party 1 may terminate a Wheeling Agreement at any time by giving Party 2 written notice at least sixty (60) days prior to termination. Party 2 may terminate a Wheeling Agreement either upon receiving the consent of Party 1 or if Party 1 does not timely elect to participate in capacity expansion or make payment pursuant to Section 9 of this Exhibit.

4. Changes to Agreements:

Changes in the terms and conditions of a Wheeling Agreement may be made at any time upon mutual written consent by both parties. Either party desiring a change shall give the other party one hundred eighty (180) days written notice. The notice shall contain the desired changes and a full explanation of the reasons for the changes. If, at the end of the 180-day period, the parties hereto cannot mutually agree to the proposed changes, the Agreement shall remain unchanged.

5. Wheeling Areas:

Each Wheeling Agreement shall include an exhibit showing all areas to be provided with wheeling services. Information included in the exhibit shall include the physical area to which water would be wheeled.

6. Requests for Wheeling Service:

Written requests to have wheeling services provided may be made at any time by either party. Such requests shall include a map or drawing of the area involved, the proposed source of water to be wheeled, and the amount of water to be wheeled.

7. Acceptance or Rejection of Requests for Wheeling Service:

Within thirty (30) days of receipt of a request to provide wheeling services, Party 2 shall determine if sufficient capacity exists in its facilities to carry the required additional water. The request shall include a plan as to how to interconnect the facilities of the two parties. After both parties have reviewed, and if necessary, revised the plan, and if capacity exists, both parties shall decide whether to enter into an agreement. If insufficient capacity exists, the request will be denied unless the additional provisions of Section 8 of this Exhibit are enacted.

8. Facility Costs in Order to Provide Wheeling Service:

All costs of modifying or upgrading facilities in order to provide wheeling services shall be paid for by Party 1. In addition, should Party 1 wish Party 2 to provide wheeling services when insufficient capacity exists, then all costs associated with upgrading any necessary facilities shall be borne by Party 1. Payment of costs by Party 1 shall be within thirty (30) days of invoice by Party 2 upon completion of an upgrade project.

9. Insufficient Capacity Due to Load or Customer Growth:

Each year capacity calculations shall be made by both parties for all facilities involved in providing wheeling services. If any facilities have become overloaded, Party 2 shall prepare a cost estimate to upgrade the necessary

facilities. Costs shall be split proportionately between the parties based on each party's capacity need through the section or facility. Party 1 shall then have ninety (90) days to decide whether to terminate the wheeling agreement, pay its share of the costs to upgrade the facilities, or reduce its demand on Party 2's facilities. Payment of costs by Party 1 shall be within thirty (30) days of invoice by Party 2 upon completion of an upgrade project.

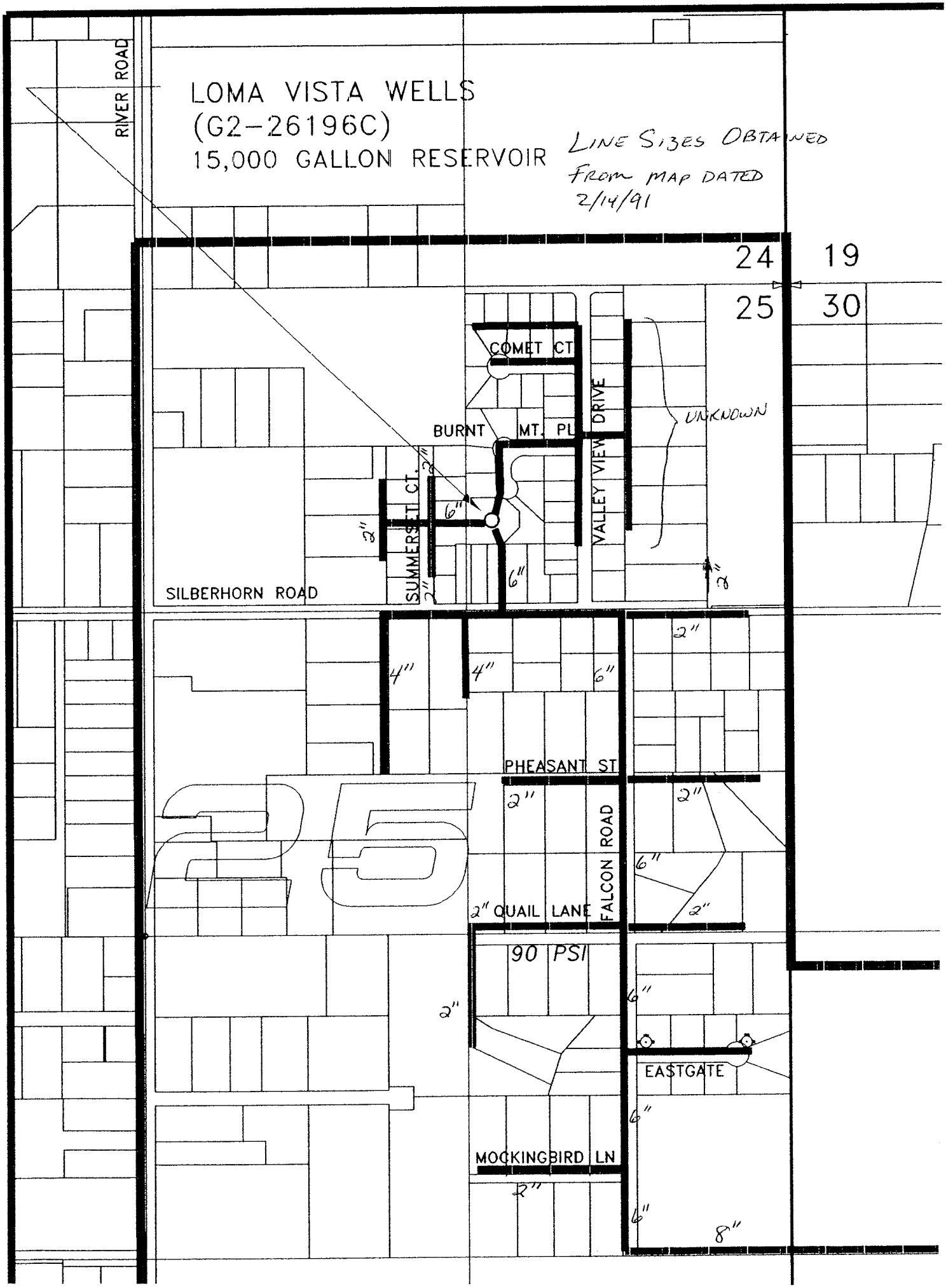
10. Wheeling Charges:

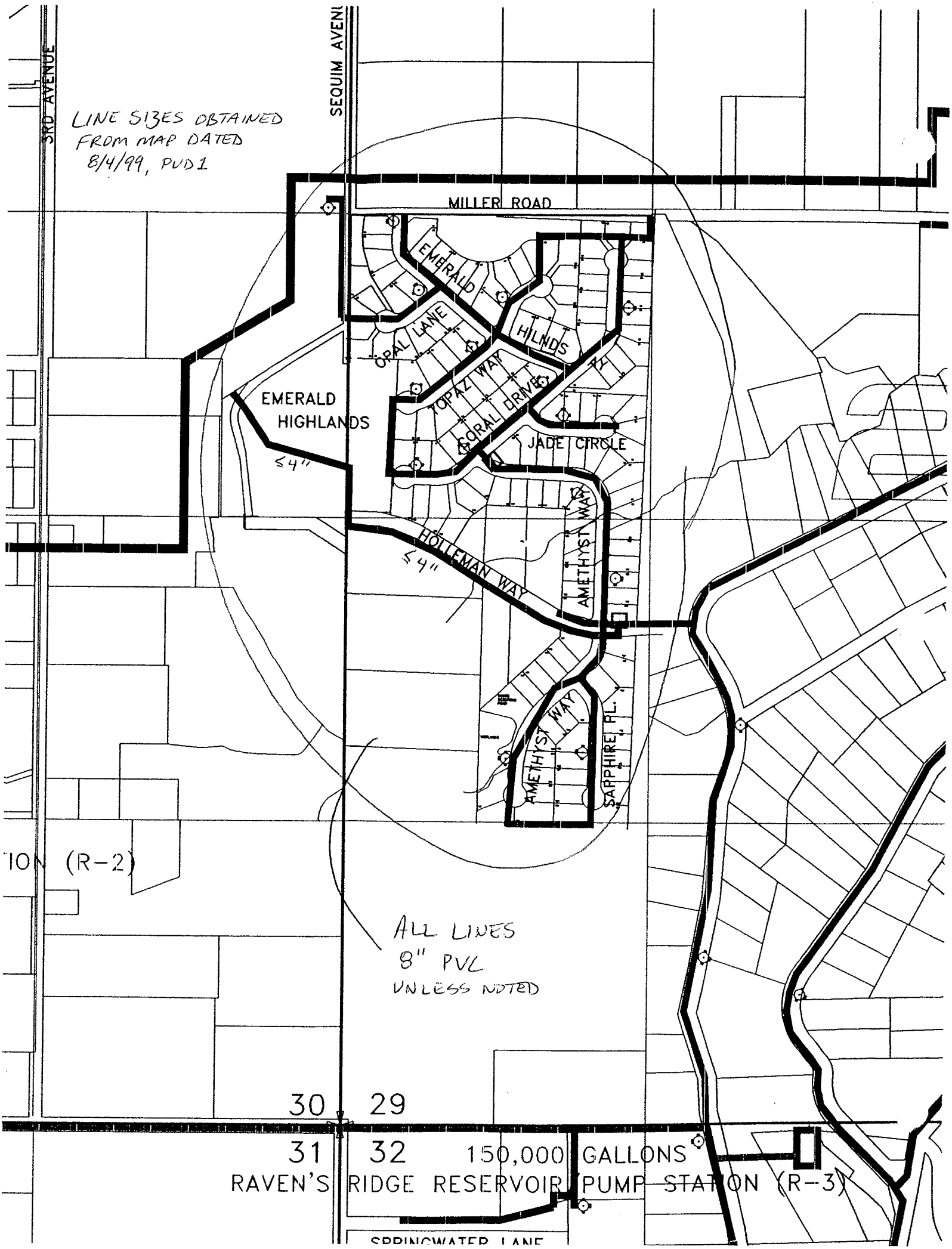
Compensation will be calculated in accordance with a formula to be established in the Wheeling Agreement and due and payable within twenty (20) days of receipt of invoice.

11. Hold Harmless:

Each Wheeling Agreement shall have a hold harmless clause.

MM/aj
1/16/95


LOMA VISTA WELLS
(G2-26196C)
15,000 GALLON RESERVOIR
LINE SIZES OBTAINED FROM MAP DATED 2/14/91
RIVER ROAD
24
19
25
30
COMET CT
BURNT MT. PL
VALLEY VIEW DRIVE
UNKNOWN
SUMMERSET CT.
SILBERHORN ROAD
PHEASANT ST
FALCON ROAD
QUAIL LANE
90 PSI
EASTGATE
MOCKINGBIRD LN
2"
6"
4"
8"


3RD AVENUE
SEQUIM AVENU
LINE SIZES OBTAINED FROM MAP DATED 8/4/99, PUD 1
MILLER ROAD
EMERALD
OPAL LANE
HILNDS
TOPAZ WAY
CORAL DRIVE
JADE CIRCLE
EMERALD HIGHLANDS
≤4"
HOLLEMAN WAY
≤4"
AMETHYST WAY
AMETHYST WAY
SAPPHIRE PL.
TION (R-2)
ALL LINES 8" PVC UNLESS NOTED
30
29
31
32
150,000 GALLONS
RAVEN'S RIDGE RESERVOIR PUMP STATION (R-3)
SPRINGWATER LANE

MEMORANDUM

Clallam County Department of Community Development

TO: Board of Clallam County Commissioners
City of Sequim City Council

FROM: Steve Gray, Senior Planner

SUBJ: Final Draft of Interlocal/SERP for March 23, 1998

DATE: March 19, 1998

Attached is the final draft of the Clallam County Interlocal/SERP prepared by County and City staff for the Board of Clallam County Commissioners and Sequim City Council consideration. The changes are based on direction from the BCCC and City Council and recommended clarification of SERP provisions.

c. correspondence file
Bob Martin, Director
Andy Meyer, Planning Director
Rick Sepler, City of Sequim Planning Director
project file

GRAY & OSBORNE, INC.
REC'D SEATTLE
JOB #
JUN - 8 1998
TV MD TMZ HS JLW
KEE TWW KA DP
MJJ TAN RRC AG
TJO JPW NEL TP GM

223 East 4th Street, P.O. Box 863, Port Angeles, WA 98362-0149 (360) 417-2000 Fax: (360)417-2443

INTERLOCAL AGREEMENT
CLALLAM COUNTY - CITY OF SEQUIM
SEQUIM URBAN GROWTH AREA

THIS AGREEMENT is entered into and between CLALLAM COUNTY, a political subdivision of the State of Washington, herein referred to as COUNTY, and the CITY OF SEQUIM, a municipal corporation, herein after referred to as the CITY.

WHEREAS, the County and City have agreed to the designation of a Sequim Urban Growth Area;

WHEREAS, the County and City have agreed to jointly prepare and adopt a comprehensive plan under the requirements of the Growth Management Act of 1990 (Chapter 36.70A RCW) for the Sequim Urban Growth Area;

WHEREAS, the City of Sequim has adopted a Comprehensive Plan to guide the character of future development within the Sequim Urban Growth Area;

WHEREAS, the County adopted the City of Sequim Comprehensive Plan for the unincorporated Sequim Urban Growth Area subject to twenty-eight (28) amendments under Ordinance No. 628, 1997;

WHEREAS, the City of Sequim Comprehensive Plan directs the County and City to prepare an interlocal agreement for the review and processing of development proposals and development of a System Expansion Review Process for the extension of utilities.

WHEREAS, the County adopted, in agreement with the City the County-Wide Planning Policies (CWPP) to guide joint planning of urban growth areas; and

WHEREAS, the CWPP advise the County and the City to develop procedures for the administration of land use regulations, review of development proposals, and extension of urban services for the unincorporated portions of the Sequim Urban Growth Area.

NOW THEREFORE, the County and City make the following agreement:

Section 1 Purpose. The purpose of this Agreement between Clallam County and the City of Sequim is to establish a procedure to ensure the orderly development of the unincorporated Sequim Urban Growth Area and to ensure the appropriate provision of urban services to such development consistent with the comprehensive plan. To implement the purpose stated above, it is the intent of this Agreement to accomplish the following:

i. Allow for the orderly development of the Sequim Urban Growth Area consistent with the comprehensive plan and the Washington State Growth Management Act, Chapter 36.70A RCW.

ii. Provide for joint coordination related to permit review and processing within the unincorporated Sequim Urban Growth Area.

iii. Establish the administration of development regulations for the unincorporated Sequim Urban Growth Area consistent with the comprehensive plan.

Section 2 Applicability. The Agreement applies to the unincorporated portions of the Sequim Urban Growth Area as designated on the Official Clallam County Comprehensive Plan Map for the Sequim-Dungeness Regional Comprehensive Plan, Title 31, Chapter 31.03 Clallam County Code. Nothing contained in this Service Agreement alters the land use powers of Clallam County and the City of Sequim.

Section 3 Definitions.

i. Comprehensive plan means a generalized coordinated land use policy statement of the county adopted pursuant to the Clallam County Charter, Growth Management Act of 1990 (Chapter 36.70A RCW) and the Planning Enabling Act (Chapter 36.70 RCW). For the purposes of this Agreement, the comprehensive plan is the joint comprehensive plan agreed upon between the County and the City.

ii. Development regulations means any controls placed on development or land use activities by the county, including but not limited to, zoning ordinances, land division ordinances, critical or sensitive area ordinances, and binding site plan ordinances.

Section 4 Comprehensive Plan. The County shall maintain administration of the comprehensive plan governing the unincorporated portions of the Sequim Urban Growth Area.

Section 5 Development Regulations. The County shall maintain administration of all its current development regulations within the unincorporated portions of the Sequim Urban Growth Area consistent with this Agreement.

Section 6 SEPA. The City agrees to assume lead agency status only for those public proposals within the unincorporated portions of the Sequim Urban Growth Area that the City initiates consistent with WAC 197-11-926. The County agrees to provide the City the opportunity to review all application materials associated with proposed actions within the Sequim Urban Growth Area prior to the issuance of a Threshold Determination pursuant to the State Environmental Policy Act (SEPA).

Section 7 Development Review Process. The County and City agree to jointly develop a development review process for land use permits and approvals in order to facilitate processing of land use applications in a timely matter and to assist applicants through the land use permit/approval process. This joint application review process shall be consistent with the comprehensive plan and the Consolidated Development Permit Process to be adopted under Chapter 26.10, Clallam County Code. The County agrees to incorporate joint application review processes as part of the adoption of development standards consistent with this Interlocal Agreement and the comprehensive plan. At a minimum, the joint application review process shall establish procedures for:

i. City participation in Clallam County pre-application meetings.

ii. Forwarding of land use applications to the City for review and comment including but not limited to: type of permits/approvals forwarded to the City for review; minimum content of forwarded application materials; length of comment period; and minimum scope of City review.

iii. The level of technical assistance and support the City will provide to the County for implementing City development standards including, but not limited to, civil

engineering plan review and inspections of facilities to be part of or connected to City infrastructure.

The County shall consider and give substantial weight to City of Sequim comments prior to issuing a decision.

Section 8 Zoning. The County agrees to seek to amend the Clallam County Zoning Code, Title 33 Clallam County Code, and Official Clallam County Zoning Map by adopting zoning land use designations and development standards that are consistent with the comprehensive plan.

Section 9 Land Divisions. Pursuant to CCC 29.30.150, Clallam County adopted the City of Sequim subdivision improvement requirements for land divisions within the unincorporated portions of the Sequim Urban Growth Area. The City agrees that any amendments to City subdivision improvement standards that will apply to land divisions within the unincorporated Sequim UGA must be jointly agreed upon by the County. The County and City agree to jointly review land division improvement requirements and adopt amended standards where appropriate for land divisions creating lot sizes equal to or greater than one-half (1/2) acre in order to preserve future redevelopment opportunities to higher urban densities.

Section 10 Sewer and Water Utilities. The County and City agree that the provision of adequate public facilities for potable water and wastewater treatment for the unincorporated portions of the Sequim Urban Growth Area shall be provided for consistent with the attached Service and Extension Review Process (Attachment A). The City shall not apply additional requirements as a condition of utility connection.

Section 11 Through the adoption of this Agreement, Clallam County shall adopt by reference the provisions of City of Sequim Resolution No. 93-9 or other mutually acceptable legislation to allow City administration of "late-comer" agreements for the installation of utility services within the unincorporated portions of the Sequim Urban Growth Area.

Section 12 Park and Recreation Level of Service (LOS) standards. The City of Sequim Comprehensive Plan has established a LOS standard for Parks and Recreation facilities located within the urban growth area. The Clallam County Countywide Planning Policies require that Parks and Recreation public facilities be established consistent with these standards to meet the needs of new development. In order to provide guidance on the establishment of these new facilities, the City shall develop a parks plan for the urban growth area which specifically addresses identified deficiencies and reconciles any identified discrepancies between both jurisdiction's Parks and Recreation LOS. The County shall participate in the preparation of this plan. The Plan shall incorporate existing and proposed regional facilities such as the Robin Hill Farm County Park, Olympic Discovery Trail, and Carrie Blake Park, and shall evaluate the location and type of neighborhood recreation facilities which are needed within the urban growth area. The resulting Plan shall be adopted by both jurisdictions. The adopted Plan shall include a joint implementation strategy and shall require the amendment of both jurisdictions capital facility plan's, as applicable. All new development or redevelopment shall provide for facilities consistent with the adopted joint Parks and Recreation Plan.

Section 13 Operation and Maintenance Pilot Program. The County agrees to initiate within one year of the adoption of this Agreement a pilot operation and maintenance program for on-site sewage systems within the Sequim Urban Growth Area. The City shall participate in the

technical development of this program. The purpose of this pilot program shall be to protect groundwater quality by encouraging property owners served by pre-existing and new on-site systems (as permitted by Section 10) to maintain and operate their systems in the most efficacious manner. The pilot program shall consider and evaluate (at a minimum) the following techniques to enhance on-site system performance:

i. The development of public information materials on best management practices associated with the operation and maintenance of on-site systems.

ii. The development of an on-site system inspection program.

iii. The creation of a data base and notification system for on-site system owners to ensure timely maintenance.

iv. The establishment of alternative and/or contract maintenance programs to be administered by the County, City, or a contracted private business.

Applicable grant funding sources to support these and other activities shall be evaluated by both the City and the County and, where appropriate jointly applied for.

Section 14 In order to better protect groundwater resources, the County and the City agree to jointly evaluate and develop an incentive program which encourages the voluntary connection of pre-existing, established development served by on-site water and/or sewer utilities to City services in areas where such services are available. The pilot program shall consider and evaluate (at a minimum) the following incentives:

i. A possible reduction in system connection charges based on the type of system.

ii. Extended financing terms for the payment of system connection charges and/or the establishment of a revolving loan program to address material and labor costs directly associated with making the connection.

iii. The establishment of jurisdictionally initiated and administered local improvement districts.

Applicable grant funding sources to support these and other activities shall be evaluated by both the City and the County and, where appropriate jointly applied for.

Section 15 The City agrees to provide the County maps in a mutually agreeable format which describe existing or planned City sewer and water utilities. The City agrees to update such maps within sixty (60) days of an amendment to the City of Sequim 6-year Capital Facilities Plan, or after installation of new water and sewer lines.

Section 16 The County and City agree to adopt development regulations necessary to implement this interlocal agreement.

The City of Sequim

_____
Bill Thomas, Mayor
on behalf of the City Council
Date: _____, 1998

Board of Clallam County Commissioners

_____
Carole Y. Boardman, Chair
Date: _____, 1998

_____
Martha M. Ireland
Date: _____, 1998

_____
Phillip Kitchel
Date: _____, 1998

_____

ATTEST:

_____
Karen Flores
Clerk of the Board

Approved As To Form:

_____
City Attorney
Date: _____, 1998

ATTACHMENT A

Clallam County/City of Sequim
Service Extension Review Process (SERP)

Clallam County - City of Sequim
Service Extension Review Process

Section 1 **Purpose:** The purpose of this Service and Extension Review Process (SERP) is to set forth an agreement between Clallam County and the City of Sequim on the provisions for sewer and water services within the unincorporated areas of the Sequim Urban Growth Area. The intent of the SERP is to ensure that adequate public facilities for potable water and wastewater treatment are provided in an efficient and coordinated manner within the Sequim Urban Growth Area.

Section 2 **Applicability and Process.** The SERP contains the requirements ~~applies to development~~ for the provision of municipal and non-municipal sewer and water utilities within the unincorporated Sequim Urban Growth Area. All development which requires a Clallam County permit or approval of sewage disposal and/or water supply utilities shall comply with the provisions of this SERP. The City of Sequim and Clallam County shall provide the public reference information (e.g., flowcharts) and amend development application procedures as necessary to facilitate the SERP. ~~The SERP is illustrated in the attached flow charts [Appendix A]. Flow chart 1 illustrates the SERP for residential development of current undeveloped legal lots of record that were created prior to the effective date. Flow chart 2 illustrates the SERP for any new lots created on or after the effective date. Flow chart 3 illustrates the SERP for developed legal lots of record that were created prior to the effective date. Flow chart 4 illustrates the SERP for non-residential development.~~

Section 3 **Definitions.**

Accessory Dwelling Unit. A separate dwelling unit within a single family dwelling or a separate structure associated with a single family dwelling which is incidental and subordinate to the primary use of the property [CCC 33.03.010 (1)].

Administrator. The director of the Department of Community Development of Clallam County or his/her designee.

Available Municipal Utility, Sewer Utility, Water Utility. An existing municipal sewer and/or water utility main located within two hundred (200) feet of a ~~the nearest point of connection between the subject~~ property line or approved dryline utility ~~and an existing or planned municipal utility~~, as measured along the public right-of-way or any public easement granted to municipal utilities, at the time of receipt by Clallam County of a complete application. ~~The point of connection to a dryline utility shall be used instead of the nearest property line where such utility was installed consistent with the SERP as the point of connection to a public utility main. Measurements shall not be taken from~~ ~~p~~Privately-owned utility connections to ~~the~~ a municipal sewer and/or water public utility main are not considered available municipal utilities.

Community On-Site Sewage Disposal System. An on-site sewage disposal system as defined under Chapter 246-272 WAC, that serves two or more dwelling units.

Connection. The physical linking or "hook-up" of municipal sewer and/or water services to a subject use or property. Connection includes all buildings, habitable structures, plumbing outlets, and domestic water lines requiring municipal sewer and/or water services.

Development. For the purposes of the SERP, development means any activity located within the unincorporated Sequim Urban Growth Area which requires a permit or approval of existing or new sewage disposal and/or water supply utilities from Clallam County, including, but not limited to, land divisions, building permits, and on-site sewage permits.

Dryline Utilities. Dryline utilities includes any of a number of methods of installing utilities at the time of development for connection to a municipal distribution system at a later time.

Duplex. Two dwelling units having a common roof. [CCC 33.03.010(20)]

Dwelling Unit. Any building or any portion thereof which is intended or designed to be used, rented, leased, let or hired out to be occupied for living purposes having independent living facilities for one family including permanent provisions for living, sleeping, eating, cooking, sanitation and including accessory structures and improvements. [CCC 33.03.010(21)]

Effective Date. Ten (10) calendar days following ~~The~~the date ~~the~~ Clallam County and the City of Sequim ~~mutually agree~~ adopt ~~on~~ the Interlocal Agreement and the Service Extension Review Process (SERP).

Existing Municipal Utility. An installed municipal water or sewer main located in the public right-of-way or public utility easement that is available for connection.

Final Plat. As set forth under Title 29 Clallam County Code.

Group Home. A facility licensed by the state which is located in a single building utilized for the full-time shelter and care of a group of unrelated people.

Land Divisions. Any applications for division of land which is subject to the Clallam County Land Division Code, Title 29, Clallam County Code, including a subdivision, Planned Unit Development, Binding Site Plan, short subdivision, or large lot subdivision.

Lot, Parcel, Tract. A lot, parcel or tract shall be an ownership of land in which the boundary is defined by a deed recorded in the County Auditor's Office and assigned a tax parcel number by the County Assessor; or a lot which has been defined by a survey recorded pursuant to Washington State surveying or platting laws and is assigned a tax parcel number by the County Assessor; or parcels recognized by resolution of the Board of County Commissioners adopted prior to the effective date of the SERP.

Municipal Services or Utilities. Sewer and water services provided by the City of Sequim. For the purposes of the SERP, municipal water services may also include the Evergreen Public Utility District water system or other public water systems that have entered into an Urban Growth Area Service Agreement with the City of Sequim.

Multiple-Family Dwelling. A building containing two or more dwelling units. For the purposes of this SERP, a group home is considered to be a multiple-family dwelling when it is occupied by thirteen or more residents, including resident staff.

Non-Municipal Utilities. Sewer and water services not defined as municipal services or utilities. Non-municipal utilities include on-site sewage systems, community on-site sewage systems, individual water supply wells, and public water systems.

Planned Municipal Utility. Are those future municipal sewer and water utilities identified and mapped in the current version of the ~~adopted~~ City of Sequim wastewater and water service plans~~Six (6) Year Capital Facility Plan~~.

Pre-existing Lot. Any lot, parcel or tract established prior to the effective date of the SERP.

Public Water System. As defined and referenced under WAC 246-290-020

Residential use. For the purposes of the SERP, residential uses shall mean single-family, multi-family, and accessory dwelling units.

SERP. The Service Extension Review Process (SERP) jointly adopted by the City of Sequim and Clallam County for the provision of sewage disposal and water within the unincorporated Sequim Urban Growth Area.

Single-Family Dwelling. A dwelling unit detached from any other dwelling unit and intended for occupation by one family and including accessory improvements and uses. This definition includes manufactured homes such as mobile homes, modular homes and other homes manufactured in components or as one complete dwelling unit. [CCC 33.03.010 (68)]. For the purposes of this SERP, a group home is considered to be a single-family dwelling when it is occupied by twelve (12) or fewer residents, including resident staff.

STEP System - A Septic Tank Effluent Pump (STEP) system consisting of a tank or tanks for settling and digesting wastewater solids and a pressure piping system for conveying the supernatant liquid into the municipal sewer system. STEP systems permit only sanitary wastewater to be discharged into the tank. Roof drains and other stormwater sources shall be strictly excluded.

Urban Growth Area Service Agreement. An agreement between the City and a private utility provider which establishes a defined geographic service area within the boundaries of the urban growth area. The private utility provider agrees to serve upon request by the individual property owners all parcels located within this area. The boundaries of the agreed upon service area may be located outside of the boundaries of an approved development, provided that appropriate water rights and approvals are obtained. The Urban Growth Area Service Agreement may be for sewer and/or water service.

Utilities - Private and municipal water and sewage disposal systems located within the Sequim Urban Growth Area.

Section 4 **Development Exempt from Municipal Connection.** The County and City agree that connection to municipal water and/or sewer utilities shall not be required for the types of development listed below; PROVIDED that such development is otherwise consistent with the provisions of the SERP and all other applicable County and State regulations. Development exempt from municipal service connection may request municipal services to comply with County and State requirements for sewage disposal and potable water. The County shall consider connection to municipal services to comply with public health and sanitation requirements.

i. Development not requiring approval of water supply and sewage disposal systems.

ii. One individual, detached ~~S~~single-family ~~and~~ or duplex residential ~~development~~ dwelling on a lot that is one (1) acre or greater.

iii. Any development that was connected to and served by a non-municipal utility prior to the effective date.

iv. Non-municipal water utilities that are used solely for agricultural or non-human consumption.

v. Any development issued an applicable and valid building permit prior to the effective date; provided that the permit ~~this exemption is only~~ remains applicable ~~and~~ valid ~~for a maximum of four (4) years from the date of issuance of the building permit by~~pursuant to the Clallam County Building Code, Chapter 21.01 C.C.C; provided further, that this exemption does not apply to any lot required to be served by a municipal utility as a condition of preliminary or final plat approval pursuant to the Clallam County Land Division Code, Title 29 C.C.C.

vi. Any development on a pre-existing lot that will be served by a public water system where such service was approved for such development as a condition of final plat approval shall not be required to connect to municipal water services.

vii. Any development on a pre-existing lot that will be served by a community on-site sewage system where such service was approved for such development as a condition of final plat approval shall not be required to connect to municipal sewer services.

viii. Accessory dwelling units allowed under the Clallam County Zoning Code, Title 33, Clallam County Code, on lots one (1) acre or larger , except where the primary residential use on the lot is connected or required to connect to municipal utilities under the SERP.

ix. Home enterprises and home based businesses permitted under the Clallam County Zoning Code, Title 33, Clallam County Code, that do not require potable water and sewage disposal beyond what could be normally expected of a single-family residence, except where the primary residential use on the property is connected or required to connect to municipal utilities under the SERP.

x. Any expansion, remodeling, or reconstruction activity of an existing structure or use that does not involve drilling of a new well or cause wastewater flows to exceed the treatment or disposal capability of the existing on-site sewage system.

xi. Development on pre-existing lots of record approved for connection to non-municipal utilities for a period of five years from the date of final plat approval.

Section 5 **Land Divisions (New Lots).** Clallam County agrees to process and condition applications for land divisions that are accepted as complete on or after the effective date as follows:

A. Non-Residential Lot. Any ~~new~~ lot where the planned use of the lot is for a commercial, industrial, or other non-residential use shall be connected to municipal sewer and water utilities prior to final plat approval. A note shall be placed on the face of the plat that indicates what municipal services are provided and that all future development requiring such services shall be required to connect to such services prior to development approval.

B. Multi-Family Residential Lot. Any new lot where the planned use of the lot is for a multi-family dwelling ~~residence~~ shall be connected to municipal sewer and water utilities prior to final plat approval. A note shall be placed on the face of the plat that indicates what municipal services are provided and that all future development requiring such services shall be required to connect to such services prior to development approval.

C. Single-Family Residential Lot Less Than 1/2 Acre. Any ~~new~~ lot less than one-half (1/2) acre where the planned use of the lot is for a single-family dwelling ~~residence~~ shall be connected to municipal sewer and water utilities prior to final plat approval. A note shall be placed on the face of the plat that indicates what municipal services are provided and that all future development requiring such services shall be required to connect to such services prior to development approval.

D. Single-Family Residential Lot Between 1/2 and 1 Acre. Any ~~new~~ lot between one-half (1/2) acre and one (1) acre where the planned use of the lot is for a single-family dwelling ~~residence~~ shall be connected to municipal sewer and water utilities prior to final plat approval. Land divisions that are not located within two hundred (200) feet of an available~~, existing~~ municipal utility, may be approved without connection to municipal utilities provided that all of the following criteria are met prior to final plat approval:

i. The County Health Official determines that the use of non-municipal utilities complies with all County and State requirements pertaining to sewage disposal and potable water.

ii. Non-municipal utilities are otherwise provided consistent with the SERP.

iii. A dry sanitary sewer main and water main is installed within the land division and side line sewer and water mains are provided to any lot between one-half (1/2) acre and one (1) acre. Common utility facilities associated with a public water system or community on-site sewage system shall be allowed in lieu of dryline utilities where such facilities meet the same design requirements for municipal utilities.

iv. Any ~~L~~lot~~s~~ less than one (1) acre shall connect to municipal utilities within one ~~hundred twenty (120) days~~ (1) year of notification by the City of Sequim that an existing municipal sewer and/or water utility is determined to be available as defined in Section 3. A note shall be placed on the face of the plat that cites which lots are subject to connection and which states the requirements for future connection when municipal services become available. Connection shall not be required where water services are provided by a public water system that is otherwise consistent with the SERP.

E. Single-Family ~~Lot~~ Residential Lot 1 Acre or Greater. Any ~~new~~ lot that is one (1) acre or greater where the planned use of the lot is for a single-family dwelling ~~residence~~ must obtain approval from the County Health Officer that the lot has met all State and County requirements pertaining to sewage disposal and potable water. Connection to municipal utilities is not required. Lots connected to municipal services shall be considered to comply with all State and County requirements pertaining to sewage disposal and potable water.

Any lot not connected to municipal utilities shall demonstrate that adequate accommodations have been provided for the future provision of municipal utilities.

Accommodations ~~may include, but are not limited to:~~ for the future provision of municipal utilities may be demonstrated by one or more of the following methods: 1)- extension of municipal services to the property line; 2) provision of dryline utilities; and/or 3) provision of municipal utility easements and right-of-ways. Notice shall be recorded on the face of the plat as follows:

> All lots [or specify individual lot numbers] shown on this [specify land division type (e.g., short plat)] have not been required to connect to [specify applicable municipal utilities]. Future development or subdivision of this property may require the provision of municipal sanitary sewer and/or domestic water services. For information on municipal utility connection standards, contact the City of Sequim for lots located within the city limits and the Clallam County Department of Community Development for lots located outside of the Sequim city limits.

Section 6 **Individual Lot Development (Pre-Existing Lot).** Unless exempted under Section 4 of the SERP, Clallam County agrees to require provisions for connection to municipal services consistent with this Section for the following types of development on a pre-existing lot of record:

i. Non-residential development;

ii. Multi-family residential development consisting of a total of three (3) or more dwelling units; and

iii. Single-family and associated accessory dwelling unit (if applicable) and duplex residential development on lots less than one (1) acre.

A. Available Municipal Utility. Where the municipal utility is an available ~~, existing~~ municipal utility, connection to such utility shall be required prior to final approval of the development by Clallam County.

B. Municipal Utility Not Available. Where the municipal utility is ~~an available, planned municipal utility, or where existing or planned municipal utilities are~~ not available, the provision for connection ~~to municipal utilities~~ shall be met by either:

i. extension of and connection to municipal utilities prior to final approval of the development by Clallam County; or

ii. ~~recording a no protest connection agreement and~~ installation of non-municipal utilities that are otherwise consistent with the provisions of the SERP; provided that, connection shall be required within one (1) year of notification by the City of Sequim that an existing municipal sewer and/or water utility is determined to be available as defined in Section 3.~~.~~

~~The no-protest connection agreement shall be recorded with the Clallam County~~ Auditor ~~and shall state that the owner or occupants,~~ current ~~and future, of the subject property shall connect to~~ municipal ~~utilities within one (1) year of notification by the City of Sequim that municipal utilities are available.~~

Section 7 **Individual Lot Development (New Lot).** Development on any lot created after the effective date shall provide for connection to available municipal utilities as conditioned at the time the lot was legally established under the Clallam County Land Division Code, Title 29, Clallam County Code, or as otherwise required under the SERP.

Section 8 **STEP Systems.** Existing or new development required to connect to a municipal sewer utility, may be permitted to establish a Septic Tank Effluent Pump (STEP) wastewater system in lieu of conventional connection where consistent with the other provisions of the SERP and the below standards:

i. The STEP system shall consist of a tank or tanks for settling and digesting wastewater solids, and a pressure piping system for conveying the supernatant liquid into the City of Sequim sewer system.

ii. The STEP system shall only allow sanitary wastewater to be discharged into the tank. Roof drains and other stormwater sources shall be prohibited.

iii. Property owners will be responsible for the maintenance of all laterals and side (or building) sewer lines associated with STEP systems.

Section 9 **Non-Municipal Utilities.** Non-municipal utilities shall comply with all applicable state and local regulations. In addition, non-municipal utilities shall meet the following requirements:

i. Existing public water systems and/or community on-site sewage disposal systems shall not be allowed to expand their services to lots less than one (1) acre unless such connection was approved prior to the effective date of the SERP by Clallam County and/or through an Urban Growth Area Service Area Agreement between the service provider and the City of Sequim, and such connection is otherwise consistent with the SERP.

ii. Extension of services by existent public water systems and/or community on-site sewage disposal systems will be reviewed to ensure that all applicable state and local regulations have been met, and that no extension of a non-municipal service by an existing non-municipal utility creates an "unservable" condition within the Sequim Urban Growth Area.

iii. Non-municipal sewage utilities allowed to serve development not otherwise exempted from connection under ~~this~~ the SERP Agreement shall be designed and installed to be able to connect in the future to municipal sewer utilities. This may include drylining utilities for future connection or the provision of a STEP system.

iv. New, non-municipal utilities shall not be located within two hundred (200) feet of the property boundary of a designated municipal ~~water system~~ wellfield area as identified on the current wellfield area map of the municipal provider. ~~[Appendix B].~~

v. Non-municipal utilities that provide service to more than fifteen (15) connections that propose to extend services shall enter into an Urban Growth Area Service agreement between Clallam County and the City of Sequim. The Urban Growth Area Service Agreement shall be consistent with the guidelines and policies for such agreements under the Clallam County County-Wide Planning Policies, dated June 30, 1992, as amended.

vi. Accessory dwelling units must be connected to the same sewer and water utility as the primary residential unit on lots that are less than one (1) acre in size.

vii. Single-family and duplex residential development established after the effective date of the SERP on lots which are one (1) acre or greater shall provide for connection to

municipal utilities consistent with this SERP when such lots are redivided pursuant to the Clallam County Land Division Code, Title 29 C.C.C. to less than one (1) acre.

viii. Development served by a failing non-municipal sewage system shall connect to an existing municipal sewer utility in accordance with the Clallam County Health Rules, C.C.H.R. 4.040 and WAC 246-272-07001, as amended. The determination of whether an on-site sewage system is failing shall be made by the County based on the definition of failure, as amended, under the State On-Site Sewage System Rules, Chapter 246-272 WAC.

Section 10 **Connection and Design Standards.** All facilities intended to be connected to a municipal utility, including dryline utilities and STEP systems, shall be designed, installed, connected, and inspected as required by the municipal service provider.

Section 11 **Waivers.** The Administrator reserves the right to waive connection requirements to municipal services for lots created prior to the effective date of the SERP which are encumbered by topographic, environmental, and/or significant technical limitations associated with the provision of services which would require the construction of facilities which are disproportionate in size and capacity to the proposed scale of development. Waivers shall not be granted in cases where failure to provide municipal utilities would have a probable adverse environmental impact.

The Administrator shall only grant waivers based on adoption of appropriate findings and conclusions. Waivers cannot be granted unless jointly agreed upon by Clallam County and the City of Sequim.

Examples of circumstances supporting the granting of a waiver may include, but shall not be limited to, the unavoidable crossing of environmentally sensitive areas such as a wetland, or the provision of services in an area containing significant topographic variations which would require major improvements such as a municipal lift station with an ultimate service area of less than 10 connections, and/or connections which would require extensive revisions to existing infrastructure.

Section 12 **Administration.** The County and City shall jointly review development subject to this SERP Agreement consistent with the development review process adopted under Section 7 of the County/City Interlocal Agreement that adopts this SERP by reference. As part of this development review process, the City shall determine whether extension of municipal services is required subject to the SERP. Where connection to municipal sewer and water services is required, the written determination shall include a statement for service commitment from the City of Sequim. The SERP standards shall be included by Clallam County as a condition of approval of the underlying development application.

Section 13 **Utility Connection and User Fees.** Utility connection and user fees shall be established by the appropriate municipal provider.

APPENDIX D

DRAFT SATELLITE MANAGEMENT PROGRAM

APPENDIX E

UTILITY DEVELOPMENT REGULATIONS

APPENDIX F

WATER SYSTEM DEVELOPER STANDARDS

APPENDIX G

WATER QUALITY RESULTS

The City of Sequim's Annual Water Quality Report 2009

Water System ID No. 77620 Y

For More Information or Questions Please Contact:
The City of Sequim Public Works Department
615 North 5th Street
360.683.4908 P
360.681.0552 F
email: waterinfo@ci.sequim.wa.us
Mailing Address:
152 West Cedar Street
City web Site: http://www.ci.sequim.wa.us/

The City of Sequim is pleased to share with you, our customers, the quality of your drinking water in this 2009 Annual Water Quality Report to you.

What we want to be sure you know:
The City of Sequim's drinking water **meets or exceeds** all state and federal safe drinking water standards. You will find this report is full of the details.

City of Sequim Annual Drinking Water Quality Report for 2009

CITY OF SEQUIM (JULY 2010)

History of Sequim's Water System

A study of the City of Sequim's water system was completed in 1973. As a result of this study, additional water system improvements were made to the City's water system. These improvements included covering the City reservoir, metering connections, and replacement of sub-standard water lines. Another report was completed in 1983 which addressed issues of water quality, water resources, and conservation. Improvements made to the City's water system which were recommended in this report included covering the 500,000 gallon reservoir, development of the Silberhorn Well Field, installation of a chlorination system in the intake piping, and construction of a new infiltration gallery on the Dungeness River. In 1986, a high-pressure zone reservoir was constructed and the Silberhorn Well Field was brought on line. The City's 1.7 million-gallon (MG) reservoir was constructed in 1996. It provides a higher-pressure zone for the City. The first Port Williams Well No. 1 was drilled in 1995. A pressure-reducing valve (PRV) and booster station was constructed at 5th Avenue and McCurdy, and Simdars Road. In 1998, additional pipelines and a PRV at 3rd Avenue and McCurdy were constructed and Port Williams Well No. 2 was drilled and equipped. A 1 million gallon reservoir was completed in 2008. Port Williams Well No 3 was completed and put into operation in 2009. In 2009 a new PRV was constructed at Simdars and Brownfield Roads. A 2-inch by 660-foot galvanized water line will be replaced this year with a new 8-inch water line that will be looped, for better drinking water quality and flow.

Water Quality Protection Programs

The City is committed to supplying its customers with high quality drinking water. The City has adopted a new comprehensive plan to ensure that the drinking water supplied to its customers meets or exceeds all Federal and State standards.

The City of Sequim's Water System Comprehensive Plan

This plan has been approved by the Sequim City Council, Department of Health (DOH) and Department of Ecology (DOE). The plan analyzes all aspects of the water system, identifying current and future plans by the City to continue to provide high quality drinking water to its customers. The City's Water Comprehensive Plan must be updated every six years.

Water Conservation Program

The Water System Comprehensive Plan recommends many ways in which the City and its residents can help preserve and protect our water resources (see page 4 under Water Conservation).

Water Storage
Commercial and domestic demand, nesting, and emergency use water storage is provided by four reservoirs. The combined storage capacity of all four reservoirs is 3,400,000 gallons of water.

Water Quality Monitoring Requirements
Existing State law requires water systems to monitor for numerous contaminants on a regular basis. The City is in compliance with existing water quality monitoring requirements. Page 7 indicates the water quality tests regularly performed by the City.

Wellhead Protection Program
The Water System Comprehensive Plan sets protective boundaries around the City's wells, identifies potential contamination sources around the wells and provides notification to City residents about wellhead protection.

If you see a potential problem let us know.

Drinking Water Wells
To protect your drinking water wells, follow the Department of Ecology's Home Owners Guide to Well Construction. You may also refer to the Washington State Administrative Code (WAC) 173-160-171. Sequim welcomes input and would be happy to supply you with additional information. Feel free to contact City staff at 360-683-4908 or www.ci.sequim.wa.us.

Snow -Pac in the Dungeness Water-Shed

City of Sequim
Public Works Department
152 West Cedar Street
Sequim, Washington 98382
360.683.4908
www.ci.sequim.wa.us

Washington's lakes, streams, and rivers play critical roles in people's lives. People rely on clean, unpolluted water for recreation, such as boating, fishing, and swimming. They also rely on clean water for DRINKING. To remain healthy, and for sheer survival, people need water that is safe to drink (see www.clallam.net for more information on WRIA 18 watershed protection).

General Health Effects Information

While traveling through the ground, groundwater dissolves some of the naturally occurring minerals that may contain substances resulting from the presence of animals or human activity. Contaminants that may be present include microbes, inorganic and organic chemicals, pesticides, herbicides, and radioactive materials. To ensure that tap water is safe to drink, the Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration regulations establish limits for contaminants in bottled water which are required to meet the same standards as public drinking water.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, persons with HIV/AIDS or other immune system disorders, some elderly and also infants, can particularly be at risk for infections. To lessen the risk of infection by *Cryptosporidium* and other microbial contaminants, these people should seek advice from the EPA, Centers for Disease Control and the Safe Drinking Water Hotline (800-426-4791).

The City of Sequim's water sources do not contain lead or copper. However, lead and copper can leach into residential water from building plumbing systems. Lead and copper monitoring is conducted at homes categorized as high risk and under worst case conditions. Homes or buildings that were built or re-plumbed with copper pipes and lead-based solder are considered to be high risk. The use of lead-based solder was stopped in 1985.

Water Conservation for You

Save Water Indoors

The average family uses 21.7% of their water washing clothes, 1.4% washing dishes, 15.7% using faucets, 16.8% showering, 26.7% flushing toilets, 13.7% on leaks, 1.7% taking baths, and 2.2% on other uses.

Save Water in the Bathroom

- **Check all faucets, pipes, and toilets periodically for leaks**
  A faucet drip or invisible leak in the toilet will add up to 15 gallons of water a day, or 105 gallons a week, which adds up to 5,475 gallons of wasted water a year. Check your flapper periodically to make sure it's a tight fit.

- **Install water saving shower heads**
  Low-flow showerheads deliver 2.5 gallons of water per minute or less and are relatively inexpensive. Older showerheads use 5 to 7 gallons per minute.

- **Take short showers or shallow baths.** Simply taking shorter showers will save gallons of water. For long exposures to the water, a partially filled bath instead of a shower will use less water.

- **Install a 1.6 gallon low-flow toilet.** Ultra-low flow toilets use only 1.6 gallons of water per flush. Using these could cut indoor water use by as much as 20%. Older toilets use 3.5 to 5 gallons per flush.

- **Check for toilet leaks**
  Once a year, check for toilet leaks. Remove the toilet tank cover and drip 10 drops of food coloring into the tank. After 15 minutes, check for color in the toilet bowl. If you see any color, your toilet has a leak and should be repaired immediately. Again, remember to check your flapper periodically to make sure it's a tight fit.

Installing a New Water Meter

Water Loss in Gallons at 60 psi	
Leak this Size	Loss per Month
1/32”	6000
1/16”	25,000
1/8”	100,000
1/4”	400,000

- **Don't use the toilet as a wastebasket.** Using a wastebasket instead of the toilet for tissues, cleaning wipes, cloth and other bits of trash will save gallons of water that otherwise are wasted. It will also save the City staff time in finding system plug-ups and doing repairs. This saves you, the taxpayer, money.

- **Fix leaky faucets immediately.** A leaky faucet may simply need a new washer. Small faucet leaks can waste 20 gallons of water a day. Large leaks can waste hundreds of gallons.

- **Turn off the water while shaving, brushing teeth, etc.** Don't let the water run when you brush your teeth, wash your face or hands, or shave. This can save 3 to 7 gallons per minute.

Save Water in the Kitchen and Laundry

- **Fill your dishwasher**
  Your dishwasher uses the same amount of water whether it is full or just partially full of dishes, so be sure to fill it. Many dishwashers have a water saver cycle to save even more water.

- **Select proper water level laundry**
  Unlike your dishwasher, you can control the amount of water used by your clothes washers. Select the proper water level for each load of laundry.

Water Use Efficiency Leakage Information for 2009	**Million Gallons**
Total Water Produced	**363**
Total Authorized Water Consumed	**314**
Unaccounted for Distribution System Water	**48**
Distribution System Losses as Percentage	**13.4%**

Monitoring Water levels in Local Wells

Questions:

- **How can I stay in-touch with decisions that affect my drinking water?**
  - Newspapers
  - City of Sequim's web page: http://www.ci.sequim.wa.us/
  - Attend Sequim City Council Meetings
  - DOH web page: http://www.doh.wa.gov/ehp/dw/default.htm
  - DOE web page: http://www.ecy.wa.gov/programs/wr/wrhome.html

- **Is bottled water cleaner and safer than tap water?**
  Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. Since the Federal Food and Drug Administration regulates contaminants in bottled water and is responsible for providing the same levels of public health protection as public water systems, bottled water is not necessarily cleaner or safer than tap water.

- **Why is chlorine added to my drinking water?**
  Pursuant to state and federal laws, very small amounts of liquid chlorine in the form of Sodium Hypochlorite (NaOCl) are added to your drinking water as a disinfecting agent to protect you from disease-causing microorganisms. If you are bothered by the chlorine taste, keep a pitcher of tap water in the refrigerator. The chlorine will dissipate rapidly if the water is allowed to sit for a time.

PROTECTING OUR WATER SUPPLIES

People have grown understandably concerned about the safety of America's drinking water supply. It is a concern we all share and the City of Sequim has been working hard with our Emergency Management partners, EPA, DOE, DOH, Homeland Security and others in the drinking water industry, to provide you with a safe and reliable water system.

- **Is our drinking water supply safe ?**
  Your city staff montors:
  - **Daily Chlorine checks**
  - **Daily Turbidity (Clarity of Water)**
  - **Monthly Coliforms**
  - **Taste and Odor**
  - **Security Surveillance at all water supply and supply areas**
  - **Backflow device testing**
  - **Inspection of all installations and repairs**

- **What should I do if I see someone around the City's drinking water supply that looks suspicious?**
  Contact your local law enforcement by dialing **9-1-1** to report a suspicious event.

Source – (SO1) Infiltration System

DOH #	Analytes	Results	Units	SRL	Trigger	MCL	Method (Analyst Init.)
20	Nitrate-N	<(0.5)	mg/L	0.5	5	10	EPA 300.0 (KW)

These tests are from July 2009
Table 2
Water Quality Data (Regulated by EPA, State and other)

Source – Silberhorn (SO2)

DOH #	Analytes	Results	Units	SRL	Trigger	MCL	Method (Analyst Init.)
20	Nitrate-N	1.66	mg/L	0.5	5	10	EPA 300.0 (KW)

These tests are from July 2009
Table 2
Water Quality Data (Regulated by EPA, State and other)

Source – Port Williams (SO5)

DOH #	Analytes	Results	Units	SRL	Trigger	MCL	Method (Analyst Init.)
20	Nitrate-N	<(0.5)	mg/L	0.5	5	10	EPA 300.0 (KW)

Source – Kirner Park

DOH #	Analytes	Results	Units	SRL	Trigger	MCL	Exceeds	
EPA REGULATED							TRIGGER	MCL
119	ASBESTOS	2.789	MFL	7	7	7		

Local Schoolchildren Experience the Dungeness River

Reading the Tables

MCL (Maximum contaminant level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum contaminant level goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MFL (Million fibers per liter): Unit of measure for asbestos fibers greater than 10 mm in length.

NTU (Nephelometric turbidity unit): The unit of measure for turbidity.

PPM (Part per million): One part per million or one milligram per liter (mg/L).

Secondary MCLs: MCLs based on factors other than health effects such as taste and aesthetics.

DBPs-TTHMs (Total Trihalomethanes): Contaminants created from the reaction of chlorine and water. The result shown is samples from 2008.

DOH (Department of Health): Washington State Department of Health.

VOC: Volatile Organic Chemicals

SOC: Synthetic Organic Chemicals

Radioactive Contaminates: Can occur naturally or be the result of oil and gas production and mining activates.

SRL: (State Reporting Level) indicates the minimum reporting level required by DOH.

NA: (Not Analyzed) use in the results column for compounds not included in current analysis

ND: (Not Detected) use in the results column for compounds analyzed and not detected at a level greater or equal to the SRL.

Trigger Level: (DOH Drinking Water response level) Systems with compounds detected at concentrations in excess of this level are required to take additional samples.

Method: Is a definitive procedure that produces a test result.

Results: Is the product of performed test.

Units: Are measurements an metric form: L = Liter, mg = milligram

Water Quality Monitoring Results

The data shown in Table 2 are some of the items tested for by the City of Sequim. All the contaminants are well below the levels allowed by the state and federal agencies. Additional information on chemical analyses can be obtained by calling Sequim Public Works Department at 360-683-4908

Table 1
Water Quality Monitoring Requirements

Parameter	Sample Location	Frequency
Routine Coliform	Distribution System	10 per Month
Turbidity	Source Supply	Every Day
Inorganics	Source Supply	Every 3 years
VOCs	Source Supply	Every 3 years
SOCs	Source Supply	Every 3 years
Lead and Copper	Distribution System	Every 3 years
Trihalomethanes	Distribution System	Every Year
Radionuclides	Source Supply	Every 4Years
Chlorine Testing	Distribution System	Every Day

Reading Water Meters with Touch Read Wand

These tests are from 2009
Table 2
Water Quality Data (Regulated by EPA, State and other)

RADIONUCLIDE ANALYSIS REPORT
Silberhorn Well Field SO2
Date Collected 10/06/2009
Date Reported 11/17/2009

DOH #	ANALYTES	LAB MIDA	RESULTS	UNITS	DATE ANALYZED	MCL	METHOD USED
	EPA/ STATE REGULATED						
165	Gross Alpha		2.8	pCi/L	11/04/2009	15	CGR/E900.0
166	Radium 228		0.7	pCi/L	10/26/2009	5	PLJ/RA-05
Determine Radium 226 activity if Gross Alpha is greater than 5.0 pCi/L*							
39	Radium 226*			pCi/L		30	
Determine Uranium activity if Gross Alpha is greater than 15.0 pCi/L**							
105	Uranium** (mass)			ug/L		30	
105	Uranium**(activity)			pCi/L		20**	
Depending on foregoing data determine the following (must be completed if data is avalible):							
40	Radium 226 +228			pCi/L			
40	Gross Alpha*** + Radium 228			pCi/L		5	
41	Gross Alpha minus Uranium			pCi/L		15	
Do the following Only if Specifically requested by client or the state							
42	Gross Beta****			pCi/L		50	
43	Tritium****			pCi/L		20,000	
44	Strontium 90****			pCi/L		8	
107	Cesium 134****			pCi/L		***	
108	Iodine 131****			pCi/L		***	

MCL (Maximum Contaminate Level): If contaminate amount exceeds the MCL, immediately contact you regional DOH office.
MIDA: Minimum Detectable Amount.
NA (Not Analyzed): use in the results column for compounds not included in current analysis.
ND (Not Detected): use in the results column for compounds analyzed and not detected at a level greater than or equal to the MDA.
*** If Gross Alpha is less than, or equal to 5 pCi/L,** it may be assumed that the Alpha activity is entirely due to Radium 226 (i.e, Radium would not need to be run). The alpha activity is ten added to the Radium 228 activity (i.e, Beta activity) for MCL determinations. If the sum of Alpha activity plus the Radium 228 activity is greater than 5pCi/L. Radium 226 activity must then be determined for water system compliance purposes (i.e, Radium 226 + Radium 228 activity)
***** Uranium's MCL is given in mass terms (ug/L).** When Uranium is determined by mass methods, it must be converted to activity levels (pCi/L) for calculation of the MCL (Gross Alpha less Uranium). A conversion factor of 0.67 pCi/L per ug/L should be used. Uranium needs to be determined only when the gross Alpha exceeds 15 pCi/L.
*** Use Gross Alpha in lieu of Radium 226 when the Gross Alpha is less than, or equal to, 5.0 pCi/L
***** The MCL for beta particle and photon radioactivity from manmade radionuclides** is the average annual concentration which shall not produce an annual dose equivalent to the body or any internal organ greater than four millirem/yr.

These tests are from 2009
Table 2
Water Quality Data (Regulated by EPA, State and other)

RADIONUCLIDE ANALYSIS REPORT
Silberhorn Well Field SO5
Date Collected 11/03/2009
Date Reported 12/21/2009

DOH #	ANALYTES	LAB MIDA	RESULTS	UNITS	DATE ANALYZED	MCL	METHOD USED
	EPA/ STATE REGULATED						
165	Gross Alpha		-0.1	pCi/L	11/04/2009	15	CGR/E900.0
166	Radium 228		0.3	pCi/L	10/26/2009	5	PLJ/RA-05
Determine Radium 226 activity if Gross Alpha is greater than 5.0 pCi/L*							
39	Radium 226*			pCi/L		30	
Determine Uranium activity if Gross Alpha is greater than 15.0 pCi/L**							
105	Uranium** (mass)			ug/L		30	
105	Uranium**(activity)			pCi/L		20**	
Depending on foregoing data determine the following (must be completed if data is avalible):							
40	Radium 226 +228			pCi/L			
40	Gross Alpha*** + Radium 228			pCi/L		5	
41	Gross Alpha minus Uranium			pCi/L		15	
Do the following Only if Specifically requested by client or the state							
42	Gross Beta****			pCi/L		50	
43	Tritium****			pCi/L		20,000	
44	Strontium 90****			pCi/L		8	
107	Cesium 134****			pCi/L		***	
108	Iodine 131****			pCi/L		***	

MCL (Maximum Contaminate Level): If contaminate amount exceeds the MCL, immediately contact you regional DOH office.
MIDA: Minimum Detectable Amount.
NA (Not Analyzed): use in the results column for compounds not included in current analysis.
ND (Not Detected): use in the results column for compounds analyzed and not detected at a level greater than or equal to the MDA.
*** If Gross Alpha is less than, or equal to 5 pCi/L,** it may be assumed that the Alpha activity is entirely due to Radium 226 (i.e, Radium would not need to be run). The alpha activity is ten added to the Radium 228 activity (i.e, Beta activity) for MCL determinations. If the sum of Alpha activity plus the Radium 228 activity is greater than 5pCi/L. Radium 226 activity must then be determined for water system compliance purposes (i.e, Radium 226 + Radium 228 activity)
***** Uranium's MCL is given in mass terms (ug/L).** When Uranium is determined by mass methods, it must be converted to activity levels (pCi/L) for calculation of the MCL (Gross Alpha less Uranium). A conversion factor of 0.67 pCi/L per ug/L should be used. Uranium needs to be determined only when the gross Alpha exceeds 15 pCi/L.
*** Use Gross Alpha in lieu of Radium 226 when the Gross Alpha is less than, or equal to, 5.0 pCi/L
***** The MCL for beta particle and photon radioactivity from manmade radionuclides** is the average annual concentration which shall not produce an annual dose equivalent to the body or any internal organ greater than four millirem/yr.

VOC – VOC1
VOC – VOC1 by Various EPA Approved Methods
Source / Point of Entry – Report of Analysis
Date Received 7/7/2009
Date Reported 7/15/2009
Source SO1 Infiltration System

DOH #	Analyte	Results	Units	SRL	Trigger	MCL*	MCL Exceeded	Method (Analyst Init)
EPA / State Regulated								
103	1,2-dibromo-3-Chloropropane	ND	ug/L	0.5		0.2		EPA 524.2 (TM)
160	Total Xylenes	ND	ug/L	0.5	0.5	10,000		EPA 524.2 (TM)
57	T-1.2 Dichloroethene	ND	ug/L	0.5	0.5	70		EPA 524.2 (TM)
60	Cis-1.2 Dichloroetene	ND	ug/L	0.5	0.5	70		EPA 524.2 (TM)
47	1.1.11-Trichloroethane	ND	ug/L	0.5	0.5	200		EPA 524.2 (TM)
48	Carbon Tetrachloride	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)
49	Benzene	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)
50	1.2-Dichloroethane	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)
51	Trichloroethane	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)
63	1.2-Dichloroprpane	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)
66	Toluene	ND	ug/L	0.5	0.5	1000		EPA 524.2 (TM)
67	1.1.2-Trichloroethane	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)
68	Ttrachloroethane	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)
71	Chlorobenzene	ND	ug/L	0.5	0.5	100		EPA 524.2 (TM)
73	Ethyl Benzene	ND	ug/L	0.5	0.5	700		EPA 524.2 (TM)
158	M/P Xylene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
45	Vinyl Chloride	ND	ug/L	0.5	0.5	2		EPA 524.2 (TM)
159	O-Xylene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
76	Styrene	ND	ug/L	0.5	0.5	100		EPA 524.2 (TM)
52	P-Dichlorobenzene	ND	ug/L	0.5	0.5	75		EPA 524.2 (TM)
84	O-Dichlorobezene	ND	ug/L	0.5	0.5	600		EPA 524.2 (TM)
95	1.2.4-Trichloroethyene	ND	ug/L	0.5	0.5	70		EPA 524.2 (TM)
46	1.1-Dichloroethyene	ND	ug/L	0.5	0.5	7		EPA 524.2 (TM)
56	Methyene Chloride	ND	ug/L	0.5	0.5	5		EPA 524.2 (TM)

SRL (State Reporting Level): Indicates the minimum reporting level required the Washington State Department of Health (DOH).
Trigger Level: DOH Drinking Water response level. Systems with Compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.
MCL (Maximum Contaminate Level): If contaminate amount exceeds the MCL, immediately contact your regional DOH office.
NA (Not Analyzed): In the results column, indicates this compound was not included in the current analysis.
ND (Not Detected): In the results column, indicates this compound was analyzed and not detected at a level greater than or equal to the SRL
<0.001: Indicates the compound was not detected in the sample at or above the concentration indicated.

VOC – VOC1
VOC – VOC1 by Various EPA Approved Methods
Source / Point of Entry – Report of Analysis
Date Received 7/7/2009
Date Reported 7/15/2009
Source SO1 Infiltration System

DOH #	Analyte	Results	Units	SRL	Trigger	MCL*	MCL Exceeded	Method (Analyst Init)
EPA Unregulated								
58	1.1-Dichloroethane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
59	2.2-Dchloropropane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
86	Bromochloromethane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
62	1.1-Dicloropropane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
162	Dichlorodifluoromethane	ND	ug/L	0.5	0.5	530		EPA 524.2 (TM)
64	Dibromoethane	ND	ug/L	0.5	0.5			
65	Cis-1.3-Dichloropropane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
69	Trans-1.3-Dichloropropane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
53	Chloromethane	ND	ug/L	0.5	0.5	1.3		EPA 524.2 (TM)
70	1.3-Dichloropropane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
72	1.1.1.2-Tetrachloroethane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
87	Isopropylbezene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
79	1.2.3-Trichloropropane	ND	ug/L	0.5	0.5	21		EPA 524.2 (TM)
78	Bromobenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
80	1.1.2.2-Teteachloroethane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
81	O-Chlorotoluene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
88	N-Propylbenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
89	1.3.5-Trimethylbenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
54	Bromomethane	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
82	P-Chlorotoluene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
90	Tert-Butybenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
91	1.2.4-Tricmethylbenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
92	Sec-Butylbenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
83	M-Dichlorobenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
93	P-Isopropyltoluene	ND	ug/L	0.5	0.5			EPA 524.2 (TM)
94	N-Butylbenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM
55	Chloroethane	ND	ug/L	0.5	0.5			EPA 524.2 (TM
97	Hexachlorobutadine	ND	ug/L	0.5	0.5			EPA 524.2 (TM
96	Naphthalene	ND	ug/L	0.5	0.5			EPA 524.2 (TM
98	1.2.3-Trichlorobenzene	ND	ug/L	0.5	0.5			EPA 524.2 (TM
85	Trichlorofluoromethane	ND	ug/L	0.5	0.5	1300		EPA 524.2 (TM
EPA Regulated - Trihalomethanes								
31	Total Trihalomethanes	ND	ug/L		60	80		EPA 524.2 (TM)
27	Chloroform	ND	ug/L	0.25				EPA 524.2 (TM)
28	Bromodichloromethane	ND	ug/L	.05				EPA 524.2 (TM)
29	Dibromochloromehane	ND	ug/L	1.5				EPA 524.2 (TM)
30	Bromoform	ND	ug/L	0.6				EPA 524.2 (TM)

Water Testing for 2009-2010

The City of Sequim has tested for VOC—VOC1 at the River Well / Dungeness River. We are also testing for nitrates at our three water sources: the River Well / Dungeness River, Silberhorn Well Field and Port Williams Well Field. Testing will continue for Radionuclide at Silberhorn and Port Williams well fields. Testing for chlorine by-products in the forms of Trihalomethanes, haloacetic acids and bromate in the water system will also continue. Lead, Copper, Disinfection Byproducts, Nitrates, Gross Alpha and Radium will be tested in 2010. All of these tests will be performed in 2010 and the test results will be included in the 2010 Annual Water Quality Report. The City of Sequim tests for Coliforms 10 times per month. As the City grows, the water testing will expand.

Thank you for allowing your city staff to serve you and share this report with you.

APPENDIX H

WATER RIGHTS INFORMATION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

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 13, 1995	G2-29239		

NAME
City of Sequim

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
152 West Cedar Street	Sequim	Washington	98382

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Five Wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2250	1850

QUANTITY, TYPE OF USE, PERIOD OF USE		
1850 Acre-feet per year (supplemental to existing rights)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
250 feet North and 150 feet West of the center of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	17	30	3W	18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Sequim including designated urban growth areas.

DESCRIPTION OF PROPOSED WORKS

Up to 5 wells completed in USGS Unit 5. Well #1: 16"X411'

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 2014	July 1, 2015

REPORT

BACKGROUND:

Pursuant to Chapters 90.03 and 90.44 Revised Code of Washington (RCW), the City of Sequim applied for a permit to appropriate public ground water from five wells. A withdrawal rate of 2,250 gallons per minute (gpm) was requested for municipal supply. The application was assigned a priority date of June 13, 1995.

Legal notice of the proposed appropriation was published in *The Sequim Gazette* of Clallam County on June 28 and July 5, 1995. Three formal protests were received as a result of this notice:

1. C.B. Frick, a water-right holder for a well located within 1/4 mile of the City's well field, protested this application on grounds that pumping of the proposed wells may cause drawdown sufficient to impair his water right.

2. A protest letter from Sunland Water District was based on the new well field's potential to impair the District's senior water rights.

3. William Reed, representing Graysmarsh Farm, protested this application on grounds that the City's well field has the potential to adversely impact ground-water flow to springs and wetlands associated with lower Gierin Creek.

A preliminary permit was issued to allow the City to drill and test the wells, and to provide Ecology with information concerning the potential impacts of pumping. Under this permit, City of Sequim Port Williams Well #1 was drilled and tested. Aquifer-testing data were collected and analyzed by Pacific Groundwater Group (PGG).

Water Rights Summary

The City of Sequim currently holds the following water rights:

1. Surface Water Certificate #1316 for 1.4 cubic feet per second (cfs) from the Dungeness River was issued in 1924 (no annual quantity is specified).

2. Ground Water Certificate #2102-A was issued in 1953 for 718 gpm and 1,160 acre-feet per year from an infiltration trench adjacent to the Dungeness River. At the time this water right was issued, the infiltration trench was intended to replace the surface water diversion under Certificate #1316 as the primary water source, and an annual quantity (sufficient for more than 20 years of population growth) was issued accordingly. The unspecified annual quantity under Certificate #1316 is therefore not additive to that issued under Certificate #2102-A.

3. Ground Water Certificate #G2-23856 for 2,100 gpm and 690 acre-feet per year, authorizes withdrawals from the Silberhorn Well Field.

The City of Sequim currently withdraws water primarily from the infiltration trench (under Certificate #2102-A) and the Silberhorn Well Field (under Certificate #G2-23856). Existing water rights for the City of Sequim total 1,850 acre-feet per year.

During periods of high turbidity in the Dungeness River, withdrawals from the infiltration trench are curtailed and the City relies entirely on withdrawals from the Silberhorn Well Field. However, withdrawals from the Silberhorn Well Field had to be decreased due to excessive drawdown of water levels in the aquifer. Due to seasonal unreliability of the infiltration trench and the lower-than-expected production capacity of the Silberhorn field, the City needs additional instantaneous capacity to serve its growing population.

INVESTIGATIONS:

Ecology staff hydrogeologist, Kirk Sinclair, and I conducted a field examination of the project site and surrounding area on February 22, 1996. I researched pertinent Department of Ecology records of water rights, claims, and well construction reports, and reviewed the summary and analysis of aquifer-testing data for City of Sequim Port Williams Well #1 compiled by Pacific Groundwater Group. Kirk Sinclair was consulted for review of this hydrogeological information.

Drilling Information on Stone Well #1

Well head elevation:	approximately 100 feet MSL
Well depth:	411 feet
Casing diameter:	16 inches
Static water level:	50 feet MSL (on 10-11-95)
Screen depth:	258 to 411 feet

Aquifer Information

Port Williams Well #1 is located at 702 Port Williams Road in the Sequim-Dungeness Valley, approximately three miles east of the Dungeness River, and just north of the city limits of Sequim. Gierin Creek flows in a northeasterly direction and lies approximately 500 feet east of the well.

Three aquifer units and two semi-confining to confining units have been defined in the unconsolidated deposits which underlie the Sequim-Dungeness Valley. The aquifer units are designated as USGS Unit 1 (the "water-table" aquifer), USGS Unit 3 (the "upper confined" aquifer), and USGS Unit 5 (the "lower confined" aquifer).

Port Williams Well #1 is completed in USGS Unit 5 which occurs at a depth of 264 to 439 feet below ground surface at this site. Here, the water-bearing zone consists of fine sand with variable amounts of silt and gravel.

Ground-water generally flows from south to north-northeast in this area, eventually discharging to Sequim Bay or the Strait of Juan de Fuca. Water-level measurements indicate that ground water flows vertically from USGS Unit 1 to Units 3 and 5 at the well site.

Assessment of Seawater Intrusion Risk

The Port Williams Well Field is located approximately two miles from the Strait of Juan de Fuca. Although the distance from marine waters makes it unlikely that seawater intrusion would affect wells at this site, seaward wells have the potential to be impaired by withdrawals from inland wells.

There is evidence that the saltwater-freshwater interface currently lies well offshore. Near-coastal wells sampled along Dungeness Bay in 1993, including the stretch between Jamestown and Port Williams, all produced ground water with chloride concentrations under 50 mg/L (Forbes and CH2M Hill, Preliminary Assessment of Seawater Intrusion in Coastal Water Wells in Eastern Clallam and Eastern Jefferson Counties, 1993).

Based on topography, it appears that ground water at this site would normally discharges toward Dungeness Bay in the direction of Gierin Creek. To protect the aquifer from seawater intrusion, PGG recommends a monitoring program for seaward wells completed in USGS Unit 5. If monitored wells show a progressive increase in chloride levels, withdrawals from the Port Williams Well Field may need to be reduced.

Potential Effects on Surface Waters and Existing Rights

The following water rights and well construction reports are on file with the Department of Ecology:

- Eight ground-water rights have been issued for wells within a half-mile radius of Port Williams Well #1.
- Nineteen additional water rights are on record for wells occurring within a one-mile radius of Port Williams Well #1.
- The nearest certificated well completed in the same aquifer unit (USGS Unit 5) is an irrigation well owned by Cy Frick, located approximately 1/4 to 1/2 mile south of the Port Williams well site. This well

and a shallower (USGS Unit 3) well are authorized a combined withdrawal of 280 gpm and 64.5 acre-feet per year under Certificate #G2-22075.

- The 274-foot deep (Unit 3) BPOE Sequim Lodge well, located over 1/4 mile west of the Port Williams site, is authorized withdrawal of 50 gpm, 2 acre-feet per year, under Certificate #G2-26992.

- The Vista System well, under Certificate #G2-27116 (authorizing withdrawal of 152 gpm and 33 acre-feet per year), completed in USGS Unit 5, is located almost one mile west of Port Williams Well #1.

- A 581-foot deep irrigation well on Graysmarsh Farm (under Certificate #G2-27337) is situated approximately 1.5 miles northeast. This well is authorized withdrawal of 200 gpm and 80 acre-feet per year.

- Another irrigation well completed in USGS Unit 5 is located approximately 800 feet northwest of Port Williams Well #1. However, there is no record of a water right associated with this well.

- Five surface-water rights are recorded in Section 17. These authorize diversions from Gierin Creek and tributary ditches.

- Fifteen ground-water-right claims and three surface-water-right claims are recorded for Section 17.

- Numerous well construction reports are on file for wells located within a half-mile radius of the well field. Wells range in depth from 35 to 320 feet. Most are completed in USGS Unit 1. Well density is considerably higher west of the well field.

The City's wells should not impair other wells completed in USGS 5 due to the small number of wells withdrawing from this aquifer. However, pumping from USGS 5 is likely to induce some vertical leakage from USGS Unit 3. This, in turn, could induce leakage from USGS Unit 1 and surface-water bodies.

Due to the high flow of ground water discharging through USGS Unit 5 to the Straits of Juan de Fuca and the presence of two intervening aquitard units, the impact of the proposed withdrawals on USGS Unit 1 and surface-water bodies is likely to be small and dispersed over a very large area. Unacceptable impacts to water levels in USGS Unit 3 will be prevented by maintaining water levels in USGS Unit 5 so that there is no ongoing progressive decline from year to year.

Discussion of Protestants Concerns

Concerns raised by protestants of this application include water availability and the potential for seawater intrusion, impairment of existing rights, and impacts to wetlands and riparian areas associated with lower Gierin Creek.

1) Water Right Certificate #G2-00800C and #G2-00801C for Sunland Associates authorize a combined withdrawal of 540 gpm and 312 acre-feet per year from two wells completed in USGS Aquifer Unit 3. The nearer of these wells is located approximately 3/4 mile north of the Port Williams well site. Due to distance and completion in a shallower aquifer, these wells should not be affected by direct drawdown interference as a result of pumping the City's wells. Long-term drawdown effects to USGS Aquifer Unit 3 will need to be prevented by maintaining the water level in USGS Unit 5 such that there is no year-to-year decline which could induce excessive vertical leakage from USGS Unit 3.

2) At least eight surface and ground water rights are associated with Graysmarsh Farm which is located downgradient of the City's Port Williams well site. These rights authorize diversions from Gierin Creek, tributaries, and springs, as well as ground water from USGS Units 1, 3, and 5.

Riparian areas and wetlands which provide quality habitat for migratory birds and anadromous fish are also present on Graysmarsh Farm. These wetlands are maintained by sub-surface ground-water flow and springs. Gierin Creek supports coho salmon and winter steelhead. Under RCW 90.54.020, perennial rivers and streams of the state must be retained with base flows necessary to provide for preservation of fish, wildlife, and other environmental values.

Graysmarsh Farm's water rights, riparian areas, and wetlands will need to be protected by monitoring and maintaining water levels in USGS Aquifer Units 1, 3, and 5. If the City's pumping results in year-to-year water-level declines, withdrawals will need to be reduced to prevent impairment.

Because seawater intrusion, if it occurs, will first become apparent in seaward wells completed in USGS Unit 5, the 581-foot deep Graysmarsh irrigation well (under Water Right Certificate #G2-27337) will need to be monitored regularly for chloride levels.

3) Mr. Frick is the owner of three wells situated approximately 1/4 mile from the Port Williams well site. Two of these wells appear to be completed in USGS Unit 3. The third well is completed at a depth of 398 feet in USGS Aquifer Unit 5.

The two wells completed in Unit 3 should be protected as proposed for the Sunland wells. Because the Unit 5 well is the nearest certificated well completed in the same aquifer as the City's Port Williams well field, I recommend that the City specifically monitor static water levels in this well to prevent impairment of Mr. Frick's water right.

Short-term impacts from pumping at the Port Williams well site are not expected. Long-term effects can be predicted only by recording the City's withdrawals and by monitoring static water levels in USGS Units 1, 3, and 5 as the well field is developed to full capacity. Periodic analysis of monitoring data by Ecology will enable regulation of the City's withdrawals, if necessary, to prevent impairment of existing rights or surface waters.

Water Requirements

According to the 1995 City of Sequim Comprehensive Water Plan, the population of Sequim and its urban growth area may reach 15,455 by the year 2015. Per capita water consumption for the City of Sequim is currently 198 gallons per day--much higher than that of similar municipal water systems. The City of Sequim needs to implement a rigorous conservation program to more efficiently use the limited water resources available in the Sequim-Dungeness area. Sequim has drafted and begun to implement a conservation program which is expected to significantly reduce its water consumption rate. The City is also taking action to provide reclaimed water for various uses. Conservation savings are expected to provide a significant portion of Sequim's future water needs.

According to Sequim's 1995 Comprehensive Water Plan, Sequim was using only 781 of the 1,850 acre-feet per year of water already allocated under existing rights. If Sequim is able to successfully reduce per capita consumption to that of nearby municipalities such as Port Townsend and Port Angeles, it should have adequate water to serve its projected population through the year 2015. I therefore recommend that this permit be issued totally supplemental to existing water rights.

Discussion of Public Interest

The Dungeness River supports critical and depressed salmonid stocks. Any further reduction in instream flows would be detrimental to fish habitat.

Withdrawals from USGS Aquifer Unit 5 may have a small effect on surface-water systems, but because the effects will be dispersed over a large area, no impairment is expected. Furthermore, because the proposed appropriation is for supplemental supply only (no new annual quantity of water is being allocated), any adverse effect should be offset by the benefit of increased flows made possible through decreased reliance on the City's infiltration trench on the Dungeness River. With Well #1 on line, Sequim estimates that withdrawals from the infiltration trench will initially be reduced by 50%. Successful development of the well field will make it possible for the City to further reduce withdrawals from the river.

Permitting a deep-source municipal water supply for the City of Sequim and its urban growth area will prevent the continued proliferation of individual (usually shallow) wells, resulting in fewer withdrawals from shallower aquifers in the future. This will ultimately be beneficial to surface waters associated with both the Dungeness River and Gierin Creek. The municipal system will also provide greater protection of water quality and allow more efficient delivery and use of water resources in the Sequim-Dungeness Valley.

FINDINGS and CONCLUSION:

In accordance with Chapters 90.03 and 90.44 RCW, I find that water is available for appropriation from the source in question and that the appropriation is a beneficial use, and subject to the provisions below, should not impair existing rights or be detrimental to the public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit to allow appropriation of 2,250 gpm from up to five wells completed in USGS Unit 5 at the Port Williams Well Field. Withdrawal of a maximum annual quantity of 1,850 acre-feet per year, supplemental to existing rights, shall be authorized for municipal supply. The period of use shall be year-round, as needed.

The permit shall be subject to all applicable State laws and regulations and to the following provisions:

Provisions

"This permit is subject to all terms and conditions contained in the Settlement Agreement which is incorporated into the Stipulation and Agreed Order of Dismissal of PCHB No. 97-41, dated September 8, 1997, as modified by the Order Nunc Pro Tunc, dated September 24, 1997."

"Water use under this and existing City of Sequim water rights shall not exceed 1,850 acre-feet per year."

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

"Ground-water withdrawals at the Port Williams Well Field shall be managed by the City of Sequim such that there are no long-term (i.e. year-to-year) declines in ground-water levels within the pumped (USGS Unit 5) or overlying (USGS Units 1 and 3) aquifers. Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or instream resources."

"Prior to issuance of a final water right certificate, the City of Sequim shall submit a completion report demonstrating the actual sustainable production of the Port Williams Well Field. The report shall assess actual and potential impacts to senior water rights in USGS Aquifer Units 1, 3, and 5 based on three years of actual use following full development of the well field. The instantaneous quantity authorized under this permit may be reduced prior to issuing the final water right certificate to reflect the sustainable yield from USGS Unit 5 and to protect senior rights."

"If senior water users are impaired through drawdown interference or water quality degradation as a result of operating the Port Williams Well Field, the City of Sequim shall reduce its withdrawals at the Port Williams Well Field to allow impaired users to exercise the full extent of their water rights."

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 states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

"The City of Sequim shall implement conservation measures as described in Chapter 9 of its July 17, 1996 Water Comprehensive Plan."

"The City of Sequim shall gradually eliminate use of surface water from the Dungeness River, except as an emergency back-up source."

REPORTED BY: Marie Peter Date: October 6, 1997

FINDINGS OF FACT AND DECISION

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

Therefore, **I ORDER** a permit be issued under Ground Water Application Number G2-29239, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 6th day of October ,1997.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

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 13, 1995	G2-29239		

NAME
City of Sequim

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
152 West Cedar Street	Sequim	Washington	98382

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Five wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2250	1850

QUANTITY, TYPE OF USE, PERIOD OF USE		
1850 Acre-feet per year (supplemental to existing rights)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
250 feet North and 150 feet West of the center of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	17	30	3W	18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Sequim including designated urban growth areas.

DESCRIPTION OF PROPOSED WORKS

Up to 5 wells completed in USGS Unit 5
Well #1: 16" X 411'

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 2014	July 1, 2015

REPORT

BACKGROUND:

Pursuant to Chapters 90.03 and 90.44 Revised Code of Washington (RCW), the City of Sequim applied for a permit to appropriate public ground water from five wells. A withdrawal rate of 2,250 gallons per minute (gpm) was requested for municipal supply. The application was assigned a priority date of June 13, 1995.

Legal notice of the proposed appropriation was published in *The Sequim Gazette* of Clallam County on June 28 and July 5, 1995. Three formal protests were received as a result of this notice:

1. C.B. Frick, a water-right holder for a well located within ¼ mile of the City's well field, protested this application on grounds that pumping of the proposed wells may cause drawdown sufficient to impair his water right.

2. A protest letter from Sunland Water District was based on the new well field's potential to impair the District's senior water rights.

3. William Reed, representing Graysmarsh Farm, protested this application on grounds that the City's well field has the potential to adversely impact ground-water flow to springs and wetlands associated with lower Gierin Creek.

A preliminary permit was issued to allow the City to drill and test the wells, and to provide Ecology with information concerning the potential impacts of pumping. Under this permit, City of Sequim Port Williams Well #1 was drilled and tested. Aquifer-testing data were collected and analyzed by Pacific Groundwater Group (PGG).

Water Rights Summary

The City of Sequim currently holds the following water rights:

1. Surface Water Certificate #1316 for 1.4 cubic feet per second (cfs) from the Dungeness River was issued in 1924 (no annual quantity is specified).

2. Ground Water Certificate #2102-A was issued in 1953 for 718 gpm and 1,160 acre-feet per year from an infiltration trench adjacent to the Dungeness River. At the time this water right was issued, the infiltration trench was intended to replace the surface water diversion under Certificate #1316 as the primary water source and an annual quantity (sufficient for more than 20 years of population growth) was issued accordingly. The unspecified annual quantity under Certificate #1316 is therefore not additive to that issued under Certificate #2102-A.

3. Ground Water Permit #G2-23856, for 2,100 gpm and 690 acre-feet per year, authorizes withdrawals from the Silberhorn Well Field.

The City of Sequim currently withdraws water primarily from the infiltration trench (under Certificate #2102-A) and the Silberhorn Well Field (under Certificate #G2-23856). Existing water rights for the City of Sequim total 1,850 acre-feet per year.

During periods of high turbidity in the Dungeness River, withdrawals from the infiltration trench are curtailed and the City relies entirely on withdrawals from the Silberhorn Well Field. However, withdrawals from the Silberhorn Well Field had to be decreased due to excessive drawdown of water levels in the aquifer. Due to seasonal unreliability of the infiltration trench and the lower-than-expected production capacity of the Silberhorn field, the City needs additional instantaneous capacity and annual quantity to serve its growing population.

INVESTIGATIONS:

Ecology staff hydrogeologist, Kirk Sinclair, and I conducted a field examination of the project site and surrounding area on February 22, 1996. I researched pertinent Department of Ecology records of water rights, claims, and well construction reports and reviewed the summary and analysis of aquifer-testing data for City of Sequim Port Williams Well #1 compiled by Pacific Groundwater Group. Kirk Sinclair was consulted for review of this hydrogeologic information.

Drilling Information for Port Williams Well #1

Well head elevation:	approximately 100 feet MSL
Well depth:	411 feet
Casing diameter:	16 inches
Static water level:	50 feet MSL (on 10-11-95)
Screen depth:	258 to 411 feet

Aquifer Information

Port Williams Well #1 is located at 702 Port Williams Road in the Sequim-Dungeness Valley, approximately three miles east of the Dungeness River, and just north of the city limits of Sequim. Gierin Creek flows in a northeasterly direction and lies approximately 500 feet east of the well.

Three aquifer units and two semi-confining to confining units have been defined in the unconsolidated deposits which underlie the Sequim-Dungeness Valley. The aquifer units are designated as USGS Unit 1 (the "water-table" aquifer), USGS Unit 3 (the "upper confined" aquifer), and USGS Unit 5 (the "lower confined" aquifer).

Port Williams Well #1 is completed in USGS Unit 5 which occurs at a depth of 264 to 439 feet below ground surface at this site. Here, the water-bearing zone consists of fine sand with variable amounts of silt and gravel.

Ground-water generally flows from south to north-northeast in this area, eventually discharging to Sequim Bay or the Strait of Juan de Fuca. Water level measurements indicate that ground water flows vertically from USGS Unit 1 to Units 3 and 5 at the well site.

Assessment of Seawater Intrusion Risk

The Port Williams Well Field is located approximately two miles from the Strait of Juan de Fuca. Although the distance from marine waters makes it unlikely that seawater intrusion would affect wells at this site, seaward wells have the potential to be impaired by withdrawals from inland wells.

There is evidence that the saltwater-freshwater interface currently lies well offshore. Near-coastal wells sampled along Dungeness Bay in 1993, including the stretch between Jamestown and Port Williams, all produced ground water with chloride concentrations under 50 mg/L (Forbes and CH2M Hill, Preliminary Assessment of Seawater Intrusion in Coastal Water Wells in Eastern Clallam and Eastern Jefferson Counties, 1993).

Based on topography, it appears that ground water at the Port Williams Well this site would normally discharge toward Dungeness Bay in the direction of Gierin Creek. To protect the aquifer from seawater intrusion, PGG recommends a monitoring program for seaward wells completed in USGS Unit 5. If monitored wells show a progressive increase in chloride levels, withdrawals from the Port Williams Well Field may need to be reduced.

Potential Effects on Surface Waters and Existing Rights

The following water rights and well construction reports are on file with the Department of Ecology:

- Eight ground-water rights have been issued for wells within a half-mile radius of Port Williams Well #1.
- Nineteen additional water rights are on record for wells occurring within a one-mile radius of Port Williams Well #1.

- The nearest certificated well completed in the same aquifer unit (USGS Unit 5) is an irrigation well owned by Cy Frick, located approximately 1/4 to 1/2 mile south of the Port Williams well site. This well and a shallower (USGS Unit 3) well are authorized a combined withdrawal of 280 gpm and 64.5 acre-feet per year under Certificate #G2-27116.

- The 274 foot deep (Unit 3) BPOE Sequim Lodge well, located over ¼ mile West of the Port Williams site, is authorized withdrawal of 50 gpm, 2 acre-feet per year under Certificate #G2-26992.

- The Vista System well, under Certificate #G2-27117 (authorizing withdrawals of 152 gpm and 33 acre-feet per year) completed in USGS Unit 5, is located almost one mile west of Port Williams Well #1.

- A 581-foot deep irrigation well on Graysmarsh Farm (under Certificate #G2-27337) is situated approximately 1.5 miles northeast. This well is authorized withdrawal of 200 gpm and 80 acre-feet per year.

- Another irrigation well completed in USGS Unit 5 is located approximately 800 feet northwest of Port Williams Well #1. However, there is no record of a water right associated with this well.

- Five surface-water rights are recorded in Section 17. These authorize diversions from Gierin Creek and tributary ditches.

- Fifteen ground-water-right claims and three surface-water-right claims are recorded for Section 17.

- Numerous well construction reports are on file for wells located within a half-mile radius of the well field. Wells range in depth from 35 to 320 feet. Most are completed in USGS Unit 1. Well density is considerably higher west of the well field.

The City's wells should not impair other wells completed in USGS 5 due to the small number of wells withdrawing from this aquifer. However, pumping from USGS 5 is likely to induce some vertical leakage from USGS Unit 3. This, in turn, could induce leakage from USGS Unit 1 and surface water bodies.

Due to the high flow of ground-water discharging through USGS Unit 5 to the Straits of Juan de Fuca and the presence of two intervening aquitard units, the impact of the proposed withdrawals on USGS Unit 1 and surface-water bodies is likely to be small and dispersed over a very large area. Unacceptable impacts to water levels in USGS Unit 3 will be prevented by maintaining water levels in USGS Unit 5 so that there is no ongoing progressive decline from year to year.

Discussion of Protestants' Concerns

Concerns raised by protestants of this application include water availability and the potential for seawater intrusion, impairment of existing rights and impacts to wetlands and riparian areas associated with lower Gierin Creek.

1) Water Right Certificate #G2-00800C and #G2-00801C for Sunland Associates authorize a combined withdrawal of 540 gpm and 312 acre-feet per year from two wells completed in USGS Aquifer Unit 3. The nearer of these wells is located approximately 3/4 mile North of the Port Williams well site. Due to distance and completion in a shallower aquifer, these wells should not be affected by direct drawdown interference as a result of pumping the City's wells. Long-term draw-down effects to USGS Aquifer Unit 3 will need to be prevented by maintaining the water level in USGS Unit 5 such that there is no year-to-year decline which could induce excessive vertical leakage from USGS Unit 3.

2) At least eight surface and ground water rights are associated with Graysmarsh Farm which is located downgradient of the City's Port Williams well site. These rights authorize diversions from Gierin Creek, tributaries, and springs, as well as ground water from USGS Units 1, 3, and 5.

Riparian areas and wetlands which provide quality habitat for migratory birds and anadromous fish are also present on Graysmarsh Farm. These wetlands are maintained by sub-surface ground-water flow and springs. Gierin Creek supports coho salmon and winter steelhead. Under RCW 90.54.020, perennial rivers and streams of the state must be retained with base flows necessary to provide for preservation of fish, wildlife, and other environmental values.

Graysmarsh Farm's water rights, riparian areas, and wetlands will need to be protected by monitoring and maintaining water levels in USGS Aquifer Units 1, 3, and 5. If the City's pumping results in year-to-year water-level declines, withdrawals will need to be reduced to prevent impairment. Because seawater intrusion, if it occurs, will first become apparent in seaward wells completed in USGS Unit 5, the 581-foot deep Graysmarsh irrigation well (under Water Right Certificate #G2-27337) will need to be monitored regularly for chloride levels.

4) Mr. Frick is the owner of three wells situated approximately 1/4 mile from the Port Williams well site. Two of these wells appear to be completed in USGS Unit 3. The third well is completed at a depth of 398 feet in USGS Aquifer Unit 5.

The two wells completed in Unit 3 should be protected as proposed for the Sunland wells. Because the Unit 5 well is the nearest certificated well completed in the same aquifer as the City's Port Williams well field, I recommend that the City specifically monitor static water levels in this well to prevent impairment of Mr. Frick's water right.

Short-term impacts from pumping at the Port Williams well site are not expected. Long-term effects can be predicted only by recording the City's withdrawals and by monitoring static water levels in USGS Units 1, 3, and 5 as the well field is developed to full capacity. Periodic analysis of monitoring data by Ecology will enable regulation of the City's withdrawals, if necessary, to prevent impairment of existing rights or surface waters.

Water Requirements

According to the 1995 City of Sequim Comprehensive Water Plan, the population of Sequim and its urban growth area may reach 15,455 by the year 2015. Per capita water consumption for the City of Sequim is currently 198 gallons per day--much higher than that of similar municipal water systems. The City of Sequim needs to implement a rigorous conservation program to more efficiently use the limited water resources available in the Sequim-Dungeness area. Sequim has drafted and begun to implement a conservation program which is expected to significantly reduce its water consumption rate. The City is also taking action to provide reclaimed water for various uses. Conservation savings are expected to provide a significant portion of Sequim's future water needs.

According to Sequim's 1995 Comprehensive Water Plan, Sequim was using only 781 of the 1,850 acre-feet per year of water already allocated under existing rights. If Sequim is able to successfully reduce per capita consumption to that of nearby municipalities such as Port Townsend and Port Angeles, it should have adequate water to serve its projected population through the year 2015. I therefore recommend that this permit be issued totally supplemental to existing water rights.

Discussion of Public Interest

The Dungeness River supports critical and depressed salmonid stocks. Any further reduction in instream flows would be detrimental to fish habitat.

Withdrawals from USGS Aquifer Unit 5 may have a small effect on surface water systems, but because the effects will be dispersed over a large area, no impairment is expected. Furthermore, because the proposed appropriation is for supplemental supply only (no new annual quantity of water is being allocated) any adverse effect should be offset by the benefit of increased instream flows made possible through decreased reliance on the City's infiltration trench on the Dungeness River. With Well #1 on line, Sequim estimates that withdrawals from the infiltration trench will initially be reduced by 50%. Successful development of the well field will make it possible for the City to further reduce withdrawals from the river.

Permitting a deep-source municipal water supply for the City of Sequim and its urban growth area will prevent the continued proliferation of individual (usually shallow) wells, resulting in fewer withdrawals from shallower aquifers in the future. This will ultimately be beneficial to surface waters associated with both the Dungeness River and Gierin Creek. The municipal system will also provide greater protection of water quality and allow more efficient delivery and use of water resources in the Sequim-Dungeness Valley.

FINDINGS and CONCLUSION:

In accordance with Chapters 90.03 and 90.44 RCW, I find that water is available for appropriation from the source in question and that the appropriation is a beneficial use, and subject to the provisions below, should not impair existing rights or be detrimental to the public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit to allow appropriation of 2,250 gpm from up to five wells completed in USGS Unit 5 at the Port Williams Well Field. Withdrawal of a maximum annual quantity of 1,850 acre-feet per year, supplemental to existing rights, shall be authorized for municipal supply. The period of use shall be year-round, as needed.

The permit shall be subject to all applicable State laws and regulations and to the following provisions:

Provisions

"Water use under this and existing City of Sequim water rights shall not exceed 1,850 acre-feet per year."

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 or as amended in the future (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly and forwarded to Ecology as requested.

"The Graysmarsh irrigation well (completed in USGS Unit 5) shall be sampled quarterly during the first year of operation of the Port Williams Well Field, and at least twice a year thereafter, as specified in the City of Sequim's Monitoring Plan. Water samples shall be analyzed for chlorides by an Ecology-certified laboratory. Resulting data shall be submitted to the Department of Ecology, Southwest Regional Office annually, in the month of February."

"Ground-water withdrawals at the Port Williams Well Field shall be managed by the City of Sequim such that there are no long-term (i.e. year to year) declines in ground-water levels within the pumped (USGS Unit 5) or overlying aquifers (USGS Units 1 and 3). Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or instream resources."

"Static water levels shall be measured and recorded at least monthly in Port Williams Well #1 (unique ID AAF384), future wells developed in the Port Williams Well Field, and in the wells specified in the City's Well Monitoring Plan. In the event that a well specified in the monitoring plan becomes inaccessible for monitoring, the City shall provide for monitoring at a comparable alternate site within 30 days. Additional monitoring wells may be required by the department to adequately characterize the effects of withdrawals at the Port Williams Well Field."

"Water levels shall be measured using a consistent methodology, in accordance with accepted industry standards. The length of the pumping period and recovery period shall be constant and shall be included in the record. Monitoring shall continue as long as the Port Williams Well Field is in use."

"Water pumpage and static water levels shall be measured and recorded at least monthly for all other water sources operated by the City of Sequim. The data shall be collected and reported as specified below."

"Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data shall be submitted annually or more frequently upon request to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format and shall include the following elements:"

For Water Use Reporting

1. Measurement method (ie; totaling meter, acoustic meter, etc.) for each well
2. Total volume pumped from each well by month in thousands or millions of gallons
3. Month of measurements
4. Unique well ID number and City of Sequim well number

For Water Level Reporting

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

For Water Quality Monitoring:

1. Unique well number
2. Sampling date and time
3. Chloride concentration (mg/L)
4. Submit paper copy of laboratory report"

"Prior to issuance of a final water right certificate, the City of Sequim shall submit a completion report demonstrating the actual sustainable production of the Port Williams Well Field. The report shall assess actual and potential impacts to senior water rights in USGS Aquifer Units 1, 3 and 5 based on three years of actual use following full development of the well field. The instantaneous quantity authorized under this permit may be reduced prior to issuing the final water right certificate to reflect the sustainable yield from USGS Unit 5 and to protect senior right.

"If senior water users are impaired through drawdown interference or water quality degradation as a result of operating the Port Williams Well Field, the City of Sequim shall reduce its withdrawals at the Port Williams Well Field to allow impaired users to exercise the full extent of their water rights."

Issuance of this water right is subject to 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 resource, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

Report Continued

"The City of Sequim shall implement conservation measures as described in Chapter 9-1 of its 1995 Water Comprehensive Plan."

"The City of Sequim shall gradually eliminate use of surface water from the Dungeness River, except as an emergency back-up source."

REPORTED BY: Marie Peters Date: March 7, 1997

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

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

Therefore, **I ORDER** a permit be issued under Ground Water Application Number G2-29239, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 7th day of March ,1997.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

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 13, 1995	G2-29239	G2-29239	

NAME
City of Sequim

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
152 West Cedar Street	Sequim	Washington	98382

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 WATERS TO BE APPROPRIATED

SOURCE
Five Wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2250	1850

QUANTITY, TYPE OF USE, PERIOD OF USE		
1850 Acre-feet per year (supplemental to existing rights)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
250 feet North and 150 feet West of the center of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	17	30	3W	18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Sequim including designated urban growth areas.

DESCRIPTION OF PROPOSED WORKS

Up to 5 wells completed in USGS Unit 5. Well #1: 16"X411'

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 2014	July 1, 2015

PROVISIONS

"This permit is subject to all terms and conditions contained in the Settlement Agreement which is incorporated into the Stipulation and Agreed Order of Dismissal of PCHB No. 97-41, dated September 8, 1997, as modified by the Order Nunc Pro Tunc, dated September 24, 1997."

"Water use under this and existing City of Sequim water rights shall not exceed 1,850 acre-feet per year."

"Ground-water withdrawals at the Port Williams Well Field shall be managed by the City of Sequim such that there are no long-term (i.e. year-to-year) declines in ground-water levels within the pumped (USGS Unit 5) or overlying (USGS Units 1 and 3) aquifers. Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or instream resources."

"Prior to issuance of a final water right certificate, the City of Sequim shall submit a completion report demonstrating the actual sustainable production of the Port Williams Well Field. The report shall assess actual and potential impacts to senior water rights in USGS Aquifer Units 1, 3, and 5 based on three years of actual use following full development of the well field. The instantaneous quantity authorized under this permit may be reduced prior to issuing the final water right certificate to reflect the sustainable yield from USGS Unit 5 and to protect senior rights."

"If senior water users are impaired through drawdown interference or water quality degradation as a result of operating the Port Williams Well Field, the City of Sequim shall reduce its withdrawals at the Port Williams Well Field to allow impaired users to exercise the full extent of their water rights."

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 states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

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 6th *day of* October, *19* 97.

Department of Ecology

ENGINEERING DATA
OK ✓

by Gene Blomstrom

Provisions Con't

"The City of Sequim shall implement conservation measures as described in Chapter 9 of its July 17, 1996 Water Comprehensive Plan."

"The City of Sequim shall gradually eliminate use of surface water from the Dungeness River, except as an emergency back-up source."

G2-CVI-2P107
#204174

CERTIFICATE OF CHANGE OF POINT OF WITHDRAWAL OF GROUND WATER

In accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the regulations of the State Director of Ecology.

THIS IS TO CERTIFY That the City of Sequim, Washington, has complied with all of the requirements of the Revised Code of Washington 90.44.100 and is hereby granted the right to add an additional (alternate) point of withdrawal for 718 gallons per minute, 1360 acre-feet per year, of waters of an infiltration trench as granted under Ground Water Certificate No. 2102-A.

That said water is used for the purpose of municipal supply continuously and had been withdrawn from an infiltration trench situated approximately 450 feet south and 1700 feet east from the northwest corner of Section 12, being within Section 12, Township 29 North, Range 4 West W.M., Clallam County, Washington.

That they have added an additional (alternate) point of withdrawal at a point approximately 500 feet north and 800 feet east from the southwest corner of Section 1, T. 29 N., R. 4 W.W.M.

Given under my hand and seal of this office at Olympia, Washington, this 26th day of September, 1979.

E. W. ASSELSTINE
Regional Manager
Department of Ecology

RECORDED:
Volume I-2, pp 107
Certificate of Change

S. P. No. 159—1939—2M. 1500.

CERTIFICATE RECORD No. 3, PAGE No. 1316

STATE OF WASHINGTON, COUNTY OF Clallam

Cert. #26 Ad. Of Water
5-24-54

CERTIFICATE OF WATER RIGHT

(For rights perfected under original enlargement or secondary permits.)
(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and the regulations of the State Supervisor of Hydraulics thereunder.)

This is to certify, that Town of Sequim of Sequim, State of Washington, has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the waters of Dungeness River, a tributary of, for the purposes of Municipal supply, under Appropriation Permit No. 424 issued by the State Supervisor of Hydraulics, and that said right to the use of said waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume 3, at Page 1316, on the 11th day of March, 19 40; that the right hereby confirmed dates from May 23, 1924; that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 1.4 cubic feet per second.

A description of the lands under such right to which the water hereby confirmed is appurtenant, and the place where such water is put to beneficial use, is as follows:

PLACE OF USE			LEGAL SUBDIVISION	FOR IRRIGATION	
Section	Township	Range		No. Acres Described in Permit	No. Acres Actually Irrigated

LOCATION OF POWER PLANT			LEGAL SUBDIVISION	FOR POWER	
Section	Township	Range		H.P. Described in Permit	H.P. Actually Developed

Section	Township	Range	LEGAL SUBDIVISION	FOR OTHER USES
	30 N.	3 W.M.	Town of Sequim, Clallam County	Municipal supply

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 Section 39, Chapter 117, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 11th day of March, 19 40.

ENGINEERING DATA

Chas. X. Quigley
State Supervisor of Hydraulics.

52-CV1-2P106
4193865

CERTIFICATE OF CHANGE OF POINT OF DIVERSION OF SURFACE WATER

In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto and rules thereunder of the State Director of Ecology.

THIS IS TO CERTIFY That the City of Sequim, Washington, has complied with all of the requirements of the Revised Code of Washington 90.03.380 and is hereby granted the right to add an additional (alternate) point of diversion of the waters of the Dungeness River as authorized under Surface Water Certificate 1316 and Certificate of Change No. 426.

That said Certificate and Certificate of Change authorizes the diversion of 1.4 cubic feet per second of water from the Dungeness River, for municipal supply continuously, from a point situated in the NE¼NW¼ of Section 12, Township 29 North, Range 4 West W.M. in Clallam County, Washington.

That they have added an additional (alternate) point of diversion for said 1.4 cubic feet per second of water at a point located approximately 500 feet north and 800 feet east from the southwest corner of Section 1, T. 29 N., R. 4 W.W.M.

Given under my hand and seal of this office at Olympia, Washington, this 26th day of September, 1979.

E. W. ASSELSTINE
Regional Manager
Department of Ecology

RECORDED:
Volume I-2, pp 106
Certificate of Change

SETTLEMENT AGREEMENT

The State of Washington, Department of Ecology ("Ecology"), Graysmarsh Limited Partnership ("Graysmarsh"), and the City of Sequim ("the City"), collectively known hereafter as "the parties," hereby enter into this Settlement Agreement.

RECITALS

On June 13, 1995, the City filed a groundwater application with Ecology requesting a permit to withdraw water from the Port Williams well field. The application was assigned Ground Water Application No. G2-29239. On March 7, 1997, Ecology issued a Report of Examination ("ROE") recommending approval of the application and a Finding of Fact and Decision which ordered the issuance of a permit to the City. On April 3, 1997, Graysmarsh timely filed its appeal of Ecology's issuance of the ROE and order to the Pollution Control Hearings Board challenging Ecology's approval of the City's application. Graysmarsh's appeal was assigned PCHB No. 97-41.

The parties desire to avoid the expense and time commitment involved in a formal hearing of Graysmarsh's appeal, and therefore agree to comply with the terms and conditions of this Settlement Agreement. The parties intend that the terms and conditions of this Settlement Agreement be incorporated into any permit and/or any amended, revised, or new report of examination that Ecology may issue to the City under Application No. G2-29239.

The Port Williams well field is located in the Gierin Creek watershed and near the Dungeness River watershed. The parties recognize that while it appears that withdrawals authorized from said field are not likely to impact streams and marshes in the region, there is a need to assure adequate flows and levels therein due to the important public interest values and private rights associated with the surface water bodies. Further, the City recognizes the need to operate its comprehensive public water supply system and its various groundwater withdrawal fields including the Port Williams field consistent with protection of surface water resources.

In light of this recognition by the parties, the parties agree to carry out the following Terms and Conditions, consisting of a Monitoring Plan and Associated Elements, which include monitoring and reporting requirements, and criteria which shall trigger further requirements related to water resources management.

TERMS AND CONDITIONS

I. WELL MONITORING PLAN

A. Wells

The Well Monitoring Plan of the City of Sequim under this Settlement Agreement ("Well Monitoring Plan") relates to the following wells:

(a) Port Williams Well #1 (unique ID AAF #384) and all other wells to be developed in the Port Williams wellfield.

(b) USGS Zone 1 monitoring well AAF #397, located at 702 Port Williams Road.

(c) USGS Zone 3 monitoring well AAF #398, located at 702 Port Williams Road.

(d) Graysmarsh well AAF #387, located at 256 Graysmarsh Lane (USGS Zone 5).

(e) Graysmarsh 40-foot-deep west berry field well (30N-3W-5R) (USGS Zone 1).

(f) All withdrawal and diversion facilities operated by the City of Sequim other than (a) above, including but not limited to wells of the Silberhorn wellfield and the City's infiltration gallery on the Dungeness River.

(g) Vern Wray--shallow well AAF #380, located at 32 Crown View Lane (if a log cannot be obtained, this well shall be sounded to establish total depth and aquifer zone).

(h) Ryan well AAF #381, located at 130 Port Williams Road (USGS Zone 1).

(i) BPOE Elks well AAF #382, located at 143 Port Williams Road (USGS Zones 1 and 3).

(j) Stone irrigation well AAF #383, located at 301 Port Williams Road (USGS Zone 3).

(k) John Willis well AAF #386, located at 90 John Scott Road (USGS Zone 3).

(l) C.B. Frick irrigation wells (30N-3W-17Q): one deep (USGS Zone 5); one or both of two shallow (USGS Zone 3) wells, to be selected by the City of Sequim.

(m) Vista Water System well AAF #350 (30N-3W-18G) (USGS Zone 5).

(n) Sunland Water District well referenced in Report of Examination as 3/4 mile north of Port Williams well site (USGS Zone 3).

B. Monitoring Procedures

1. Monitoring Equipment

An approved flow metering device shall be installed and maintained in all City-owned wells, in accordance with RCW 90.03.360, WAC 508-64-020 through -040 or as amended in the future (installation, operation, and maintenance requirements to be attached [see Ecology Report of Examination]).

Installation and maintenance of an access port as described in WAC 173-160-355 is required in all wells specified under this Well Monitoring Plan. In all wells of the Port Williams wellfield and in the two "USGS monitoring wells" (AAF #397 and AAF #398) continuous water level monitoring equipment shall also be installed. A reference point for depth soundings shall be described and recorded in the well description; the reference point may be marked on the access port as appropriate.

Unless water-level monitoring equipment has already been installed in the well, which equipment achieves substantially the same purpose and which has been approved by Ecology, City-owned wells requiring continuous water level measurements shall have a pressure transducer and datalogger installed in the well. Water level measurements shall be automatically recorded at intervals no less frequent than 1 hour.

Manual water level soundings shall utilize an electric sounder or steel tape capable of measuring water levels to the nearest 0.01 foot.

Water samples shall be collected in containers supplied by a state-certified laboratory following procedures specified by the laboratory. Samples shall be collected at the nearest available discharge point to the well. When at least four chloride analyses have been obtained and reliably correlated with specific conductance measured in both the field and laboratory, a calibrated specific conductance meter may be used in lieu of laboratory analysis, provided that any exceedance of the highest previous correlated specific conductance value by 25 percent or more shall require sampling and analysis to confirm the chloride concentration and to extend the correlation relationship).

2. Monitoring Procedures, Locations, and Frequencies

Water levels shall be measured in accordance with accepted industry standards. Ecology Form or equivalent shall be used to record water level data, and all information requested on the form shall be completed. In addition, durations of the pumping period and recovery period prior to measurement shall be recorded if known and shall be included in the records. Two water level measurements not less than 5 minutes apart shall be recorded, showing the trend in water levels; if these measurements differ by more than 0.05 foot, a third measurement shall be taken not less than 5 minutes after the second.

Static water levels shall be measured continuously and recorded at least monthly in the following wells:

(a) Port Williams Well #1 (unique ID AAF #384) and all other wells to be developed in the Port Williams wellfield.

(b) USGS Zone 1 monitoring well AAF #397, located at 702 Port Williams Road.

(c) USGS Zone 3 monitoring well AAF #398, located at 702 Port Williams Road.

(d) Graysmarsh well AAF #387, located at 256 Graysmarsh Lane (USGS Zone 5).

(e) Graysmarsh 40-foot-deep west berry field well (30N-3W-5R) (USGS Zone 1).

Static water levels shall be monitored at least monthly in the following wells:

(f) All withdrawal and diversion facilities operated by the City of Sequim other than (a) above, including but not limited to wells of the Silberhorn wellfield and the City's infiltration gallery on the Dungeness River.

(g) Vern Wray--shallow well AAF #380, located at 32 Crown View Lane (if a log cannot be obtained, this well shall be sounded to establish total depth and aquifer zone).

(h) Ryan well AAF #381, located at 130 Port Williams Road (USGS Zone 1).

(i) BPOE Elks well AAF #382, located at 143 Port Williams Road (USGS Zones 1 and 3).

(j) Stone irrigation well AAF #383, located at 301 Port Williams Road (USGS Zone 3).

(k) John Willis well AAF #386, located at 90 John Scott Road (USGS Zone 3).

(l) C.B. Frick irrigation wells (30N-3W-17Q): one deep (USGS Zone 5); one or both of two shallow (USGS Zone 3) wells, to be selected by the City of Sequim.

(m) Vista Water System well AAF #350 (30N-3W-18G) (USGS Zone 5).

(n) Sunland Water District well referenced in Report of Examination as 3/4 mile north of Port Williams well site (USGS Zone 3).

As to the above wells, except as provided in (4) of this paragraph:

(1) access ports shall be installed by the City in the City's wells and in non-City-owned wells which are not equipped with access ports;

(2) all required measurements and samples from each well specified in the monitoring plan shall be performed on the specified schedule;

(3) monitoring records in a commonly used electronic format (*i.e.*, spreadsheet and/or database) shall be maintained; and

(4) as to non-City-owned wells, if a request by the City for access on reasonable terms to the well or to monitoring data is not allowed by the well owner, the requirements of (1), (2) and (3) shall have no applicability.

Cumulative ground water withdrawals shall be measured at least monthly in all wells owned or operated by the City and in all other wells listed above in which functioning flow meters are installed.

Chloride content shall be determined in the deep Graysmarsh irrigation well (AAF #387, completed in USGS Unit 5) quarterly during the first year of operation of the Port Williams wellfield, and at least twice a year thereafter.

In the event that a well specified in the Well Monitoring Plan becomes inaccessible for monitoring, the City shall investigate monitoring at a comparable alternate site within 30 days and shall select an appropriate alternative site if feasible. Replacement or additional monitoring wells may be required by Ecology to adequately characterize the effects of withdrawals at the Port Williams Wellfield. Wells shall not be dropped from the Well Monitoring Plan without approval of Ecology, except in the case of physical obstructions or access being denied by the well owner; the City shall inform Ecology of any such occurrence.

C. Reporting Requirements

Water pumpage, well monitoring, and static water level data, along with a summary and analysis of the data, shall be submitted annually in the month of February or more frequently upon request to Ecology's Southwest Regional Office, Water Resources Program, and to the owners of any non-City wells which are part of the Well Monitoring Plan, if they request in writing to receive such reports. However, if extraordinary declines in ground water levels or changes in water analysis are noted, all information will be sent as soon as practical but not later than 30 days from discovery to the affected well owner(s) and to the aforenoted Ecology regional office. The data shall be submitted cumulatively in digital spreadsheet (except laboratory reports; see item 3(d) below) form and shall include the following elements:

1. For Water Use Reporting

(a) Measurement method (*i.e.*, totaling meter, acoustic meter, etc.) for each well.

(b) Total volume pumped from each well by month in thousands or millions of gallons.

(c) Dates of measurements.

(d) Unique well ID number and City of Sequim well number.

2. **For Water Level Reporting**

(a) Unique well number and City of Sequim well number.

(b) Measurement date and time.

(c) Measurement method (*i.e.*, air line, electric tape, pressure transducer, etc.).

(d) Well status (*i.e.*, pumping, recently pumped, etc.; also see Section C-2.).

(e) Water level accuracy (*i.e.*, to nearest foot, tenth of foot, etc.).

(f) Description of the measuring point (*i.e.*, top of casing, sounding tube, etc.).

(g) Measuring point elevation above or below land surface to the nearest 0.1 foot.

(h) Land surface elevation at the wellhead to the nearest foot.

(i) Static water level below measuring point to the nearest 0.1 foot.

3. **For Water Quality Monitoring**

(a) Unique well number.

(b) Sampling date and time.

(c) Chloride concentration (mg/L) and/or specific conductance (mhos/cm).

(d) Paper copy of laboratory report.

II. ASSOCIATED ELEMENTS - TWO TIERS

A. Overview - Criteria for Various Actions

Two tiers of criteria are set forth. The "Tier 1" criteria are designed to "trigger" the City to initiate a hydrogeologic study if water levels decline by more than the indicated criteria. Specifically, the City will conduct a hydrogeologic study to assess the cause(s) of the reduction in water level(s) in the well(s) monitored by the City as part of its Well Monitoring Plan. The "Tier 2" criteria relate to reporting of extraordinary conditions by the City, and the bases for subsequent response to that information by Ecology.

B. "Tier 1" Criteria

The following "Tier 1" criteria are set forth for triggering a hydrogeologic study by the City:

Distance of Monitored Well from the Port Williams Well No. 1	Drawdown in a Monitored Well in USGS Zone 5
500 to 1000 feet	40 feet or greater
1000 to 2500 feet	35 feet or greater
2500 to 5000 feet	30 feet or greater
> 5000 feet	25 feet or greater

The "Tier 1" criteria apply only to changes in water level in a well listed in the City's Well Monitoring Plan associated with USGS Zone 5 ("lower artesian aquifer"), relative to typical seasonal levels.

"Tier 1" criteria refer to changes in water level in addition to background fluctuations such as seasonal variations and local drawdowns caused by pumping of the well used for observation or other nearby wells not a part of the Port Williams wellfield. If either of these background fluctuations can be defined or approximated based on existing data, the changes in water level in addition to background fluctuations will be based on subtracting the background fluctuation from the observed change in water level in the observation well. If data are unavailable to define background fluctuations, comparison of water-level data collection during the same season (*e.g.*, spring) and during similar pumping conditions of the observation well (*e.g.*, not pumping) will be made to indicate water level changes in addition to background fluctuations.

If triggered by changes in water level as hereinbefore set forth, a hydrogeologic study will be initiated by the City to evaluate the cause(s) of the change in water level. The study will collect and consider all available water level and pumping data from the area; any available information on changes in irrigation practice, surface water data collected by Graysmarsh, Ecology, or others; precipitation data; new hydrogeologic data assembled by the USGS, Ecology, or others; changes in land use; and other data pertinent to a hydrogeology study. The City will conduct comprehensive hydrogeologic assessment of the greater project area and, to the extent possible, identify the probable cause or causes of the changes in water levels. The analysis may include use of computer modeling.

The study will be initiated within 90 days of triggering and will be completed in a timely and reasonable manner. When completed, the City will provide copies to Graysmarsh and Ecology. Copies will be made available to other parties upon request at cost.

C. "Tier 2" Criteria (Relating to Extraordinary Conditions)

If an extraordinary condition is present as defined in this paragraph, the City shall as soon as practical but no later than 30 days from discovery report in writing the condition to the affected well owner(s) and to Ecology. Ecology shall immediately evaluate the condition and thereafter issue a response to the permittee directing it to perform such other actions, if any, as Ecology in its discretion deems appropriate. In relation thereto, Ecology may consider the following alternatives:

1) cease or reduce withdrawals authorized under the permit, or

2) modify the data collection-monitoring program, or

3) undertake additional data collection-monitoring, or

4) provide a "physical solution" to alleviate the declines, changes, or flow condition as hereinbefore set forth, or

5) perform a combination of one or more of the above, or

6) take no additional action.

The following are defined as "extraordinary conditions":

1) Ground water declines in excess of:

(a) 10 feet or more at any USGS Zone 3 ("upper artesian aquifer") wells in the City's Well Monitoring Plan.

(b) the criteria listed for monitored USGS Zone 5 wells in the table below.

Distance of Monitored Well from Port Williams Well No. 1	Drawdown in a Monitored Well in USGS Zone 5
500 to 1000 feet	50 feet
1000 to 2500 feet	45 feet
2500 to 5000 feet	40 feet
>5000 feet	35 feet

The "Tier 2" criteria apply only to changes in water level in a well listed in the City's Well Monitoring Plan associated with USGS Zones 3 and 5. "Ground water decline" means the amount of lowering of ground water levels in a given well below the seasonal average water level in that well prior to the priority date of this permit.

Notwithstanding any other provision in this Settlement Agreement, nothing in this Settlement Agreement shall limit or enlarge Ecology's authority to regulate the City's water use under applicable law. Under its statutory authority, Ecology may take any action it deems appropriate to regulate the City's withdrawals in order to prevent impairment of senior water rights. Any action taken by Ecology is subject to appeal as provided by law.

CHRISTINE O. GREGOIRE
Attorney General

Dated: August 28, 1997

Alan Reichman

ALAN M. REICHMAN, WSBA #23874
Assistant Attorney General
Attorneys for Respondent
State of Washington
Department of Ecology
(360) 459-6161

PERKINS COIE

Dated: August 14, 1997

Charles B. Roe Jr.

CHARLES B. ROE, JR., WSBA #684
Attorneys for Graysmarsh Limited Partnership

PRESTON, GATES & ELLIS

Dated: August 27, 1997

Adam Gravley

ADAM GRAVLEY, WSBA #20343
Attorneys for Respondent
City of Sequim

F:\CASES\AR3\GRAYSMAR\SETTLEMENT

CERTIFICATE RECORD NO. 2, PAGE NO.

STATE OF WASHINGTON, COUNTY OF Clallam

Cert #26 ch. Pt. Wireless 5.14.54

CERTIFICATE OF WATER RIGHT

(For rights perfected under original, enlargement or secondary permits.)

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and the regulations of the State Supervisor of Hydraulics thereunder.)

This is to certify, that Town of Sequim

Sequim, State of Washington, has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the waters of Dungeness River, a tributary of

for the purposes of Municipal supply

under Appropriation Permit No. 424 issued by the State Supervisor of Hydraulics, and that said right to the use of said waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume 2, at Page 1316, on the 11th day of March, 19 40, that said right hereby confirmed dates from May 23, 1924; that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 1.4 cubic feet per second.

A description of the lands under such right to which the water hereby confirmed is appurtenant, or the place where such water is put to beneficial use, is as follows:

PLACE OF USE			LEGAL SUBDIVISION	FOR IRRIGATION	
Section	Township	Range		No. Acres Described in Permit	No. Acres Actually Irrigated

LOCATION OF POWER PLANT			LEGAL SUBDIVISION	FOR POWER	
Section	Township	Range		H. P. Described in Permit	H. P. Actually Developed

Section	Township	Range	LEGAL SUBDIVISION	FOR OTHER USES
	30 N.	3 W. W.M.	Town of Sequim, Clallam County	Municipal supply

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 Section 39, Chapter 117, Session Laws 1917.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 11th day of March, 19 40.

Chas. E. Carkeek

State Supervisor of Hydraulics.

CERTIFICATE OF CHANGE OF POINT OF DIVERSION OF WATER

In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and rules thereunder of the State Supervisor of the Division of Water Resources.

THIS IS TO CERTIFY that the Town of Sequim, of Sequim, Washington, has complied with all of the requirements of Section 90.28.090 Revised Code of Washington, and is hereby granted a permit to change the point of diversion of waters of the Dungeness River in the amount of 1.4 second-feet as granted by water right Certificate No. 1316; from a point situated in the SW¼ of SW¼ of Sec. 1, Twp. 29 N., Rge. 4 W. W. M.; to a point situated in the NE¼ of NW¼ of Sec. 12, Twp. 29 N., Rge. 4 W. W. M., such point being above the present point of diversion, all within Clallam County, Washington.

WITNESS THE SEAL and SIGNATURE of the Supervisor of Water Resources of the State of Washington, affixed this 24th day of May, 1954.

Chas. J. Bartholet

CHAS. J. BARTHOLET, Supervisor
DIVISION OF WATER RESOURCES

RECORDED:
Vol. 1, Page 426
Records of Change of
Point of Diversion
of Water.
CONSERVING WATER

501210

RECEIVED
By
OCT 10 1979
CITY OF SEQUIM
SEQUIM, WA.

CERTIFICATE OF CHANGE OF POINT OF DIVERSION OF SURFACE WATER

In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto and rules thereunder of the State Director of Ecology.

THIS IS TO CERTIFY That the City of Sequim, Washington, has complied with all of the requirements of the Revised Code of Washington 90.03.380 and is hereby granted the right to add an additional (alternate) point of diversion of the waters of the Dungeness River as authorized under Surface Water Certificate 1316 and Certificate of Change No. 426.

That said Certificate and Certificate of Change authorizes the diversion of 1.4 cubic feet per second of water from the Dungeness River, for municipal supply continuously, from a point situated in the NE¼NW¼ of Section 12, Township 29 North, Range 4 West W.M. in Clallam County, Washington.

That they have added an additional (alternate) point of diversion for said 1.4 cubic feet per second of water at a point located approximately 500 feet north and 800 feet east from the southwest corner of Section 1, T. 29 N., R. 4 W.W.M.

Given under my hand and seal of this office at Olympia, Washington, this 26th day of September, 1979.

E. W. ASSELSTINE
Regional Manager
Department of Ecology

501210

Dept of Ecology
1979 OCT -4 AM 11:03
561 627
CLALLAM COUNTY, WASH.

RECORDED:
Volume I-2, pp 106
Certificate of Change

Mail: City of Sequim
Box 245
Sequim

2102

E. P. No. [illegible]

CERTIFICATE RECORD NO. 5 PAGE NO. [illegible]

STATE OF WASHINGTON, COUNTY OF Clallam

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 SEQUIM, WASHINGTON

[illegible], 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 an infiltration trench

located within [illegible] of Sec. 12, Twp. 29 N., Rge. 4 W.W.M.

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. [illegible] 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 5 at page [illegible], that the right hereby confirmed dates from February 16, 1953; 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 718 gallons per minute; [illegible] acre-feet per year for municipal supply. [illegible]

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 Sequim, Clallam 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 29th day of December, 19 54.

M B Walker
State Supervisor of Water Resources.

Report of Examination on Ground Water

Received date 2-16-53 Date of exam. 5-28-53 Appli. No. 2996

Name Town of Sequim, Washington

Type of works infiltration trench Dimensions

Progress of works not started

Quantity applied for 718 g.p.m. 1160 acre-feet per year

Legal sub NE¼ NW¼ Sec. 12 Twp. 29 N. Rge. 4 W. County Clallam

Use municipal supply

Irrigation-acreage: Present 0 Planned 0 Feasible 0

Municipal: Population 3000 as of 1970

Industrial

Time pump will be operated continuously

Other water rights appurtenant to this land

Proximity to existing works, springs, wells, or streams Trench will be well below the bottom of the river channel elevations. Trench will be constructed between the present channel of the Dungeness River and the high bluffs on the east side of the river at this location. Town of Sequim holds a S.W. Permit for 1.4 c.f.s.

Area Sub-area Zone

RECOMMENDATIONS

Approved for 718 g.p.m. 1160 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

The quantity of water recommended for permit is based on a daily per capita use of 380 gallons per day or a total of 1160 acre-feet per year.

The applicant will furnish information to this office as to the size and type of equipment installed and the gallons per minute furnished.

Signed this 29th day of May, 1953.

Stuart E. Shumway
STUART E. SHUMWAY
Engineer

RECEIVED
By
OCT 10 19
CITY OF SEQUIM
SEQUIM, WA

501211

CERTIFICATE OF CHANGE OF POINT OF WITHDRAWAL OF GROUND WATER

In accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the regulations of the State Director of Ecology.

THIS IS TO CERTIFY That the City of Sequim, Washington, has complied with all of the requirements of the Revised Code of Washington 90.44.100 and is hereby granted the right to add an additional (alternate) point of withdrawal for 718 gallons per minute, 1360 acre-feet per year, of waters of an infiltration trench as granted under Ground Water Certificate No. 2102-A.

That said water is used for the purpose of municipal supply continuously and had been withdrawn from an infiltration trench situated approximately 450 feet south and 1700 feet east from the northwest corner of Section 12, being within Section 12, Township 29 North, Range 4 West W.M., Clallam County, Washington.

That they have added an additional (alternate) point of withdrawal at a point approximately 500 feet north and 800 feet east from the southwest corner of Section 1, T. 29 N., R. 4 W.W.M.

Given under my hand and seal of this office at Olympia, Washington, this 26th day of September, 1979.

E. W. ASSELSTINE
Regional Manager
Department of Ecology

501211

501211

Dept of Ecology
1979 OCT -4 AM 11:03
561 628
C. THOMAS, AUDITOR
CLALLAM COUNTY, WASH.

RECORDED:
Volume I-2, pp 107
Certificate of Change

Mail: City of Sequim

VOL 561 PAGE 628

19971001123000

FILED AT THE REQUEST OF City of Sequim
RECORDED IN RECORDS/CLALLAM CO.
97 DEC -2 AM 8:53
VOL. ... PAGE 2
KEN FOSTER, AUDITOR
CLALLAM COUNTY, WASH.
BY ... DEPUTY

City of Sequim
152 W. Cedar St
Sequim WA 98382

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Sequim
152 W Cedar St
Sequim WA

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 12, 1975	G2-23856	G2-23856	G2-23856

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)
3 Wells	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	700	690

QUANTITY/TYPE OF USE/PERIOD OF USE

690 Acre-feet per year/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
NE1/4 NW1/4	25	30	4W	18	Clallam

PARCEL # n/a

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	n/a	n/a

PARCEL # n

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

Approximately 300 feet South and 750 feet West of the North quarter corner of Section 25.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Sequim.

PROVISIONS

All conditions and requirements contained in reports of examination or permits previously issued apply to this certificate unless specifically noted below.

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 90.44.020.

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

Given under my hand and the seal of this office at Olympia, Washington, this 24th *day of* November, *1997.*

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Tom Fitzsimmons
Department of Ecology

By J. Mike Harris, Section Supervisor

ENGINEERING DATA
OK mp
ECY 040-1-2 (Rev. 8-97)

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 13, 1995	G2-29239	G2-29239	

NAME
City of Sequim

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
152 West Cedar Street	Sequim	Washington	98382

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 WATERS TO BE APPROPRIATED

SOURCE
Five Wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2250	1850

QUANTITY, TYPE OF USE, PERIOD OF USE		
1850 Acre-feet per year (supplemental to existing rights)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
250 feet North and 150 feet West of the center of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	17	30	3W	18	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of Sequim including designated urban growth areas.

DESCRIPTION OF PROPOSED WORKS

Up to 5 wells completed in USGS Unit 5. Well #1: 16"X411'

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 2014	July 1, 2015

PROVISIONS

"This permit is subject to all terms and conditions contained in the Settlement Agreement which is incorporated into the Stipulation and Agreed Order of Dismissal of PCHB No. 97-41, dated September 8, 1997, as modified by the Order Nunc Pro Tunc, dated September 24, 1997."

"Water use under this and existing City of Sequim water rights shall not exceed 1,850 acre-feet per year."

"Ground-water withdrawals at the Port Williams Well Field shall be managed by the City of Sequim such that there are no long-term (i.e. year-to-year) declines in ground-water levels within the pumped (USGS Unit 5) or overlying (USGS Units 1 and 3) aquifers. Withdrawals shall be limited to that amount which can be sustainably withdrawn from USGS Unit 5, on an annual basis, without impairing senior rights or instream resources."

"Prior to issuance of a final water right certificate, the City of Sequim shall submit a completion report demonstrating the actual sustainable production of the Port Williams Well Field. The report shall assess actual and potential impacts to senior water rights in USGS Aquifer Units 1, 3, and 5 based on three years of actual use following full development of the well field. The instantaneous quantity authorized under this permit may be reduced prior to issuing the final water right certificate to reflect the sustainable yield from USGS Unit 5 and to protect senior rights."

"If senior water users are impaired through drawdown interference or water quality degradation as a result of operating the Port Williams Well Field, the City of Sequim shall reduce its withdrawals at the Port Williams Well Field to allow impaired users to exercise the full extent of their water rights."

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 states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

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 6th *day of* October, *19* 97.

Department of Ecology

ENGINEERING DATA
OK ✓

by Gene Blomstrom

PERMIT

ovisions Con't

he City of Sequim shall implement conservation measures as described in Chapter 9 of its July 17, 1996 ater Comprehensive Plan."

he City of Sequim shall gradually eliminate use of surface water from the Dungeness River, except as an nergency back-up source."

Water Right Tracking System
Department of Ecology
WR Document List Sorted By Priority Date Report

Reported By: MGAL461
Report Date: 2/9/2012

File #	Cert #	Person	Stat	Doc	Priority Dt	Purpose	Qi	UOM	Qa	Ir Acres	WRIA	County	TRS	QQ/Q	Src's	1stSrc
S2-*01107ALCWRIS	01316A	Sequim City	A	Cert	5/23/1924	MU	1.4	CFS			18	CLALLAM	29.0N 04.0W 12	NE/NW	2	DUNGENESS RIVER
G2-*02996ALCWRIS	02102A	Sequim City	A	Cert	2/16/1953	MU	718	GPM	1160		18	CLALLAM	29.0N 04.0W 12	NE/NW	2	INFILTRATION TREN
G2-CV1-2P107	02102A	Sequim City	A	CertChg	2/16/1953	MU	718	GPM	1160		18	CLALLAM	29.0N 04.0W 12	NE/NW	2	INFILTRATION TREN
S2-CV1P426	1316	Sequim City	A	CertChg	5/24/1954	MU	1.4	CFS			18	CLALLAM	29.0N 04.0W 12	NE/NW	1	DUNGENESS RIVER
G2-23856		Sequim City	A	Cert	6/12/1975	MU	700	GPM	690		18	CLALLAM	30.0N 04.0W 25		3	WELL
G2-24179AWRIS		Sequim City	I	NewApp	5/26/1976	MU	2100	GPM			18	CLALLAM	29.0N 04.0W 01		1	WELL
S2-24267CWRIS		Sequim City	A	Cert	8/18/1976	RE,FS	0.5	CFS			18	CLALLAM	30.0N 03.0W 20	SE/NE	1	BELL CREEK
G2-24764AWRIS		Sequim City	I	NewApp	1/9/1978	MU	300	GPM			18	CLALLAM	30.0N 04.0W 24		1	WELL
S2-CV1-2P106		Sequim City	A	CertChg	9/26/1979	MU	1.4	CFS			18	CLALLAM	29.0N 04.0W 01		1	DUNGENESS RIVER
G2-28728		Sequim City	I	NewApp	1/19/1993	MU	1946	GPM			18	CLALLAM	30.0N 04.0W 25		10	WELL
G2-29239		Sequim City	A	Pmt	6/13/1995	MU	2250	GPM	1850		18	CLALLAM	30.0N 03.0W 17		1	WELL
TOTAL RECORDS:	11															

SELECTION CRITERIA

Region	Central,Eastern,Northwest,Southwest
Person	Sequim city%

This data may not be complete or accurate.Validity of water rights documented by statements of claims can only be determined in Superior Court. Ecology cannot guarantee the validity of the water rights documented by Permits and Certificates

APPENDIX I

RECOMMENDED BOIL WATER NOTICE

APPENDIX J

CROSS-CONNECTION CONTROL PROGRAM

CITY OF SEQUIM

ORDINANCE #_____

AN ORDINANCE ADOPTING THE CITY OF SEQUIM CROSS CONNECTION CONTROL MANUAL AND AMENDING SECTION _____ OF THE SEQUIM MUNICIPAL CODE.

WHEREAS, the City determines it is in the interest of the public health, safety and welfare to implement a comprehensive cross connection control program in accordance with RCW Chapter 70.54 and Washington Administrative Code (WAC) Chapter 246-290-490, and

WHEREAS, it is of benefit to all water customers that the location of all cross connections and backflow risks to the city water supply be located, proper backflow prevention devices installed and a regular program of inspections and testing of backflow protection devices be conducted.

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF SEQUIM DO ORDAIN AS FOLLOWS:

Section 1: Amendment. Section _____ of the Sequim Municipal Code is hereby amended to read as follows:

CROSS CONNECTIONS

A. The control, including elimination, of cross connections for all new and existing water service customers shall be in accordance with the City of Sequim's Cross Connection Control Manual, attached hereto and incorporated in reference herein. In addition, applicable regulations of the Department of Health stated in the State of Washington Administrative Code (WAC 246-290-490) or subsequent revisions, shall be complied with. Where, in a specific case, different materials, methods or other requirements apply, the more restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement the specific requirement shall govern.

Section 2: Severability. If any section, subsection, sentence, clause, phrase or work of this Ordinance should be held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutional by a court of

competent jurisdiction, such invalidity or unconstitutionality thereof shall not affect the validity or constitutionality of any other section, subsection, sentence, clause, phrase or word of this Ordinance.

Section 2: Effective Date: This ordinance shall take effect and be in full force five (5) days after its passage, approval and publication.

PASSED this _____ day of _____, _____, and sign in authentication of its passage this _____ day of _____, _____.

_____

ATTEST:

_____

APPROVED AS TO FORM:

_____

SEQUIM CITY ATTORNEY

PUBLISHED:

CITY OF SEQUIM
CROSS CONNECTION CONTROL MANUAL

I. Definitions

A. Approved
Accepted by the Building Inspector as meeting an applicable specification stated or cited in this regulation.

B. Auxiliary Water Supply
Any water supply to the premises other than the City's approved public potable water supply.

C. Backflow
The undesirable reversal of flow of water or other substances through a cross-connection and into the piping of a public water system or consumer's potable water system.

D. Backflow Prevention Assembly
The nomenclature "assembly" refers to a backflow preventer which is designed to be in-line tested and repaired, and to meet the head loss and flow requirements of the recognized approval authority. The "assembly" consists of the backflow prevention unit, two resilient seated shutoff valves, and test cocks.

E. Backflow Prevention Device
The nomenclature "device" refers to a backflow preventer that is not designed for in-line testing.

1. Air Gap (AG)
A physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be an "approved air gap", the separation must be at least twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch. When located within three pipe diameters (measured horizontally) of a wall, the separation must be at least three times the diameter of the supply piping or four times the diameter of the supply piping for intersecting walls.

2. Atmospheric Vacuum Breaker (AVB)
A device which contains a float check (poppet), a check seat and an air inlet vent. When water pressure is reduced to a gauge pressure of zero or below, the float check drops, allowing air to enter the device, preventing backsiphonage. It is designed to prevent backsiphonage only.

3. Double Check Valve Assembly (DCVA)
An approved assemble consisting of two independently operating check valves, loaded to the closed position by springs or weights, and installed as a unit with, and

between, two resilient seated shut off valves and having suitable connections for testing.

4. Pressure Vacuum Breaker Assembly (PVBA)
An approved assembly consisting of a spring loaded check valve loaded to the closed position and installed as a unit with, and between, two resilient seated shut off valves and having suitable connections for testing. It is designed to protect against backsiphonage only.

5. Reduced Pressure Backflow Assembly (RPBA)
An approved assembly consisting of two independently operated check valves, spring loaded to the closed position, separated by a spring loaded differential pressure relief valve loaded to the open position, and installed as a unit with, and between, two resilient seated shut off valves and having four suitable test cocks for checking the water tightness of the check valves and the operation of the relief valve.

F. Backpressure
Backflow due to increased pressure above the supply pressure caused by pumps, gravity, or other sources of pressure.

G. Backsiphonage
Backflow due to negative or subatomic pressure in the distribution system.

H. City
The City of Sequim or their duly authorized representative.

I. Contamination
An impairment of the quality of the potable water which creates an actual hazard to the public health through poisoning or through the spread of diseases by sewage, industrial fluids or waste. Also defined as severe or high hazard. Also see *Pollution*. The term "contamination" used in EPA and state drinking water regulations "Maximum contamination level" bestows a different meaning than that used in describing a cross-connection hazard.

J. Cross-Connection
Any actual or potential physical connection between a public water system and any source of non-potable liquid, solid or gas that could contaminate the public water supply by backflow.

K. Customer
For purposes of cross-connection control, the owner or operator of a plumbing system connected to a public water system via a service connection.

L. Director
The Director, or delegated representative, in charge of the City of Sequim Department of Public Works.

M. In-Premise Protection
A method of backflow prevention in which a backflow prevention assembly is installed on the customer's internal water supply line prior to a fixture, piece of equipment or area that has been determined to have backflow potential. This shall effectively isolate the fixture, piece of equipment or area from the rest of the customer's distribution system.

N. Owner
Any person who has legal title to, or license to operate or occupy, a property upon which a cross-connection inspection will be made or upon which a cross-connection is present.

O. Person
Any individual, partnership, company, public or private corporation, political subdivision or agency of the State or of the United States or any other legal entity.

P. Pollution
An impairment of the quality of the potable water supply which does not create a hazard to the public health but which does adversely affect the aesthetic qualities of such potable waters for domestic use. Also defined as low hazard. See also *Contamination.*

Q. Premise Isolation
A method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection to isolated the customer's plumbing system from the purveyor's distribution system.

R. Purveyor
The Purveyor or delegated representative in charge of the City of Sequim water system.

S. Reclaimed Water
Effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater.

T. Water Service Entrance
That point in the owner's water system beyond the sanitary control of the City; generally considered to be the outlet end of the water meter and always before any unprotected branch.

II. Purpose and Scope

A. This Manual establishes minimum standards for the City to protect the public potable water supply from possible contamination of pollution due to backflow or backsiphon from a customer's private internal system into the public potable water system.

B. This Manual establishes minimum cross-connection control operating policies, provides guidelines and requirements for installation, testing, and maintenance of approved backflow prevention assemblies and establishes permitting, and inspection requirements for existing and new backflow prevention assemblies.

C. The purpose of this Manual is not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this Manual.

III. Authority

A. The Federal Safe Drinking Water Act of 1974 (and Amendments of 1996), the statutes of the State of Washington Title 43 RCW and Chapter 246-290-490 WAC require purveyors to "protect public water systems from contamination due to cross connections".

B. *City of Sequim Municipal Code, Chapter _____ regulates cross-connections*

IV. Responsibility

A. The Director shall be responsible for administering the provisions of this Manual.

B. If the Director determines, consistent with the provisions of this Manual, a backflow prevention assembly is required at any customer's premises, the Director, or his delegated agent, shall give notice to the customer to install an air gap or approved backflow prevention assembly which isolates the customer's plumbing system from the City's distribution system.

C. Installation of requested backflow protection assemblies shall be a condition of continued water service from the City. Service from the City's water supply system to any premises upon which the potential for backflow into the city system exists shall be discontinued or refused unless corrective action is taken in accordance with this manual.

D. Upon installation the customer shall contact the City requesting inspection of said assembly or assemblies. The customer shall be subject to all applicable inspection and permitting fees.

E. Upon approval of the installation by the City the customer shall have the assembly or assemblies tested by a State of Washington certified Backflow Assembly Tester (BAT) and shall submit a copy of the test report signed by the property owner to the City in accordance with this Manual.

V. Failure to Comply - Violations - Penalties

Any person, firm, or corporation who willfully violates any provisions and requirements of this Manual or Sequim Municipal Code _____ shall be subject to discontinuance of supply of City water to the premise where the violation exists. Discontinuance of the City potable supply to the premise shall remain in effect until corrective action as required by the Director is completed, tested and approved.

VI. Requirements

General

A. Compliance with the provisions of the City of Sequim Cross Connection Control Manual shall be a condition of receiving the City of Sequim water supply.

B. It is unlawful for any person to allow any contaminants or pollutants to backfeed from their facility and/or property into the city distribution system. Any connections now existing or hereafter installed that could allow for backfeed of any contaminants or pollutants into the city distribution system shall be discontinued and/or eliminated. Connection which cannot be discontinued and/or eliminated shall require the installation of a State of Washington approved backflow protection assembly that shall be regularly inspected and tested in accordance with the City of Sequim Cross Connection Control Manual.

C. When the City requires that the public water supply be protected by premise isolation, the owner shall be responsible for water quality beyond the outlet end of the premise isolation assembly and should utilize fixture isolation protection for that purpose. Fixture isolation assemblies shall be installed in accordance with the Uniform Plumbing Code.

D. The City may allow that the public supply be protected by fixture isolation for existing customer connections. Such an allowance shall only be permitted so long as the Director determines that the level of protection is adequate to protect the City's distribution system, and the owner agrees, in writing (unless waived by the City) to (1) implement and maintain the fixture isolating backflow protection to the satisfaction of the City; and (2) comply with all applicable plumbing codes, including permitting requirements.

City of Sequim

E. On new installations the City will provide on-site evaluation and/or inspection of plans in order to determine the type of backflow prevention assembly, if any, that will be required.

F. For premises existing prior to the start of this program, the City will perform evaluations and inspections of plans and/or premises and inform the owner by letter of any corrective action deemed necessary, the method of achieving the correction, and the time allowed for the correction to be made. Up to sixty days will be allowed; however, this time period may be shortened by the Director depending upon the degree of hazard involved and the history of the device(s) in question.

G. Premises are subject to inspection on or after the expiration date of required action to correct a cross-connection. Premises that have failed to comply with the City's request shall receive written notice, via registered mail, that water service to the premise will be terminated within a period not to exceed thirty (30) calendar days. In the event the owner informs the City of extenuating circumstances as to why the correction has not been completed, the City may grant a time extension up to but not exceeding sixty (60) days.

H. If the City determines at any time that a serious threat to the public health exists, the water service shall be terminated immediately, provided, however, that notice will be posted on the premises affected at the time said service is terminated.

I. Inspection shall be done during the initial installation, during on-site reviews of existing installations, and after any relocation.

J. When an initial installation or test identifies a backflow prevention assembly is not properly functioning, the owner shall correct the malfunction and have the assembly inspected and re-tested until the backflow device operates correctly.

Owner

K. The owner shall be responsible for the elimination or protection, by an air gap or approved backflow prevention assembly, of all cross-connection on their premises.

L. The owner after having been informed by a letter from the City shall, at their expense, install any and all required backflow prevention assemblies.

M. The Owner shall, at their expense, be responsible for having all backflow prevention assemblies tested: (1) at the time of installation, (2) annually after installation, or more frequently if test indicate repeated failures to meet test criteria; and (3) after an assembly is repaired, reinstalled or relocated or an air gap is re-plumbed or replaced by an approved RPBA. The test shall be performed by a State of Washington certified Backflow Assembly Tester (BAT) and signed by the owner. The results of the tests shall be reported within 30 days to the Director on a form provided by or approved by the City.

N. The owner shall, immediately, or no later than 30 days, or otherwise as directed by the Director, correct any malfunction of the backflow preventer which is revealed by periodic testing.

O. The owner shall inform the City of any proposed or modified cross-connection and also any existing cross-connections of which the owner has actual knowledge but has not been found by the City.

P. The owner shall install only backflow prevention assemblies approved by the City.

Q. Any owner having a private well or other private water source shall not cross-connect to the City's system.

R. The owner shall provide access to premises to the City at the City's request. Failure to provide access to inspect facilities shall be grounds for termination of water service.

S. The owner shall be responsible for the payment of all fees for permits, annual or semi-annual device testing, re-testing in the case that the assembly fails to operate correctly, and any re-inspection for non-compliance with City requirements. Permits and fee schedules shall be as specified in the applicable sections the City of Sequim's Municipal Code.

VII. Installation and Testing - Minimum Requirements

A. Minimum requirements for the installation and testing of all backflow protection assemblies shall be in accordance with the Cross Connection Control Manual - Accepted Procedure and Practice produced by the Pacific Northwest Section, American Water Works Association (PNWS/AWWA), Sixth Edition, December 1995, including subsequent revisions, adopted by reference herein. A copy is available for viewing at the Public Works Department of the City of Sequim, additional copies can be purchased from the PNWS/AWWA.

B. In addition, all backflow protection assemblies shall be installed at a location that is easily accessible for inspection and testing. Assemblies located in vaults shall have adequate clearances and depths to allow the City to inspect and test. Assemblies that cannot be easily and readily inspected shall be required to be relocated and re-plumbed as required by the City. The owner shall contact the City of applicable installation requirements and standards.

C. All bypass lines parallel to a line on which a backflow prevention assembly is installed shall have an approved backflow prevention assembly installed that is equal in type to the assembly required by the City on the main line.

VIII. Backflow Protection Devices

A. All backflow protection assemblies (RPBAs, RPDAs, DCVAs, DCDAs, PVBAs and AVBs) installed for protection of the public water supply shall be models included on the current approved backflow prevention assemblies list developed by the University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research Manual of Cross Connection Control or other such agency acceptable to the Director. The Washington Department of Health maintains a copy of this list (DOH Publication # 331-090). A copy is available for viewing at the Public Works Department of the City of Sequim, additional copies can be purchased from the PNWS/AWWA.

B. Any existing backflow protection assembly in use, but not currently listed by USC, can continue to be used providing all the following conditions are met

1. The assemblies were included on the City and/or USC list of approved backflow prevention assemblies at the time of installation;
2. The assemblies have been properly maintained;
3. The assemblies are functioning properly based on inspection by the City and testing by a certified Backflow Assembly Tester;
4. The degree of protection is satisfactory for protection of the City's water system as determined by the Director.

C. When an unlisted assembly does not meet the above conditions, is moved, or can not be repaired using spare parts from the original manufacturer, the assembly shall be replaced by an assembly currently listed as approved by the USC Foundation for Cross-Connection Control and Hydraulic Research or other such agency acceptable to the Director.

IX. Applicability

A. The provisions of this Manual are applicable to all connections to the City water supply. The City recognizes there are varying degrees of risks associated with different types of uses and will consider this when determining if a cross connection exists and applicable backflow prevention assemblies.

B. The following Tables 1, 2, 3 and 4 are derived from the Pacific Northwest Section - American Water Works Association's Cross Connection Control Manual, Accepted Procedures and Practices, Sixth Edition, 1995. These tables, subject to revisions, provide minimum requirements and guidance for the assessment of the degree of hazard and required level of protection. If the actual degree of hazard is determined, by the Director, to be higher than these tables indicate, a higher lever of protection may be required.

Table 1. Summarizes the relative level of protection provided by the different categories of assemblies and devices.

Table 2. A list of customer categories or types of water use where premise isolation is required in all cases.

Table 3. A list of customer categories or types of water use where premise isolation is required for existing service connections is accordance with the provisions of Section VI - D of this Manual.

Table 4. A list of some of the fixtures, equipment or uses of water which may constitute a cross connection and the minimum level of protection required.

TABLE 1
RELATIVE LEVEL OF PROTECTION

Abbreviations	Description/Application Summary [1]	Relative Level of Protection [2]
AG	Approved Air Gap For high and low health hazards, backpressure and backsiphonage	1
RPBA & RPDA	Reduced Pressure Backflow Assembly Reduced Pressure Detector Assembly For high and low health hazards, backpressure and backsiphonage	2
DCVA & DCDA	Double Check Valve Assembly Double Check Detector Assembly For low health hazards only, backpressure and backsiphonage	3
PVBA & SVBA	Pressure Vacuum Breaker Assembly Spill-Resistant Vacuum Breaker Assembly For high and low health hazards, backsiphonage only	4
AVB HBVB LFVB DCAV DCV	Atmospheric Vacuum Breaker Hose Bib Vacuum Breaker Lab Faucet Vacuum Breaker For very low health hazards, and backsiphonage only Dual Check with Atmospheric Vent Dual Check Valve or Meter Check Valve (Dual) For very low health hazards, backpressure and backsiphonage	5

Note: [1] The above descriptions of applicable and relative level of protection are based on the perspective of the City's selection of assemblies and devices for the prevention of the contamination of the water distribution system. Plumbing codes may classify some devices as providing higher levels of protection and as suitable for both backpressure and backsiphonage.

[2] This Manual does not address the location, inspection, and testing of AVBs, HBVBs, LFVBs, DCAVs and DCVs.

TABLE 2
MANDATORY SERVICE ISOLATION

Category of Premise or Use of Water	Assessed Health Hazard	Minimum Protection Recommended at Meter
Radioactive material processing plants or nuclear reactors	severe	RPBA & AG
Sewer treatment plants or sewage pump station	severe	RPBA & AG
Hospitals, medical centers, medical/dental or vet clinics, plasma centers, blood plasma centers	high	RPBA
Mortuaries	high	RPBA
Laboratories	high	RPBA
Metal plating industries	high	RPBA
Petroleum processing or storage plants	high	RPBA
Food processing and beverage bottling plants, canneries, packing (slaughter) houses	high	RPBA
Film processing facilities	high	RPBA
Piers and docks, graving docks, boat marinas, dry docks	high	RPBA
Commercial laundries and dry cleaners	high	RPBA
Premises restricting inspection	high	RPBA
Premises with unapproved auxiliary supply, including reclaimed water		
New	high	RPBA
Existing		
Interconnected with potable water supply	high	RPBA
Not interconnected with potable water supply	low	DCVA
Premises with approved auxiliary supply	low	DCVA
Car washes	high	RPBA
Premises with fire sprinkler systems and/or private hydrants		
With chemical addition	high	RPBA/RPDA
Without chemical addition	low	DCVA/DCDA
Tall buildings (over 30 feet) (elevation above the connection between the service line and the distribution system)	low	DCVA
Irrigation Systems (individually metered and supplied by domestic water supply)		
With chemical addition	high	RPBA
Without chemical addition	low	DCVA

TABLE 3
RECOMMENDED SERVICE ISOLATION

[illegible]	[illegible]	[illegible]
Battery manufacturing or repair facilities	high	RPBA
Ice manufacturing and cold storage plants	high	RPBA
Residential irrigation	low	DCVA

TABLE 4
RECOMMENDED PROTECTION AT FIXTURES AND EQUIPMENT

Description of fixture, equipment or use of water [1]	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premise or Internal Isolation [2]
Air compressor	low	DCVA	
Air conditioning systems	high	RPBA	
Air washers	high	RPBA	
Aquarium make-up water	high	AG/RPBA	
Aspirators, medical/lab	high	AVB	RPBA
Aspirators, medical/lab	high	RPBA	
Aspirator, weedicide, herbicide, and pesticide	high	RPBA	
Aspirator, vault drain	high	RPBA	
Autoclave	high	RPBA	
Autopsy tables	high	RPBA	
Baptismal fountain	high/low	RPBA, AG/AVB	
Bathtub, below rim filler	high	RPBA	
Bedpan washer	high	RPBA	
Post-mix beverage dispenser using CO2	high	RPBA	
Bidets	low	AVB	
Boiler feed lines	high	RPBA	
Bottle washing equipment	high	RPBA	
Bottle washing equipment	high	PVBA/AVB	RPBA
Box hydrant (irrigation)	high	PVBA/DCVA	
Brine tank	low	AG/DCVA	
Can washing equipment	high	RPBA	
Can washing equipment	high	PVBA/AVB	RPBA
Chemical feed tank for industrial process	high	AG/RPBA	RPBA

Table 4: Continued

Description of fixture, equipment or use of water [1]	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premise or Internal Isolation [2]
Chemical feeder for commercial cleaners	high	AG/RPBA	
Chemical feeder for commercial cleaners	high	AVB/PVBA	RPBA/DCVA
Chlorinators	high	RPBA	
Commercial coffee urns	low	AG/AVB	
Computer cooling lines	high	RPBA	
Condensate tanks	high	RPBA	
Commercial cooling kettles	low	AG/AVB	
Cooling towers	high	AG/RPBA	
Decorative ponds	high	AG/RPBA	
Degreasing equipment	high	RPBA	
Dental equipment/cuspidors	high	RPBA	RPBA
Dialysis equipment	high	RPBA	
Dishwashers	low	AVB	
Drinking fountains	low	AG	
Dye vats and tanks	high	AG/RPBA	
Etching tanks	high	AG/RPBA	RPBA
Fermenting tanks	high	AG/RPBA	RPBA
Fertilizer injection	high	RPBA	
Film processors	high	RPBA	
Fire dept. connection	low	DCVA	
Fire sprinkler system w/o chemical addition	low	DCVA/DCDA	
Fire sprinkler system with chemical addition	high	RPBA/RPDA	
Floor drains	high	AG	
Flushing floor drains	high	AVB	DCVA
Fume hoods (lab)	high	AVB	RPBA
Garbage can washers	high	RPBA	
Heat exchangers other than double wall with leak path	high	RPBA	
Heat pumps	high	RPBA	
High pressure washers w/o chemical injection	low	DCVA	
Hose bibbs (residential)	low	AVB/HBVB	
Hose bibbs (industrial)	varies	AVB/HBVB	RPBA/DCVA
Hoses, kitchen rinse	low	AVB	
Hot tubs	high	AG/RPBA	
Commercial hot water heating boilers	high	RPBA	
Hydrotherapy baths	high	RPBA	
Ice makers	high	AG/RPBA	
Industrial fluid systems	high	RPBA	

Table 4: Continued

Description of fixture, equipment or use of water [1]	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premise or Internal Isolation [2]
Intertied (looped) services	low	DCVA	
Irrigation system (lawn) with chemical addition	high	RPBA	
Irrigation system (lawn) w/o chemical addition	low	PVBA/DCVA	
Janitor sinks	low	AVB/HBVB	
Kitchen equipment	low	AVB	
Laboratory equipment	high	AVB/LFVB	RPBA
Laundry machines, commercial	high	RPBA	
Livestock drinking tanks	high	AC/AVB	DCVA
Make-up tanks	high	AG/RPBA	
Mobile carpet cleaners	high	RPBA	
Pesticide applicator trucks	high	AG/RPBA	
Photo developing sinks/tanks	high	RPBA	
Private fire hydrants	low	DCVA	
Pump prime lines	high	RPBA	
Radiator flushing equipment	high	RPBA	
Recreational vehicle dump station	severe	AG	RPBA
Sewer connected equipment	severe	AG	
Sewer flushing	severe	AG	
Spas	high	AG/RPBA	
Steam generating equipment	high	RPBA	
Sterilizers	high	RPBA	
Stills	high	RPBA	
Sumps	high	AG	
Swimming pools	high	AG/RPBA	
Trap primers	high	AG	
Used or gray water systems	high	RPBA	
X-ray equipment	high	RPBA	

[1] The information in Table 4 may differ from the backflow prevention requirements for individual plumbing fixtures found in plumbing codes. For public health protection within a customer's premise, the Uniform Plumbing Code governs. Table 4 is provided to illustrate only some of the health hazards found in plumbing systems. This table will be used by the City in assessing the degree of hazard a customer's plumbing system places upon the City's water distribution system. Deficiencies in backflow prevention within the customer's premise should be compensated for through the selection of an appropriate assembly for premise isolation.

[2] Where a high health hazard is assessed, the use of an atmospheric vacuum breaker or other backflow devise for protection at a fixture should only be allowed when area or premise isolation is provided by an approved backflow assembly.

X. Administrative Procedures

The City of Sequim has recently amended the Municipal Code and adopted this Cross Connection Control Program Manual. In order to carry out the provisions of these new requirements, a surveillance program based upon proper management, effective customer education, adequate record keeping, and aggressive inspections must be properly implemented.

Such a program for cross connections and sanitary hazards initially requires the inspection of all new and existing buildings, structures, and grounds. As proposed, this procedure will require the Public Works Director and Building Official to assist with these requirements. Each must be knowledgeable in the field of pumping and building inspection, pipe arrangements, and certified in cross connection control.

1. Minimum Requirements

The following requirements are based on the most current edition of the Cross Connection Control Manual published by the Pacific Northwest Section - American Water Works Association (PNWS-AWWA). These requirements are provided for clarification and in any disagreement between these listed below and requirements listed elsewhere in this Manual, the more restrictive shall govern. As described in elsewhere in this manual, the premise isolation requirement may be waived or reduced for certain existing businesses, providing certain conditions are met.

<u>RPBAs</u>

A. Premises on which materials dangerous to health or wherein toxic substances are handled, shall be required to have an approved reduced backflow assembly installed at the service connection.

B. Premises where entry is physically restricted so that inspections for cross connections cannot be made sufficient to assure that cross connections do not exist, shall be required to have an approved reduced pressure backflow assembly installed at the service connection.

C. Premises having an auxiliary water supply with internal cross connections that are not correctable or intricate plumbing arrangements which make it impractical to ascertain whether or not cross connections exist, shall be required to have an approved reduced pressure backflow assembly installed at the service connection.

<u>DCVAs</u>

D. Premises which handle a substance that is objectionable, although not a health hazard, in a manner constituting a potential cross connection, shall be required to have an approved double check valve assembly installed at the service connection.

E. Premises having an auxiliary water supply with no known cross connections, shall be required to have an approved double check valve assembly installed at the service connection.

F. Premises on which any substance that is not a health hazard but is under pressure so as to enable entry into the public water supply or where a cross connection could reasonably be expected to be present, shall be required to have an approved double check valve assembly installed at the service connection.

G. Premises which have a repeated history of cross connections being established or re-established, shall be required to have an approved double check valve assembly installed at the service connection.

Fire Protection Systems

H. Premises having a fire protection system where no chemicals are allowed to be used, shall be required to have an approved double check valve assembly (DCVA) or approved double check detector assembly (DCDA) installed at the fire service connection.

I. Residential premises having a fire protection system where no chemicals are allowed to be used, shall be required to have an approved double check valve assembly (DCVA) installed at the water service connection.

J. Residential fire systems with a flow through system using approved potable water pipe and materials shall not be required to install backflow protection.

Irrigation Systems

K. Premises having an irrigation system where chemicals or herbicides are allowed to be used, shall be required to have an approved reduced pressure backflow assembly installed at the service connection.

L. Non-residential premises having an irrigation system which is subject to flooding, backpressure, elevated piping or where compressed air is allowed to be used, shall be required to have an approved double check valve assembly installed at the service connection.

M. Non-residential premises having an irrigation system which does not fall into one of the prior two categories, shall be required to have an approved pressure vacuum breaker assembly or double check valve assembly installed on the system.

2. New and Proposed Construction

A. Upon application for a building permit, the Building Official or authorized designate shall require detailed plans and specifications for the plumbing installation. The customer shall also be required to complete a Cross Connection Control Program Survey.

B. The Building Official, or authorized designate, shall review these plans, specifications and survey to determine the probability of cross connections, the availability of auxiliary water supply, and the handling of substances which, if introduced into the water supply, would constitute a health, plumbing, or system hazard.

C. During the construction phase of any new building, structure, or ground installation, and during the plumbing inspection, the Building Official or authorized designate will

also perform the required cross connection control inspection. Upon completion of the plumbing inspections the Building Official or authorized designate shall complete the CCC Field Inspection Form, to document that subject cross connection control inspection has been made and to document the location of any and all backflow prevention assemblies and/or devices.

D. All backflow prevention assemblies installed internally or at the service connection shall be tested by a certified Backflow Assembly Tester and the test reports submitted to the Building Official or authorized designate (using the Backflow Assembly Test Report form).

3. Existing Buildings, Structures, and Grounds

The systematic program of inspection shall be established with priority given on the basis of risk to public health and shall be conducted as outlined below.

A. A form letter will be sent to each commercial and industrial metered customer explaining the program and stressing the relationship between cross connections and water-borne disease epidemics, types of health hazards, and cross connection. The duties and liabilities of the owners or managers as well as the rules and regulations that apply, will be explained. The letter will also include a questionnaire of desired information such as the type of water used on the premises, auxiliary water supplies, chemicals used, and certain types of fixtures installed. These questionnaires are to be returned to the Building Official or authorized designate.

B. Based on the known information of the customers operation and the information received on the questionnaire, an inspection schedule will be prepared based on the location of the hazard within the facility and the degree of hazard posed to the utility.

C. Approximately 10 days prior to the scheduled date of inspection the City will contact the owner, requesting an appointment with the owner/manager of the premises to discuss the necessity for the inspection and other pertinent matters.

D. On the appointed date the Building Official or authorized designate will meet with the owner/manager and explain the purpose of the inspection. The Building Official or authorized designate will suggest the owner/manager appoint an individual from his firm that is knowledgeable with the firm's plumbing system to accompany the inspectors. At this time, the Building Official or authorized designate can obtain any blue prints or drawings of the "in-plant" system that are available and discuss any questions or other problems the owner/manager may have.

E. On the date of the scheduled inspection, the City of Sequim's Inspector, with the owner's representative, will make a complete physical survey of all exposed piping. The underground system is to be checked as accurately as possible. All lines will be sketched on a field drawing, except where intricate plumbing arrangements make it impractical. In this case an "as-built" drawing will be requested. Each line shall be followed to its end and a survey made to determine whether there are any actual or potential cross connections or any conditions that might tend to pollute the potable water system.

F. Immediately upon completion of the survey the inspection team will orally brief the owner/manager of their findings.

G. The inspection team will prepare a written report that will include, but shall not be limited to, the following:

- Complete identifying information.
- All cross connections found, their location and optional methods of control.
- All industrial fluids, chemical, or other contaminating liquids used or pumped under pressure and their use and probability of cross connections.
- Any applicable drawings, sketches, blueprints or other documents used in support of the inspection.
- A summary of findings.
- Specific recommendations.

H. The inspection team will submit a copy of the completed report to the Building Official or authorized designate.

I. Upon completion of the review of the report the Building Official or authorized designate shall prepare a letter to the respective customer. The letter will outline the findings of the report, the corrective action required, and establish a corrective action completion date (usually 60 days). A copy of the report will be maintained on file for review by the State Department of Health.

J. On the corrective action completion date, or soon thereafter, the Inspector shall take a copy of the report and re-inspect the items that required corrective action.

K. Upon completion, the Inspector shall report in writing to the Building Official or authorized designate, the results of the re-inspection.

L. After receiving the results of the re-inspection the Building Official or authorized designate shall take such action as deemed appropriate under the provisions of the City's Cross Connection Control Manual.

M. When all required actions have been completed and the device(s) tested by a certified Backflow Assembly Tester, a letter shall be sent to the Owner. Said letter will inform them of the annual testing requirements, including maintaining all backflow prevention devices in proper operating order as evidenced by submission, to the City, of the annual testing report.

4. Residential Education and Awareness

The City may develop or acquire pamphlets and/or bill stuffers to send to all of the water system customers. These shall include, but are not limited to, the following subjects:

A. Home irrigation safety;
B. Residential fire sprinkler systems;
C. Health hazards associated with hose connection (chemical sprayers, radiator flush kits, etc.), utility sinks, and other household dangers.

If the City develops this program, this information shall be mailed directly to the customers.

The City shall also take advantage of other opportunities for public education by developing a traveling exhibit that can be set up at community events, schools and at City Hall.

5. Registering of Certified Testers

The City will maintain a list of Backflow Assembly Testers (BATs) that may be provided to customers. Persons or organizations wishing to be added to this list will be required to provide the City with copies of the following:

A. Proof of current certification by the State of Washington as a BAT for all persons that are authorized to perform tests.

B. Proof of current calibration tests performed for all testing equipment (annual calibration is required).

C. A copy of a current business license authorizing the company to work in the City of Sequim.

6. Record keeping and tracking of assemblies

The City will establish records that will meet all of the record keeping requirements of the state and allow effective monitoring and tracking of customer compliance with the annual backflow assembly testing requirements. The general content of the City's records will be as follows:

Information on each assembly will include: the location of the business (or water service) where it is located (some businesses may have multiple devices), initial inspection information for each location (inspector, date, survey #, comments) installation information (installed by, contact info., date installed, specific location, water line size, water pressure, hazard level and hazard protected), assembly information (assembly #, type manufacturer, size, model, serial # and inspection period), and a complete testing history (initial and final test results for each year with: pass/fail, test type, date, tester's name and certification #, line pressure and test results for all three valves, repair information, test kit info and owner's signature.)

7. Standard Forms and Letters

A. Form Letter to be sent to all commercial and industrial customers
B. CCC Program Survey
C. CCC Plan Check
D. CCC Inspection Form
E. Backflow Assembly Test Form

City of Sequim
Cross Connection Control Program
Field Inspection

Date:_____

Business:_____ Business Type:_____

Address:_____ Mailing Address:_____

_____ _____

Contact Person:_____ Phone/Fax:_____

Inspection Type: Unannounced Scheduled Areas Inspected:_____

New Business Complaint _____

Backflow Incident _____

City Water Service:	Size	Pressure	Meter No.	Backflow Assembly (Type or "N/A")
Domestic				
Fire				
Irrigation				

Existing Cross Connection Protection (Approved Assemblies)					
Hazard/Location	Assembly Type	Make	Model	Serial #	Tested Annually? (Attach Reports)

Item No.	Location & Description of Potential Cross Section	Inspector's Recommendation

Hazardous Chemicals/Products Used or Stored on Site:

1._____ 4._____ 7._____ 10._____

2._____ 5._____ 8._____ 11._____

3._____ 6._____ 9._____ 12._____

Sketch of Water Lines & Hazard Locations

Inspector Signature _____ Date _____ Owner Signature _____ Date _____

City of Sequim
Cross-Connection Plan Check

Project Name:_____ Date_____

Project Address:_____ _____

Owner's Name:_____ Phone_____

Plumbing Contractor:_____ Phone_____

Plans approved as submitted, with the following backflow protection devices installed as indicated:

Device	Location & Hazard	Size

Plans approved provided the following conditions are met:

Items	Recommended Correction

_____
Inspected by:

Based upon a review of the above information and the *Cross Connection Control Program Survey* completed by the owner, premise isolating backflow prevention assemblies shall be installed on the following service connections:

Device Type	Type of Service	Size

_____
Building Official or Authorized Designate

ASSEMBLY IS:

☐ NEW
☐ REPLACEMENT
☐ EXISTING

CITY OF SEQUIM

BACKFLOW PREVENTION ASSEMBLY INSPECTION AND TEST REPORT

City of Sequim
152 West Cedar Street
Sequim, WA 98382-3317
Phone (360) 683-4139
Fax (360) 681-3448

NAME OF PREMISES

STREET ADDRESS

LOCATION OF ASSEMBLY

DOWNSTREAM PROCESS

FACILITY TYPE

MANUFACTURER

MODEL NO

SIZE_DIA

SERIAL NO

BFP REFERENCE

DATE INSTALLED

ASSEMBLY TYPE

RPBA
DCVA
PVB
AG

	INITIAL TEST RESULTS	TEST AFTER REPAIR OR CLEANING
RPBA	Pressure Drop Across 1st Check Valve ____ PSID Relief Valve Opened ____ PSID No. 1 Check Leaked ☐ Closed Tight ☐ No. 2 Check Leaked ☐ Closed Tight ☐ Line Pressure ____ PSI Passed Test: Yes ☐ No ☐	Pressure Drop Across 1st Check Valve ____ PSID Relief Valve Opened ____ PSID No. 1 Check Leaked ☐ Closed Tight ☐ No. 2 Check Leaked ☐ Closed Tight ☐ Line Pressure ____ PSI Passed Test: Yes ☐ No ☐
DCVA	No. 1 Check Leaked ☐ Closed Tight ☐ ____ PSID No. 2 Check Leaked ☐ Closed Tight ☐ ____ PSID Line Pressure ____ PSI Passed Test: Yes ☐ No ☐	No. 1 Check Leaked ☐ Closed Tight ☐ ____ PSID No. 2 Check Leaked ☐ Closed Tight ☐ ____ PSID Line Pressure ____ PSI Passed Test: Yes ☐ No ☐
PVB	Air Inlet ____ PSID Check Valve Leaked ☐ Closed Tight ☐ ____ PSID Line Pressure ____ PSI Passed Test: Yes ☐ No ☐	Air Inlet ____ PSID Check Valve Leaked ☐ Closed Tight ☐ ____ PSID Line Pressure ____ PSI Passed Test: Yes ☐ No ☐
AG	Minimum Separation Yes ☐ No ☐	PLEASE RECORD REPAIR, REPLACEMENT, OR CLEANING INFORMATION IN SECTION BELOW

Installation Meets AWWA Guidelines ☐

Remarks

Tested by

Tester's Company

Repaired by

Plumber's Company

Repair Tested by

Tester's Company

Certification

Phone Number

License #

Phone Number

Certification

Phone Number

Date of Test

Date of Repair

Date of Test

Owner's signature: _____ Date: _____

CITY OF SEQUIM

CROSS CONNECTION CONTROL PROGRAM SURVEY

City of Sequim
152 West Cedar Street
Sequim, WA 98382-3317
Phone (360) 683-4139
Fax (360) 681-3448

In order to protect the public potable water supply from possible contamination or pollution due to backflow from a customer's private internal system, the City has established a Cross Connection Control Program. The City recognizes that there are varying degrees of risks associated with different types of uses and will consider this when determining if a cross connection exists and what, if any, backflow prevention device will be required.

Please complete the following survey, sign and date it, and submit it with the rest of your application materials.

Name of business: _____

Facility Street Address: _____ Phone: _____

Name of Contact Person: _____ Phone: _____

Brief description of business: _____

_____

_____

	Yes	No
1. Does (or will) your business have a fire sprinkler system and/or private hydrant?	☐	☐

2. Please indicate if your business falls under any of the following categories or uses of water:

	Yes	No		Yes	No
Car Wash	☐	☐	Mortuary	☐	☐
Chemical Plant	☐	☐	Nursing Home	☐	☐
Food process and bevarage bottling plants, canneries, packing (slaughter) houses	☐	☐	Pier or dock, boat marina, dry dock	☐	☐
Hospital, medical center, medical/dental or vet clinics, plasma centers	☐	☐	Petroleum processing or storage plant	☐	☐
Laboratory	☐	☐	Radioactive material processing plant	☐	☐
Metal plating industry	☐	☐	Sewer treatment plant or sewage pump station	☐	☐
			Tall building (over 30')	☐	☐

3. Please indicate if your business has (or will have) any of the following facilities on site:

	Yes	No		Yes	No
Battery mfg. or repair facility	☐	☐	Film processing facilities	☐	☐
Cold storage plant	☐	☐	Ice mfg. plant	☐	☐
Commercial laundry	☐	☐	Mobile home park	☐	☐
Dairy or farm	☐	☐	Shopping center	☐	☐
Dry cleaner	☐	☐			

4. Please indicate if your business will have any of the following fixtures, equipment or areas on site:

	Yes	No		Yes	No
Air compressors	☐	☐	Autopsy tables	☐	☐
Air conditioning systems	☐	☐	Baptismal fonts	☐	☐
Air washers	☐	☐	Bathtub, below rim filter	☐	☐
Aquarium make-up water	☐	☐	Bedpan washers	☐	☐
Aspirators, medical	☐	☐	Beverage dispensers using CO-2	☐	☐
Aspirators, weedicide, herbicide, pesticide	☐	☐	Bidets	☐	☐
Aspirator, vault drain	☐	☐	Boiler feed lines	☐	☐
Autoclaves	☐	☐	Bottle washing equipment	☐	☐

	Yes	No		Yes	No
Box hydrants	☐	☐	Hoses, kitchen rinse	☐	☐
Brine tanks	☐	☐	Hot tubs	☐	☐
Can washing equipment	☐	☐	Hot water heating boilers (commercial)	☐	☐
Chemical feeder tanks	☐	☐	Hydrothrapy baths	☐	☐
Chlorinators	☐	☐	Ice makers	☐	☐
Coffee urns (commercial)	☐	☐	Industrial fluid systems	☐	☐
Computer cooling lines	☐	☐	Intertied (looped) services	☐	☐
Condensate tanks	☐	☐	Irrigation systems	☐	☐
Cooking kettles (commercial)	☐	☐	Janitor sinks	☐	☐
Cooling towers	☐	☐	Kitchen equipment	☐	☐
Decorative ponds	☐	☐	Laboratory equipment	☐	☐
Degreasing equipment	☐	☐	Laundry machines (commercial)	☐	☐
Dental equipment/cuspidors	☐	☐	Livestock drinking tanks	☐	☐
Dialysis equipment	☐	☐	Make-up tanks	☐	☐
Dishwashers	☐	☐	Mobile carpet cleaners	☐	☐
Drinking fountains	☐	☐	Pesticide applicator trucks	☐	☐
Dye vats and tanks	☐	☐	Photo developing tanks and sinks	☐	☐
Etching tanks	☐	☐	Private hydrants	☐	☐
Fermenting tanks	☐	☐	Pumps, prime lines	☐	☐
Fertilizer injection equipment	☐	☐	Radiator flushing equipment	☐	☐
Film processor	☐	☐	Recreational vehicle dump stations	☐	☐
Fire department connections	☐	☐	Sewer connected equipment	☐	☐
Fire sprinkler systems	☐	☐	Sewer flushing	☐	☐
Fire sprinkler system with chemical addition	☐	☐	Spas	☐	☐
Floor drains	☐	☐	Steam generating equipment	☐	☐
Flushing floor drains	☐	☐	Sterilizers	☐	☐
Fume hoods	☐	☐	Stills	☐	☐
Garbage can washers	☐	☐	Sumps	☐	☐
Heat exchangers	☐	☐	Swimming pools	☐	☐
Heat pumps	☐	☐	Trap primers	☐	☐
High pressure washers	☐	☐	Used or grey water systems	☐	☐
Hose bibbs	☐	☐	X-ray equipment	☐	☐

5. Please provide the following information on any existing backflow protection that you are aware of.

Existing Cross Connection Protection (Approved Assemblies)					
Hazard/Location	Assembly Type	Make	Model	Serial #	Tested Annually? (Attach Reports)

6. Please provide the name of all products or chemicals that are mixed with water at your location.

_____

_____

Name of the person completing this form (printed): _____

Signature: _____ Date: _____

Owner's signature: _____ Date: _____

APPENDIX K

SEQUIM MUNICIPAL CODE, TITLE 13, DIVISION I

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Sequim Municipal Code

Division I. Water System

Chapter 13.04
ADMINISTRATION AND ENFORCEMENT

Sections:

13.04.010 General provisions.

13.04.010 General provisions.

A. The city shall have the authority to decide any question which may arise and which is not fully covered by any of the provisions of this title, and its decision in such cases shall be final.

B. The right is reserved by the city to amend or to add to these rules and regulations, or to change water rates as experience may show to be necessary or expedient.

C. Any person violating any of the provisions of this title shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine in any sum not exceeding $100.00, or by both fine and imprisonment.

D. Any ordinance, or parts of ordinances, repealed by any ordinance codified in this title which are re-enacted in form or substance in this title, shall not be construed as new enactments, but as continuances and amendments of such ordinances, or parts of ordinances.

E. All rights of action under existing ordinances which this title in any way supersedes or repeals, whether action has been commenced thereon or not, shall proceed without being in any manner affected by the passage of ordinances codified in this title. (Ord. 164 § 15, 1953)

The Sequim Municipal Code is current through Ordinance 2013-003, passed February 11, 2013.
Disclaimer: The City Clerk's Office has the official version of the Sequim Municipal Code. Users should contact the City Clerk's Office for ordinances passed subsequent to the ordinance cited above.

City Website: http://www.sequimwa.gov/ (http://www.sequimwa.gov/)
City Telephone: (360) 683-4139
Code Publishing Company (http://www.codepublishing.com/)
eLibrary (http://www.codepublishing.com/elibrary.html)

Chapter 13.08
DEFINITIONS

Sections:

13.08.010 Definitions.

13.08.010 Definitions.

As used in this title, the following terms shall have the meanings ascribed to them in this chapter:

A. "Availability" means the city currently has the capacity to serve the connected unit.

B. "City of Sequim" means, in context, either the city or the official governing body of the city, including the city manager and city council exercising control and operation of the municipal water or sewer system.

C. "Standby rate" means a rate charged by the city for water and for sewer availability when city water is shut off but not disconnected. A standby rate is not available for sewer-only rate class customers.

D. "Water superintendent" means the official appointed by the city to superintend the construction, maintenance and operation of the municipal water system.

E. "Water collector" means the person or persons designated by the city to collect water rates. The word "person" wherever used in this title shall be held to mean and include natural persons of either sex and also associations, copartnerships and corporations, whether acting for or by themselves, or through or by a servant, agent or employee; the singular number shall be held and construed to include the plural and the masculine pronoun to include the feminine. (Ord. 2011-007 § 1 (Exh. A); Ord. 164 § 1, 1953)

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City Telephone: (360) 683-4139
Code Publishing Company (http://www.codepublishing.com/)
eLibrary (http://www.codepublishing.com/elibrary.html)

Chapter 13.12
APPLICATION FOR SERVICE

Sections:

13.12.010 Application.

13.12.010 Application.

A. The city will require prospective customers to sign an application for water service. The application must be made in writing on a standard form at the office of the water department. The application shall set forth:

1. The signature of the applicant;
2. The owner of the premises to be served;
3. The location of the premises;
4. The address of the party paying the bills;
5. The size of the service pipe required;
6. The purpose for which the water is to be used.

B. The application is merely a written request for service and does not in itself bind the city to serve.

C. The city reserves the right to serve water upon any premises regardless of classification through either metered or flat rate service. (Ord. 164 § 2, 1953)

The Sequim Municipal Code is current through Ordinance 2013-003, passed February 11, 2013.
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Chapter 13.16
WATER SERVICE REGULATIONS

Sections:

13.16.010 Acceptance of application – Contract.
13.16.020 Additional contracts.
13.16.030 Rates, rules and regulations subject to change.
13.16.040 Notice of vacation of premises.
13.16.050 Water to be used only for stated purposes.
13.16.060 Right of city to make special contracts.

13.16.010 Acceptance of application – Contract.
In case the premises of the applicant for water service are connected as a result of his application being accepted, the application given in writing shall be considered as a contract in which the applicant agrees to abide by such rates, rules and regulations as are in effect at the time of signing the application or as may be adopted thereafter by the city, and to pay all bills promptly. (Ord. 164 § 3, 1953)

13.16.020 Additional contracts.
When a customer's requirements for water are unusual or large or necessitate special or reserve equipment or special consideration, the city may require a contract for an extended period and may also require the person or customer to furnish security satisfactory to the city to protect the city against loss and to guarantee the performance of the provisions of the contract. (Ord. 164 § 3, 1953)

13.16.030 Rates, rules and regulations subject to change.
Except for special contracts, which specify the length of time to which the contract rate shall be extended, all rates, rules and regulations are subject to change or modification by the city without notice. (Ord. 164 § 3, 1953)

13.16.040 Notice of vacation of premises.
Each customer about to vacate any premises supplied with water service by the city shall give notice of his intended removal at least two days prior thereto, specifying the date and hour service is desired to be discontinued; otherwise he will be responsible for all water supplied to the premises until the city water department shall have notice of such removal. No remission of rates will be made for a period of less than 20 days from the date such notice is given. (Ord. 164 § 3, 1953)

13.16.050 Water to be used only for stated purposes.
No person supplied water from the city mains shall be entitled to use it for any other purpose than stated in the application, or supply in any way other persons or premises. (Ord. 164 § 3, 1953)

13.16.060 Right of city to make special contracts.
The city reserves the right to make special contracts, the provisions and conditions of which may be different from or have exceptions to the regular published schedules. Such special contracts shall be in writing and signed by the proper customer and the city. (Ord. 164 § 3, 1953)

Chapter 13.20
WATER SYSTEM REGULATIONS

Sections:

13.20.010 Interference with system.
13.20.020 Tampering – Owners to install valves.
13.20.030 Use of fire hydrants.
13.20.040 Access to premises for inspection.
13.20.050 Responsibility and service preference.

13.20.010 Interference with system.
It is a violation of these rules and regulations for any person or persons to attach to or detach from any water main or service pipe or water connections through which water is supplied by the city, or to interfere in any manner with such pipe or connection without first obtaining the written consent of the water superintendent. (Ord. 164 § 5, 1953)

13.20.020 Tampering – Owners to install valves.
It is a violation of these rules and regulations for any person to use or tamper with any valve, curb stop, etc., which is the property of the city for the purpose of turning water on or off, and the city shall hold any person responsible for the cost of repairing any damage to any of the city's property caused by such usage or tampering. The city shall require every property owner to install his own valve in his own pipe for the control of service to his premises. (Ord. 164 § 5, 1953)

13.20.030 Use of fire hydrants.
It is a violation of these rules and regulations for any person or persons to cut, alter, change, remove, disconnect or connect with or in any manner interfere, meddle or tamper with any fire hydrant owned or used by the city; provided that, the provisions of this section shall not apply to the city fire department, and/or the city street department. Other departments of the city may be allowed to connect to the fire hydrants but before doing so must obtain a written permit therefor from the water superintendent and must use a spanner or regulation wrench in connection therewith. (Ord. 164 § 5, 1953)

13.20.040 Access to premises for inspection.
Employees of the city shall have access to all parts of any building or premises served by water or sewer utilities of the city for the purpose of inspecting the condition of the pipes and fixtures in the manner in which the utilities are being used. Entry onto private premises shall occur in accordance with the following: (i) by consent of the owner or occupier of the premises; or (ii) pursuant to a warrant issued by a magistrate of the courts of the state. Warrantless and/or nonconsensual entrance may be made only in exigent circumstances, as the circumstances are defined pursuant to case law of the state, which exigent circumstances shall include, but shall not be necessarily limited to, situations where there is smoke or fire coming from or upon the premises; where there is perceived hazard to persons or properties which may be eliminated with prompt and speedy inspection and/or repair of the utility services involved; and where the conduct of the owners and/or occupiers of the premises are such as to manifest an immediate danger to persons or properties or the utilities of the city, unless inspection and remedial measures are immediately taken. (Ord. 489 § 2, 1986; Ord. 164 § 5, 1953)

13.20.050 Responsibility and service preference.
A. The city shall not be liable for any loss or damage of any nature whatsoever caused by any defect in the customer's line, plumbing or equipment, and the city may, without further notice,

discontinue service to any customer when a defective condition of plumbing or equipment upon the premises of the customer results, or is likely to result, in interference with proper service or is likely to cause contamination of the water. The city does not assume the duty of inspecting the customer's line, plumbing or equipment, and shall not be responsible therefor, and will not be liable for the failure of the customer to receive service on account of defective plumbing or apparatus on the customer's premises, or for excessive consumption.

B. The city will not permit any physical connection between a private water supply and the city's distribution system or supply line.

C. The city will exercise reasonable diligence and care to furnish and deliver a continuous and sufficient supply of pure water to the customer, and to avoid any shortage or interruption of delivery of the same. The city will not be liable for high or low pressure conditions, chemical or bacteriological conditions, interruption or shortage or insufficiency of supply, or any loss or damage occasioned thereby. The use of water upon the premises of the customer is at the risk of the customer, and the responsibility of the city shall cease at the point of delivery of water. Unless otherwise specified in agreement, the point of delivery shall be the point where the city's service line attaches the customer's line.

D. The city, whenever it shall find it necessary for the purpose of making repairs or improvements to its system, shall have the right to suspend temporarily the delivery of water, but, in all such cases, a reasonable notice thereof as circumstances will permit shall be given to the customers, and the making of such repairs and improvements will be prosecuted as rapidly as may be practicable, and if practicable, at such time as will cause the least inconvenience to the customers.

E. In case of shortage of supply, the city reserves the right to give preference in the manner of furnishing service to customers, as in the judgment of its representatives shall be for the best interests of the city, from the standpoint of public convenience and necessity. (Ord. 164 § 7, 1953)

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Chapter 13.24
WATER METERS

Sections:

13.24.010 Reading of meters.

13.24.010 Reading of meters.

Water meters for the city may be read bimonthly, and the bills rendered for water consumption will be based on consumption to the nearest 100 cubic feet. (Ord. 303 § 1, 1974)

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APPENDIX L

DETAILED CIP PROJECT COST ESTIMATES

City of Sequim
Preliminary Project Cost Estimate
Booster Station Project BS-1
Upper Zone Booster Station

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 26,000	$ 26,000
2	CMU Building	1 LS	$ 80,000	$ 80,000
3	Booster Pump, 500 gpm	2 EA	$ 15,000	$ 30,000
4	Piping, Valves, and Fittings	1 LS	$ 40,000	$ 40,000
5	PRV Stations	2 EA	$ 35,000	$ 70,000
6	Electrical Systems	1 LS	$ 40,000	$ 40,000
7	Manual Transfer Switch	1 LS	$ 3,500	$ 3,500
	Subtotal			$ 289,500
	Tax rate (8.6%)			24,897
	Subtotal:			$ 314,400
	Contingency (20%)			$ 62,880
	Total Estimated Construction Cost			**$ 377,000**
	Engineering and Administrative Costs (25%):			$ 94,000
	Total Estimated Project Cost			**$ 471,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Booster Station Project BS-2
5th and McCurdy Booster Station Improvements

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 16,000	$ 16,000
2	10 HP Pitless Booster Pump	2 EA	$ 34,000	$ 68,000
3	Piping, Valves, and Fittings	1 LS	$ 15,000	$ 15,000
4	Electrical Systems	1 LS	$ 25,000	$ 25,000
5	Standby Generator w/ ATS	1 LS	$ 50,000	$ 50,000
	Subtotal			$ 174,000
	Tax rate (8.6%)			14,964
	Subtotal:			$ 189,000
	Contingency (20%)			$ 37,800
	Total Estimated Construction Cost:			**$ 227,000**
	Engineering and Administrative Costs (25%):			$ 57,000
	Total Estimated Project Cost:			**$ 284,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Booster Station Project BS-3
Simdars Road Booster Station

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 23,000	$ 23,000
2	10 HP Pitless Booster Pump	3 EA	$ 34,000	$ 102,000
3	Piping, Valves, and Fittings	1 LS	$ 30,000	$ 30,000
4	Electrical Systems	1 LS	$ 50,000	$ 50,000
5	Standby Generator w/ ATS	1 LS	$ 50,000	$ 50,000
	Subtotal			$ 255,000
	Tax rate (8.6%)			21,930
	Subtotal:			$ 276,900
	Contingency (20%)			$ 55,380
	Total Estimated Construction Cost:			**$ 332,000**
	Engineering and Administrative Costs (25%):			$ 83,000
	Total Estimated Project Cost:			**$ 415,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Storage Project ST-1
Happy Valley Reservoir

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 195,000	$ 195,000
2	Reservoir Foundation	1 LS	$ 100,000	$ 100,000
3	Steel Reservoir, 2.5 MG	1 LS	$ 1,600,000	$ 1,600,000
4	Reservoir Painting	1 LS	$ 150,000	$ 150,000
5	Site Piping	1 LS	$ 50,000	$ 50,000
6	Electrical, Telemetry, and Instrumentation	1 LS	$ 50,000	$ 50,000
	Subtotal			$ 2,145,000
	Tax rate (8.6%)			184,470
	Subtotal:			$ 2,329,500
	Contingency (20%)			$ 465,900
	Total Estimated Construction Cost			**$ 2,795,000**
	Engineering and Administrative Costs (25%):			$ 699,000
	Total Estimated Project Cost			**$ 3,494,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Storage Project ST-2
Port Williams Reservoir Study

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Project Feasibility Study	1 LS	$ 28,000	$ 28,000

Subtotal	$ 28,000
Tax rate (8.6%)	2,408
Subtotal:	$ 30,400
Contingency (20%)	$ 6,080
Total Estimated Construction Cost	**$ 36,000**
Engineering and Administrative Costs (25%):	$ 9,000
Total Estimated Project Cost	**$ 45,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Storage Project ST-3
420 Reservoir Mixing System

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 5,000	$ 5,000
2	Mixing System	1 LS	$ 35,000	$ 35,000
3	Diver Install of System	1 LS	$ 5,000	$ 5,000
4	Electrical	1 LS	$ 5,000	$ 5,000
	Subtotal			$ 50,000
	Tax rate (8.6%)			4,300
	Subtotal:			$ 54,300
	Contingency (20%)			$ 10,860
	Total Estimated Construction Cost:			**$ 65,000**
	Engineering and Administrative Costs (25%):			$ 16,000
	Total Estimated Project Cost:			**$ 81,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Storage Project ST-4
500,000 Gallon Reservoir Reuse Study

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Reuse Reservoir Study	1 LS	$ 15,000	$ 15,000

Subtotal	$ 15,000
Tax rate (8.6%)	1,290
Subtotal:	$ 16,300
Contingency (20%)	$ 3,260
Total Estimated Construction Cost	**$ 20,000**
Engineering and Administrative Costs (25%):	$ 5,000
Total Estimated Project Cost	**$ 25,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Source Project S-1
Port Williams Well No. 4

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 12,000	$ 12,000
2	Clearing and Grubbing	1 LS	$ 2,000	$ 2,000
3	Excavation Safety Systems	1 LS	$ 2,000	$ 2,000
4	Site Piping	1 LS	$ 50,000	$ 50,000
5	Foundation Gravel	10 TN	$ 45	$ 450
6	Bank Run Gravel	100 TN	$ 25	$ 2,500
7	Crushed Surfacing	100 TN	$ 45	$ 4,500
8	Well No. 4 Pump	1 LS	$ 60,000	$ 60,000
9	Well Drilling	1 LS	$ 165,000	$ 165,000
10	Electrical and Telemetry	1 LS	$ 150,000	$ 150,000
	Subtotal			$ 448,450
	Tax rate (8.6%)			38,567
	Subtotal:			$ 487,000
	Contingency (20%)			$ 97,400
	Total Estimated Construction Cost			**$ 584,000**
	Engineering and Administrative Costs (25%):			$ 146,000
	Total Estimated Project Cost			**$ 730,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Source Project S-2
New Well

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 12,000	$ 12,000
2	Clearing and Grubbing	1 LS	$ 2,000	$ 2,000
3	Excavation Safety Systems	1 LS	$ 2,000	$ 2,000
4	Site Piping	1 LS	$ 50,000	$ 50,000
5	Foundation Gravel	10 TN	$ 45	$ 450
6	Bank Run Gravel	100 TN	$ 25	$ 2,500
7	Crushed Surfacing	100 TN	$ 45	$ 4,500
8	Well Pump	1 LS	$ 60,000	$ 60,000
9	Well Drilling	1 LS	$ 165,000	$ 165,000
10	Electrical and Telemetry	1 LS	$ 150,000	$ 150,000
	Subtotal			$ 448,450
	Tax rate (8.6%)			38,567
	Subtotal:			$ 487,000
	Contingency (20%)			$ 97,400
	Total Estimated Construction Cost			**$ 584,000**
	Engineering and Administrative Costs (25%):			$ 146,000
	Total Estimated Project Cost			**$ 730,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Storage Project S-3
Additional Source Supply Study

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Source Supply Study	1 LS	$ 31,000	$ 31,000

Subtotal	$ 31,000
Tax rate (8.6%)	2,666
Subtotal:	$ 33,700
Contingency (20%)	$ 6,740
Total Estimated Construction Cost	**$ 40,000**
Engineering and Administrative Costs (25%):	$ 10,000
Total Estimated Project Cost	**$ 50,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Source Project S-4
Silberhorn Well Study and Redevelopment

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Silberhorn Well Video Inspection	1 LS	$ 10,000	$ 10,000
2	Well Redevelopment Study	1 LS	$ 20,000	$ 20,000
3	Well Modifications	1 LS	$ 62,000	$ 62,000

Subtotal	$ 92,000
Tax rate (8.6%)	7,912
Subtotal:	$ 99,900
Contingency (20%)	$ 19,980
Total Estimated Construction Cost	**$ 120,000**
Engineering and Administrative Costs (25%):	$ 30,000
Total Estimated Project Cost	**$ 150,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Booster Station Project S-5
Redevelopment of Silberhorn Wells No. 2 and No. 3 (Well Replacement)

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 41,000	$ 41,000
2	Drill New Well (Approx 250 ft depth)	2 EA	$ 67,000	$ 134,000
3	Well Pump (400 gpm)	2 EA	$ 50,000	$ 100,000
4	Piping, Valves, and Fittings	1 LS	$ 25,000	$ 25,000
5	Well Head Building	2 EA	$ 50,000	$ 100,000
6	Electrical System Improvements	1 LS	$ 50,000	$ 50,000
	Subtotal			$ 450,000
	Tax rate (8.6%)			38,700
	Subtotal:			$ 488,700
	Contingency (20%)			$ 97,740
	Total Estimated Construction Cost:			**$ 586,000**
	Engineering and Administrative Costs (25%):			$ 147,000
	Total Estimated Project Cost:			**$ 733,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Booster Station Project S-6
Infiltration Gallery Improvements

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	1 LS	$ 37,000	$ 37,000
2	CMU Building	1 LS	$ 80,000	$ 80,000
3	Booster Pump, 350 gpm	3 EA	$ 25,000	$ 75,000
4	Piping, Valves, and Fittings	1 LS	$ 40,000	$ 40,000
5	Redevelopment of Collectors	1 LS	$ 75,000	$ 75,000
6	Electrical Systems	1 LS	$ 50,000	$ 50,000
7	Standby Generator and ATS	1 LS	$ 50,000	$ 50,000
	Subtotal			$ 407,000
	Tax rate (8.6%)			35,002
	Subtotal:			$ 442,000
	Contingency (20%)			$ 88,400
	Total Estimated Construction Cost			**$ 530,000**
	Engineering and Administrative Costs (25%):			$ 133,000
	Total Estimated Project Cost			**$ 663,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-1
Hammond Street Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 49,000	$ 49,000
2	12-inch PVC Water Pipe, Including Fittings	2,775 LF	$ 90	$ 249,750
3	Locate Existing Utilities	LUMP SUM	$ 9,000	$ 9,000
4	Erosion Control	LUMP SUM	$ 9,000	$ 9,000
5	Additional Pipe Fittings	1,600 LB	$ 4	$ 6,400
6	Trench Safety Systems	LUMP SUM	$ 5,600	$ 5,600
7	12-inch Gate Valves	4 EA	$ 4,500	$ 18,000
8	Fire Hydrants	8 EA	$ 4,500	$ 36,000
9	Gravel Backfill	1,820 CY	$ 20	$ 36,400
10	Foundation Gravel	210 TN	$ 30	$ 6,300
11	HMA Cl. B PG 58-22	300 TN	$ 150	$ 45,000
12	Sawcutting	6,550 LF	$ 3	$ 19,650
13	Crushed Surfacing, Top Course	200 TN	$ 35	$ 7,000
14	Cold Mix Asphalt	150 TN	$ 110	$ 16,500
15	Connections to Existing System	3 EA	$ 2,500	$ 7,500
16	3/4" Service Connections, Complete	8 EA	$ 1,200	$ 9,600
17	Traffic Control	48 HRS	$ 95	$ 4,560
	Subtotal			$ 535,260
	Tax rate (8.6%)			46,032
	Subtotal:			$ 581,300
	Contingency (20%)			$ 116,260
	Total Estimated Construction Cost:			**$ 698,000**
	Engineering and Administrative Costs (25%):			$ 175,000
	Total Estimated Project Cost:			**$ 873,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-2
Brown Road Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 48,000	$ 48,000
2	12-inch PVC Water Pipe, Including Fittings	2,600 LF	$ 90	$ 234,000
3	Locate Existing Utilities	LUMP SUM	$ 9,000	$ 9,000
4	Erosion Control	LUMP SUM	$ 9,000	$ 9,000
5	Additional Pipe Fittings	1,300 LB	$ 4	$ 5,200
6	Trench Safety Systems	LUMP SUM	$ 5,200	$ 5,200
7	12-inch Gate Valves	18 EA	$ 4,500	$ 81,000
8	Fire Hydrants	5 EA	$ 4,500	$ 22,500
9	Gravel Backfill	1,480 CY	$ 20	$ 29,600
10	Foundation Gravel	170 TN	$ 30	$ 5,100
11	HMA Cl. B PG 58-22	240 TN	$ 150	$ 36,000
12	Sawcutting	5,200 LF	$ 3	$ 15,600
13	Crushed Surfacing, Top Course	160 TN	$ 35	$ 5,600
14	Cold Mix Asphalt	120 TN	$ 110	$ 13,200
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	8 HRS	$ 95	$ 760
	Subtotal			$ 524,760
	Tax rate (8.6%)			45,129
	Subtotal:			$ 569,900
	Contingency (20%)			$ 113,980
	Total Estimated Construction Cost:			**$ 684,000**
	Engineering and Administrative Costs (25%):			$ 171,000
	Total Estimated Project Cost:			**$ 855,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-3
5th Avenue Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 10,000	$ 10,000
2	8-inch PVC Water Pipe, Including Fittings	650 LF	$ 75	$ 48,750
3	Locate Existing Utilities	LUMP SUM	$ 2,000	$ 2,000
4	Erosion Control	LUMP SUM	$ 2,000	$ 2,000
5	Additional Pipe Fittings	300 LB	$ 4	$ 1,200
6	Trench Safety Systems	LUMP SUM	$ 1,300	$ 1,300
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Fire Hydrants	2 EA	$ 4,500	$ 9,000
9	Gravel Backfill	320 CY	$ 20	$ 6,400
10	Foundation Gravel	40 TN	$ 30	$ 1,200
11	HMA Cl. B PG 58-22	50 TN	$ 150	$ 7,500
12	Sawcutting	1,300 LF	$ 3	$ 3,900
13	Crushed Surfacing, Top Course	40 TN	$ 35	$ 1,400
14	Cold Mix Asphalt	30 TN	$ 110	$ 3,300
15	Connections to Existing System	3 EA	$ 2,500	$ 7,500
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	8 HRS	$ 95	$ 760
	Subtotal			$ 109,810
	Tax rate (8.6%)			9,444
	Subtotal:			$ 119,300
	Contingency (20%)			$ 23,860
	Total Estimated Construction Cost:			**$ 143,000**
	Engineering and Administrative Costs (25%):			$ 36,000
	Total Estimated Project Cost:			**$ 179,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-4
Reservoir Road and 7th Avenue Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 30,000	$ 30,000
2	12-inch PVC Water Pipe, Including Fittings	1,400 LF	$ 90	$ 126,000
3	Locate Existing Utilities	LUMP SUM	$ 6,000	$ 6,000
4	Erosion Control	LUMP SUM	$ 6,000	$ 6,000
5	Additional Pipe Fittings	700 LB	$ 4	$ 2,800
6	Trench Safety Systems	LUMP SUM	$ 2,800	$ 2,800
7	12-inch Gate Valves	5 EA	$ 4,500	$ 22,500
8	PRV Station	1 EA	$ 50,000	$ 50,000
9	Fire Hydrants	2 EA	$ 4,500	$ 9,000
10	Gravel Backfill	800 CY	$ 20	$ 16,000
11	Foundation Gravel	90 TN	$ 30	$ 2,700
12	HMA Cl. B PG 58-22	130 TN	$ 150	$ 19,500
13	Sawcutting	2,800 LF	$ 3	$ 8,400
14	Crushed Surfacing, Top Course	90 TN	$ 35	$ 3,150
15	Cold Mix Asphalt	60 TN	$ 110	$ 6,600
16	Connections to Existing System	2 EA	$ 2,500	$ 5,000
17	3/4" Service Connections, Complete	5 EA	$ 1,200	$ 6,000
18	Traffic Control	52 HRS	$ 95	$ 4,940
	Subtotal			$ 327,390
	Tax rate (8.6%)			28,156
	Subtotal:			$ 355,500
	Contingency (20%)			$ 71,100
	Total Estimated Construction Cost:			**$ 427,000**
	Engineering and Administrative Costs (25%):			$ 107,000
	Total Estimated Project Cost:			**$ 534,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-5
Norman Street and Eunice Street

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 24,000	$ 24,000
2	8-inch PVC Water Pipe, Including Fittings	1,650 LF	$ 75	$ 123,750
3	Locate Existing Utilities	LUMP SUM	$ 5,000	$ 5,000
4	Erosion Control	LUMP SUM	$ 5,000	$ 5,000
5	Additional Pipe Fittings	700 LB	$ 4	$ 2,800
6	Trench Safety Systems	LUMP SUM	$ 3,300	$ 3,300
7	8-inch Gate Valves	5 EA	$ 1,800	$ 9,000
8	Fire Hydrants	3 EA	$ 4,500	$ 13,500
9	Gravel Backfill	810 CY	$ 20	$ 16,200
10	Foundation Gravel	90 TN	$ 30	$ 2,700
11	HMA Cl. B PG 58-22	130 TN	$ 150	$ 19,500
12	Sawcutting	3,300 LF	$ 3	$ 9,900
13	Crushed Surfacing, Top Course	100 TN	$ 35	$ 3,500
14	Cold Mix Asphalt	80 TN	$ 110	$ 8,800
15	Connections to Existing System	3 EA	$ 2,500	$ 7,500
16	3/4" Service Connections, Complete	10 EA	$ 1,200	$ 12,000
17	Traffic Control	8 HRS	$ 95	$ 760
	Subtotal			$ 267,210
	Tax rate (8.6%)			22,980
	Subtotal:			$ 290,200
	Contingency (20%)			$ 58,040
	Total Estimated Construction Cost:			**$ 348,000**
	Engineering and Administrative Costs (25%):			$ 87,000
	Total Estimated Project Cost:			**$ 435,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-6
7th Avenue Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 46,000	$ 46,000
2	12-inch PVC Water Pipe, Including Fittings	2,700 LF	$ 90	$ 243,000
3	Locate Existing Utilities	LUMP SUM	$ 9,000	$ 9,000
4	Erosion Control	LUMP SUM	$ 9,000	$ 9,000
5	Additional Pipe Fittings	1,400 LB	$ 4	$ 5,600
6	Trench Safety Systems	LUMP SUM	$ 5,400	$ 5,400
7	12-inch Gate Valves	5 EA	$ 4,500	$ 22,500
8	Fire Hydrants	5 EA	$ 4,500	$ 22,500
9	Gravel Backfill	1,540 CY	$ 20	$ 30,800
10	Foundation Gravel	170 TN	$ 30	$ 5,100
11	HMA Cl. B PG 58-22	250 TN	$ 150	$ 37,500
12	Sawcutting	5,400 LF	$ 3	$ 16,200
13	Crushed Surfacing, Top Course	170 TN	$ 35	$ 5,950
14	Cold Mix Asphalt	120 TN	$ 110	$ 13,200
15	Connections to Existing System	3 EA	$ 2,500	$ 7,500
16	3/4" Service Connections, Complete	10 EA	$ 1,200	$ 12,000
17	Traffic Control	108 HRS	$ 95	$ 10,260
	Subtotal			$ 501,510
	Tax rate (8.6%)			43,130
	Subtotal:			$ 544,600
	Contingency (20%)			$ 108,920
	Total Estimated Construction Cost:			**$ 654,000**
	Engineering and Administrative Costs (25%):			$ 164,000
	Total Estimated Project Cost:			**$ 818,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-7
Happy Valley Road

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 64,000	$ 64,000
2	8-inch PVC Water Pipe, Including Fittings	5,000 LF	$ 75	$ 375,000
3	Locate Existing Utilities	LUMP SUM	$ 12,000	$ 12,000
4	Erosion Control	LUMP SUM	$ 12,000	$ 12,000
5	Additional Pipe Fittings	2,300 LB	$ 4	$ 9,200
6	Trench Safety Systems	LUMP SUM	$ 10,000	$ 10,000
7	8-inch Gate Valves	5 EA	$ 1,800	$ 9,000
8	Fire Hydrants	3 EA	$ 4,500	$ 13,500
9	Gravel Backfill	2,440 CY	$ 20	$ 48,800
10	Foundation Gravel	280 TN	$ 30	$ 8,400
11	HMA Cl. B PG 58-22	400 TN	$ 150	$ 60,000
12	Sawcutting	10,000 LF	$ 3	$ 30,000
13	Crushed Surfacing, Top Course	310 TN	$ 35	$ 10,850
14	Cold Mix Asphalt	230 TN	$ 110	$ 25,300
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	100 HRS	$ 95	$ 9,500
	Subtotal			$ 702,550
	Tax rate (8.6%)			60,419
	Subtotal:			$ 763,000
	Contingency (20%)			$ 152,600
	Total Estimated Construction Cost:			**$ 916,000**
	Engineering and Administrative Costs (25%):			$ 229,000
	Total Estimated Project Cost:			**$ 1,145,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-8
Washington Street Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 42,000	$ 42,000
2	12-inch PVC Water Pipe, Including Fittings	2,500 LF	$ 90	$ 225,000
3	Locate Existing Utilities	LUMP SUM	$ 8,000	$ 8,000
4	Erosion Control	LUMP SUM	$ 8,000	$ 8,000
5	Additional Pipe Fittings	1,300 LB	$ 4	$ 5,200
6	Trench Safety Systems	LUMP SUM	$ 5,000	$ 5,000
7	12-inch Gate Valves	5 EA	$ 4,500	$ 22,500
8	PRV Station	1 EA	$ 35,000	$ 35,000
9	Gravel Backfill	1,430 CY	$ 20	$ 28,600
10	Foundation Gravel	160 TN	$ 30	$ 4,800
11	HMA Cl. B PG 58-22	230 TN	$ 150	$ 34,500
12	Sawcutting	5,000 LF	$ 3	$ 15,000
13	Crushed Surfacing, Top Course	160 TN	$ 35	$ 5,600
14	Cold Mix Asphalt	110 TN	$ 110	$ 12,100
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	Traffic Control	100 HRS	$ 95	$ 9,500
	Subtotal			$ 465,800
	Tax rate (8.6%)			40,059
	Subtotal:			$ 505,900
	Contingency (20%)			$ 101,180
	Total Estimated Construction Cost:			**$ 607,000**
	Engineering and Administrative Costs (25%):			$ 152,000
	Total Estimated Project Cost:			**$ 759,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-9
West Sequim Bay Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 57,000	$ 57,000
2	12-inch PVC Water Pipe, Including Fittings	3,500 LF	$ 90	$ 315,000
3	Locate Existing Utilities	LUMP SUM	$ 11,000	$ 11,000
4	Erosion Control	LUMP SUM	$ 11,000	$ 11,000
5	Additional Pipe Fittings	1,800 LB	$ 4	$ 7,200
6	Trench Safety Systems	LUMP SUM	$ 7,000	$ 7,000
7	12-inch Gate Valves	4 EA	$ 4,500	$ 18,000
8	Fire Hydrants	8 EA	$ 4,500	$ 36,000
9	Gravel Backfill	2,000 CY	$ 20	$ 40,000
10	Foundation Gravel	220 TN	$ 30	$ 6,600
11	HMA Cl. B PG 58-22	330 TN	$ 150	$ 49,500
12	Sawcutting	7,000 LF	$ 3	$ 21,000
13	Crushed Surfacing, Top Course	220 TN	$ 35	$ 7,700
14	Cold Mix Asphalt	160 TN	$ 110	$ 17,600
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	Traffic Control	140 HRS	$ 95	$ 13,300
	Subtotal			$ 622,900
	Tax rate (8.6%)			53,569
	Subtotal:			$ 676,500
	Contingency (20%)			$ 135,300
	Total Estimated Construction Cost:			**$ 812,000**
	Engineering and Administrative Costs (25%):			$ 203,000
	Total Estimated Project Cost:			**$ 1,015,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-10
Washington Harbor Loop Water Main

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 64,000	$ 64,000
2	12-inch PVC Water Pipe, Including Fittings	4,000 LF	$ 90	$ 360,000
3	Locate Existing Utilities	LUMP SUM	$ 12,000	$ 12,000
4	Erosion Control	LUMP SUM	$ 12,000	$ 12,000
5	Additional Pipe Fittings	2,000 LB	$ 4	$ 8,000
6	Trench Safety Systems	LUMP SUM	$ 8,000	$ 8,000
7	12-inch Gate Valves	4 EA	$ 4,500	$ 18,000
8	Fire Hydrants	8 EA	$ 4,500	$ 36,000
9	Gravel Backfill	2,280 CY	$ 20	$ 45,600
10	Foundation Gravel	260 TN	$ 30	$ 7,800
11	HMA Cl. B PG 58-22	370 TN	$ 150	$ 55,500
12	Sawcutting	8,000 LF	$ 3	$ 24,000
13	Crushed Surfacing, Top Course	250 TN	$ 35	$ 8,750
14	Cold Mix Asphalt	180 TN	$ 110	$ 19,800
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	Traffic Control	160 HRS	$ 95	$ 15,200
	Subtotal			$ 699,650
	Tax rate (8.6%)			60,170
	Subtotal:			$ 759,800
	Contingency (20%)			$ 151,960
	Total Estimated Construction Cost:			**$ 912,000**
	Engineering and Administrative Costs (25%):			$ 228,000
	Total Estimated Project Cost:			**$ 1,140,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-11
Fir St from N 5th Ave to N Sequim Ave

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 51,000	$ 51,000
2	10-inch PVC Water Pipe, Including Fittings	2,700 LF	$ 80	$ 216,000
3	Locate Existing Utilities	LUMP SUM	$ 10,000	$ 10,000
4	Erosion Control	LUMP SUM	$ 10,000	$ 10,000
5	Additional Pipe Fittings	1,300 LB	$ 4	$ 5,200
6	Trench Safety Systems	LUMP SUM	$ 5,400	$ 5,400
7	10-inch Gate Valves	10 EA	$ 3,000	$ 30,000
8	Fire Hydrants	10 EA	$ 4,500	$ 45,000
9	Gravel Backfill	1,540 CY	$ 20	$ 30,800
10	Foundation Gravel	170 TN	$ 30	$ 5,100
11	HMA Cl. B PG 58-22	250 TN	$ 150	$ 37,500
12	Sawcutting	5,400 LF	$ 3	$ 16,200
13	Crushed Surfacing, Top Course	170 TN	$ 35	$ 5,950
14	Cold Mix Asphalt	120 TN	$ 110	$ 13,200
15	Connections to Existing System	9 EA	$ 2,500	$ 22,500
16	3/4" Service Connections, Complete	36 EA	$ 1,200	$ 43,200
17	Traffic Control	128 HRS	$ 95	$ 12,160
	Subtotal			$ 559,210
	Tax rate (8.6%)			48,092
	Subtotal:			$ 607,300
	Contingency (20%)			$ 121,460
	Total Estimated Construction Cost:			**$ 729,000**
	Engineering and Administrative Costs (25%):			$ 182,000
	Total Estimated Project Cost:			**$ 911,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-12
Fir St from N Sequim Ave to N Brown Rd

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 41,000	$ 41,000
2	10-inch PVC Water Pipe, Including Fittings	2,650 LF	$ 80	$ 212,000
3	Locate Existing Utilities	LUMP SUM	$ 8,000	$ 8,000
4	Erosion Control	LUMP SUM	$ 8,000	$ 8,000
5	Additional Pipe Fittings	1,200 LB	$ 4	$ 4,800
6	Trench Safety Systems	LUMP SUM	$ 5,300	$ 5,300
7	10-inch Gate Valves	6 EA	$ 3,000	$ 18,000
8	Fire Hydrants	3 EA	$ 4,500	$ 13,500
9	Gravel Backfill	1,510 CY	$ 20	$ 30,200
10	Foundation Gravel	170 TN	$ 30	$ 5,100
11	HMA Cl. B PG 58-22	250 TN	$ 150	$ 37,500
12	Sawcutting	5,300 LF	$ 3	$ 15,900
13	Crushed Surfacing, Top Course	170 TN	$ 35	$ 5,950
14	Cold Mix Asphalt	120 TN	$ 110	$ 13,200
15	Connections to Existing System	3 EA	$ 2,500	$ 7,500
16	3/4" Service Connections, Complete	10 EA	$ 1,200	$ 12,000
17	Traffic Control	96 HRS	$ 95	$ 9,120
	Subtotal			$ 447,070
	Tax rate (8.6%)			38,448
	Subtotal:			$ 485,500
	Contingency (20%)			$ 97,100
	Total Estimated Construction Cost:			**$ 583,000**
	Engineering and Administrative Costs (25%):			$ 146,000
	Total Estimated Project Cost:			**$ 729,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-13
Brown Rd from E Fir St to E Washington ST

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 30,000	$ 30,000
2	12-inch PVC Water Pipe, Including Fittings	1,800 LF	$ 90	$ 162,000
3	Locate Existing Utilities	LUMP SUM	$ 6,000	$ 6,000
4	Erosion Control	LUMP SUM	$ 6,000	$ 6,000
5	Additional Pipe Fittings	900 LB	$ 4	$ 3,600
6	Trench Safety Systems	LUMP SUM	$ 3,600	$ 3,600
7	12-inch Gate Valves	2 EA	$ 4,500	$ 9,000
8	Fire Hydrants	4 EA	$ 4,500	$ 18,000
9	Gravel Backfill	1,030 CY	$ 20	$ 20,600
10	Foundation Gravel	120 TN	$ 30	$ 3,600
11	HMA Cl. B PG 58-22	170 TN	$ 150	$ 25,500
12	Sawcutting	3,600 LF	$ 3	$ 10,800
13	Crushed Surfacing, Top Course	110 TN	$ 35	$ 3,850
14	Cold Mix Asphalt	80 TN	$ 110	$ 8,800
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	92 HRS	$ 95	$ 8,740
	Subtotal			$ 325,090
	Tax rate (8.6%)			27,958
	Subtotal:			$ 353,000
	Contingency (20%)			$ 70,600
	Total Estimated Construction Cost			**$ 424,000**
	Engineering and Administrative Costs (25%):			$ 106,000
	Total Estimated Project Cost			**$ 530,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-14
S Sunnyside Ave from E Maple ST to E Prairie ST

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 6,000	$ 6,000
2	8-inch PVC Water Pipe, Including Fittings	350 LF	$ 75	$ 26,250
3	Locate Existing Utilities	LUMP SUM	$ 1,000	$ 1,000
4	Erosion Control	LUMP SUM	$ 1,000	$ 1,000
5	Additional Pipe Fittings	200 LB	$ 4	$ 800
6	Trench Safety Systems	LUMP SUM	$ 700	$ 700
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Fire Hydrants	1 EA	$ 4,500	$ 4,500
9	Gravel Backfill	170 CY	$ 20	$ 3,400
10	Foundation Gravel	20 TN	$ 30	$ 600
11	HMA Cl. B PG 58-22	30 TN	$ 150	$ 4,500
12	Sawcutting	700 LF	$ 3	$ 2,100
13	Crushed Surfacing, Top Course	20 TN	$ 35	$ 700
14	Cold Mix Asphalt	20 TN	$ 110	$ 2,200
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	36 HRS	$ 95	$ 3,420
	Subtotal			$ 65,770
	Tax rate (8.6%)			5,656
	Subtotal:			$ 71,400
	Contingency (20%)			$ 14,280
	Total Estimated Construction Cost:			**$ 86,000**
	Engineering and Administrative Costs (25%):			$ 22,000
	Total Estimated Project Cost:			**$ 108,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-15
E Etta St from S Sequim Ave to S Sunnyside Ave

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 13,000	$ 13,000
2	8-inch PVC Water Pipe, Including Fittings	550 LF	$ 75	$ 41,250
3	Locate Existing Utilities	LUMP SUM	$ 2,000	$ 2,000
4	Erosion Control	LUMP SUM	$ 2,000	$ 2,000
5	Additional Pipe Fittings	200 LB	$ 4	$ 800
6	Trench Safety Systems	LUMP SUM	$ 1,100	$ 1,100
7	8-inch Gate Valves	4 EA	$ 1,800	$ 7,200
8	Fire Hydrants	2 EA	$ 4,500	$ 9,000
9	Gravel Backfill	270 CY	$ 20	$ 5,400
10	Foundation Gravel	30 TN	$ 30	$ 900
11	HMA Cl. B PG 58-22	40 TN	$ 150	$ 6,000
12	Sawcutting	1,100 LF	$ 3	$ 3,300
13	Crushed Surfacing, Top Course	30 TN	$ 35	$ 1,050
14	Cold Mix Asphalt	30 TN	$ 110	$ 3,300
15	Connections to Existing System	8 EA	$ 2,500	$ 20,000
16	3/4" Service Connections, Complete	14 EA	$ 1,200	$ 16,800
17	Traffic Control	55 HRS	$ 95	$ 5,225
	Subtotal			$ 138,325
	Tax rate (8.6%)			11,896
	Subtotal:			$ 150,200
	Contingency (20%)			$ 30,040
	Total Estimated Construction Cost:			**$ 180,000**
	Engineering and Administrative Costs (25%):			$ 45,000
	Total Estimated Project Cost:			**$ 225,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-16
Marlo Dr West from the End of the Existing Main to River Rd

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 14,000	$ 14,000
2	8-inch PVC Water Pipe, Including Fittings	900 LF	$ 75	$ 67,500
3	Locate Existing Utilities	LUMP SUM	$ 3,000	$ 3,000
4	Erosion Control	LUMP SUM	$ 3,000	$ 3,000
5	Additional Pipe Fittings	400 LB	$ 4	$ 1,600
6	Trench Safety Systems	LUMP SUM	$ 1,800	$ 1,800
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Fire Hydrants	2 EA	$ 4,500	$ 9,000
9	Gravel Backfill	440 CY	$ 20	$ 8,800
10	Foundation Gravel	50 TN	$ 30	$ 1,500
11	HMA Cl. B PG 58-22	70 TN	$ 150	$ 10,500
12	Sawcutting	1,800 LF	$ 3	$ 5,400
13	Crushed Surfacing, Top Course	60 TN	$ 35	$ 2,100
14	Cold Mix Asphalt	40 TN	$ 110	$ 4,400
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	4 EA	$ 1,200	$ 4,800
17	Traffic Control	56 HRS	$ 95	$ 5,320
	Subtotal			$ 151,320
	Tax rate (8.6%)			13,014
	Subtotal:			$ 164,300
	Contingency (20%)			$ 32,860
	Total Estimated Construction Cost:			**$ 197,000**
	Engineering and Administrative Costs (25%):			$ 49,000
	Total Estimated Project Cost:			**$ 246,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-17
West Sequim Bay Road from Battelle to Connect with Marina Water System

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 38,000	$ 38,000
2	12-inch PVC Water Pipe, Including Fittings	2,000 LF	$ 90	$ 180,000
3	8-inch PVC Water Pipe, Including Fittings	500 LF	$ 75	$ 37,500
4	Locate Existing Utilities	LUMP SUM	$ 7,000	$ 7,000
5	Erosion Control	LUMP SUM	$ 7,000	$ 7,000
6	Additional Pipe Fittings	1,200 LB	$ 3	$ 3,600
7	Trench Safety Systems	LUMP SUM	$ 4,000	$ 4,000
8	12-inch Gate Valves	4 EA	$ 1,400	$ 5,600
9	8-inch Gate Valves	4 EA	$ 1,000	$ 4,000
10	Fire Hydrants	4 EA	$ 3,000	$ 12,000
11	Gravel Backfill	1,380 CY	$ 20	$ 27,600
12	Foundation Gravel	160 TN	$ 30	$ 4,800
13	HMA Cl. B PG 58-22	230 TN	$ 120	$ 27,600
14	Sawcutting	5,000 LF	$ 3	$ 15,000
15	Crushed Surfacing, Top Course	150 TN	$ 20	$ 3,000
16	Cold Mix Asphalt	110 TN	$ 80	$ 8,800
17	Connections to Existing System	4 EA	$ 2,000	$ 8,000
18	3/4" Service Connections, Complete	21 EA	$ 1,000	$ 21,000
19	Traffic Control	80 HRS	$ 35	$ 2,800
	Subtotal			$ 417,300
	Tax rate (8.4%)			35,053
	Subtotal:			$ 452,400
	Contingency (25%)			$ 113,100
	Total Estimated Construction Cost:			**$ 566,000**
	Engineering and Administrative Costs (25%):			$ 142,000
	Total Estimated Project Cost:			**$ 708,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-18
Service of Emerald Highlands

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 11,000	$ 11,000
2	8-inch PVC Water Pipe, Including Fittings	800 LF	$ 75	$ 60,000
3	Locate Existing Utilities	LUMP SUM	$ 2,000	$ 2,000
4	Erosion Control	LUMP SUM	$ 2,000	$ 2,000
5	Additional Pipe Fittings	400 LB	$ 4	$ 1,600
6	Trench Safety Systems	LUMP SUM	$ 1,600	$ 1,600
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Gravel Backfill	390 CY	$ 20	$ 7,800
9	Foundation Gravel	40 TN	$ 30	$ 1,200
10	HMA Cl. B PG 58-22	60 TN	$ 150	$ 9,000
11	Sawcutting	1,600 LF	$ 3	$ 4,800
12	Crushed Surfacing, Top Course	50 TN	$ 35	$ 1,750
13	Cold Mix Asphalt	40 TN	$ 110	$ 4,400
14	Connections to Existing System	2 EA	$ 2,500	$ 5,000
15	Traffic Control	34 HRS	$ 95	$ 3,230
	Subtotal			$ 118,980
	Tax rate (8.6%)			10,232
	Subtotal:			$ 129,200
	Contingency (20%)			$ 25,840
	Total Estimated Construction Cost:			**$ 155,000**
	Engineering and Administrative Costs (25%):			$ 39,000
	Total Estimated Project Cost:			**$ 194,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-21
S Lee Chatsfield to Espeth Way

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 8,000	$ 8,000
2	8-inch PVC Water Pipe, Including Fittings	500 LF	$ 75	$ 37,500
3	Locate Existing Utilities	LUMP SUM	$ 2,000	$ 2,000
4	Erosion Control	LUMP SUM	$ 2,000	$ 2,000
5	Additional Pipe Fittings	200 LB	$ 4	$ 800
6	Trench Safety Systems	LUMP SUM	$ 1,000	$ 1,000
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Fire Hydrants	1 EA	$ 4,500	$ 4,500
9	Gravel Backfill	240 CY	$ 20	$ 4,800
10	Foundation Gravel	30 TN	$ 30	$ 900
11	HMA Cl. B PG 58-22	40 TN	$ 150	$ 6,000
12	Sawcutting	1,000 LF	$ 3	$ 3,000
13	Crushed Surfacing, Top Course	30 TN	$ 35	$ 1,050
14	Cold Mix Asphalt	20 TN	$ 110	$ 2,200
15	Connections to Existing System	4 EA	$ 2,500	$ 10,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	40 HRS	$ 95	$ 3,800
	Subtotal			$ 91,150
	Tax rate (8.6%)			7,839
	Subtotal:			$ 99,000
	Contingency (20%)			$ 19,800
	Total Estimated Construction Cost:			**$ 119,000**
	Engineering and Administrative Costs (25%):			$ 30,000
	Total Estimated Project Cost:			**$ 149,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-22
Washington Harbour Road to Washington Harbor Loop

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 17,000	$ 17,000
2	12-inch PVC Water Pipe, Including Fittings	1,000 LF	$ 90	$ 90,000
3	Locate Existing Utilities	LUMP SUM	$ 3,000	$ 3,000
4	Erosion Control	LUMP SUM	$ 3,000	$ 3,000
5	Additional Pipe Fittings	500 LB	$ 4	$ 2,000
6	Trench Safety Systems	LUMP SUM	$ 2,000	$ 2,000
7	12-inch Gate Valves	2 EA	$ 4,500	$ 9,000
8	Fire Hydrants	2 EA	$ 4,500	$ 9,000
9	Gravel Backfill	570 CY	$ 20	$ 11,400
10	Foundation Gravel	60 TN	$ 30	$ 1,800
11	HMA Cl. B PG 58-22	90 TN	$ 150	$ 13,500
12	Sawcutting	2,000 LF	$ 3	$ 6,000
13	Crushed Surfacing, Top Course	60 TN	$ 35	$ 2,100
14	Cold Mix Asphalt	50 TN	$ 110	$ 5,500
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	60 HRS	$ 95	$ 5,700
	Subtotal			$ 186,000
	Tax rate (8.6%)			15,996
	Subtotal:			$ 202,000
	Contingency (20%)			$ 40,400
	Total Estimated Construction Cost			**$ 242,000**
	Engineering and Administrative Costs (25%):			$ 61,000
	Total Estimated Project Cost			**$ 303,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-24
E Maple St from S Sequim Ave to S Sunnyside Ave

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 9,000	$ 9,000
2	8-inch PVC Water Pipe, Including Fittings	500 LF	$ 75	$ 37,500
3	Locate Existing Utilities	LUMP SUM	$ 2,000	$ 2,000
4	Erosion Control	LUMP SUM	$ 2,000	$ 2,000
5	Additional Pipe Fittings	200 LB	$ 4	$ 800
6	Trench Safety Systems	LUMP SUM	$ 1,000	$ 1,000
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Fire Hydrants	1 EA	$ 4,500	$ 4,500
9	Gravel Backfill	240 CY	$ 20	$ 4,800
10	Foundation Gravel	30 TN	$ 30	$ 900
11	HMA Cl. B PG 58-22	40 TN	$ 150	$ 6,000
12	Sawcutting	1,000 LF	$ 3	$ 3,000
13	Crushed Surfacing, Top Course	30 TN	$ 35	$ 1,050
14	Cold Mix Asphalt	20 TN	$ 110	$ 2,200
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	8 EA	$ 1,200	$ 9,600
17	Traffic Control	40 HRS	$ 95	$ 3,800
	Subtotal			$ 96,750
	Tax rate (8.6%)			8,321
	Subtotal:			$ 105,100
	Contingency (20%)			$ 21,020
	Total Estimated Construction Cost:			**$ 126,000**
	Engineering and Administrative Costs (25%):			$ 32,000
	Total Estimated Project Cost:			**$ 158,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-25
Connection across South 3rd Ave at Sycamore St

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 5,000	$ 5,000
2	8-inch PVC Water Pipe, Including Fittings	50 LF	$ 75	$ 3,750
3	Locate Existing Utilities	LUMP SUM	$ 1,500	$ 1,500
4	Erosion Control	LUMP SUM	$ 1,000	$ 1,000
5	Additional Pipe Fittings	500 LB	$ 4	$ 2,000
6	Trench Safety Systems	LUMP SUM	$ 100	$ 100
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Fire Hydrants	0 EA	$ 4,500	$ -
9	Gravel Backfill	20 CY	$ 20	$ 400
10	Foundation Gravel	10 TN	$ 30	$ 300
11	HMA Cl. B PG 58-22	10 TN	$ 150	$ 1,500
12	Sawcutting	100 LF	$ 3	$ 300
13	Crushed Surfacing, Top Course	10 TN	$ 35	$ 350
14	Cold Mix Asphalt	5 TN	$ 110	$ 550
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	24 HRS	$ 95	$ 2,280
	Subtotal			$ 27,630
	Tax rate (8.6%)			2,376
	Subtotal:			$ 30,000
	Contingency (20%)			$ 6,000
	Total Estimated Construction Cost:			**$ 36,000**
	Engineering and Administrative Costs (25%):			$ 9,000
	Total Estimated Project Cost:			**$ 45,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-26
Isolation Valves on Washington Street from 5th Ave to Sequim Ave

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 15,000	$ 15,000
2	Locate Existing Utilities	LUMP SUM	$ 1,500	$ 1,500
3	Erosion Control	LUMP SUM	$ 1,000	$ 1,000
4	Additional Pipe Fittings	1,500 LB	$ 4	$ 6,000
5	Trench Safety Systems	LUMP SUM	$ 1,500	$ 1,500
6	8-inch Gate Valves	8 EA	$ 1,800	$ 14,400
7	10-inch Gate Valves	8 EA	$ 3,000	$ 24,000
8	Fittings	LUMP SUM LS	15000	$ 15,000
9	Foundation Gravel	15 TN	$ 30	$ 450
10	HMA Cl. B PG 58-22	15 TN	$ 150	$ 2,250
11	Sawcutting	120 LF	$ 3	$ 360
12	Crushed Surfacing, Top Course	10 TN	$ 35	$ 350
13	Cold Mix Asphalt	15 TN	$ 110	$ 1,650
14	Traffic Control	46 HRS	$ 95	$ 4,370
	Subtotal			$ 87,830
	Tax rate (8.6%)			7,553
	Subtotal:			$ 95,400
	Contingency (20%)			$ 19,080
	Total Estimated Construction Cost:			**$ 114,000**
	Engineering and Administrative Costs (25%):			$ 29,000
	Total Estimated Project Cost:			**$ 143,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-27
W Prarie St from S Sequim Ave to S 2nd Ave

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 12,000	$ 12,000
2	8-inch PVC Water Pipe, Including Fittings	660 LF	$ 75	$ 49,500
3	Locate Existing Utilities	LUMP SUM	$ 2,000	$ 2,000
4	Erosion Control	LUMP SUM	$ 2,000	$ 2,000
5	Additional Pipe Fittings	300 LB	$ 4	$ 1,200
6	Trench Safety Systems	LUMP SUM	$ 1,300	$ 1,300
7	8-inch Gate Valves	2 EA	$ 1,800	$ 3,600
8	Fire Hydrants	2 EA	$ 4,500	$ 9,000
9	Gravel Backfill	320 CY	$ 20	$ 6,400
10	Foundation Gravel	40 TN	$ 30	$ 1,200
11	HMA Cl. B PG 58-22	50 TN	$ 150	$ 7,500
12	Sawcutting	1,320 LF	$ 3	$ 3,960
13	Crushed Surfacing, Top Course	40 TN	$ 35	$ 1,400
14	Cold Mix Asphalt	30 TN	$ 110	$ 3,300
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	16 EA	$ 1,200	$ 19,200
17	Traffic Control	48 HRS	$ 95	$ 4,560
	Subtotal			$ 133,120
	Tax rate (8.6%)			11,448
	Subtotal:			$ 144,600
	Contingency (20%)			$ 28,920
	Total Estimated Construction Cost:			**$ 174,000**
	Engineering and Administrative Costs (25%):			$ 44,000
	Total Estimated Project Cost:			**$ 218,000**

** ENR Values used for November, 2012 were 9,398.

City of Sequim
Preliminary Project Cost Estimate
Distribution System Improvement D-28
South 7th Avenue from Silberhorn Rd to McCurdy Road

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 23,000	$ 23,000
2	12-inch PVC Water Pipe, Including Fittings	1,350 LF	$ 90	$ 121,500
3	Locate Existing Utilities	LUMP SUM	$ 4,000	$ 4,000
4	Erosion Control	LUMP SUM	$ 4,000	$ 4,000
5	Additional Pipe Fittings	700 LB	$ 4	$ 2,800
6	Trench Safety Systems	LUMP SUM	$ 2,700	$ 2,700
7	12-inch Gate Valves	3 EA	$ 4,500	$ 13,500
8	Fire Hydrants	3 EA	$ 4,500	$ 13,500
9	Gravel Backfill	770 CY	$ 20	$ 15,400
10	Foundation Gravel	90 TN	$ 30	$ 2,700
11	HMA Cl. B PG 58-22	130 TN	$ 150	$ 19,500
12	Sawcutting	2,700 LF	$ 3	$ 8,100
13	Crushed Surfacing, Top Course	80 TN	$ 35	$ 2,800
14	Cold Mix Asphalt	60 TN	$ 110	$ 6,600
15	Connections to Existing System	2 EA	$ 2,500	$ 5,000
16	3/4" Service Connections, Complete	0 EA	$ 1,200	$ -
17	Traffic Control	76 HRS	$ 95	$ 7,220
	Subtotal			$ 252,320
	Tax rate (8.6%)			21,700
	Subtotal:			$ 274,000
	Contingency (20%)			$ 54,800
	Total Estimated Construction Cost:			**$ 329,000**
	Engineering and Administrative Costs (25%):			$ 82,000
	Total Estimated Project Cost:			**$ 411,000**

** ENR Values used for November, 2012 were 9,398.