CASCADIA WATER ™
WASHINGTON STATE – SOUTHWEST REGION
PART B – DIAMOND POINT

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August 2025

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CERTIFICATE OF ENGINEER
Water System Plan for Diamond Point
a system owned by Cascadia Water, LLC.

The technical material and data contained within this report has been prepared by or under the direction of the following registered professional engineer(s), licensed in accordance with the laws of the State of Washington to practice in the State of Washington.

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ABBREVIATIONS

AC	Asbestos Cement
AF	Auditor's File
ADD	Average Day Demand
App	Approved
APWA	American Public Works Association
AWWA	American Water Works Association
BMPs	Best Management Practices
CCC	Cross-Connection Control
CCS	Cross-Connection Control Specialist
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
CWSP	Coordinated Water System Plan
CWSSA	Critical Water Supply Service Area
DOH	Washington State Department of Health
DOE	Washington State Department of Ecology
DS	Dead Storage
DSL	Distribution System Leakage
ERU	Equivalent Residential Unit
ES	Equalizing Storage
Ex	Existing
FSS	Fire Suppression Storage
gpm	Gallons Per Minute
GMA	Growth Management Act
GWI	Ground Water Under the Influence of Surface Water
HGL	Hydraulic Grade Line
ID	Identification
ICC	Island County Code
LID	Local Improvement District
LLC	Limited Liability Corporation
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand
MMADD	Maximum Month Average Day Demand
mg/L	Milligram per liter
NFPA	National Fire Protection Association
No.	Number
OS	Operational Storage
PE	Professional Engineer
PHD	Peak Hour Demand
ppb	Part Per Billion
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
OFM	State Office of Financial Management
RCW	Revised Code of Washington
SAL	State Advisory Level
SBS	Standby Storage
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemical
SWI	Seawater Intrusion
UTC	Utilities and Transportation Commission

UBI	Unified Business Identifier
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WDM	Water Distribution Manager
WDS	Water Distribution Specialist
WFI	Water Facilities Inventory
WHPA	Wellhead Protection Area
WQMS	Water Quality Monitoring Schedule
WRIA	Water Resources Inventory Area
WSP	Water System Plan
WTPO	Water Treatment Plant Operator
WSDOT	Washington State Department of Transportation
WUE	Water Use Efficiency

1 DESCRIPTION OF WATER SYSTEM

This chapter addresses the Diamond Point water system (hereafter "Water System") ownership and management, system background, inventory of existing facilities, related plans, existing service area characteristics, future service area, service are agreement, service area policies, satellite management agencies, and condition of service.

1.1 Ownership and Management

The following sections summarize the water system name and ID number, type of ownership, management structure, certified operator, engineer, and WFI.

1.1.1 Water System Name and ID Number

Water System Name: Diamond Point
Water System ID No: 19210 4

1.1.2 Type of Ownership and Management

Diamond Point is owned by Cascadia Water, LLC (Cascadia), a private investor-owned utility company consisting of water systems located throughout the State of Washington. Cascadia is a wholly owned subsidiary of NW Natural Water Company, LLC.

1.1.3 Management Structure

Cascadia Water, LLC was formed in November of 2018 through the acquisition and combination of Lehman Enterprises, Inc. on Whidbey Island. Cascadia is a for-profit corporation incorporated in the State of Washington. As noted above, Cascadia is a wholly owned subsidiary of NW Natural Water Co. Because Cascadia owns multiple water systems with a combined number of customers greater than 100, its systems are regulated by the Washington Utilities and Transportation Commission (UTC).

1.1.4 Water System Operations

Daily operation and compliance for all water systems is handled internally by Cascadia. These services include meter reading, billing, and general accounting. Contact information for Cascadia is provided below:

Cascadia Water
Mailing Address:
PO Box 549, Freeland, WA 98249
Physical Address:
18181 SR 525, Freeland WA 98249
Phone: (360) 331.7388
E-Mail: info@cascadiawater.com

1.1.5 Diamond Point Staff

Table 1-1 System Staff

Name	Position	Certification
Culley Lehman	General Manager	WDM 2
Adam Lehman	System Operator	CCS, WDM 3, WDS, WTPO 1
Dale Metzger	System Operator	CCS, WDM 2
Amy Lehman	Office Manager	-
Stephani Long	Office Administrator	-

1.1.6 Engineer

Water system engineer of record:

Facet, Inc.
Jeff Tasoff, P.E., Principal/Civil Engineer
Additional Principals: Erik Davido, P.E. and Quin Clements, P.E.
P.O. Box 1132
Freeland, WA 98249
Phone: (360) 331-4131 x203
Email: jeff@dcgengr.com or quin@dcgengr.com

The Water System's engineer performs the following services:

1. Identifying source, storage, or water distribution system needs and improvements;
2. Analyzing alternate solutions to address the identified needs and improvements;
3. Assuring that the system configuration will function properly, be efficient, and economical;
4. Preparing detailed construction documents to implement the selected improvements;
5. Assisting in obtaining plan approval and obtaining bids from contractors to perform the work;
6. Inspecting and testing the quality of the contractor's work and making necessary reports and recommendations to the water system;
7. Completing Washington State Department of Health (WSDOH) certification documents to the extent that the engineer has direct knowledge of the as-built facilities; and
8. Review developer's extension to ensure proposed projects meet Town standards and future system needs.

1.1.7 Water System Financial Accounting

Cascadia provides billing services and maintains customer records, including water usage for all water systems. Cascadia also maintains each of the systems' financial records, estimates future budgetary needs, and proposes changes to the water rate structure. Cascadia is a private water company operating within Washington state that has 100 or more connections and/or charges more than $557 a year per customer, it is regulated by the Washington Utilities and Transportation Commission (UTC). The UTC reviews the budgets, expenses, and profits of a water system to govern utility rates for customers. The latest tariff results from the UTC and system budgets are presented in the Part A Water System Plan for Cascadia Water.

1.2 System History and Background

Diamond Point is located within unincorporated Clallam County encompassed within Sections 15, 16, 21 and 22 of Township 30 North, Range 2 West of the Willamette Meridian. The Water System serves residential homes, one non-residential connection (a beach front access) and is classified as a Group A water system. Figure 1-1 shows the location of Diamond Point and its associated service area boundary.

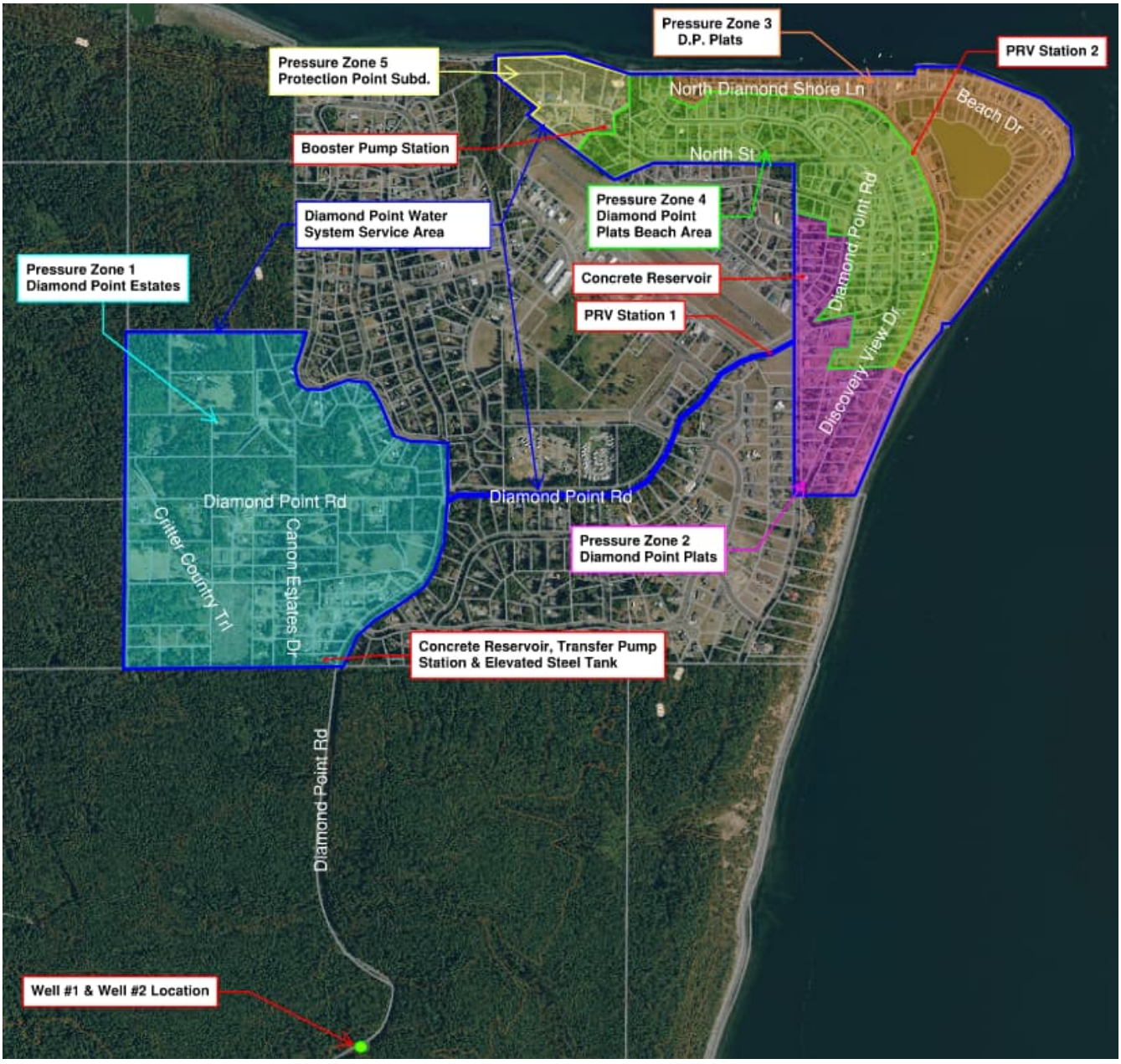

Figure 1-1 Diamond Point Service Area

Diamond Point originated in 1961, when the Water System was purchased with the intention to serve subdivisions of Diamond Point, Diamond Point First Addition, and Johnson's Discovery Bay View Tracts. The system consisted of one ground water source, and a 25,000-gallon wood stave tank. In 1962, The Water System served 13 connections with the intent to in-fill platted lots. By 1969, the system began

metering customer service connections, and the original well began experiencing seawater intrusion. In 1974 a 125,000-gallon concrete standpipe was constructed to replace the original wood stave tank.

In June 1975, what is now referred to as Well #1 was drilled, located approximately 4,000 feet south of the service area on Clallam County parcel number 023021130010. Following the installation of Well #1 the original well was abandoned. Subsequently, Well #2 was installed in 1981 adjacent to Well #1 to meet growing demand of the Water System. With the newly drilled wells and additional system upgrades the system grew from 13 connections in 1962 to 131 connections in the 1980s.

Later in 1991 a 57,000 gallon storage tank and PVC distribution system were added to serve a 100-acre service area called Diamond Point Estates. During this time, watermain replacement took place along with the system achieving capabilities to supply 6 fire hydrants in the Diamond Point Estates subdivision. By 1995 the system was serving 195 total connections. Following the construction and platted lots, the system is currently serving 305 connections and is approved for 324 connections as of January 2023. The current system configuration and system updates are discussed in Section 3.3.

1.2.1 Geography and Topography

The communities served by Diamond Point are located in the most northeastern portion of Clallam Country on the Miller Peninsula which is defined by the mouth of Discovery Bay and the Strait of Juan De Fuca in Sequim Washington. The geography throughout the area consists of various plats of single-family residences and surrounding the service area is Miller Peninsula State Park. The Water System is located on the northern and eastern shoreline with steep slopes that create a natural boundary down to the bay. Aside from the steep slopes, the elevation varies from 400-feet to 32-feet above sea level. There are various streams, ponds, and other geohazard areas located throughout the current retail service area. These items are shown in Figure 1-2.

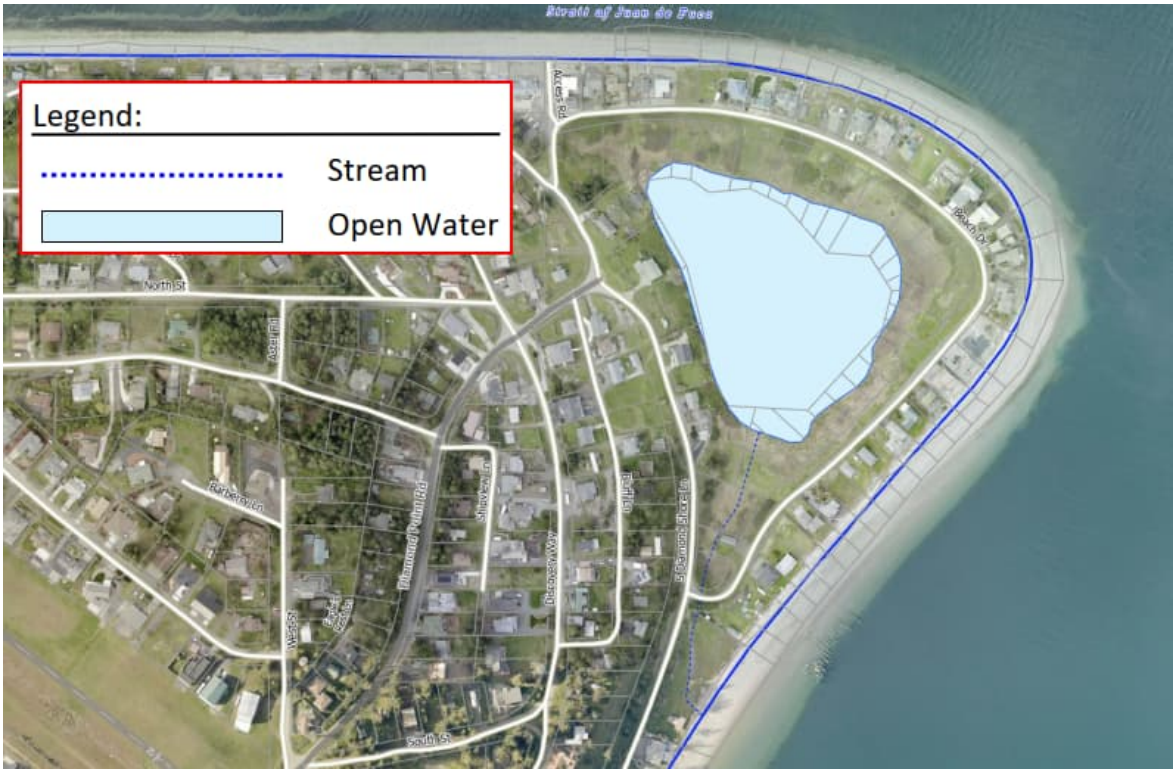

Figure 1-2 Diamond Point Critical Areas

1.2.2 Climate

The climate within Clallam has quite mild weather year-round with an average temperature of 70-degrees Fahrenheit in the hottest months of the summer and 35-degrees in the coldest months of the winter. Rainfall for Clallam County is on the high end with around 60-inches of rain per year.

1.2.3 Neighboring/Adjacent Water Systems

The current service area map for the system is included in Appendix B. Diamond Point surrounds a neighboring Group-A Water System of Sunshine Acres. Both water systems are surrounded by Miller State Park. There exists a second water system located approximately 1 mile to the south of the well site located in Jefferson County. See Figure 1-3 for the neighboring water systems map. The system with adjacent purveyors are discussed in Section 1.1.3.

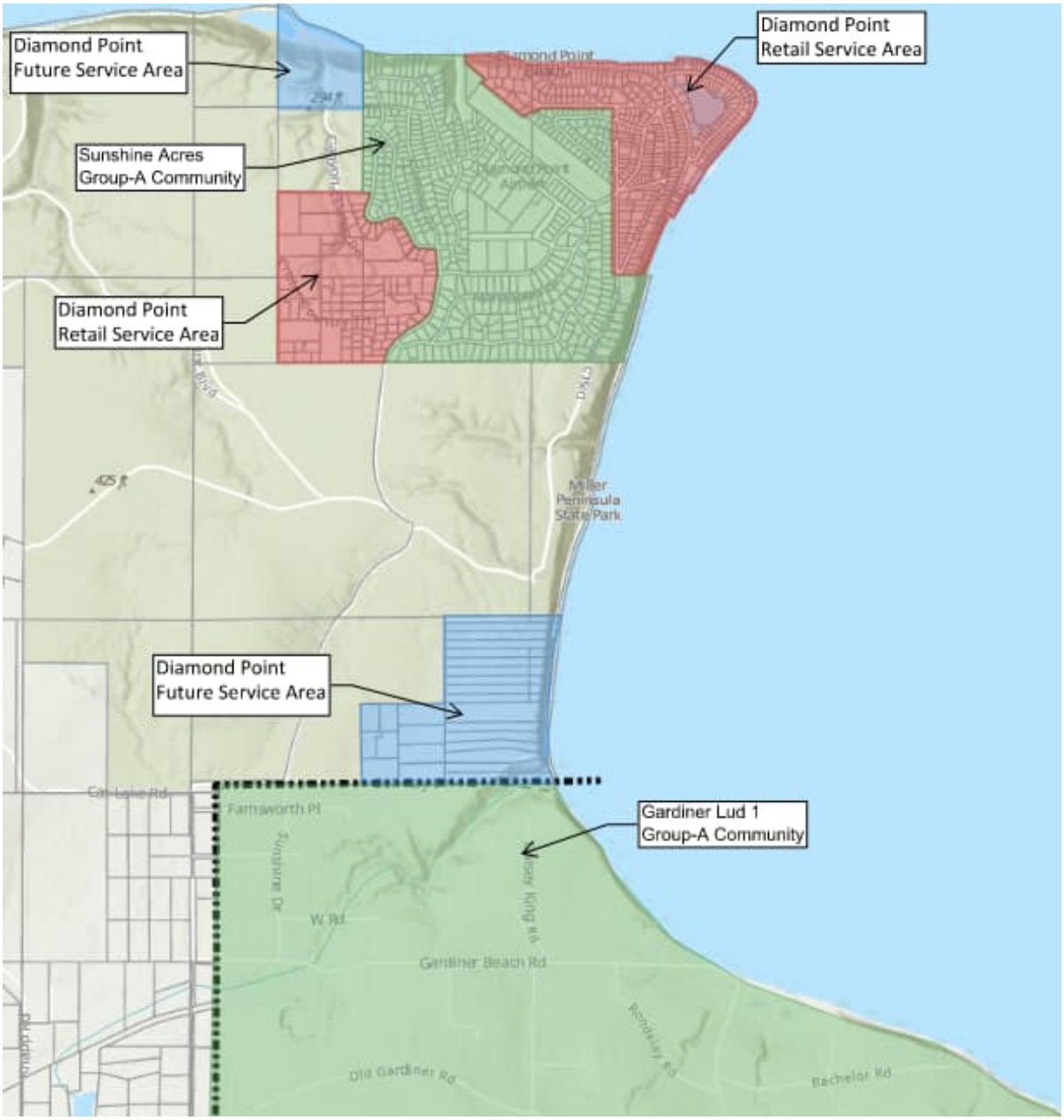

Figure 1-3 Neighboring Water Systems

Table 1-2, below indicates some of the larger adjacent water systems to the system covered under this plan. This table shows the water system owned by Cascadia and the adjacent water system(s).

Table 1-2 System and Adjacent Purveyor

Adjacent Water Systems	PWS ID	Number of Active Connections[1]
Sunshine Acres	86250	380
Gardiner Lud 1	07877 W	159

[1] Number of Active Connections based on DOH fortress WFIs.

1.2.3.1 Interties

Diamond Point does not currently have any interties with the neighboring water systems. Interties may be a cost-effective way of providing system redundancy in the event of a line break or source production issues. The Diamond Point system currently has existing mains bordering the Sunshine Acres system, which is owned and operated by Washington Water Service. Cascadia and Washington Water Service are currently discussing the potential to implement an emergency intertie between these two systems.

1.2.3.2 Incorporation of Neighboring Systems

Cascadia would consider incorporating or consolidation of other existing water systems into Diamond Point when and if feasible. The system(s) of interest would be required to have infrastructure which meets or exceeds Cascadia standards prior to a connection being made between the systems. Residences in the newly incorporated service area would be responsible for connection fees and costs associated with the consolidation process. On a case-by-case basis Cascadia will consider cost offsets for the connection fees based on various factors including existing infrastructure value and the ability to transfer water rights to offset the source demand impacts from the new connections.

1.3 Inventory of Existing Facilities

The detailed system inventory for the system is provided in Appendix N and Chapter 3 discusses the system's existing facilities in greater detail.

1.4 Existing Service Area Characteristics

General descriptions of the service area characteristics and existing zoning/land use are discussed in the following sections.

1.4.1 Description of Service Area

The retail service area for Diamond Point is located approximately 10 miles northeast of the city of Sequim in the most northeastern portion of the Miller Peninsula, butting up to the shoreline of Discovery Bay to the east and the Strait of Juan de Fuca to the north. The service area spans roughly 270 acres within the various plats served by the distribution system The service area is divided into five pressure zones of which additional detail is provided in Section 3.3. The service area boundary is shown in Figure 1-1 and is included in Appendix B.

1.4.2 Existing Zoning and Land Use

The current retail service area for Diamond Point is within an area zoned as "Urban Residential Low Density" (URL) according to Clallam County's terminology. Portions of the future service area are in

areas zoned as "Rural Low" (R5) in addition to URL Zoning. A portion of the Clallam County zoning map is provided in Appendix D. The wells that serve the system are currently located on land zoned at "Public Land" (P). The following zoning categories are included in the service area with the corresponding section from the Clallam County Code (CCC):

- Urban Residential Low Density (URL): CCC 33.13.020
- Rural Low (R5): CCC 33.10.020
- Public Lands (P): CCC 33.07.050

The service area primarily consists of rurally zoned areas. The way these areas can be developed depends greatly on the various classifications. The CCC should be consulted for additional information.

1.5 Service Area Boundary

In 2007, an updated franchise agreement draft was created for Diamond Point between Aquarius Utilities and Clallam County. Cascadia Water is pursuing measures to locate, coordinate and finalize Service Are Agreements with Clallam County over the next few years. Any Service area changes will comply with Clallam County and DOH Requirements. Any available documentation will be included in Appendix C.

1.6 Consistency from Local Planning

Concurrent with the state submittal, the Water System Plan will be coordinated with Clallam County to ensure consistency with the county planning requirements.

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2 BASIC PLANNING DATA AND WATER DEMAND FORECASTING

Current and projected planning data/parameters are discussed in this Chapter which is essential for properly analyzing the distribution system in Chapter 3. There are currently 306 active connections for Diamond Point's distribution system with the system currently limited to 324 service connections. The system currently provides service to residential connections, and 1 non-residential connection. The non-residential connection serves a community beach access point.

This report looks at three planning phases. Phase 1 is the six-year planning window from 2023 to 2029. Phase 2 is for the extended planning period of 2029 to 2043. Phase 3 covers the long-term planning from the year 2044 and beyond. This chapter and the next will provide data to support an increase in the number of service connections that can be supported by the system.

2.1 Current Water Use

The system's current population, service connections, water usage, and Equivalent Residential Units (ERUs) are discussed in the following sections.

2.1.1 Current Population

Diamond Point currently serves 319 full-time single-family residences and one non-residential connection. The system is estimated to serve approximately 795 residents for 180 days or more per year. The Water Facility Inventory (WFI), included in Appendix A, has been updated to reflect the current connections and residents served.

There are 396 existing buildable parcels within Diamond Point's service area. A breakdown of the number of parcels in each pressure zone is provided in Table 2-1. The non-buildable parcel in Pressure Zone #1 is owned by Cascadia and contains Reservoirs #1 and #2 and the transfer pump station. The non-buildable parcel in Pressure Zone #2 is also owned by Cascadia and contains Reservoir #3. The non-buildable parcels in Pressure Zone #4 are privately owned parcels directly on the beach. Information regarding the distribution system is provided in Section 3.3 with a system schematic provided in Figure 3-1.

Currently the System is not seeking to expand its service area. A map of the System's service area is included in Appendix B.

Table 2-1 Buildable Lots / Potential ERUs by Pressure Zone

Pressure Zone	Buildable Parcels	Non-Buildable Parcels	Total Parcels
1	93	1	94
2A	2	0	2
2	45	1	46
3	138	0	138
4	114	45	159
5	13	0	13
Total	405	47	

2.1.2 Equivalent Residential Units

Many water systems can be comprised of various types of connections including residential, commercial, industrial, etc. To properly assess the capacity of a system, connections are referred to as Equivalent Residential Units (ERUs). An ERU is a system-specific unit of measure used to express the amount of water

consumed by a typical full-time. The Design Manual defines an ERU as "a system-specific unit of measure used to express the amount of water consumed by a typical full-time single-family residence".

2.1.2.1 Full-Time Residential Connections

To determine a system's capacity in terms of the number of ERUs, one must determine the number of full-time residences. The WFI states that all 305 residential connections are full time. However, based on service meter data, it appears that a significant portion of these connections are part time. For the purposes of this capacity analysis, residential connections consuming 2,000 cubic feet of water per year or more were classified as full time. 2,000 cubic feet equates to 40 gallons per day. Typical indoor water usage from the Design Manual is 54-64 gallons per day. With 2.5 residents per home this would equate to 135 to 160 gallons per day. The 40 gallons per day is significantly below these values. In addition, anecdotal information from the System suggests that approximately two-thirds of connections are full time. With the minimum annual consumption of 2,000 cubic feet approximately 200 connections of the 305 (or 2/3) are classified as full-time residential connections. The number of full-time residential connections varies from year to year as shown in Table 2-2.

Table 2-2 Full-Time Single-Family Residential Connections by Year

Year	Full-Time Residential Connections
2020	199
2021	209
2022	199

2.1.3 Water Usage History

Before the capacity of each system component can be determined, water system demand must be established. Source meter data from 2020 to 2022 was provided by Cascadia and was used to calculate the System's average day demand (ADD) and maximum day demand (MDD). Additionally, service meter data from 2020 to 2022 was used to calculate the average day demand of a typical full-time single-family residence (ERU_{ADD}) and the maximum day demand of a typical full-time single-family residence (ERU_{MDD}). ERU_{ADD} and ERU_{MDD} were used to calculate the peak hour demand (PHD) of the System and the number of ERUs the System has capacity to serve.

Water production data, water consumption data, and calculated ERU_{ADD} and ERU_{MDD} values are summarized in Table 2-3. More comprehensive data is provided in Appendix R.

Table 2-3 Water System Demand Information

	2020	2021	2022
Full-Time Residential Connections	199	209	199
Source Production (gal)	11,075,600	12,519,800	13,107,500
Max. Month Source Production (gal)	1,425,800	1,828,900	1,815,600
System-Wide Total Consumption (gal)	8,781,228	10,060,794	8,329,646
System-Wide Full-Time Residential Consumption (gal)	8,255,482	9,487,722	7,704,146
Distribution System Leakage (gal)	2,294,372	2,459,006	4,777,854
ERU_{ADD} (gpd/ERU)	113	124	106
ERU_{MDD} (gpd/ERU)	311	391	354

2.1.3.1 Water Production

Historical water production from 2020 to 2022 has been summarized in Table 2-4. The water production has fluctuated slightly over the past 5 years with a peak production year in 2021 consisting of 14,609,800 gallons. An analysis of the monthly source meter data for 2020 to 2022 is provided in Appendix R

Table 2-4 Source Production Data

Month	2020 Production (gal)	2021 Production (gal)	2022 Production (gal)
January	491,200	647,100	969,400
February	767,600	918,900	788,300
March	625,300	737,200	762,900
April	757,700	818,200	817,000
May	877,800	1,209,500	1,004,400
June	1,007,100	1,117,100	958,200
July	1,039,000	1,487,400	1,438,700
August	1,425,800	1,828,900	1,815,600
September	1,192,000	1,308,900	1,424,900
October	982,900	863,200	1,383,000
November	716,700	874,700	889,100
December	1,192,500	708,700	856,000
Total	11,075,600	12,519,800	13,107,500

Analysis of seasonal demand can assist in identifying trends and differences within the summer and winter months. This data allows the engineer to design the distribution system to support the peak usage for seasonal demands. Knowledge of seasonal variations in water demand over the past 3-years can help planning personnel and better serve customers and properly maintain the distribution system.

There is a seasonal demand which occurs during the summer months as irrigation increases and due to a potential increase in population during these months. Variations in consumption rates reflect change in weather conditions, community activities, and habits of the population. The seasonal distribution of the water demand is graphically shown in Figure 2 1.

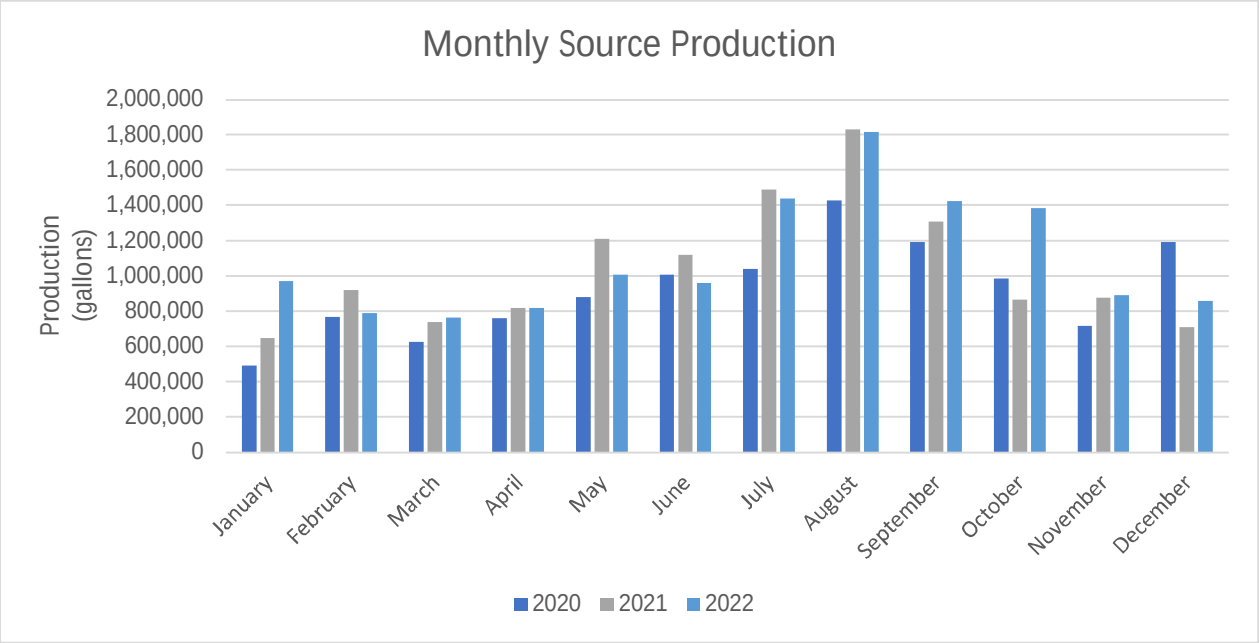

Figure 2-1 Monthly/Seasonal Demand

the highest seasonal use for all connections is during the summer months of May through August. This is typical for residential communities as irrigation requirements significantly increase due to warmer temperatures, and summer homes are in use. High summer demand is also typical for the non-residential connection, as beach access is utilized more often during summer months.

2.1.3.2 Distribution System Leakage

Distribution system leakage (DSL) is defined by DOH as the difference between total water produced and total authorized consumption and typically included losses due to leaks, illegal service connections, accounting errors, inaccurate meter readings, and various other unmetered uses. As shown in Table 2-5 there is a significant distribution system leaking from the water efficiency reports. Since the 3-year average exceeds 10 percent, the Water System created a Water Loss Control Action Plan per WAC 246-290-820 to address the exceedance and create a plan for a reduction in water loss as discussed in Chapter 4 of this plan. The plan includes the investigation of possible leaks in the distribution lines and ensuring the accuracy of the system water meters. Cascadia is in the process of implementing a meter replacement program with remote read meters to ensure that the system has access to timely and reliable consumption data.

Table 2-5 Historical Water Consumption and Loss

Year	Total Water Usage (gallons)	Total Water Production (gallons)	Total Usage (ac-ft/yr)	DSL
2017	10,668,298	8,547,897	32.74	19.9%
2018	9,791,906	7,827,236	30.05	20.1%
2019	13,134,090	10,396,340	40.31	20.8%
2020	16,258,560	12,125,900	49.90	25.4%
2021	13,635,711	9,925,601	41.85	27.2%

2.1.4 Average Day Demand (ADD)

ADD is the annual water produced by a system's sources divided by the number of days in the year. ADD for 2021 is calculated as follows.

$$ADD = \frac{12{,}519{,}800\ gal}{365\ days} = 34{,}301\ gal/day$$

Average day demand (ERU_{ADD}) is the average volume of water consumed by a typical full-time single-family residence in a single day. Service meter data was used to determine the annual volume of water consumed by full-time single-family residences (i.e., those consuming 2,000 cubic feet of water per year or more). By definition, a typical full-time single-family residence consumes the same volume of water as an ERU; therefore, the number of full-time residential connections listed in Table 2-3 can be considered equivalent to ERUs as shown in the following calculation for 2021.

$$ERU_{ADD} = \frac{9{,}487{,}722\ gal}{(365\ days)(209\ ERUs)} = 124\ gpd/ERU$$

ADD and ERU_{ADD} were also calculated for 2020 and 2022. ERU_{ADD} for 2021 was the largest calculated. Due to some of the assumptions and data available a factor of safety of 1.2 was applied to this calculation resulting in a ERU_{ADD} of 150 gpd/ERU, which was selected as the design ERU_{ADD} to provide a conservative estimate of the System's capacity.

2.1.5 Maximum Day Demand (MDD)

MDD is the maximum amount of water produced by a system's sources in a single day over the course of a year. When daily source meter readings are not available, as is the case for the System, the MDD can be approximated by first calculating the maximum month average day demand (MMADD). MMADD is the total amount of water produced by a system's sources in its maximum production month divided by the number of days in that maximum month. The following calculation is for the 2021 MMADD.

$$MMADD = \frac{1{,}828{,}900\ gal}{31\ days} = 58{,}997\ gal/day$$

Once MMADD has been determined, MDD can be calculated by multiplying the MMADD by a factor. This factor is equal to 1.65 for systems serving fewer than 1,000 people (DOH 2020). The 2021 MDD is calculated as follows.

$$MDD = MMADD \times 1.65 = 58{,}997\ gal/day \times 1.65 = 97{,}345\ gal/day$$

ERU_{MDD} is the maximum volume of water consumed by a typical full-time residence in a single day. Daily service meter data is not available to determine ERU_{MDD} directly. Monthly service meter data is also not

available to determine ERU_{MDD}. However, one can use available annual service meter data and monthly source meter data to estimate ERU_{MDD} according to the following steps.

1. Estimate the average daily consumption by non-full-time residential connections during the maximum month of source production.
2. Estimate daily distribution system leakage.
3. Estimate the average daily consumption by full-time residential connections during the maximum month of source production by subtracting the quantities estimated in Step 1 and Step 2 from the MMADD.
4. Estimate the maximum month average day demand of a typical full-time residence (ERU_{MMADD}) by dividing the quantity estimated in Step 3 by the number of full-time residential connections.
5. Multiply ERU_{MMADD} by factor to estimate ERU_{MDD}.

ERU_{MDD} for 2020 to 2022 were calculated and are listed in Table 2-3. The following calculations are for 2021.

Step 1

First, determine the system-wide annual non-full-time residential consumption by subtracting the system-wide annual full-time residential consumption from the system-wide annual total consumption.

$$10{,}060{,}794\ gal/yr - 9{,}487{,}722\ gal/yr = 573{,}072\ gal/yr$$

Second, estimate the portion of system-wide annual non-full-time residential consumption that occurred during the maximum month of source production by multiplying the system-wide annual non-full-time residential consumption by the ratio of maximum month source production (which for 2021 occurred in August) to annual source production.

$$573{,}072\ gal/yr \left(\frac{1{,}828{,}900\ gal/month}{12{,}519{,}800\ gal/yr}\right) = 83{,}714\ gal/month$$

Third, convert to units of gallons per day.

$$\frac{83{,}714\ gal/month}{31\ days/month} = 2{,}700\ gal/day$$

Step 2

Distribution system leakage (DSL) is assumed to be constant throughout the year. Therefore, the daily DSL can be estimated by dividing the annual DSL by the number of days in the year.

$$\frac{2{,}459{,}006\ gal}{365\ days} = 6{,}737\ gal/day$$

Step 3

The calculated quantities from Steps 1 and 2 are then subtracted from the MMADD.

$$58{,}997\ gal/day - 2{,}700\ gal/day - 6{,}737\ gal/day = 49{,}559\ gal/day$$

Step 4

In 2021 there were 209 full-time residential connections.

$$ERU_{MMADD} = \frac{49{,}559\ gal/day}{209\ ERUs} = 237\ gpd/ERU$$

Step 5

The 2021 ERU_{MDD} is calculated as follows.

$$ERU_{MDD} = ERU_{MMADD} \times 1.65 = 237\ gpd/ERU \times 1.65 = 391\ gpd/ERU$$

ERU_{MDD} for 2021 was the largest calculated. It was rounded up to 400 gpd/ERU, which was selected as the design ERU_{MDD} to provide a conservative estimate of the System's capacity.

2.1.6 Peak Hour Demand (PHD)

Peak Hour Demand (PHD) was calculated in accordance with Section 3.4.2 of the DOH Water System Design Manual, 2020 edition (Design Manual). Equation 3-1 from the Design Manual uses the MDD, and the number of potential connections determined in the capacity analysis to determine the PHD flowrate. From Section 3.4 below, the system capacity was determined to be 714 connections limited by the water right and ADD.

Equation 3-1

$$PHD = \frac{MDD}{1440}[(C)(N) + F] + 18$$

PHD = Peak Hourly Demand (gallons per minute)
N = number of potential connections
C = coefficient based on system size
F = coefficient based on system size
MDD = Maximum Daily Demand (gpd/ERU)

The coefficients used in the above formula are dependent upon the number of connections served as described in Table 2-6.

Table 2-6 Peak Hour Demand (PHD) Equation Coefficients

Range of ERUs	C	F
15-50	3.0	0
51-100	2.5	25
101-250	2.0	75
251-500	1.8	125
501-1,000,000	1.6	225

PHD for the System with the proposed number of ERUs was calculated using the design ERUMDD value of 400 gpd/ERU.

PHD was also calculated for each pressure zone based on the potential future ERUs listed in Table 2-3 and a combined PHD for Pressure Zones 1 through 2 and Pressure Zones 3 through 5. These PHDs are used in Sections 3.3.7 and 3.4.7 to calculate storage capacity and for use in the hydraulic model. A summary of the each PHD calculated is provided in Table 2-7.

Table 2-7 Peak Hour Demand Summary

Pressure Zone(s)	ERUs	PHD (gpm)
1	142	118
2	45	56
3	138	116
4	114	102
5	13	29
1 – 2	187	143
3 – 5	265	185
Total: (1 – 5)	452	279

2.2 Projected Land Use, Future Population, and Demand Forecasting

The projected land use, future population, and water demand forecasting for Diamond Point is discussed in the following sections.

2.2.1 Projected Land Use

As discussed in Section 1, the Water System existing service area provides service to land zoned as urban residential low density (URL) as described in Clallam County Code (CCC) 33.13.020. URL land is limited in the allowable land use such as, agricultural, bed and breakfast, duplexes, multi and single-family dwelling. Large commercial development, airports, and motels are prohibited in URL zoning. The Water System's future service area will provide service to land zoned as low rural (R5) as described in CC 33.10.020. R5 land is limited in the allowable land use such as agricultural, bed and breakfast, duplex, and single-family dwelling. Large commercial development is prohibited in R5 zoning. A vicinity map showing the location of the Water System is shown in Figure 1-2. Zoning and Land Use maps for each of the water systems' boundaries are provided in APPENDIX DB.

Site specific fire flow requirements for individual development projects are determined by Clallam County through its development review processes. The potential for any major business or larger multifamily structures being located within the water system area is minimal due to zoning restrictions. There is a potential for Rural Cluster Developments, and commercial- nonresidential development within the service area.

2.2.2 Projected Connections

From the current system demands, and equipment based on a completed capacity analysis the system can support up to 714 connections see Section 3.4. Since 1995 the Water System had increased from 195 connections to 306 connections, averaging four additional connections every year. The projected number of ERUs served at the end of each planning phase is specified in Table 2-8. Phase 3 planning looks beyond the 20-year window to determine what strategic planning may be necessary to safeguard the distribution system into the future. Total build-out of the existing service area was estimated at 431 number of lots.

The estimated number of connections for 2029 and 2043 were determined by using a 1% population growth rate to establish the number of future residents served and 2.5 residents per residential connection as recommended by DOH. From the 2023 WFI, the system averages 2.5 residents per connection with 305 active residential connections, and a population served of 763 residents. The 1% population growth rate used for this report is a conservative estimation based off the current growth rate of 0.73% indicated in the Clallam County Census. Equation 2-1 and the values provided in Table 2-6 were

used to calculate the PHD for 2023, 2029, 2043, the current number of DOH approved connections, and the maximum system physical capacity as summarized in Table 2-8.

Table 2-8 Group A Peak Hour Demand (PHD) Based on MDD

Year	N (ERUs)	MDD (gpd/ERU)	Coefficient Associated with Range of ERUs	Factor Associated with Range of ERUs	PHD (gpm)
2023	306	400	1.8	125	206
2029	325	400	1.8	125	215
2043	373	400	1.8	125	239
Approved	324	400	1.8	125	215
Max	509	400	1.6	225	307

2.2.3 Projected Demand

Projected demands are based on ERU projections and trends in the annual production of ADD. The project demands for annual production is summarized in Table 2-9 based on the number of projected ERUs discussed in Section 2.1.6.

Table 2-9 Projected Annual Demand Based on ADD

Year	N (ERUs)	ADD (gpd/ERU)	Annual Production (gallons)	Annual Production (ac-ft)
2023	320	150	17,520,000	53.8
2029	340	150	18,597,833	57.1
2043	390	150	21,377,729	65.6

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3 SYSTEM ANALYSIS

This chapter summarizes the analysis of the existing system to determine if the system facilities are capable of supplying sufficient quality and quantity of water to meet existing and projected demands as identified in Chapter 2. Improvements to the system to meet projected demands are discussed in the final section of this chapter.

3.1 System Design Standards

See Part A of the Cascadia Water – Water System Plan for the Southwest region.

3.2 Water Quality Parameters

Groundwater wells provide the source water for the water system and therefore they are required to comply with the water quality requirements specified in WAC 246-290 Part 4 – Water Quality, which includes requirements from the Code of Federal Regulations (CFR) Title 40.

It is required that purveyors of the community water system have one complete analysis from each water source every thirty-six months. A selection of recent water quality test results is included in Appendix L and additional information is available on the DOH Sentry website:

https://fortress.wa.gov/doh/eh/portal/odw/si/Intro.aspx

Waivers are available to modify some of the testing requirements noted below. The DOH will provide the system with a water quality monitoring schedule (WQMS) that summarizes the specific testing requirements for that system. A copy of the WQMS is included in Appendix K. Required water quality monitoring locations and schedules, as specified in WAC 246-290 and 40 CFR, are summarized in Table 3-1.

Table 3-1 Water Quality Monitoring Schedule

Constituent	Sample Location	Schedule/Frequency
Asbestos	One sample from distribution system or if required by department, from the source.	One sample every 9 years.
Bacteriological	From representative points throughout distribution system.	One sample per month.
Complete Inorganic Chemicals (IOCs) & Physical	From a point representative of the source, after treatment, and prior to entry to the distribution system.	Waiver One sample every 9 years.
Lead/Copper	From the distribution system at targeted sample tap locations.	Ten samples every 3 years.
Nitrate/Nitrite	From a point representative of the source, after treatment, and prior to entry to the distribution system.	One sample annually.
Potential Trihalomethanes – Ground Water *	From two representative points in the distribution system.	Two samples every 3 years.
Radionuclides	From the source.	One sample every 6 years.
Volatile Organic Chemicals (VOCs)	From a point representative of the source, after treatment, and prior to entry to distribution system.	Waiver One sample every 6 years.
Synthetic Organic Chemicals (SOCs Herbicides)	From a point representative of the source, after treatment, and prior to entry to distribution system.	Waiver One sample every 9 years.
Synthetic Organic Chemicals (SOCs Pesticides)	From a point representative of the source, after treatment, and prior to entry to distribution system.	Waiver One sample every 3 years.
Synthetic Organic Chemicals (SOCs including EDB and other soil contaminants, Dioxin, Endothall, Diquat, Glyphosphate)	From a point representative of the source, after treatment, and prior to entry to distribution system.	Complete Waiver Granted
Pre-and Polyfluoroalkyl Substances (PFAS)	From a point representative of the source, after treatment, and prior to entry to distribution system.	One sample every 3 years.

*The water system currently has a treatment system installed for chlorination of the system, that may trigger these testing requirements to be implemented.

3.2.1 Water Testing

The latest water quality testing results are provided for each system in Appendix L. The testing schedule for the system is provided in Appendix K. The frequency of testing for each system is dependent on size, past testing results, and system configuration. The following test are performed throughout the system:

- Radionuclides
- Arsenic
- Lead & Copper
- Synthetic Organic Chemicals

- Volatile Organic Chemicals
- Bacteriological
- Asbestos
- Iron
- Manganese
- Nitrates

3.2.2 Bacteriological Testing

The State requires that systems serving up to a population of 1,000 people have a minimum of one routine bacteriological analysis per month. The sample is to be taken from a point representative of the distribution system. A copy of the routine sampling locations and repeat sample locations is included as part of the Coliform Monitoring Plan, which is included in Appendix M. In the event a coliform detection occurs, the routine sample sites, as well as upstream and downstream repeat samples sites listed in the Coliform Monitoring Plan will also be used to determine that the potable water system is safe for public consumption.

3.2.3 Inorganic Chemical Testing

WAC 246-290 and CFR 40 specify testing for primary and secondary inorganic chemicals. The maximum contaminant levels (MCLs) for inorganic chemicals are summarized in Table 3-2.

Table 3-2 Inorganic Chemical Maximum Contaminant Levels (MCLs)

PRIMARY INORGANIC CHEMICALS			
Substance	MCLs (mg/L)	IOC Results S01 (mg/L)	IOC Results S02 (mg/L)
Antimony (Sb)	0.006	LT	LT
Arsenic (As)	0.010	0.0040	0.0104
Asbestos	7 million fibers/liter (longer than 10 microns)	N/A	N/A
Barium (Ba)	2.0	LT	LT
Beryllium (Be)	0.004	LT	LT
Cadmium (Cd)	0.005	LT	LT
Chromium (Cr)	0.1	LT	LT
Copper (Cu)	*	LT	LT
Cyanide (HCN)	0.2	LT	LT
Lead (Pb)	*	0.001	0.001
Mercury (Hg)	0.002	LT	LT
Nickel (Ni)	0.1	LT	LT
Nitrate (as N)	10.0	0.2	0.21
Nitrite (as N)	1.0	LT	LT
Selenium (Se)	0.05	LT	LT
Sodium (Na)	*	7.3	7.35
Thallium (Tl)	0.002	LT	LT
SECONDARY INORGANIC CHEMICALS			
Chloride (Cl)	250.0	5.53	5.54
Fluoride (F)	2.0	0.11	0.1

Iron (Fe)	0.3	LT	LT
Manganese (Mn)	0.05	LT	LT
Silver (Ag)	0.1	LT	LT
Sulfate (SO_4)	250.0	LT	LT
Zinc (Zn)	5.0	LT	LT

A: Testing results less than the state reporting limit are entered as LT.

Although the state board of health has not established MCLs for copper, lead, and sodium; there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of 20 mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets.

3.2.4 Physical Characteristics

WAC 246-290 and CFR 40 specify testing physical characteristics. The MCLs for physical characteristics are summarized in Table 3-3.

Table 3-3 Physical Characteristics

Substance	Secondary MCLs	Physical characteristics Results S01	Physical characteristics Results S02
Color	15 Color Units	LT	LT
Specific Conductivity	700 umhos/cm	229 umhos/cm	223 umhos/cm
Total Dissolved Solids (TDS)	500 mg/L	N/A	N/A

A: Testing results less than the state reporting limit are entered as LT.

The generally accepted classification of hardness is summarized in Table 3-4. An MCL for hardness has not been established. In general, water having a hardness of less than 100 mg/L is not considered hard for ordinary domestic use. The system's hardness concentration was measured at 110 mg/L and 109 mg/L for S01 and S02 respectively, which is considered moderately hard.

Table 3-4 Relative Hardness

Description	Concentration of $CaCO_3$
Soft	0-60 mg/L
Moderately hard	61-120 mg/L
Hard	121-180 mg/L
Very hard	181-350 mg/L
Saline/Brackish	> 350 mg/L

The water hardness impacts the corrosivity of water and it may have negative impacts on lead and copper levels in delivered water. If water softening is desired in the future, lead and copper testing should be performed to ensure that water corrosivity concerns do not become an issue.

3.2.5 Disinfection Byproducts (DBP)

When chlorine is added to drinking water to serve as a disinfectant for various organisms, a residual must be maintained throughout the distribution system. However, chlorine is a very active substance, and it reacts with naturally occurring substances to form compounds known as disinfection byproducts (DBPs). The most common DBPs formed when chlorine is used for disinfection are trihalomethanes (THMs), and haloacetic acids (HAAs).

The Stage 2 Disinfectants and Disinfection Byproducts Rule regulates the concentration of disinfectant chemicals and byproducts that may be present in the distribution system water. These chemical species are considered primary contaminants. Testing for DBPs is performed annually unless the MCL is exceeded, in which case a running annual average (RAA) is used for comparison against the MCL. The number of samples is dependent on system size. Each of the locational running annual average (LRAA) results must be in compliance.

The concentrations of each of the trihalomethane compounds (trichloromethane, dibromochloromethane, bromodichloromethane, and tribromomethane) are totaled to determine the total trihalomethanes (TTHM) level. The MCL for TTHM is 0.080 mg/L. The concentrations of each of the five haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid, and dibromoacetic acid) are totaled to determine the haloacetic acids (HAA5s) level. The MCL for HAA5 is 0.060 mg/L. Currently, the system has a chlorination treatment system installed. The Water System shall test for compounds discussed in this section.

3.2.6 Radionuclides

The State considers radionuclides primary contaminants. The MCLs for radionuclides and the latest source test results are summarized in Table 3-5.

Table 3-5 Radionuclides MCLs

Substance	MCL (pCi/L)	Radionuclides Results S01 (pCi/L)	Radionuclides Results S02 (pCi/L)
Radium-226	3.0	N/A	N/A
Combined Radium-226 and Radium-228	5.0	LT	LT
Gross alpha particle activity (excluding uranium)	15.0	LT	LT

A: Testing results less than the state reporting limit are entered as LT.

The State specifies that the average annual concentration shall not produce an annual dose equivalent to the total body or any internal organ greater than four millirem/year.

3.2.7 Volatile Organic Chemicals (VOCs)

The State requires that public water systems sample and evaluate for Volatile Organic Chemicals (VOCs). If there are violations of the MCLs for any constituent, they must be addressed for elimination immediately. If there are no violations of the MCLs, the purveyor must sample again for VOCs after twelve months. If no VOCs (excluding THMs) are verified after the initial twelve months of monitoring, purveyors of community water systems shall monitor each source at least once every thirty-six months. The VOC MCLs are summarized in Table 3-7.

Table 3-6 Volatile Organic Chemicals (VOCs) MCLs

Contaminant	MCL (µg/L)	State Reporting Limits (µg/L)	VOC Results S01 (µg/L)	VOC Results S02 (µg/L)
Vinyl chloride	2.0	All VOC State Action Limits are 0.0005 µg/L	All VOC Results LESS THAN MCL	All VOC Results LESS THAN MCL
Benzene	5.0			
Carbon tetrachloride	5.0			
1,2-Dichloroethane	5.0			
Trichloroethylene	5.0			
para-Dichlorobenzene	75.0			
1,1-Dichloroethylene	7.0			
1,1,1-Trichloroethane	200.0			
cis-1,2-Dichloroethylene	7.0			
1,2-Dichloropropane	5.0			
1,4 Dichlorobenzene	75.0			
Ethylbenzene	700			
Monochlorobenzene	100			
o-Dichlorobenzene	600			
Styrene	100			
Tetrachloroethylene	5.0			
Toluene	1000.0			
trans-1,2-Dichloroethylene	100.0			
Xylenes (total)	10,000.0			
Chloride(Dichloromethane)	5.00			
1,2,4-Trichlorobenzene	70.0			
1,1,2-Trichloroethane	5.0			

3.2.8 Synthetic Organic Chemicals (SOCs)

The synthetic organic chemical (SOC) MCLs are summarized in Table 3-7.

Table 3-7 Synthetic Organic Chemicals (SOCs) MCLs

Contaminant	MCL (µg/L)	State Reporting Limits (µg/L)	SOC Results S01 (µg/L)	SOC Results S02 (µg/L)
Toxaphene	3.0000	1.000	N/A	N/A
2,4,5-TP	50.0000	0.2000	LT 0.2000	LT 0.2000
Benzo[a]pyrene	0.2000	0.0200	N/A	N/A
Dalapon	200.000	1.000	LT 1.000	LT 1.000
Di(2-ethylhexyl)adipate	400.0000	0.6000	LT 1.3000	LT 1.3000
Di(2-ethylhexyl)phthalate	6.0000	0.6000	LT 1.3000	LT 1.3000
Dinoseb	7.0000	0.2000	LT 0.2000	LT 0.2000
Diquat	20.0000	-	N/A	N/A
Endothall	0.1	-	N/A	N/A
Endrin	2.000	0.0100	N/A	N/A
Glyphosate	0.7	-	N/A	N/A
Hexacholorbenzene	1.000	0.1000	N/A	N/A

Hexachlorocyclo pentadiene	50.0	0.1000	N/A	N/A
Oxamyl (Vydate)	0.2	-	N/A	N/A
Picloram	0.5	0.1000	LT 0.1000	LT 0.1000
Simazine	0.004	0.0700	N/A	N/A
2,3,7,8-TCDD (Dioxin)	$3x10^{-8}$	-	N/A	N/A

3.2.9 Seawater Intrusion

Due to the existence of seawater intrusion (SWI) in many wells located on the shorelines of Washington State, the possibility of seawater intrusion into the potable water aquifers must be investigated on a regular basis. The DOH Design Manual identifies wells are at risk for intrusion if the well is located within ½ mile of the shoreline and pump water from a depth below sea level, and within ½ mile of a groundwater source with chloride concentrations over 100 mg/L. Department of Ecology may condition water right permits to provide for reduced pumping rates or may require a water system to abandon sources if seawater intrusion threatens senior water right permits. Diamond Point's Well #1 and Well #2 are located ½ mile away from nearest shoreline located east of the system. Chloride was measured from at a concentration of 5.53 mg/L, and 5.54 mg/L for S01 and S02 respectively. Diamond Point is considered low risk for seawater intrusion. It is recommended that the system continue testing its well field for chloride to check for any long-term trends in the aquifer.

3.2.10 Source Water Quality

Water quality samples from the distribution system show adequate water quality. Lead and copper concentrations were measured at less than 0.002 and 0.02 mg/L respectively. Total coliform concentrations are measured monthly, with positive results for E. Coli and Coliform as of May 23rd, 2023. The Water System installed an emergency chlorination system followed by a permanent chlorination system at the wells site location. The Water System will follow the required testing parameters. Water quality improvements have been identified and a capital improvement project has been identified and scheduled for the immediate term. See section 8.2.2 for additional information.

3.2.11 Finished Water Quality

Water quality samples for bacteriological contaminants are measured in the distribution system monthly. Samples taken in May 2023 were positive for E. Coli and Coliform in the distribution system. The system installed emergency chlorination treatment at the wells site location. Cascadia is in the process of installing a permanent chlorination treatment system. The system will continue to monitor for bacteriological contaminants as discussed in Table 3-1.

Lead and copper concentrations were measured at 0.002 and 0.02 mg/L respectively. Water quality improvements have been identified and a capital improvement project has been identified and scheduled for the immediate term. See section 8.2.2 for additional information. The latest water quality results are provided in Appendix L.

3.3 System Description and Analysis

Potential system improvements were determined by analysis of system testing, studies, review of water system inventories, consultation with the system operator regarding needed improvements, and longer-term goals for the system. The distribution system needs by functional group are summarized in the following sections. A schematic diagram of the existing distribution system for Diamond Point is provided in Figure 3-1 to assist the reader in following the system configuration and operations.

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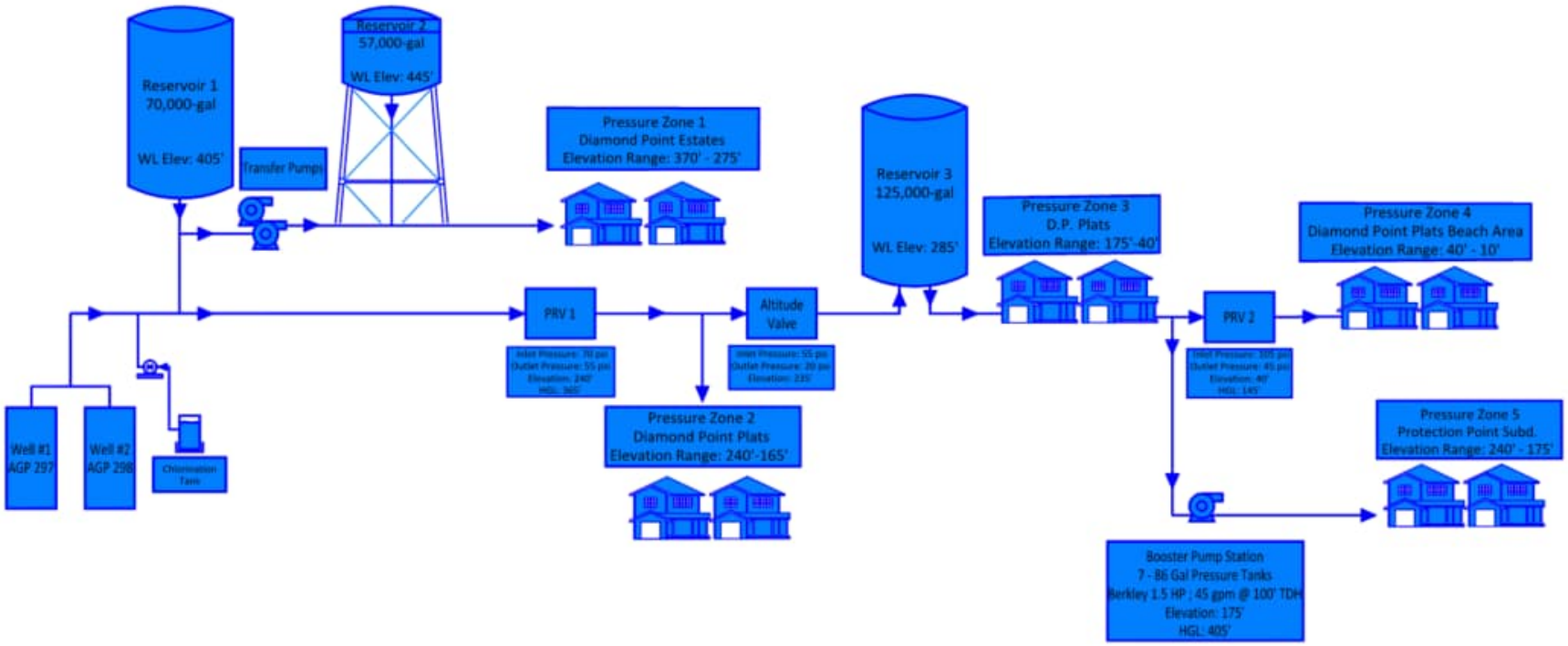

Figure 3-1 Diamond Point Water System Schematic

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3.3.1 Existing System Configurations

The system is currently supplied by two wells (Well #1 and Well #2). The wells are located off Diamond Point Road approximately 1 mile south of the existing retail service area. Well #1 and Well #2 alternate operations and by flowing simultaneously and their functions are controlled by reservoir floats in a concrete storage tank Reservoir 1. Per DOH Project number 23-1108, the produced water from both sources. The wells pump into a 4-inch line that conveys water north towards the primary system pumphouse and Reservoir 1 located on Clallam County parcel 023021120030. There are no existing services between the wells and Reservoir 1. At Clallam County parcel 023021120030, source water can either transition towards Reservoir 1 and the Transfer Pumps or continue north into the distribution system. On the parcel with Reservoir 1 the system also has Reservoir 2 and a building housing the Transfer Pump Station.

The distribution system consists of five (5) different pressure zones which are described below:

Pressure Zone 1

The wells pump direct water to fill Reservoir 1. The Transfer Pump Station pumps water from Reservoir 1 into Reservoir 2 which is an elevated reservoir which gravity feeds Pressure Zone 1. Reservoir The transfer pump station consists of two pumps in a pumphouse which operate in a lead/lag/alternate configuration when Reservoir 2 calls for water.

The water level in Reservoir 2 creates a hydraulic grade line (HGL) of 444 feet for Pressure Zone 1. The service connections range in elevation from approximately 275 feet to 370 feet, creating static pressure ranges of approximately 32-to 73-psi. There are currently 86 buildable parcels in Pressure Zone 1.

Pressure Zone 2

Pressure Zone 2 is fed via gravity from Reservoir 1, which floats on the distribution system with a common inlet/outlet. As noted previously, the wells can also pump directly into Pressure Zone 2. Water is conveyed through approximately 5,000-feet of 4-inch PVC transmission main from a tee branching off to Reservoir 1.

There are two connections that are served off the 4-inch PVC transmission prior to a pressure reducing valve station (PRV 1) located near the intersection of Diamond Point Road and Discovery View Drive. These connections are adjacent to the geographical area delineated as Pressure Zone 1 in the system's records. The water level in Reservoir 1 creates a hydraulic grade line of approximately 405 feet and the service connections are at an elevation of approximately 345 feet, which would result in static pressures of approximately 26-psi. Since these are below standard, Cascadia operates a booster pump at each of these service connections. Pressures on the discharge side of the booster pumps are set at 60-psi.

PRV 1 is at an elevation of approximately 240 feet and is set to maintain a downstream pressure of 55-psi, resulting in a hydraulic grade line of approximately 365 feet for Pressure Zone 2. The service connections range in elevation from approximately 165 feet to 240 feet, creating static pressure ranges of approximately 55- to 88-psi. There are currently 45 buildable parcels in Pressure Zone 2.

Pressure Zone 3

Pressure Zone 3 is fed via gravity from Reservoir 3 which is located on Clallam County Parcel 023015510551. Water levels in Reservoir 3 are controlled by an altitude valve located onsite and is filled from distribution system piping in Pressure Zone 2. Pressure Zone 3 is connected to Pressure Zone 2 by watermains; however, there are normally closed valves on those watermains which separate the two pressure zones. The closed valves are identified in the distribution piping map provided in Appendix V.

The water level in Reservoir 3 creates a hydraulic grade line of approximately 285 feet for Pressure Zone 3. The service connections range in elevation from approximately 40 feet to 175 feet, creating static

pressure ranges of approximately 48- to 107-psi. There are currently 138 buildable parcels in Pressure Zone 3.

Pressure Zone 4

Pressure Zone 4 is separated from Pressure Zone 3 by a pressure reducing valve station (PRV 2). PRV 2 is at an elevation of approximately 40 feet and is set to maintain a downstream pressure of 45-psi, resulting in a hydraulic grade line of approximately 145 feet for Pressure Zone 4. The service connections range in elevation from approximately 10 feet to 40 feet, creating static pressure ranges of approximately 45- to 58-psi. There are currently 114 buildable parcels in Pressure Zone 4.

Pressure Zone 5

Pressure Zone 5 is pressurized by a booster pump station that draws water from Pressure Zone #3. The pressure switch settings for the pump station are currently 70/96-psi and a flow control valve limits flow to 30 gpm. This will ensure that appropriate pressures can be maintained in the watermain leading to the pumphouse while providing sufficient flow to the pressure zone. For establishing a hydraulic grade line for Pressure Zone 5, the proposed 96-psi pressure switch pump off setting was used. The booster pump station is at an elevation of approximately 175 feet, resulting in a hydraulic grade line of approximately 400 feet. The service connections range in elevation from approximately 175 feet to 240 feet, creating static pressure ranges of approximately 67- to 90-psi. There are currently 13 buildable parcels in Pressure Zone 5.

3.3.2 Water Rights

Water rights place a legal limit on the amount of water a system can withdrawal from its sources and therefore may impact the capacity of a system. Diamond Point has multiple water rights. The Washington State Department of Ecology (DOE) interpreted these water rights in a letter dated September 26, 2006. This letter and each of the System's water rights are included in Appendix E. A summary of the System's water rights as interpreted by DOE is provided in Table 3-8. Additional water rights are not needed nor requested in association with this Water System Plan. A completed Water Right Self-Assessment Form is included in Appendix F.

Table 3-8 Water Rights Summary

Instantaneous Withdrawal (gpm)	Annual Withdrawal (acre-feet/year)
218	100

3.3.3 Source

Diamond Point is served by two ground water wells that are located on Clallam County parcel 023021130010. The wells are located approximately a mile south of the existing retail service area. DOH requirements for groundwater sources specify that the well shall be located, constructed, and maintained in a manner which will ensure the minimum possibility of contamination, and be so situated and developed as to prevent surface water from entering the well. To ensure adequate sanitary control in the vicinity of the well, the water systems must control all land within a radius of 100-feet of the well field, expect that the systems shall control land of a greater or lesser size or of a different shape than is defined by a 100-foot radius where an evaluation of geological and hydrological data, well construction details, and other relevant factors indicates that a control area of different size or shape will assure adequate sanitary control in the vicinity of the well. Cascadia Water has restrictive covenants for the parcel

containing both sources which are included in Appendix H. Bacteriological, chemical, and physical water quality are discussed in Section 3-2.

Well #1 was drilled in 1975 to serve as a primary source. Well #2 was drilled in 1981 to serve as a supplemental primary source for anticipated future development. The land surface elevation of both wells is approximately 305-feet (NAVD88). Well logs for each well are in Appendix G. Detailed information regarding each source is summarized in Table 3-9.

Table 3-9 Source Type, Location, and Use Information

	Well #1	Well #2
Source Type	Well (Non GWI)	Well (Non GWI)
DOE Tag	AGP297	AGP298
Source Location	Sec 21 T30N R02W	Sec 21 T30N R02W
Purpose of Use	Domestic Water Supply – Primary	Domestic Water Supply – Primary
Place of Use	See Water Right	See Water Right
Year of Installation	1975	1981
App. Capacity (gpm)	300	310
Ex. Capacity (gpm)	300	310
Pump Size (hp – gpm)	7.5 hp – 300 gpm	7.5 hp – 300 gpm
Casing Size	8”	7.5”
Ground Elev. (ft)	305	305
Bottom Well Depth (ft)	393	392
Static Water Depth (ft)	266	273
Top of Screens (ft)	373	372
Bottom of Screens (ft)	393	392
Drawdown (ft)	27	10

3.3.3.1 *Condition of Sources*

The sources are routinely monitored by the operator. No problems have been reported that would indicate an adverse condition was present.

3.3.3.2 *Current Facility Age and Estimate of Future Life Expectancy*

The groundwater wells that serve the system are 48- and 42-years old. The anticipated useful life of wells will vary depending on numerous factors. It is recommended that the static water level and pumping water levels be measured and recorded annually to monitor the status of both the wells and the installed pumps. The static water levels, pumping rates, and drawdown levels will help to determine timelines and priorities for replacement.

Depending on the operating conditions of the well pumps (i.e., if the head/flow and cycle times are within manufacturer recommendations), the well pumps should last through the Phase I planning cycle. However, as submersible pumps may fail without much warning, it is recommended that documentation on the installed submersible pumps and adequate reserves be kept on hand to fund and facilitate an emergency well pump replacement. Currently, both wells appear to be functioning as intended without a noticeable drop in production.

3.3.3.3 *Condition and Capacity of Transmission Mains*

The transmission main convey pumped water from the wells via a 4-inch PVC, class 160, solvent weld pipe approximately 4,000 feet north to Reservoir 2 located off Diamond Point Road in Pressure Zone 1. This portion of piping has historical and consistent issues with failure. This item is addressed in Section 3.5.1 regarding needed source improvements.

3.3.4 Storage

Water storage is necessary for multiple reasons. These reasons include an adequate storage volume to meet the daily fluctuations in demand, a sufficient volume to allow adequate runtime for pumps, an emergency reserve in case the supply system should fail, and to provide a large volume water for potential firefighting needs.

Water system storage is provided by three (3) individual reservoirs. Reservoir 1 is a circular reinforced concrete reservoir with a height of 30 feet and a diameter of 20 feet. This equates to approximately 70,500 gallons of reservoir storage. Reservoir 2 is a 114,000-gallon elevated steel tank. Due to seismic concerns, the tanks maximum available storage is limited to 57,000-gallons. Both Reservoir 1 and 2 are located approximately 4,000 feet north of the well site location off Diamond Point Road on Clallam County parcel 023021120030. Reservoir 3 is a circular reinforced concrete reservoir with a height of 52 feet and a diameter of 20 feet. This equates to approximately 122,200 gallons of reservoir storage. This reservoir is located off of West Road on Clallam County parcel 023015510551. The total storage available for the Water System is 252,000-gallons. A summary of the storage facilities for each system are provided in Table 3-10.

Table 3-10 Storage Facility

Reservoir	Volume (gallons)	Diameter (feet)	Height (feet)	Storage (gallons/ft)	Material	Year Built	Location
Reservoir 1	70,500	20.0	30.0	2,350	Concrete	2008	Diamond Point Rd
Reservoir 2	106,200	28.7	22.0	4,830	Steel	1986	Diamond Point Rd
Reservoir 3	122,200	20.0	52.0	2,350	Concrete	1974	West Rd

The system reservoirs provide the following storage components:

- Operational Storage (OS) – Section 3.4.6.1
- Equalizing Storage (ES) – Section 3.4.6.2
- Standby Storage (SBS) – Section 3.4.6.4
- Fire Suppression Storage (FSS) – Section 3.4.6.5
- Dead Storage (DS) – Section 3.4.6.3

3.3.4.1 *Current Facility Age and Estimate of Future Life Expectancy*

Concrete storage reservoirs, and elevated steel tank reservoirs typically have a 70+-year anticipated service life. The useful lifespan of the existing storage reservoir should surpass the planning periods of this Water System Plan. However, the reservoir should be routinely inspected for leaks, cracking, and other signs of wear or degradation. There have been bacteriological issues in Pressure Zone 1 in the past couple years that are being addressed with the chlorination of the sources. Since these issues are isolated to Zone 1, Reservoir 2 should be evaluated as a potential cause.

3.3.5 Booster Pumps and Pressure Tanks

Within the Diamond Point distribution system there are currently three (3) booster type pumps installed in. There are two (2) Transfer Pumps located in the building adjacent to Reservoir 1. The Transfer Pump

Station conveys water from Reservoir 1 into Reservoir 2, which in turn gravity feeds Pressure Zone 1. The two (2) transfer pump station operate in a lead/lag/alternate configuration when Reservoir 2 calls for water. Additional transfer pump information is provided in Table 3-11. Each Transfer Pump is capable of filling Reservoir 2 at a rate that exceeds the PHD associated with Pressure Zone 1.

Table 3-11 Transfer Pump Capacity

	Transfer Pump #1	Transfer Pump #2
Make and Model	Goulds 3656	Goulds 3656
Size	2 ½ x 3-10	2 ½ x 3-10
Impeller Diameter	8 ⅝"	8 ⅝"
Motor Horsepower	7.5	7.5
Motor RPM	1,750	1,750
Motor Phase	3	3
Capacity	300 gpm	300 gpm

Pressure Zone 5 is pressurized by a booster pump station that draws water from Pressure Zone 3. Information on the booster pump station is provided in Table 3-12.

Table 3-12 Pressure Zone 5 Booster Pump Capacity

	Booster Pump
Pump Make and Model	Berkeley 15LT2
Pump Quantity	1
Motor Horsepower	1 ½
Motor RPM	3,450
Motor Phase	1
Pump Inlet Pressure	30 – 48 psi
Pressure Tanks	(7) 86-gallon tanks
Current Pressure Switch Settings (ON/OFF)	70/90 psi
Flow Control Valve Setting	30 gpm

The pressure switch settings for the Pressure Zone 5 booster pumps is set at 70/96 psi and a flow control valve installed on the system limits flows to 30 gpm. This limitation ensures that appropriate pressures can be maintained in the water main leading to the pumphouse while providing sufficient flow to the services associated with Pressure Zone 5. There are seven (7) 86-gallon pressure tanks with bladders which are currently installed in the pump house for Pressure Zone 5 which provide pump protection for this pump.

3.3.5.1 *Current Facility Age and Estimate of Future Life Expectancy*

The Transfer Pumps should last through the planning period of this Water System Plan. They are currently sufficiently sized to exceed the PHD associated with Pressure Zone 1. Additional information regarding pump capacity and proposed improvements are detailed in Section 3.5.4.

3.3.6 Distribution

Mains throughout the systems are tapped for the individual service connections. The following sections provide additional details on the distribution system.

3.3.6.1 Length, Diameter, and Type of Pipe

A comprehensive inventory of the system, including distribution system piping, is provided in Appendix N. A comprehensive inventory of the system is provided in A summary of the pipe length and material within the system is provided in Table 3-13.

Table 3-13 Distribution System Piping Sizing

Diameter (in)	Material	Year Installed	Length (ft)
2	PVC Schedule 80	2000	220
4	Black PVC (unknown)	1960	12,130
4	Asbestos Cement (AC)	1965	12,650
4	PVC Class 160	1980	3,475
6	Asbestos Cement (AC)	1970	755
6	PVC C900	1990- 2008	7,255
8	PVC C900	1990- 2008	1,860
Total:			37,590

The various lines sizes in the distribution system are shown in Figure 3-2. The 4-inch water main that runs from Reservoir 1 to the Well Field is shown off the figure. A more detailed plan of the pipe sizes and types is provided in Appendix V.

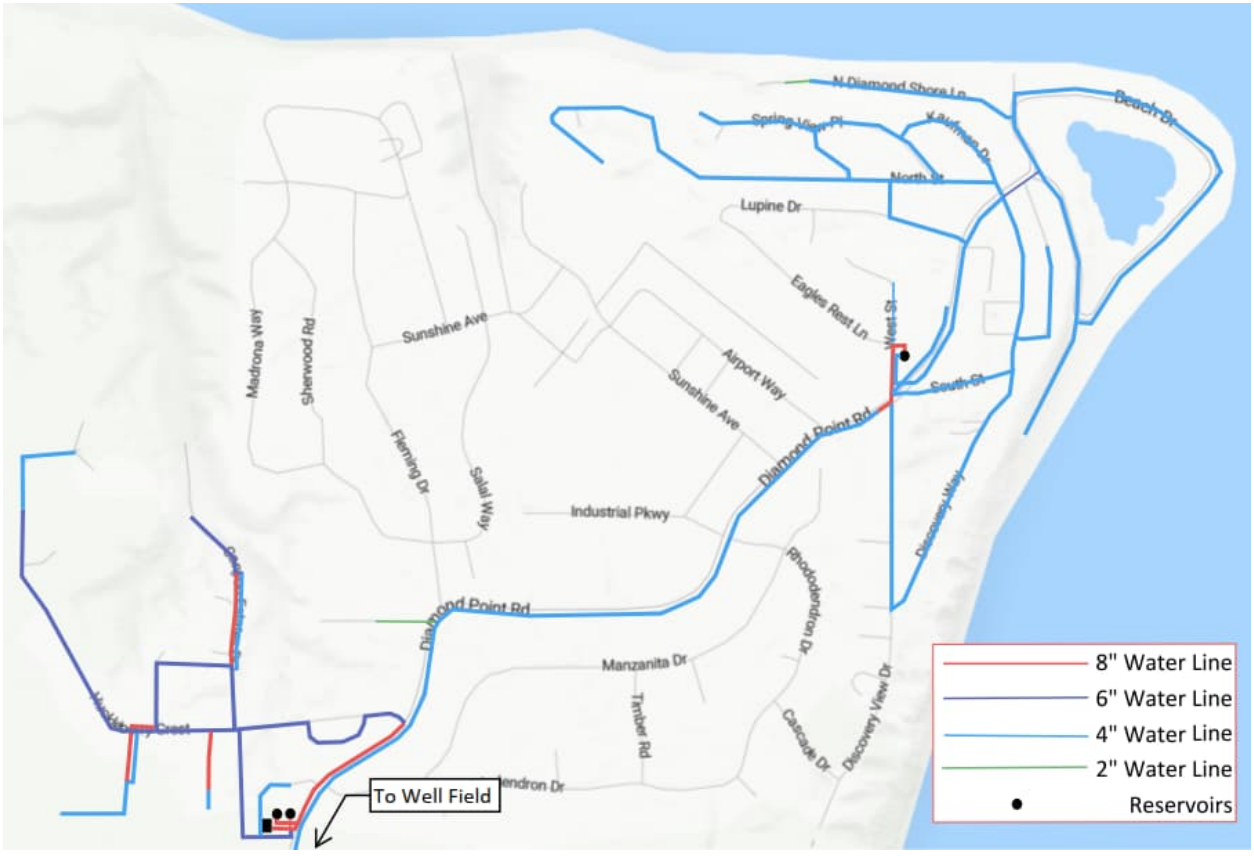

Figure 3-2 Diamond Point Distribution Piping

3.3.7 Hydraulic Analysis of Distribution System

Hydraulic analyses were done for the system distribution system using the hydraulic modeling software EPANET. The model uses the Hazen-Williams equation to estimate head-losses throughout the system. Models were developed for both the existing system and the system following distribution system improvements at approximately 2043 in accordance with Section 6.1.4 of the Design Manual.

Per the Design Manual, the distribution systems must be adequately sized to meet minimum residual pressure requirements at service connections. It is further recommended that maximum pressures and velocities are limited. These requirements and recommendations are as follows:

1. Minimum design pressure of 30 psi at service connections under PHD conditions
2. Minimum design pressure of 20 psi in distribution system under fire flow plus MDD conditions, if applicable
3. Maximum recommended design pressure of 80 psi
4. Maximum recommended design velocity in watermains of 8 feet per second (fps)

A hydraulic model for the System was prepared and is included in Appendix Q. This hydraulic model assumes 452 ERUs, including 142 ERUs in Pressure Zone 1 to represent the future parcels in that pressure zone and future ERUs. The model includes three scenarios: static, peak hour demand, and fire flow plus MDD.

Static Zero Demand Scenario:

The static scenario (zero demand) model of the system is not required by DOH. The model was created to analyze the highest pressures in the system to determine how the system operates during normal operation. To simulate high pressures, the static model assumes reservoirs are filled to the top of operational storage and the Pressure Zone 5 booster pump pressure settings are set at the "off" pressure. In the "Future" models, the new booster pumps serving Pressure Zone 1 are set at their assumed "off" pressure setting as well.

PHD Scenario:

The peak hour demand (PHD) model simulates a peak demand scenario and therefore represents the lowest pressures the System will experience under normal operating conditions. Per the Design Manual, waters systems are required to be capable of providing the PHD to the system while maintaining a required minimum pressure of 30-psi at all service connections. In this scenario, equalizing storage in each reservoir is depleted and the Pressure Zone 5 booster pump pressure settings are set at the "on" pressure. In the "Future" models, the new booster pumps serving Pressure Zone 1 are set at their assumed "on" pressure setting as well.

Fire Flow & MDD Scenario:

The fire flow scenario models the system is required to be capable of providing the MDD with fire flow demands at a hydrant while maintaining a required minimum pressure of 20-psi at all service connections. Clallam County Code (CCC) 21.02.035 (d) lists the fire flow requirements for a residential system, requiring 500 gpm for forty-five (45) minutes. In this scenario, equalizing and fire suppression storage in each reservoir is depleted (See Section 3.4.5.6). This modeling scenario has been included despite fire flow requirements not being applicable to the Diamond Point system. A letter from the Clallam County Fire Marshal has been included in Appendix U clarifying that fire flow requirements are not applicable at this system as they were constructed before any applicable county regulations were in effect.

3.3.7.1 Existing Distribution System – Static Scenario

In this static model, each reservoir level is set at the top of operational storage (See Section 3.4.5.6). The Pressure Zone 5 booster pump settings are at the "off" pressure of 96-psi. The model indicates that in this scenario, service pressures in the distribution system will range between 32- and 107-psi. There are two service connections in Pressure Zone 2A which have pressures below 30 psi. As previously noted in Section 3.3.1, the two services at this point in the distribution system have service pressures maintained by individual pumps maintained by the owner/operator, Cascadia Water. Pressures at all other service connections exceed 30-psi. The highest pressures occur in Pressure Zone 3 upstream of PRV 2.

3.3.7.2 Existing Distribution System – PHD Scenario

In this PHD model, each reservoir level is set at the bottom of equalizing storage (See Section 3.4.5.6). The Pressure Zone 5 booster pump settings are at the "on" pressure of 70-psi. The model indicates that in this scenario, System pressures will range between 32- and 89-psi. Once again, the two service connections in Pressure Zone 2, where service pressures are supported by individual pumps maintained by Cascadia Water, the model shows pressures to be 20.4-psi. Pressures at all other service connections exceed 30-psi. The highest pressures occur in Pressure Zone #3 upstream of PRV 2. The maximum velocity in the distribution system watermains is 4.7 fps.

3.3.7.3 Existing Distribution System – Fire Flow & MDD Scenario

In this Fire Flow & MDD model, each reservoir level is set at the bottom of equalizing and fire suppression storage (See Section 3.4.5.6). Fire flow demand was placed at fire hydrant #3 in the hydraulic model because this results in the worst-case distribution system pressure of all hydrants. The model indicates that in this scenario, System pressures will range between 28- and 98-psi. Once again, the two service connections in Pressure Zone 2, where service pressures are supported by individual pumps maintained by Cascadia Water, the model shows pressures to be 11.4 psi. The highest pressures occur in Pressure Zone 3 upstream of PRV 2. The maximum velocity in the distribution system watermains is 5.7 fps.

Minimum pressure requirements are met in all three hydraulic model scenarios. Therefore, the distribution system has adequate capacity to support the proposed capacity of 472 ERUs. Currently Pressure Zone 2 is unable to meet fire flow demands due to the undersized, 4-inch, distribution main from Reservoir 1 to PRV 1 along Diamond Point Road.

3.3.7.4 Future Distribution System – Static Scenario

With all future models, the Capital Improvement Projects specified in Chapter 8 are shown in the model. The significant changes in the hydraulic model include:

- Replace the Reservoir 2 with a ground level reservoir hydraulically equivalent to Reservoir 1.
- Replace the Transfer Pumps with properly sized booster pumps and a hydropneumatic tank
- Replace and increase the diameter of the line from the wells up to Reservoir 1 to 6-inches in diameter.
- Replace and increase the diameter of the line from Reservoir 1 to PRV 1 to 8-inces in diameter.
- Loop the northwest corner of Pressure Zone 1 with 6-inch diameter pipe.

In this static model, each reservoir level is set at the top of operational storage (See Section 3.4.5.6). The Pressure Zone 5 booster pump and the new Pressure Zone 1 booster pumps are at the "off" pressure of 96- and 50-psi respectively. The model indicates that in this scenario, service pressures in the distribution system will range between 48- and 107-psi. The highest pressures occur in Pressure Zone 3 upstream of PRV 2.

3.3.7.5 Future Distribution System – PHD Scenario

In this PHD model, each reservoir level is set at the bottom of equalizing storage (See Section 3.4.5.6). The Pressure Zone 5 booster pump sand the new Pressure Zone 1 booster pumps are at the "on" pressure of 70- and 40-psi respectively. The model indicates that in this scenario, System pressures will range between 31- and 89-psi. The highest pressures occur in Pressure Zone 3 upstream of PRV 2. The maximum velocity in the distribution system watermains is 4.7 fps (aside from water passing through the PRV stations).

3.3.7.6 Future Distribution System – Fire Flow & MDD Scenario

In the Fire Flow & MDD model, each reservoir level is set at the bottom of equalizing and fire suppression storage (See Section 3.4.5.6). Fire flow demand was placed at Node 30 (northwest corner of Pressure Zone 1) in the hydraulic model because this results in the worst-case distribution system pressure of all hydrants. The model indicates that in this scenario, System pressures will range between 36- and 98-psi. The highest pressures occur in Pressure Zone 3 upstream of PRV 2. The maximum velocity in the distribution system watermains is 3.3 fps.

With the proposed improvements, the system would be able to provide fire flow to the distribution system within Pressure Zone 2 and the fill rate for Reservoir 3 would no longer need to be throttled at 50 gpm.

3.4 Capacity Analysis

The system capacity was calculated in accordance with the DOH Water System Design Manual (June 2020) using the equations/procedures in Chapter 4: Water System Capacity Analysis.

The capacity calculations are based on the accepted design values as outlined in Chapter 2 for both Average Daily Demand (ADD) and Maximum Daily Demand (MDD). The capacities were calculated and expressed in terms of Equivalent Residential Units (ERUs) based on existing system parameters. System consumption data including customer consumption data, including ADD and MDD expressed in terms of gallons per day per ERU, were used throughout the system capacity calculations.

The analysis provided in this section demonstrates that the physical and legal capacities for Diamond Point is 472 ERUs limited by the source operation. A copy of the capacity analysis calculations detailed in this section are provided in Appendix P.

3.4.1 Water Right Capacity Based on Annual Volume & Average Day Demand

The water right for the system allows for an annual withdrawal of 75 acre-feet per year (24,437,160-gallons). Equation 4-4b in the Design Manual was used to determine the number of ERUs based upon Average Daily Demand (ADD) and water right:

Equation 4-4b:

$$N = \frac{(Q_a)}{(ERU_{ADD})(365)}$$

$$N = \frac{100\ acre \cdot \frac{\text{ft}}{\text{yr}} \cdot \frac{43{,}560\ \text{ft}^2}{\text{acre}} \cdot 7.48 \frac{\text{gal}}{\text{ft}^3}}{365\ days/yr \cdot 150 \frac{gpd}{ERU}} = 595\ ERUs$$

Where,

N = ERUs Supported
V_a = Annual Volume (gallons/year)

Q_a = Annual Volume (gallons/year)
t_a = time that the source (Qi) delivers flow in a 24-hour period (minutes)
ERU_{ADD} = ADD value per ERU (Section 2.1.4)

ADD was determined to be 150 gpd/ERU (See Section 2.1.4) and the established water right annual withdrawal volume of 100 ac-ft/yr as the annual volume (V_a), then the number of total ERUs that may be served calculates to 595 ERUs based on ADD and the allowed annual withdrawal volume.

3.4.2 Water Right Capacity Based on Instantaneous Flow & Maximum Day Demand

The water right for the system allows for an instantaneous pumping rate of 218 gallons per minute. Equation 4-4a in the WSDOH Design Manual to determine the number of ERUs based upon Maximum Daily Demand (MDD) and water right:

Equation 4-4a:

$$N = \frac{(V_d)}{(ERU_{MDD})} = \frac{(Q_i * t_d)}{(ERU_{MDD})}$$

$$N = \frac{218\ gpm\ \cdot\ 1{,}440\ minutes/day}{400\ gpd/ERU} = 784\ ERUs$$

Where,

N = ERUs Supported
V_a = Annual Volume (gallons/year)
Q_a = Annual Volume (gallons/year)
t_a = Annual Volume (gallons/year)
ERU_{MDD} = MDD value per ERU (Section 2.1.5)

MDD was determined to be 400 gpd/ERU (Section 2.1.5) and the current water right instantaneous pumping rate of 218 gallons per minute as the annual volume (V_d), then the number of total ERUs that may be served calculates to 784 ERUs based on MDD and the allowed instantaneous pumping rate.

3.4.3 Source Capacity Based on Maximum Day Demand

According to the Design Manual, all water systems must have sufficient source capacity to meet MDD. In other words, over a 24-hour period, a system's sources must be able to produce a volume of water greater than or equal to the MDD. The Design Manual Section 4.4.2.7 outlines the evaluation procedure to the number ERUs that can be supported based upon source capacity and MDD. The Design Manual provides Equation 4-1 to determine individual source capacity of each source in the System.

Equation 4-1:

$$V_j = Q_j t_j$$

Where,

V_j = Total volume produce by source (in a 24-hour period)
Q_i = Delivery rate of source (gallons per minute)
t_i = Time that the source (Qi) delivers flow in a 24-hour period (minutes)

Section 3.10.4 of the Design Manual recommends against designs based on pumping 24-hours per day to meet future MDD. An assumed 20 hours per day, once again, provides a factor of safety and an increased ability to meet unexpected demands. The System has two sources, both of which are groundwater wells.

The current production rate of each well was used to determine the source capacity of the System. These production rates are 136 gpm for Well #1 and 147 gpm for Well #2. More detailed information on these sources is provided in Section 3.3.3. Using Design Manual Equation 4-1, the individual source capacity for each well was calculated as follows.

$$V_1 = Q_1 t_1 = (136\ gal/min)(720\ min/day) = 97{,}900\ gal/day$$
$$V_2 = Q_2 t_2 = (147\ gal/min)(720\ min/day) = 105{,}800\ gal/day$$

The total source capacity of the System is the sum of the individual source capacities and can be calculated using Equation 4-2 from the Design Manual. Emergency sources are not included in this calculation.

Equation 4-2:

$$V_T = \sum Q_j t_j$$

$$V_T = 97{,}900\ gal/day + 105{,}800\ gal/day = 203{,}700\ gal/day$$

Where,

V_T = Total volume of water delivered from all nonemergency sources over a 24-hour period

The Design Manual provides Equation 4-3 to for the evaluation of the maximum number of ERUs a system can support based on that system's total source capacity and ERU_{MDD}.

Equation 4-3:

$$N = \frac{V_t}{ERU_{MDD}} = \frac{(Q_s * t_d)}{ERU_{MDD}}$$

$$N = \frac{203{,}700\ gal/day}{400\ gal/day/ERU} = 509\ ERUs\ maximum$$

Where,

N = ERUs Supported
Q_i = Delivery rate of source (gallons per minute)
t_i = Time that the source (Qi) delivers flow in a 24-hour period (minutes)
ERU_{MDD} = MDD value per ERU (Section 2.1.5)

Therefore, the number of ERUs that can be supported by the Water System's sources is 509.

3.4.4 System Capacity Based on Booster Pump Capacity

Currently, the Water System's pressure zones are gravity fed from each reservoir except for Pressure Zone 5 located in the north-central portion of the service area. The Pressure Zone 5 booster pump should be able to meet the PHD of Pressure Zone 5. Equation 3-1 from the DOH Water System Design Manual was used to determine the maximum number of ERUs the System's existing booster pump station can support.

Equation 3-1:

$$N = \frac{\left[\frac{1440(Q_B - 18)}{MDD - F}\right]}{C}$$

$$N = \frac{\frac{1440}{400\ gpd/ERU}(30\ gpm - 18) - 0}{3.0} = 14\ ERUs\ maximum$$

Where,
N = Number of ERUs
Q_B = Booster Pump Capacity (gallons/minute)
MDD = Maximum Daily Demand per ERU (gpd/ERU)
F = PHD Coefficient from Table 2-6
C = PHD Coefficient from Table 2-6

The booster pump capacity (Q_B) was determined using the pump curve for the Pressure Zone 5 booster pump. The booster pump curve is included in Appendix O. As discussed in Section 3.3.5, a flow control valve is installed on the outlet side of the pump which restricts flow to 30-gpm. According to the hydraulic model, when the booster pump is running with 70-psi on its pressure side, the lowest pressure the pump will experience on its suction side is 31 psi; therefore, the minimum maximum pressure boosts the pump must provide is 39-psi. When the booster pump is running with 90-psi on its pressure side, the lowest pressure the pump will experience on its suction side is 42 psi. The 39/42 psi operating points were plotted on the pump curve, resulting in a flow rate operating range of 30 to 59 gpm. Due to the flow control valve, 30-gpm was used for Q_B when determining N in Equation 3-1

There are 13 buildable parcels/current potential ERUs in Pressure Zone 5 and no plans to increase the number of ERUs, therefore the booster pump has sufficient capacity to meet demand for the current and future anticipated demands.

3.4.4.1 Pressure Tanks

The system as currently installed has six, 86-gallon bladder tanks installed at the Pressure Zone 5 booster pump station to provide pump protection. Equation 9-1 from the DOH Design Manual was used to determine the minimum pressure tank volume needed for the system.

Equation 9-1:

$$T \geq \frac{(R)(Q_p)}{(N_C)(V_B)}$$

Where:
$R = \frac{15(P_1+14.7)(P_2+14.7)}{(P_1-P_2)(P_2+9.7)}$
V_B = The gross volume of an individual bladder tank (86 gal).
T = The number of bladder tanks of gross volume V_B
P_1, P_2 = Pressure boosts provided by booster pump corresponding to selected for water system operation in psi. P_1 corresponds to the pump-off pressure and P_2 corresponds to the pump-on pressure.
N_C = Number of pump operating cycles per hour (6).
Q_P = Pump delivery capacity in gpm at midpoint of selected pressure range.

Equation 9-1 was applied to two scenarios: where the booster pump experiences the lowest pressure on its suction side and when it experiences the highest pressure on its suction side .

Pressure Tank Sizing – Low Pressure Analysis:

According to the hydraulic model, at the pump off pressure (90-psi), the suction side pressure is 31-psi, resulting in a pressure boost of P_1 = 59-psi. At the pump on pressure (70-psi), the suction side pressure is 30-psi, resulting in a pressure boost of P_2 = 40-psi. A pressure boost of 59-psi corresponds to a flow rate of 29 gpm on the pump curve, and a pressure boost of 40-psi corresponds to 47 gpm. Therefore, Q_P = 38 gpm. The number of required bladder tanks can then be calculated as follows.

$$T \geq \frac{(64)(38\ gpm)}{(6)(86\ gal)} \geq 4.7\ tanks = 5\ tanks\ required$$

Pressure Tank Sizing – High Pressure Analysis:

According to the hydraulic model, at the pump off pressure (90-psi), the suction side pressure is 48-psi, resulting in a pressure boost of P_1 = 42-psi. At the pump on pressure (70-psi), the suction side pressure is 45 psi, resulting in a pressure boost of P_2 = 25-psi. A pressure boost of 42-psi corresponds to a flow rate of 45 gpm on the pump curve, and a pressure boost of 25 psi corresponds to 58 gpm. Therefore, Q_P = 51.5 gpm. The number of required bladder tanks can then be calculated as follows.

$$T \geq \frac{(57.2)(51.5\ gpm)}{(6)(86\ gal)} \geq 5.7\ tanks = 6\ tanks\ required$$

The number of required pressure tanks is equal to the highest number required from the two identified scenarios. Therefore, six (6) 86-gallon pressure tanks are required. As noted in Table 3-11, seven (7) 86-gallon pressure tanks are currently installed; therefore, the existing pressure tanks have sufficient capacity to meet Pressure Zone 5 demand.

3.4.5 System Capacity Based on Existing Storage Volumes

Water storage is necessary for multiple reasons. These reasons include an adequate storage volume to meet the daily fluctuations in demand, a sufficient volume to allow adequate runtime for pumps and the treatment system(s), an emergency reserve in case the supply system should fail, and to provide a large volume water for potential firefighting needs.

The capacity for the distribution system was analyzed to determine the necessary storage volumes associated with the three (3) reservoir that serve the system. A summary of each reservoir and its total volume is provided in Table 3-9. A complete set of calculations are included in Appendix P. The following storage components were analyzed and reported:

- Operational Storage (OS) – Section 3.4.5.1
- Equalizing Storage (ES) – Section 3.4.5.2
- Standby Storage (SBS) – Section 3.4.5.4
- Fire Suppression Storage (FSS) – Section 3.4.5.5
- Dead Storage (DS) – Section 3.4.5.3

Each component of storage for the system is discussed in the following subsections.

3.4.5.1 Operational Storage

Operational storage (OS) is the volume of the reservoir devoted to supplying the water system while under normal operating conditions.

Reservoir 1:

Reservoir 1 is filled by the two (2) wells. Operational storage is the height difference between the water levels in the reservoir where the well pumps are turned on and off. One foot of operational storage is assumed. Therefore, the operational storage is calculated as follows.

$$OS_{Res\ 1} = 1.0\ ft \times 2{,}350\ gal/ft = 2{,}350\ gal\ (or\ 1.0\ ft\ of\ storage)$$

Reservoir 2:
Reservoir 2 is filled by the Transfer Pumps. Operational storage is the height difference between the water levels in the reservoir where the transfer pumps are turned on and off. One foot of operational storage is assumed. Therefore, the operational storage is calculated as follows.

$$OS_{Res\ 2} = 1.0\ ft \times 4{,}830\ gal/ft = 4{,}830\ gal\ (or\ 1.0\ ft\ of\ storage)$$

Reservoir 3:
Reservoir 3 filling operations are controlled by an altitude valve on the reservoir inlet line as described in Section 3.3.1. Operational storage is the height difference between the water levels in the reservoir where the altitude valve opens and closes. Six inches of operational storage is provided. Therefore, the operational storage is calculated as follows.

$$OS_{Res\ 3} = 0.5\ ft \times 2{,}350\ gal/ft = 1{,}175\ gal\ (or\ 0.5\ ft\ of\ storage)$$

3.4.5.2 Equalizing Storage

Equalizing Storage (ES) is the volume of water that is needed to meet the peak demand period for the water system while maintaining 30-psi in the distribution system according to DOH Section 7.1.1.2. ES is calculated for from Equation 7-1 in the Design Manual:

Equation 7-1:

$$ES\ =\ (PHD - Qs) \cdot 150\ minutes, but\ in\ no\ cases\ less\ than\ zero$$

Where:
PHD = peak hour demand (Table 2-7, Section 2.1.6);
Qs = well pump capacity,

Reservoir 1:
The combined PHD of Pressure Zones 1 and 2 are applied to determining the volume of equalizing storage required for Reservoir 1. However, the PHD of Pressure Zones 3 through 5 are not applied to the equalizing storage of Reservoir#1; this is because the altitude valve on the Reservoir #3 fill line is throttled to 50 gpm to maintain adequate distribution system pressures while Reservoir 3 is calling for water. Therefore, the peak flowrate considered for determining Reservoir 1's equalizing storage is the sum of the combined PHD from Pressure Zones 1 and 2, as listed in Table 2-7, and 50 gpm. This equates to 154 gpm + 50 gpm = 204 gpm. ES for Reservoir 1 is therefore calculated as follows:

$$ES = (204\ gpm - 136\ gpm)(150\ min) = 10{,}200\ gal\ (or\ 4.3\ ft\ of\ storage)$$

Reservoir 2:
The PHD of Pressure Zone 1 is applied to determine the volume of ES required for Reservoir 2. Since Reservoir 2 is filled by the Transfer Pump from Reservoir 1, the Qs value is that pumping rate of an individual Transfer Pump (300 gpm). ES for Reservoir 2 is therefore calculated as follows.

$$ES = (118\ gpm - 300\ gpm)(150\ min) = -27{,}300\ gal$$

$$\therefore ES = 0\ gal$$

Reservoir 3:
The combined PHD of Pressure Zones 3 through 5 are applied to determining the volume of ES required for Reservoir 3. Per Table 2-7 the combined PHD for these pressure zones is 185 gpm. Since the filling of Reservoir 3 is throttled to 50 gpm to protect system pressures, the Qs value for this reservoir is 50 gpm. ES for Reservoir 2 is therefore calculated as follows.

$$ES = (185\ gpm - 50\ gpm)(150\ min) = 20{,}250\ gal\ (or\ 8.6\ ft\ of\ storage)$$

3.4.5.3 Dead Storage

Dead Storage (DS) is the unusable volume at the top and bottom of the tank. The DS will be the sum of the Top Dead Storage (TDS) and Bottom Dead Storage (BDS) associated with each reservoir. Those values are detailed for each reservoir as follows.

Reservoir 1:
TDS for Reservoir 1 is the height difference between the well pump off water level and the reservoir ceiling. One foot of top dead storage is assumed. TDS for Reservoir 1 is calculated as follows:

$$TDS = 1.0\ ft \times 2{,}350\ \ gal/ft = 2{,}350\ gal\ (or\ 1.0\ ft\ of\ storage)$$

0.5 feet of BDS is provided in the reservoir to protect pumps which still allows for adequate pressures in Pressure Zone 2. BDS for Reservoir 1 is calculated as follows:

$$BDS = 0.5\ ft \times 2{,}350\ \ gal/ft = 1{,}175\ gal\ (or\ 0.5\ ft\ of\ storage)$$

Total dead storage for Reservoir 1 is the sum of its TDS and BDS, or 3,525 gallons.

Reservoir 2:
TDS for Reservoir 1 is the height difference between the Transfer Pump off water level and the reservoir ceiling. Reservoir 2 operates with 10 feet of TDS due to seismic limitations on the level the elevated steel tank can be filled to. TDS for Reservoir 2 is calculated as follows:

$$TDS = 10.0\ ft \times 4{,}830\ \ gal/ft = 48{,}300\ gal\ (or\ 10.0\ ft\ of\ storage)$$

0.5 feet of BDS is assumed for a silt stop on the reservoir inlet/outlet. Adequate pressures in Pressure Zone 1 can be maintained during PHD and fire flow plus MDD conditions with a reservoir water level of 6-inches. BDS for Reservoir 2 is calculated as follows:

$$BDS = 0.5\ ft \times 4{,}830\ \ gal/ft = 2{,}415\ gal\ (or\ 0.5\ ft\ of\ storage)$$

Total dead storage for Reservoir 2 is the sum of its TDS and BDS, or 50,715 gallons.

Reservoir 3:
TDS for Reservoir 3 is the height difference between the altitude valve closing water level and the reservoir ceiling. One foot of top dead storage is assumed. TDS for Reservoir 3 is calculated as follows:

$$TDS = 1.0\ ft \times 2{,}350\ \ gal/ft = 2{,}350\ gal\ (or\ 1.0\ ft\ of\ storage)$$

0.5 feet of BDS is provided is assumed for a silt stop on the reservoir inlet/outlet. Adequate pressures in Pressure Zones 3 through 5 can be maintained during PHD and fire flow plus MDD conditions with a reservoir water level of 0.5 feet. BDS for Reservoir is calculated as follows:

$$BDS = 0.5\ ft \times 2{,}350\ \ gal/ft = 1{,}175\ gal\ (or\ 0.5\ ft\ of\ storage)$$

Total dead storage for Reservoir 3 is the sum of its TDS and BDS, or 3,525 gallons.

3.4.5.4 Standby Storage

Water Systems employ Standby Storage (SB) in reservoirs to provide continued water supply during abnormal operating conditions, such as structural, electrical, mechanical, or treatment process failure; or source contamination (WAC 246-290-420). As noted in the Design Manual, SB is a recommendation. The amount of SB may be reduced below the recommended level as the degree to which SB is incorporated is a direct reflection of the consumers' expectations of water service during abnormal operating conditions. Section 7.1.1.3 of the Design Manual recommends SB volume equal to MDD for the pressure zones served. The same section of the Design Manual recommends a minimum SB volume of at least 200 gallons per ERU. There are multiple reasons to consider a reduced SB volume for systems with multiple sources, such as Diamond Point.

Below, the SB associated with each of the three (3) system reservoirs is discussed. This includes the "available SB" which is calculated as the storage not already utilized in OS, ES, and DS.

Reservoir 1:
The available (SB_{Ava1}), recommended (SB_{Rec1}), and minimum (SB_{Min1}) volumes of standby storage associated with Reservoir 1 and the potential 45 ERUs associated with Pressure Zone 2 (See Table 2-7) are calculated as follows:

$$SB_{Ava1} = V_R - OS - ES - DS = 70{,}500\ gal - 2{,}350\ gal - 10{,}200\ gal - 3{,}575\ gal = 54{,}425\ gal$$

$$SB_{Rec1} = ERU_{MDD}\ x\ ERUs = 400\frac{gpd}{ERU}\ x\ 45\ ERUs = 18{,}000\ gal$$

$$SB_{Min1} = 200\frac{gpd}{ERU}\ x\ ERUs = 200\frac{gpd}{ERU}\ x\ 45\ ERUs = 9{,}000\ gal$$

With 45 potential future ERUs in Pressure Zone 2, the Reservoir 1 available SB is equivalent to 1,209 gallons per ERU which exceeds the recommended levels by 36,425 gallons which could be use to supplement Reservoir 2, if Transfer Pumps are operational, and Reservoir 3. A summary of Reservoir 1 storage components is provided in Table 3-14.

Reservoir 2:
The available (SB_{Ava2}), recommended (SB_{Rec2}), and minimum (SB_{Min2}) volumes of standby storage associated with Reservoir 2 and the potential 142 ERUs associated with Pressure Zone 1 (See Table 2-7) are calculated as follows :

$$SB_{Ava2} = V_R - OS - ES - DS = 106{,}200\ gal - 4{,}830\ gal - 0\ gal - 50{,}715\ gal = 50{,}655\ gallons$$

$$SB_{Rec2} = ERU_{MDD}\ x\ ERUs = 400\frac{gpd}{ERU}\ x\ 142\ ERUs = 56{,}800\ gal$$

$$SB_{Min2} = 200\frac{gpd}{ERU}\ x\ ERUs = 200\frac{gpd}{ERU}\ x\ 142\ ERUs = 28{,}400\ gal$$

With 142 potential future ERUs in Pressure Zone 1, the Reservoir 2 available SB is equivalent to 356 gallons per ERU which exceeds the minimum recommended levels (SB_{Min2}). An additional 6,145 gallons of excess SB from Reservoir 1 would allow Reservoir 2 to meet the recommended volume of SB (SB_{Rec2}) if Transfer Pumps were operational. A summary of Reservoir 2 storage components is provided in Table 3-14.

Reservoir 3:
The available (SB_{Ava3}), recommended (SB_{Rec3}), and minimum (SB_{Min3}) volumes of standby storage associated with Reservoir 3 and its potential 265 ERUs associated with Pressure Zones 3 through 5 (See Table 2-7) are calculated as follows :

$$SB_{Ava3} = V_R - OS - ES - DS = 122{,}200\ gal - 1{,}175\ gal - 20{,}250\ gal - 3{,}575\ gal = 97{,}250\ gal$$

$$SB_{Rec3} = ERU_{MDD}\ x\ ERUs = 400\frac{gpd}{ERU}\ x\ 265\ ERUs = 106{,}000\ gal$$

$$SB_{Min3} = 200\frac{gpd}{ERU}\ x\ ERUs = 200\frac{gpd}{ERU}\ x\ 265\ ERUs = 53{,}000\ gal$$

With 265 potential future ERUs in Pressure Zones 2 through 5, the Reservoir 3 available SB is equivalent to 367 gallons per ERU which exceeds the minimum recommended levels (SB_{Min3}). An additional 8,750 gallons of excess SB from Reservoir 1 would allow Reservoir 3 to meet the recommended volume of SB (SB_{Rec2}). A summary of Reservoir 3 storage components is provided in Table 3-14.

3.4.5.5 Fire Suppression Storage

Fire Suppression Storage (FSS) level depends on the maximum flow rate and duration which is set by the local fire protection authority which determines a fire flow requirement for water systems. Fire flow requirements for residential communities in Clallam County are 500 gpm for 45 minutes, or 22,500 gallons of storage. Per WAC 246-290-235(4) systems may consolidate or nest SB and FSS volumes with the larger of the two volumes being the minimum available. Fire hydrants are only available in Pressure Zone 1, therefore FSS is only required in Pressure Zone 1. The available SB volume from Reservoir 2 exceeds the required FSS of 22,500 gallons, therefore the reservoir provides adequate FSS. FSS is nested within the standby storage for Reservoir 2.

Although Reservoir 1 and Reservoir 2 are not required to provide FSS, both reservoirs have available standby storage volumes in excess of the required FSS. A summary of Reservoir 3 storage components is provided in Table 3-14.

3.4.5.6 Storage Summary

The provided storage volumes (assuming the maximum potential capacity of the system as established in Appendix P) is summarized in the Table 3-14.

Table 3-14 Storage Components

Storage Component	Reservoir 1		Reservoir 2		Reservoir 3	
	Volume (gal)	Height (ft)	Volume (gal)	Height (ft)	Volume (gal)	Height (ft)
Operational Storage (OS)	2,350	1.0	4,830	1.0	1,175	0.5
Equalizing Storage (ES)	10,200	4.3	0	0	20,250	8.6
Standby Storage (SB)	54,425	23.2	50,655	10.5	97,250	41.4
Fire Suppression Storage (FSS)[A]	*(22,500)*	*(9.6)*	*(22,500)*	*(4.7)*	*22,5000*	*(9.6)*
Dead Storage (DS)	3,525	1.5	50,715	10.5	3,525	1.5
Totals:	70,500	30.0	106,200	22.0	122,200	52.0

3.4.5.7 Water Age and Turnover

Water age may sometimes become a problem in storage reservoirs, especially when the system is not at its maximum design capacity. The average age of the water in the reservoir is calculated based upon the system ERU_{ADD} of 150 gpd/ERU and the current number of connections. The storage volume used is the total volume of the reservoir minus the top dead storage and the operational storage (232,700 gallons).

$$Water\ Age\ = \frac{Storage\ Volume}{ADD_{min} \cdot ERU}\ =\ \frac{232{,}700\ gallons}{150\ \text{gpm/ERU} \cdot 306\ \text{ERU}} = 5.07\ days$$

The available storage volume is approximately within the general recommendation of complete turnover of water occurring at least every three to five days.

3.4.5.8 Storage Capacity

As noted in the previous subsection, storage capacity for each reservoir correlates to system operations and specific pressure zone. To place an actual numerical value to the storage capacity to various pressure zone the following assumptions have been made:

1. Top Dead Storage, Bottom Dead Storage, and Operational Storage remain unchanged as the ERUs increase.
2. The minimum recommended Standby Storage of 200 gallons per ERU (Design Manual Section 7.1.1.3) will be maintained.

In this scenario, that maximum number of ERU is that can be supported by each reservoir would be the available ES and SB for each reservoir. It is calculated as follows:

$$ES_{Avail}\ +\ SB_{Avail}\ = \left[\left[\left(\frac{MDD}{1440}\right)(CN + F)\ + 18\right] - Q_S\ x\ 150\right] + 200N$$

$$N = \frac{(ES + SB) - 2700 + 150Q_S - \left(5/48\right)(MDD)(F)}{\left(5/48\right)(MDD)(C) + 200}$$

Below, the maximum number of ERUS associated with each of the three (3) system reservoirs is discussed.

Reservoir 1:
For these calculations, Reservoir 1 supports the ERUs in Pressure Zone 2. The excess number of ERUs can assist in supplementing the storage of Reservoir 3 (Pressure Zones 3 through 5). The available ES and SB for Reservoir 1 is 64,625 gallons (See Table 3-14). The number ERUs that can be supported in Pressure Zone 2 by Reservoir 1 is 280.

Reservoir 2:
For these calculations, Reservoir 2 supports the ERUs in Pressure Zone 1. The available ES and SB for Reservoir 2 is 50,655 gallons (See Table 3-14). The number ERUs that can be supported in Pressure Zone 1 by Reservoir 2 is 158.

Reservoir 3:
For the purpose of these calculations, Reservoir 3 supports the ERUs in Pressure Zones 3 through 5. The available ES and SB for Reservoir 3 is 117,500 gallons (See Table 3-14). The number ERUs that can be supported in Pressure Zones 3 through 5 by Reservoir 3 is 399.

3.4.6 Summary of System Capacities

An analysis of the system components, water rights and well capacities was performed to determine which item provided the system's connection limit. The calculations for this are summarized in Table 3-15.

Table 3-15 Connection Limiting Factors

Components	Limiting Factor	ERU Capacity
Annual Water Right (V_a)	V_a & ADD	595
Instantaneous Water Right (Q_i)	Q_i & MDD	784
Source Production	Q_s & MDD	849
Current Source Operation [1]	Q_s & MDD	509
Storage	Pressure Zone 1 Pressure Zone 2 Pressure Zones 3 – 5	280 158 399
Distribution System	-	Adequate
Booster Pump (Pressure Zone 5)	-	Adequate

[1]ERUs the system can support when alternating well pumping operations.

The maximum number of ERUs that Diamond Point can support is the smallest of the individual component capacities. The limiting capacity for the System is its annual water right capacity, at 595 ERUs. However, the System is currently choosing to alternate well pumping operations with the installed pumps producing less than the water right limit. Choosing to operate the wells in this manner limits the number of ERUs the System can support to 509. If the System chose to lower the combined production and pump its wells simultaneously or install larger well pumps in the future, it could support more ERUs. In that scenario the System must ensure it is maintaining compliance with its instantaneous water right and the pumps are appropriately sized to not exceed the well capacity.

Due to distribution system leakage (DSL), a number of those 509 ERUs are associated with DSL. Per section 4.4.5 of the Design Manual, DSL demand can be expressed as a separate demand on the water system in terms of ERUs based on ERU_{MDD}. The following calculations are for 2022

$$DSL\ ERUs\ (Based\ on\ ERU_{MDD}) = \frac{4{,}777{,}854\ gal}{(365\ days)(354\ gpd/ERU)} = 37.0\ ERUs = 37\ ERUs\ minimum$$

The DSL ERUs for 2020 through 2022 are shown in Table 3-16. The 2022 DSL ERUs based on ERU_{MDD} was selected as the design DSL ERUs because it was the highest for the time period analyzed. If the System decreases its DSL in the future, the DSL ERUs would also decrease, and the System would have a higher capacity to serve more ERUs.

Table 3-16 DSL ERUs

Year	Distribution System Leakage (gal)	ERU_{ADD} (gpd/ERU)	ERU_{MDD} (gpd/ERU)	DSL ERUs Based on ERU_{MDD} (ERUs)
2020	2,294,372	133	311	21
2021	2,459,006	124	391	18
2022	4,777,854	106	354	37

With 37 ERUs associated with DSL the legal and physical capacity of the system to support active connection is 472 ERUs.

3.5 Selection and Justification of Improvement Projects

System needs discussed in this chapter were selected and prioritized based on the categories shown in Table 3-17.

Table 3-17 Potential Improvements Prioritization Categories

Category	Description	Time Frame
Emergency	Improvement needed to eliminate a health risk or serious physical risk to the system	Now
Immediate	Improvement that should be investigated, initiated, and/or completed as soon as possible to minimize potential risk or to get process started for future needs	Within 1 year
Near Term	Improvement that improves capacity, flow, or redundancy	1 to 2 years
Medium Range	Improvement that is not necessary near term but will improve system enough that it should not be long term	2 to 6 years
Long Range	Improvement that is needed in the future	6+ years
Budget Providing	Non-critical improvement that can occur anytime budget providing	Anytime budget providing

The time frames shown in Table 3-17 are for guidance purposes and are subject to change based on such factors as regulations and the Cascadia's financial situation.

Based on the analysis of each system and their existing components included in this chapter, potential system improvements were prioritized based on the categories in Table 3-17 and are summarized in Table 3-18.

3.5.1 Source Needs

The system currently has sufficient sources and source production to meet the measured and projected demands of their consumers through the 20-year planning period. However, at the end of the 20-year period both groundwater sources will be approximately 70-years old and planning for replacement of the sources will likely be necessary at that time.

The system and its operator should incorporate annual monitoring of the system sources into their standard operations and maintenance (See Chapter 6). Annually the static water level, pump rates, and corresponding drawdown should be measured and evaluated to assist in assessing the health of the aquifer and well. The operator is in the process of replacing both source meters to ensure proper monitoring of system resources and tracking of distribution system losses.

Well pumps will likely need to be in the long-range planning for the system. Replacement well pumps should be selected to provide an appropriate production rate for each respective well at the required total dynamic head to pass to the top of the reservoir. The well logs provided in Appendix G indicate that both wells can produce at the allowable instantaneous rate specified in their water right. Prior to replacement of well pumps a pump test should be performed to monitor production rates and corresponding drawdown to assess any additional improvements that need to be done at that time. When new pumps

are installed, two (2) 1" sounding/access tubes should be installed, and a pressure transducer should be installed in each well to monitor water levels and recovery and incorporated into the SCADA system.

A known deficiency in the distribution/production system of Diamond Point has been the water line that conveys water from the two sources up to the primary distribution system and Reservoir 1. This line has had a history of leaks and failures that indicate it has reached or exceeded its anticipated useful life. This portion of the water line should be replaced and sized to meet future demands.

3.5.2 Treatment Needs

As part of DOH Project #23-1108, the system is installing disinfection treatment improvements to address a persistent bacteriological issue in Pressure Zone 1. This system provide hypochlorite disinfection and chlorine monitoring. This system has the capacity to meet the projected demands of the system through the 20-year planning period.

3.5.3 Storage Needs

The capacity analysis for the system as referenced in Table 3-15, indicates that the storage capabilities in the system has capacity to meet the projected 20-year ERU projections based on equalizing and standby storage.

As has been noted, there had been a persistent issue with bacteriological tests in Pressure Zone 1 which are currently being addressed with a disinfection treatment system (DOH Project 22-1108). The viability of the elevated reservoir (Reservoir 2) in regard to the bacteriological issues and seismic resiliency should be evaluated. It is anticipated that the reservoir will need to be replaced in the long-term planning of the Water System Plan. If replaced, the new reservoir will likely be sited adjacent to Reservoir 1 and be hydraulically equivalent. The reservoir should be sized to maintain or increase storage capabilities of the system. A corresponding project will be noted in Section 3.5.4 to address pressurization in Pressure Zone 1 in relation to the removal of Reservoir 2.

3.5.4 Booster Pump & Pressure Tank Needs

Per Design Manual Section 8.1.2, "for reliability purposes, the booster pump station should be able to meet the PHD when the largest capacity booster pump is out of service." Currently the booster pump station that serves Pressure Zone 5 only has a single pump and does not provide the needed redundancy. An additional pump should be provided to this portion of the distribution system to provided the required system functionality and reliability desired by Cascadia Water. Any project in the Pressure Zone 5 pumphouse will require piping, valve, and control configuration improvements to implement needed modifications.

As noted in Section 3.5.3, it is anticipated that the long-term planning of the system will require the replacement of the elevated reservoir (Reservoir 2) whose elevation provides the hydraulic grade line to serve Pressure Zone 1. If the reservoir is replaced with a new reservoir at ground level, as is anticipated, it would be necessary to install a booster pumps system which can serve existing and future demands associated with Pressure Zone 1, including fire flow demands. This project will likely replace the Transfer Pumps and controls with a system more tailored to the distribution system demands.

3.5.5 Distribution Needs

The Diamond Point distribution system has a variety of needs to ensure that they are providing an adequate service level to their customers, particularly with regards to fire flow capacity. Currently only Pressure Zone 1 has the capacity to meet MDD and fire flow demand if/when fire hydrants are installed.

Future water main replacements should incorporate a minimum size of 8-inches and prioritize loops in the system. The following projects should be planned during the next 20 years.

- As noted in Section 3.5.1, the 4-inch line the conveys water from the two sources to Reservoir 1 should be prioritized for replacement. This section of line has a history of failure which has been a consistent detriment to system reliability and conservation of resources.
- Replacement of the 4-inch water main along Diamond Point Road from Reservoir 1 to PRV 1 needs to be replaced and increased in size. This line has apparently been a priority to the system dating back to at least the last Water System Plan. This section of water main is undersized for the intended operations of the system. Its size limits the rate at which Reservoir 3 can be filled and prohibits the system from being able to provide fire flow capabilities to most of its consumers. This section of water main should be replaced with, at least, an 8-inch water main that is sized for future anticipated demands associated with Pressure Zones 3 through 5, including fire flow.
- According to available records, the oldest water mains were installed in approximately 1961 with what is listed as "Portco" black plastic piping. These portion of the system should be monitored for leaking and should be replaced with appropriate sized water mains as needed. Also, the condition of the Asbestos Cement piping, which was installed from 1965 to 1970 should be evaluated whenever it is exposed. Aging portions of this distribution system should be replaced as needed to address failures and persistent issues with distribution system losses.
- Connecting the watermain at the intersection of Dungeness Greens Way and Hogback Road to the east end of Lotzgesell Road. This connection should be an 8-inch diameter main totaling approximately 2,000-feet. This project will provide a valuable loop to the system using the newest portion of the distribution system along Dungeness Greens Way.
- Replacement of the 4-inch water main along Lotzgesell Road, totaling approximately 3,400-feet of pipe. This portion of the distribution system should be increased to 8-inch diameter water mains to enable fire flow capacity to the northing portion of the system including Five Acre School and the Dungeness Recreation Area.
- Replacement of the 4-inch water mains along Greywolf Road, Maynard Road, Tyler View Place, and the associated connecting lines with new 8-inch water mains. This project would replace approximately 6,200-feet of distribution main and enable fire flow capacity to the northwest portion of the service area.

Table 3-18 and Chapter 8 will provide additional details regarding the budgeting and anticipated timeline for the water main replacement projects.

3.5.6 Control and Telemetry Needs

The Water System would benefit from having an integrated supervisory control and data acquisition (SCADA) system that could be monitored from a central location. A SCADA system is planned for installation to allow the operators to monitor the Water System more efficiently. At a minimum, the SCADA system should provide the functionality to monitor and adjust well pump run status, booster pump run status, system pressures, reservoir elevation, source production values, and alarm status.

Cascadia is planning to provide security improvements to their individual systems. The security improvements include site fencing around pumphouses and reservoirs, intrusion alarms on storage tanks, reservoir hatches, and pumphouse doors.

3.5.7 Non-Facility Needs

Cascadia is in the process of testing remote read meters to replace/upgrade their existing meters and will be implemented for Diamond Point. The remote read meters would reduce labor costs associated with meter reading and would have the capability to alert customers of potential leaks on their property. The meter replacement project will be prioritized based on age of existing meters, distribution system leakage, ease of installation and potential labor savings. Source meters will also be placed on a routine replacement scheduled to ensure accuracy of well production data.

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Table 3-18 Prioritized Potential Group A System Improvements Needs

Monterra				
#	Prioritization	Component	Component Description	Cost
1	Immediate Term (2026)	Distribution	Leak Detection – Elevation of the Water System to determine leaking or cracking, and the root of the server distribution leaking. Implement a plan to reduce water leakage to under 10%.	$35,000
2	Immediate Term (2025)	Source	The source meters on the system will be replaced.	$4,000
3	Immediate Term (2025/2026)	Distribution	Water meters throughout the system will be replaced with remote read meters.	$214,200 ($700/meter)
4	Immediate Term (2025)	Distribution	Generators for Booster Pumps & Transfer Pumps & Well Pumps– A properly designed generator will be sized and installed to allow for functioning of the booster pumps, transfer pumps and well pumps.	$40,000
5	Immediate Term (2028)	Controls & Telemetry	Security fencing will be installed around the system reservoirs and wells, and well pump house. Security alarms will be added to reservoir hatches.	$50,000
6	Medium Range (2026 - 2030)	Distribution	Booster Pump Station Upgrades – Installation of additional booster pumps (size and number of pumps to be verified in design) to pressurize Pressure Zone 5 with the largest booster pump out of service to meet PHD and 30-psi throughout the distribution pressure zone.	$100,000
7	Medium Range (2026 - 2030)	Distribution	Water Line Replacement – Replace 5,200-feet of transfer line between Reservoir 1 to PRV 1. The new watermain should be increased in size to allow for proper pressurization of the system while providing the fire flows in accordance with DOH and Clallam County standards.	$1,100,000 ($200/foot)
8a	Medium Range (2026 - 2030)	Storage	New Storage Reservoir - Decommission the elevated reservoir (Reservoir 2) for the cause of bacteriological hits in the distribution system. Installation of a new 125,000-gallon reservoir (size to be verified in design) to provide adequate storage for the distribution system. Project will include the necessary site piping to connect Reservoir 2 to the pumphouse and distribution system.	$650,000

8b	Medium Range (2026 - 2030)	Distribution	Booster Pump Station Upgrades – With the removal/replacement of Reservoir 2, the system will need to modify or replace the Transfer pump with booster pumps to pressurize Pressure Zone 1. Pumps will be sized to meet Clallam County and DOH fire suppression standards. Number and capacity of pumps to be determined during design.	$175,000
9	Medium Range / Long Range (2030 - 2040)	Distribution/ Source	Waterline Replacement – Replace 4,500-feet of water line from Wells 1 and 2 up to Reservoir 1. The new line should be sized to allow the sources to produce at the allowable instantaneous water right for the system.	$900,000 ($200/foot)
10	Long Range (2030 - 2040)	Source	Well Pump Replacement – According to both well logs, the existing wells have capacity to produce water at rates equal to the system's existing water right. When replacing well pumps an evaluation should be done for each source to properly size a pump for the THD associated with the system and to meet the available water right.	$120,000 ($60,000/well)
11	Long Range (2030 - 2040)	Intertie	Cascadia Water would like to pursue an intertie with Washington Water between the Diamond Point and Sunshine Acres systems. The intertie will consist of a vault with meters, check valves, and pressure sustaining valves to protect both systems in case of emergencies.	$200,000
12	Budget Pending	Distribution	Pressure Zone 3 – Water main replacements in this pressure zone to expand the fire flow capabilities of the system. This project will prioritize the water main along Diamond Point Road (from Reservoir 3 to PRV 2) and Discovery Way.	$480,000
13	Budget Pending	Distribution	Pressure Zone 3 – Water main replacements in this pressure zone to expand the fire flow capabilities of the system. Following the lines identified in Project 12, the system will replace the remaining lines in Pressure Zone 1 (Spring View Place, North Street, etc).	$550,000
13	Budget Pending	Distribution	Pressure Zone 4 – Water main replacements in this pressure zone to expand the fire flow capabilities of the system. Following the lines identified in Project 12 & 13, the system will replace lines in Pressure Zone 4 (Beach Drive & Diamond Shore Lane).	$750,000

4 WATER USE EFFICIENCY PROGRAM AND WATER RESOURCE ANALYSIS

4.1 Water Use Efficiency Program

Western Washington, even with abundant precipitation, does not have an unlimited supply of fresh potable water as highlighted by recent decisions by the Department of Ecology to close basins in Skagit and Whatcom counties from allowing new exempt wells and stopping the issuance of new water rights. The Water System is located in Clallam County with an average of 60-inches of rain per year, that is considered a large amount of precipitation.

These events highlighted the need to establish measures for both short term emergency and long term systematic per capita water use reduction. Cascadia has consistently encouraged water conservation through a variety of methods and plans. These follow state legislated guidelines to do as much as possible to encourage more conservation.

A general mandate has been made by RCW 90.03.005, RCW 90.03.400, RCW 90.54.020, and RCW 90.54.180 for water use efficiencies in Washington State water systems. RCW 43.20.230 makes a specific directive to DOH to incorporate procedures and guidelines relating to the conservation of water during the approval procedures of system plans.

Cascadia recognizes that water is a valuable and essential natural resource that needs to be managed wisely. The main objectives of this water conservation program are:

- Increase awareness among water users of the importance of conserving water and of the methods available to achieve reductions in their water use.
- Replacement of water meters to accurately measure distribution system water loss.
- Reduce distribution system water loss (DSL).

The most recent available WUE report from the System (2022 Annual Performance Report) reported a 3-year annual average DSL of 28.4%. Over the past three reported years the DSL has increased yearly from 25.4% in 2020 to 32.6% in 2022. Since DSL exceeds 10% a Water Loss Control Action Plan (WCLAP) has been prepared for Diamond Point (See Appendix J).

4.1.1 Water Loss Control Action Plan

The Diamond Point system is required to establish a water use reduction goal as part of its Water Loss Control Action Plan to address distribution system losses. The action plan to be implemented contains various aspects with the intent of obtaining accurate data, identifying real losses, and improving the system efficiency. The water systems will implement several water use efficiency measures which are covered in the WLCAP included in Appendix J.

4.1.1.1 Goals

Diamond Point has not had a Water Use Efficiency (WUE) goal since, at least, March of 2008 according their annual report. As part of this Water System Plan the system has set a new goal with their conservation program with the intent of reducing in distribution system leakage.

The Water System would like to reduce distribution system losses by 10.0% within six years. Reductions in the DSL will be accomplished though the Capital Improvements Program that proposes the replacement of aging infrastructure in the Water System based on analyzed and observed deficiencies.

4.2 Source of Supply Analysis

The Department of Ecology requires water systems to demonstrate serious consideration of all options prior to issuing new or expanded water rights. The purpose of a source of supply analysis is to evaluate opportunities to obtain or optimize the use of existing sources already developed and evaluate other innovative methods to meet water needs.

A source of supply analysis is required of all systems that will be pursuing water rights within 20 years of approval of their WSP as defined by the water demand forecast. The Water System has adequate water right at this time and is not projected to require additional rights within the 20-year planning period.

4.2.1 Enhanced Conservation Measures

As discussed in Section 4.1, Cascadia will implement use efficiency measures with the goal of reducing DSL within the Diamond Point distribution system.

4.2.2 Water Rights Changes

As further discussed in Section 4.3, Diamond Point is not projected to pursue additional water rights within the six-year planning period. Therefore, no changes in water rights are foreseen.

4.2.3 Interties

Currently there are no additional water systems intertied with Diamond Point. Diamond Point surrounds Sunshine Acres water system with transfer lines already established through the water system's service area. Sunshine Acres could be considered as a candidate for intertie and/or incorporation. The current service area could allow for intertie without further development. If the intertie would allow the Water System to purchase water from another system, it could provide a cost-effective way of providing system redundancy in the event of line breaks or source production issues. An intertie with another water system would only be considered if:

- The water quality meets State/Federal water quality standards, and
- The water chemistry is compatible with the existing water quality of the system, and
- The hydraulic grade is higher than the Water System's or can feasibly/economically be boosted as necessary, and
- The system has adequate capacity to support the intertie, and
- Both systems are able to maintain compliance with their water rights.

A more thorough analysis of potential interties is beyond the scope of this planning document. If discussions with neighboring systems are fruitful and mutually acceptable, then a study and project report will be generated for future intertie projects with Diamond Point's water system.

4.3 Water Right Evaluation

The following sections summarize Diamond Point's water right evaluation.

4.3.1 Existing Water Rights

Currently, Diamond Point has water right with certificate number G2-25897 C. The established water right allows the Water System a maximum instantaneous withdrawal (Q_i) of 218 gpm and a maximum volume (Q_a) of 100-acre-feet per year (ac-ft/yr).

4.3.2 Water Right Self-Assessment

The "Water Rights Self-Assessment Form for Water System Plan" provided by the DOH has been completed for the Water System and is included in Appendix F.

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5 SOURCE WATER PROTECTION

5.1 Introduction

Protection of the source of the water supply is of utmost concern for public water systems. The Water System's production wells have been free of man-made contaminants such as PFAS contaminants. DOH requires all Group-A water systems to complete PFAS sampling by December of 2025. The Water System is scheduled to perform PFAS sampling in 2024. The two groundwater sources are completed in relatively deep aquifers, and are typically protected by glacial till or clay confining layers. These confining layers slow the transport of potential contaminates and allow for their natural degradation.

5.2 Wellhead Restrictive Covenants

January 3, 2008 the Diamond Point has established Restrictive Covenant for the water system sources contained within Miller State Park with Washington State Parks and the Recreation Commission. The wells are located in Clallam County parcel 023021130000. The Restrictive Covenant document is provided in Appendix H.

5.3 Wellhead Protection Program

The Water System will implement a wellhead protection program. This program will incorporate the following:

- Periodic monitoring of the existing wells for nitrates and conductivity to check for any sudden change in water quality.
- Sending informational flyers out to water customers outlining proper storage and use of common household chemicals, yard and lawn fertilizers, pesticides, and herbicides.
- Posting signs identifying the system source pollution control zones.
- Sending letters to property owners within the capture zones regarding the presence of the system source wells.

The Water System's source water is from groundwater wells. The wells physical parameters are discussed in Section 3.3.3. The Water System's Wellhead Protection Program is attached in Appendix I.

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6 OPERATION AND MAINTENANCE PROGRAM

This chapter serves as a general Operations and Maintenance Program (O&M) for the Diamond Point water system. It contains various task, procedures, and strategies to maintain the system in proper working order and it should be used in conjunction with other available plans such as any available an Emergency Response Plan, and the Cross-Connection Control Plan.

6.1 Water System Management and Personnel

Cascadia Water hires knowledgeable and certified staff to operate and maintain their owned systems. Cascadia Water is a wholly owned subsidiary of NW Natural Water Company, LLC. Cascadia staff consists of a qualified system manager, certified operators, and maintenance staff. These staff are responsible for the day-to-day operation and maintenance of Cascadia's water systems.

6.2 Operator Certification

The duties of certified waterworks operators are defined in WAC 246-292. Table 6-1 lists the titles and certifications for positions in Cascadia's staff. Staff should continually maintain certifications through continuing education as required by each individual certification.

Table 6-1 Water System Staff Certifications

Operator	Position	Certifications
Culley Lehman	General Manager	WDM 2
Adam Lehman	System Operator	CCS, WDM 3, WDS, WTPO 1
Dale Metzger	System Operator	WDM 2

6.3 Routine Operating Procedures and Preventative Maintenance

Periodic maintenance of all components of the Water System is necessary to ensure continuous, uninterrupted service. General maintenance of many items may include checking set-points, security items, and screens, painting exposed surfaces, lubricating moving parts, cleaning, rebuilding, and assessing overall operation for major repairs or replacement. Such maintenance should involve a minimum of the following as outlines in Table 6-2.

Table 6-2 Drinking Water Operations & Maintenance (O&M) Schedule

Daily
Pump Houses
▪ Record production and source meter readings (actual and digital)
▪ Record pump hours, calculate daily run times for booster, transfer and well pumps
▪ Visual premises check – correct or report any problems
▪ Bladder Tanks: Monitor Pressure fluctuation during a cycle (cut-in cut-out pressures) and number of cycles per hour
Reservoirs
▪ Record reservoir levels
▪ Pressure checks (incoming system, outgoing system, pressure tanks)
▪ Verify reservoir level(s) on tank match level at pump house
▪ Visual premises check – correct or report any problems
System Controls
▪ Visual premises check – correct or report any problems
Weekly
Pump Houses
▪ Chlorine Residuals (total and free) from 2 different locations in the system, record, and make CL2 adjustments as needed
▪ Operate all pumps manually
▪ Pump facilities should be visually checked at least weekly.
▪ Visual inspection of well heads – correct or report problems
▪ Generator – check fuel levels (fill as needed)
▪ Generator – check and record hours
▪ Generator – verify auto test is operating properly
Reservoirs
▪ Perimeter check – correct or report problems
Monthly
General System O&M
▪ Well water level and chloride measurement for each source
▪ Bacteria Testing: 1 sample required per month. See Coliform Monitoring Plan
▪ Chlorination Report (due to WSDOH the 10th of each month)
▪ Static and pumping level measurements
▪ Flow/production calculations
▪ Temperature and pH samples from individual wells and reservoir

▪ Bladder Tanks: Check water or air leakage of tanks associated pipes and fittings
Every Two Months
▪ Consumer meter readings
▪ Shut off/on services with delinquent & unresolved bills
Quarterly
Pump Houses
▪ All Valves: Open and close the valves to make sure they are not seized.
▪ Transfer Pumps: Check the integrity of the pump's foundation and check the hold down bolts for tightness.
▪ Transfer Pumps: Remove and clean all strainers and filters in the system.
▪ Raw Water Booster Pumps, Transfer Pumps, New Distribution Pumps: Conduct a motor inspection: Clean? Grease free of dirt? Blockage? Ohmmeter periodically to see if winding insulation is OK.
▪ Bladder Tanks: Check compressor intake air filters
▪ Bladder Tanks: Monitor the condition of the tank support and ensure tanks are firmly mounted to the floor.
Bi-Annually
General System O&M
▪ Water main flushing (see Flushing Plan)
▪ Source meter testing, maintenance, and calibration
▪ Water Use Efficiency – review production and consumption data to identify presence of any leaks
▪ By January 31st and April 30th of each year: submit the year's chloride and conductivity chemical analysis results to DOE [per Water Right Provisions]
▪ By January 31st and April 30th of each year: submit the year's depth to static water level measurements to DOE [per Water Right Provisions]
Annually
General System O&M
▪ Cross-connection control – Verify high/medium risk customers have submitted test reports for backflow devices
▪ Water Use Efficiency (due July 1)
▪ Consumer Confidence Report (due July 1)
▪ Operator Continuing Education
▪ All electrical contacts in the pump control systems should be tightened once a year.
▪ Blow-off inspection and exercising
▪ Fire hydrant inspection and exercising (performed by Fire Department)
▪ Backflow prevention device inspection
▪ Line valve inspection and exercising

Every 3 Years
▪ Reservoir inspection and cleaning by underwater divers
▪ Air valve inspections (air release, air/vacuum, and combination air valves)
▪ Large customer meter testing and replacement
As Needed
▪ Water Quality Monitoring as required by WSDOH
▪ Cross-Connection Control (CCC) – Identify new risk customers; require CCC installation of devices according to CCC plan
▪ Meter Reads
▪ Meter Installation / Testing / replacement (as needed)
▪ Meter box maintenance
▪ Leak checks/detection. Maintain record of leaks
▪ System leak repair / pair / service line replacement
▪ Repair supply ordering
▪ Fire hydrant maintenance
▪ As-Built records should be kept on each water line in the system
▪ Pumps and motors should be inspected and maintained in accordance with the manufacturer's recommendations
▪ Lawn maintenance and weed trimming of facilities, near hydrants, etc.
▪ Respond / troubleshoot customer complaints
As Triggered
▪ Emergency Shutdown Trigger: Emergency conditions (fire, leak, etc.) Action: Activate local emergency shutdown. Notify the owner/general manager.
▪ Respond to fault conditions and shutdown notifications. Trigger: PLC sends text message and email notifications for fault conditions and shutdowns Action: Respond to notification by investigating conditions at the Water System
▪ Replace Hydropneumatic Tank butyl rubber bladder. Trigger: Bladder failure, such as due to abnormal pressure drop Action: Investigate issue and potentially replace butyl rubber bladder

If the Water System has received approval of a comprehensive plan or abbreviated water system plan by the DOH and has submitted and received approval of standard construction specifications, then detailed plans and specifications for distribution mains need not be submitted individually for approval. If such approval is obtained, only alterations to the plan need be submitted to the DOH.

The DOH also requires bacteriological samples to be taken and that chemical analyses of Diamond Point's supply sources be made often enough to assure compliance. Water quality requirements are listed in detail in Section3.2. The organization practice of maintaining paper cards on file or an electronic database with information that includes the type of meter and its serial number, date of installation, and maintenance performed. In addition, operators have found that a service record for each resident is valuable for maintaining a complete system record. This record can be valuable when attempting to repair or locate service lines or when attempting to see if breakage or leaks follow a pattern.

6.4 Water Quality Sampling Procedures & Program

The Water Quality Monitoring requirements are set forth in WAC 246-290-300 and were discussed in Chapter 3 of this plan. The regulations cover sampling frequencies for bacteriological, inorganic chemical and organic chemical samples as well as radionuclides, volatile organic compounds (VOC), and secondary chemical and physical contaminants.

Samples must be analyzed in laboratories approved by the DOH. A minimum of one bacteriological sample per month is required. For a groundwater supply, one inorganic chemical sample is required every three years. Organic and VOC samples are necessary only when required by the DOH. Radionuclides must be sampled during four consecutive quarters, once every four years. Sampling for secondary chemical and physical contaminants must occur once every three years.

The MCL's for the various substances are listed in Section 3.2. If these levels are exceeded at any time, the procedures in Section 6.4.2 must be followed. (These procedures are described in more detail in the State Board of Health Drinking Water Regulations).

6.4.1 Bacteriological Detection Program

Coliform treatment Level 1 technique is triggered when the Water System has two or more total coliform-positive samples in the same month. The Level 1 technique is also triggered if the Water System fails to take every required repeat sample after any single total coliform-positive routine sample. The required notifications required by the Water System vary depending on the type of violation that occurs. outlines the testing results, repeat sample results and the type of violation associated with each scenario:

Table 6-3 Coliform & E.coli Detection Response Procedures

Routine Sample 1	Routine Sample 2	Repeat Samples [A]	Violation
Coliform Detected No E.coli/Fecal	No Detection	No Detections	No Violation
Coliform Detected No E.coli/Fecal	Coliform Detected No E.coli/Fecal	No Detections	Non-Acute Violation
Coliform Detected No E.coli/Fecal	No Detection	Coliform Detected	Non-Acute Violation
Coliform Detected No E.coli/Fecal	No Detection	Coliform Detected E.coli/Fecal Detected	Acute Violation
Coliform Detected E.coli/Fecal Detected	No Detection	No Detections	No Violation [B]
Coliform Detected E.coli/Fecal Detected	No Detection	Coliform or E.coli/ Fecal Detected	Acute Violation
Coliform Detected E.coli/Fecal Detected	Coliform Detected E.coli/Fecal Detected	No Detections	Non-Acute Violation

A. Each detection will require 3 repeat samples taken as noted in the Water System's Coliform Monitoring Plan

B. Although not considered a violation, The WSDOH should be contacted following routine results.

A non-acute violation requires public notification as soon as is practical but must be performed within 30 days. The WSDOH must be notified, and certification forms submitted within 10 days. For an acute violation, the public must be notified within 24-hour with a boil water advisory. The DOH must be notified, and certification forms submitted within 10 days

6.4.2 Organic Compound Detection Procedures

The procedures to comply with the DOH requirements in the event of a MCL exceedance for an Inorganic Chemical (IOC), Volatile Organic Chemical (VOC), or Synthetic Organic Chemical (SOC) detection. Nitrates and Nitrates are subject to a separate process by the WSDOH as noted in Section 6.6.3. Currently the Water System has varied waivers for testing parameters are detailed in Table 3-1. The following steps should be taken in the event of an MCL exceedance for either IOC or VOC.

1. The WSDOH must be notified, and the testing frequency is increased to quarterly.
2.(A) If the running annual average is less than the MCL there isn't considered to be a violation and the system should continue testing as instructed by the WSDOH.
2.(B) If the running annual average is greater than the MCL the violation must be reported to the WSDOH within 48-hours.
3. Following notification of the violation, the WSDOH determines if the violation poses an acute health risk.
4.(A) If the violation is determined to be an acute health risk by the WSDOH the Water System must notify the public within 24-hours with a Tier 1 Public Notice (Notice to the public via public ration and TV).
4.(B) If the violation is determined not to be an acute health risk by the WSDOH the Water System must notify the public within 30-days with a Tier 2 Public Notice (Newspaper notice, or mailing).
5. Following the violation, the Water System will take actions as directed by the WSDOH.

6.4.3 Nitrate and Nitrite Detection Procedures

Nitrate and nitrite are classified as inorganic constituents but are subject to a separate process from other IOCs. The responses to an MCL violation are outlined in WAC 246-290-320 (3)(b). If the nitrate or nitrite MCL is exceeded, a confirmation sample is required. In the case of any nitrate/nitrite MCL exceedance the WSDOH should be notified of the violation. Compliance actions will then be based on the average of the routine and confirmation samples. Quarterly monitoring would be required if the average result is greater than 5.0 mg/L. The Water System will follow any subsequent actions in accordance with guidance from the WSDOH.

6.4.4 Radionuclide Detection Procedures

The Water System has a waiver to test for radionuclides every 6-years for the established well field (S03). Pursuant to 40 CFR 141.26, any MCL violation must be reported to the WSDOH. The Water System will provide public notice in accordance with the WSDOH standards and the WSDOH will be notified if there are any Radionuclide Detections over the MCL.

6.4.5 Pressure Loss in Distribution System

When disruptions to the distribution system occur which lead to pressure-loss, the following procedures will be followed:

a. Investigation of the cause for pressure loss: The primary cause of pressure loss in the distribution system is due to breaks in water mains. Other potential causes include the failure of the distribution system pump or inadequate water levels at the reservoir.
b. Repair the failed system: Once the cause of pressure loss is identified the system should be repaired to restore pressurization in the system.
c. Identify Impacted Customers.
d. Contact Impacted Customers: Service connections impacted by the pressure loss event will be notified.
e. Contact the DOH: In the case of a significant loss of pressure to the distribution system, the DOH will be notified. Coordinating with the DOH, the Water System will determine the necessary advisories and testing procedures for the event.
f. Collect Samples: After normal operating pressures have been restored the Water System will collect bacteriological samples to determine which maintenance procedures should be followed regarding flushing of the system, disinfection, and repeat sampling.
g. Notify Customers: Once resolved, customers will be notified that drinking water is safe for use.

Cascadia Water operators will follow the protocols found in Table 6-4 in assessing proper procedures during water main break events.

Table 6-4 Water Main Break Response Procedures

	I	II	III	IV
Pressure During Break	Positive pressure maintained during break	Positive pressure maintained during break	Loss of pressure at break site or limited water system depressurization elsewhere	Loss of pressure at break site and depressurization elsewhere in the system
Pressure During Repair	Positive pressure maintained during repair	Positive pressure maintained at break site until pipe exposed & trench dewatered. Shutdown limited to immediate valved off area. No Loss of pressure elsewhere in system.	Loss of pressure at the while the pipe is buried or submerged / Or no pressure loss at break site, but pressure loss elsewhere in system.	Loss of pressure at break site while the pipe is still buried or submerged and/or widespread depressurization.
Contamination Risk	Unlikely	Limited Possibility	Significant Possibility	Likely or Certain
Boil Water Advisory	No	No	Yes	Yes
Coliform Sampling	No	No	Yes	Yes

6.5 Coliform Monitoring Program

Group A public water systems are required to develop a written coliform monitoring plan and to collect samples according to that plan. The plan consists of a map of sampling locations and a description of sampling procedures. The DOH has put together two manuals; “Preparation of a Coliform Monitoring Plan” and “Coliform Monitoring.” These manuals provide guidance for preparation of a coliform monitoring plan and the required frequency of sample collection. The samples must be received and analyzed by a laboratory within 30 hours from the time collected. When any sample results in a coliform presence, a “set” of repeat samples must be collected within 24 hours of notification. For a system, like Diamond Point, that collects one routine sample per month, three repeat samples are required. The following procedure should be followed in collecting the three repeat samples:

- Collect the first “repeat” sample from the same location as the previous coliform presence sample was taken.
- Collect a second “repeat” sample at a site within five service connections in either direction down the distribution pipeline from the previously mentioned coliform presence location.
- Collect a third “repeat” sample from a site within five service connections down the distribution pipeline in the opposite direction (starting from the first repeat sample location).

6.6 Emergency Program

The ability of a water system to sustain operations during emergency events and/or respond to emergency situations is important. The goal is to quickly react to emergency conditions, adjust the system to maintain safe and adequate service to the greatest extent feasible, and to return the system to entirely

normal operations as rapidly as possible. Depending upon the nature and severity of an emergency event, certain components of the system are going to be more vulnerable and subject to failure than others. This plan addresses the operation of Diamond Point's under such conditions. The Water System must also be prepared to notify the potentially affected public if an emergency arises. Depending upon the urgency, the affected public may be notified through any of one or a combination of methods such as the following:

- Posted notices at publicly visible locations.
- Public notices in newspapers circulating in the local vicinity.
- Announcements over local radio and television stations.
- Police loudspeaker - roaming system.
- Door-to-door delivery of announcements and personal contact.
- E-mail to community residents.

All announcements should inform the public what situation has occurred, what intermediate measures must be taken by them (i.e., conservation methods, where to go for water, or what to do with their water prior to consumption) and when they can expect to see the system return to normal operation.

If there is an outage over 24-hours in duration notify the Southwest Drinking Water Operations Office of the DOH. In case of emergency the DOH may order Diamond Point to provide notification by newspaper and to radio and television stations where such notice is required to protect public health. The Water System shall keep detailed and complete records of all public notification occurrences to document compliance with this section.

Table 6-5 Emergency Contact List

Emergency Contact	Contact Information
Culley Lehman, Manager Cascadia Water, LLC	Cell: 360-661-7781
Buried Cable Locations	1-800-424-5555
Jeff Tasoff, PE	Office: 360-331-4131 ext. 203 Cell: 360-914-0682
DOH After Hours Hotline	1-877-481-4901
DOE Spill Response	1-800-424-8802
Clallam County Public Health	360-417-2274
Fire/Police/Medical Emergencies	911

An Emergency Response Plan has been prepared for the system. In the event of an emergency the plan should be used as a guide to assist in identifying appropriate steps and measures to be taken by system operators. A copy of the Emergency Response Plan is provided in Appendix S.

6.7 Cross-Connection Control Program

Diamond Point has previously developed a cross-connection control program as required under WAC 246-290-100 and outlined under WAC 246-290-490. A copy of the Cross-Connection Control Program is included in Appendix T.

Diamond Point's responsibility for cross-connection control shall begin with its water supply sources, including storage, distribution facilities, and end at the point of delivery to each customer's water system, which is the water meter. Diamond Point's plan is outlined below. The rules and regulations provided in the tariff for Cascadia (See Cascadia Water – Water System Plan – Part A) outline requirements for cross-

connection control. Diamond Point is in the process of surveying consumers and the Water System to determine the potential cross-connection devices currently connected to the system. This process should be completed by the end of 2025 for the systems in this plan.

6.7.1 Procedures for Hazard Evaluations

As a condition of new connections to the Water System, an initial evaluation to assess the degree of cross-connection hazard posed by the consumer's premises to Diamond Point's distribution system shall be conducted by Cascadia. Cascadia shall determine the method of backflow protection required, if any. The required method of backflow protection shall be installed and a satisfactory test result by a qualified backflow assembly tester shall be provided by the consumer to Diamond Point before water service is provided.

As a condition of continued water service, annual evaluation should be conducted on existing connections with water use characteristics that pose potential hazardous cross-connection conditions to Diamond Point's distribution system. These potential uses can include, but are limited to:

- Outdoor pools
- Livestock storage
- Sprinkler systems
- Premises with heat exchangers and/or solar potable hot water systems
- Premises with fire systems using chemicals.

As a condition of continued water service, Diamond Point will evaluate connections that have had a potential change in use.

6.7.2 Eliminating or Controlling Cross-Connections

When cross-connections cannot be eliminated they shall be controlled by installation of approved backflow prevention devices commensurate with the degree of hazard.

Diamond Point's Cross-Connection Control Program shall consist of premises isolation at or near the service connection or an alternative location acceptable to the Water System between the service connection and the first point of any hazard. The Water System shall ensure that an approved reduced pressure backflow assembly (or reduced pressure detector assembly) is installed for all premises posing a high degree of cross-connection hazard, including those listed in Section 6.7.1.

Diamond Point shall require at a minimum, a double check valve assembly (or double check detector assembly) installed in accordance with WAC 51-46-0603 of the Unified Plumbing Code for premises posing a low degree of cross-connection hazards.

Cascadia prohibits interconnection of any private water supply with the Water System. Cascadia policy requires that the owner of a property or any person residing thereon receiving water service from Cascadia shall not connect, directly or indirectly, the water service line, or any part of the plumbing of such structure receiving water service from Cascadia, with any other water source, water system, plumbing or any utility line whatsoever.

6.7.3 Backflow Preventer Inspection, Testing, and Repairs

All backflow prevention assemblies are subject to annual inspection and testing by a DOH certified backflow assembly tester.

As a condition of continued water service, customers shall make their premises, to which water is supplied, accessible to a state certified backflow assembly tester for inspection and testing annually to

determine whether backflow prevention assemblies are properly installed, maintained and are operational. Diamond Point may deny or discontinue water service to any customer failing to cooperate in the installation, inspection, testing, maintenance, or repair of approved backflow prevention devices pursuant to WAC 246-290-490.

Diamond Point will promptly notify property owners with known potential cross-connections. Diamond Point shall also notify on an annual basis all customers with approved backflow prevention devices of the need for an annual inspection.

6.7.4 Quality Assurance Program

Diamond Point shall require backflow prevention assemblies to be models included on the current list of backflow prevention assemblies approved for use in Washington State. Existing backflow prevention assemblies installed on the system not on the current list of backflow prevention assemblies approved for use in Washington State may be allowed by the Water System if the following applies:

- The backflow prevention assembly was included on the list of backflow prevention assemblies approved for use in Washington State and/or Uniform Building Code list of approved backflow prevention assemblies at the time of installation;
- The backflow prevention assembly has been properly maintained;
- The backflow prevention assembly is commensurate with Cascadia's assessed degree of hazard as determined by Cascadia in its sole discretion; and
- The backflow prevention assembly has been inspected and tested annually and has successfully passed the annual tests.

Diamond Point shall require that an unlisted backflow prevention assembly be replaced by an approved assembly commensurate with the degree of hazard, when the unlisted assembly:

- Is moved; or
- Cannot be repaired using spare parts from the original manufacturer.

6.7.5 Responding to Backflow Incidents

In the case of a backflow incident in the Water System, Diamond Points's water system administrator shall notify the Board of Commissioners and the local Department of Health as soon as possible, but no later than the end of the next business day, when a backflow incident is known to have:

- Contaminated Cascadia's public water system of Diamond Point.
- Occurred within the premises of a customer served by Diamond Point.

6.8 Record Keeping and Reporting

Record keeping and reporting requirements are given in WAC 246-290-480 for all public water systems. All files are retained at the offices of Cascadia Water. Customer complaints are maintained by Cascadia and are brought to the attention of operators, corporate offices, and general management as needed.

6.9 Summary of O&M Deficiencies

Cascadia continually strives to improve O&M procedures for the Water System. Currently there are no specific improvements planned that need to be addressed at this time.

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7 DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

7.1 Technical Specifications and Design Standards

Cascadia has created technical specifications and standard details which are included in the Part A Water System Plan for Cascadia Water.

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8 IMPROVEMENT PROGRAM

The purpose of this chapter is to incorporate the needs of each water system, as identified in previous chapters, into an improvement program. The Capital Improvement Plan (CIP) presented in this chapter has been developed in accordance with the requirements identified in WAC 246-290-100.

The development of a comprehensive plan and improvement program provides orderly maintenance and improvement of each water system. Population and water demand forecasts and existing system analyses, discussed in previous chapters, were used to formulate the following Capital Improvement Plan. Each water system's design criteria were included in the formation of the plan.

The existing piping systems were also reviewed to determine the necessity of replacing older water mains. Considerations included material condition, size, and capacity. The following sections summarize Cascadia's Improvement Program which is organized in two basic elements: 1) Prioritizing Improvement Projects, and 2) Improvement Schedule.

Planning Phase 1 (6 years; 2020 - 2026)

Some existing system deficiencies and known operational issues have been identified. Some of the water systems are currently approved for additional connections according to documents from the DOH. It is anticipated that the Group A water systems combined will serve approximately 1,100 connections by the end of 2026. For WB Waterworks 1, Sea View Water, LLC, and CAL Waterworks, the anticipated needs at 2026 are greater than the current number of DOH approved connections. To meet current and future demands, specific infrastructure improvements to increase system capacity are required during this planning horizon. Each water system has projects identified to improve distribution system efficiencies, treatment, and redundancy needs. Other capital projects will consist of maintenance, repair, and replacement of the existing facilities, and providing treatment. For some systems, it will be necessary to provide an additional source of water, or water main replacement in future phases. The owners should be aware of those future needs to ensure that sufficient funding is available to address necessary repairs/replacements to aging infrastructure that are needed in future phases.

Planning Phase 2 (20-year horizon; 2026 - 2040)

It is anticipated that the Group A water systems combined will serve approximately 1,400 connections by the end of 2040. For W&B Waterworks 1, Sea View Water, LLC, Beachcomber H_20 Company, CAL Waterworks, and TEL Company #4 the anticipated needs in 2040 are greater than the current number of DOH approved connections.

Furthermore, at projected growth rates, in 2040 W&B Waterworks 1's demand is estimated to exceed its physical capacity as limited by water rights and source capacity. For expansion to continue, the system will need to obtain additional water rights and source(s) or reduce water usage to stay within the water right limitations.

In Phase 2 of the planning cycle (2026-2040), water systems will continue to investigate the development, or complete the development, of additional water source(s) as many existing sources will have been in service in excess of 50-years during this planning phase. In addition, replacing/upgrading the distribution system is anticipated to be a priority. Due to the large costs associated with main replacement, it is important to initiate the financial plans in Phase 1 that will enable these projects to be completed during Phase 2. The CIP will be re-evaluated during future WSP updates, and the CIP can be adjusted at that time.

Planning Phase 3 (20+ years, 2040 and beyond)

As indicated above, build-out for many of the water systems is estimated to occur during Phase 2. As the systems continue to grow in phase 3, the primary challenge may be developing additional sources of supply. In Phase 3, replacement/upgrade of the remaining distribution system is anticipated.

8.1 Prioritizing Projects

A three-step process was used to develop the Cascadia CIP. These steps are identification of potential system improvements, evaluation of the alternatives, and selection of alternatives. Potential system improvements/needs are identified in Section 3.5 and summarized in Table 3-18. This Section summarizes projects addressing the potential system improvements/needs, evaluation of the improvements alternatives, and selection of improvements.

8.2 Identification of System Improvements Projects

Section 3.5 identifies the potential system needs categorized by system functional group (or component). Each aspect of the water system was analyzed, and a draft list of potential improvements was developed to address existing or anticipated system deficiencies. When applicable, alternative improvements were developed for each deficiency. The alternatives were determined in consideration of meeting DOH and specific water system standards, improving reliability of the water system, and minimizing capital and operating costs. The following sections summarize potential improvement projects addressing the needs in each of the system functional groups.

8.2.1 Source

Source needs are identified for continued system growth and to provide redundancy within the system. These include the replacement of failing infrastructure, improved system reliability, and the evaluation of future locations for additional well sites.

Replacement of Failing Infrastructure

1. New source meters need to be installed on each well in the immediate term. This maintenance issue will assist in the goals set for in the Water Use Efficiency program outlined in Chapter 4 and the Water Loss Control Action plan provided in Appendix J.
2. The water line that conveys water from the wells to the distribution system has been a consistent source of leaks for the system. This line is located along the Clallam County right-of-way for Diamond Point Road. According to available records, it shares a trench with lines from a neighboring water system. The service history with this portion of line is a larger concern since all water consumed in the system must pass through this section of pipe making it a significant deficiency in the ability for the system to meet water use efficiency goals. Upon replacement of this line, the system should evaluate line location, size, and viability to relocation of wells as noted in the next section.

System Reliability

1. Emergency generators can provide power to well pumps during power outages. Diamond Point has adequate storage, but extended power outages raise concern regarding the ability to replenish the source water in the reservoir(s). A generator should be installed on the site with wells to allow at least one of the system's wells to be active in case of an extended power outage. The generator switch should meet all applicable electrical codes. The generator fuel supply should meet all applicable codes, especially spill control measures in the vicinity of the well field. Typically, a propane fired generator is preferred due to spill concerns within the well radii.

Future Well Site Locations

1. The previous source project notes the concerns associated with the water line from the sources to the distribution system. This portion of the water main extends approximately 4,500-feet and is solely dedicated to conveyance of source water as there are no connections to consumers between the sources and Reservoir 1. Due to the cost associated with replacement of this line it may be more cost effective to develop new wells much closer to the site of Reservoir 1. This would require the

modification of water rights to allow for withdrawal in a different quarter section of Section 21, Township 30 North, Range 2 West.

8.2.2 Treatment

Treatment facilities improve the quality of water distributed to customers and can reduce flushing and reservoir cleaning needs. As part of the current improvement project underway at Diamond Point (DOH Project #23-1108), the system is installing a disinfection treatment system. It is anticipated that these improvements will meet the needs of the system through the long-term planning period of this water system plan.

If in the long-term plan for the system it is determined that new sources should be developed, those sources should be evaluated to determine if treatment will be required for effective use of those sources. A potential treatment system shall be designed to meet current and future demands of the specific water system. Treatment methods will be selected based on the water quality of raw source water. Treatment methods include chlorination, iron and manganese removal, nitrate treatment, and arsenic treatment.

8.2.3 Storage

The recently approved disinfection treatment project was brough about due to repeated positive bacteriological tests in Pressure Zone 1. This area is exclusively fed from the elevated reservoir, Reservoir 2. In addition to the recent bacteriological test, this reservoir has additional concerns related to the excessive top dead storage from previous seismic requirements. For these reasons, this reservoir is a concern for the distribution system and should be considered for replacement in the long-term planning of the system.

Replacement reservoirs will likely be located adjacent to Reservoir 1 and should be of equal height with Reservoir 1 to provide simplicity and reliability in operations. The reservoir shall be designed to meet current and future demands of the water system based on.

8.2.4 Distribution

The system plans on completing water main extensions and replacements. Water main replacements will prioritize replacement of portions of the distribution system that are undersized and portions that have a history of repairs indicating aging and failing water lines. Additional projects include improvement to the pressurization of the system through booster pumps projects. The following projects address the potential distribution needs and long-term plans of the system.

Water Main Replacements

1. The 4-inch water main between Reservoir 1 to PRV 1 has been a long-standing priority for the system dating back to, at least, the last Water System Plan. This portion of water main limits the rate at which Reservoir 3 and be filled while supplying water to Pressure Zone 2. The water main is undersized and needs to be replaced with a larger capacity pipe. There are only two services off this portion water main so various methods of replacement could be considered including pipe bursting in addition to open cut construction techniques. The new water main should be increased in size to allow for proper pressurization of the system while providing the fire flows in accordance with DOH and Clallam County standards.
2. The 4-inch water mains associated with Pressure Zones 3 and 4 are insufficiently sized to provide adequate fire flow capacity. The water main in this portion of the distribution system is anticipated to be scheduled in the long-term improvements to the system. The priority of these improvements may be adjusted to account for the condition of these pipes over time. It is anticipated that improvements

will start at Reservoir 3 and proceed down along the main trunk of Pressure Zone 3 followed by the remaining portion of Pressure Zone 3 and 4. These projects are noted as projects 12 through 14 in Table 3-18.

3. Additional water main replacements should be prioritized based on various factors including the failure of infrastructure and portions of distribution piping that limit system capacity.

Booster Pumps – System Pressurization

1. The booster pump station serving Pressure Zone 5, needs an additional booster pump. Currently, the system has a single pump that does not meet the DOH standards of a closed system providing PHD and 30-psi with the largest pump out of service. During design, the size and number of pumps should be verified based on the future number of potential services associated with Pressure Zone 5.
2. As noted in Section 8.2.3, with the removal/replacement of Reservoir 2, the system will need to modify the means and method of pressurizing Pressure Zone 1. A hydraulically equivalent tank to Reservoir 1 would require the replacement or modified use of the existing Transfer Pump Station. During design, the with booster pumps to pressurize Pressure Zone 1. During design the size and number of pumps should be verified based on the future number of potential services associated with Pressure Zone 1. Pumps will be sized to meet Clallam County and DOH fire suppression standards.

8.2.5 Controls

Upon purchasing of the Diamond Point system by Cascadia Water, there have been general telemetry upgrades made to the system. These improvements include the installation of SCADA network to monitor well operations, reservoir levels, system pressures, and general security measures. In addition, there have been improvements made to system reliability with additional generators to provide continued service in emergency events.

The system should continue to implement needed upgrades to system telemetry as needed to control reservoir via pressure transducer, monitory source water levels, chlorine monitoring, and other system upgrades necessary to support available system operators.

8.2.6 Capital Improvements from Previous WSP

Projects identified in previous WSPs are shown below:

1. Storage Tank Upgrade Project: This project was completed with the installation of what is referred to in this report as Reservoir 1.
2. Well site pad & generator receptacle: This project is in the current/immediate term for completion by Cascadia Water.
3. Well site security improvements: This project was not completed. See project 5 in Table 3-18.
4. Upgrade size of well pumps: This project was not completed. See Section 8.2.1 for further discussion and analysis of system options.
5. Replace transmission mains from wells: This project was not completed. See project 11 in Table 3-18.
6. Tank #2 spot blast and repaint: This project was not completed.
7. Distribution system replacement: There is a note that it will likely not be funded. See Section 8.2.4 to see the priority of various distribution system projects.

8. Canyon Estates water main loop: This project was not completed. It is anticipated that this improvement will likely be completed through developer extensions.
9. Second booster pump as Protection Point BPS #1: This appears to be associated with Pressure Zone 5. See project 6 in Table 3-18.

8.2.7 Developer Extensions

Developer extensions are listed in the CIP to identify major water main improvements above and beyond normal looped water main improvements that land developments typically construct for the direct benefit of their project. These specific improvements should be incorporated into future land development activities along property frontage or within land development itself. Alignment for these improvements may be adjusted to local topography and land use.

No developer extensions have been identified for the current planning period. However, the system is interested in a potential expansion of the water systems and would entertain and support developer extensions when feasible.

8.2.8 Non-Facility Improvements

Potential non-facility improvements include continued promotion of conservation policies, clarification of the systems water rights (if new wells are developed), and updates of the Water System's procedures and policy to ensure that the integrity of the water distribution system is maintained.

Cascadia is in the process of installing and replacing all water service meters. Cascadia plans on include the replacement of service meters on a 10- to 15-year interval. In addition, source meters will be replaced approximately every 10 years.

8.3 Selection of Alternatives

The discussions of projects for supply, storage and distribution are contained within Chapter 3 and summarized in Section 8.2 above. The sequence and scheduling of projects was developed by following a general priority outline balanced with the review of the current and projected financial resources of each water system. These financial resources are further detailed in Chapter 9. The considerations in selecting projects included:

- Health Standards
- Land Use
- Quantity
- Reliability
- Costs
- Regional Benefit
- Environmental Effects
- Flexibility
- Implementation
- Life Expectancy
- Risk

8.4 Improvement Schedule

WAC 246-290-100 specifies that the WSP shall plan improvements for at least 20 years into the future with an annual schedule of improvements at least 6 years into the future. The DOH Planning Handbook

states that the improvement schedule should be based on one or more of the following schedule considerations:

- Identified Deficiencies
- Growth
- Fixed Dates Financial Priority
- Milestones
- Ongoing Programs
- Availability of Outside Funding
- Major Facilities
- Critical Facilities
- Distribution Facilities
- Non-Facilities
- Timing of Improvements
- Location of Improvements

8.5 Improvement Project Funding

As further detailed in Chapter 9, it is projected that all planned capital improvement projects scheduled for the next 20 years may be funded by projected cash reserves.

9 FINANCIAL PROGRAM

Cascadia Water is a rate supported Investor-Owned Utility (IOU) incorporated in the State of Washington which operates numerous systems throughout the state of Washington. All charges and fees for their systems are established in the Cascadia Water Company Tariff (Tariff) submitted to the Washington Utilities and Transportation Commission (UTC). The summary of the financial program for Cascadia Water is provided in the Cascadia Water – Water System Plan – Part A.

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10 MISCELLANEOUS DOCUMENTS

This Chapter summarizes supportive documents and agreements that are not otherwise discussed in other sections of the Water System Plan.

10.1 County/Adjacent Utility Correspondence

Island County was notified of the Cascadia updated Water System Plan. In addition to Island County, the following adjacent Utilities were also notified:

- Sunshine Acres (862506)
- Gardiner Lud 1 (07877W)

Correspondence that supports the updating of the Plan is provided in Appendix U.

10.2 State Environmental Policy Act (SEPA) Determination

A State Environmental Policy Act (SEPA) checklist is not required as the Diamond Point water system serves less than 1,000 connections. Therefore, the documentation has not been included with this plan.

10.3 Agreements

A copy of any agreements between Diamond Point/Cascadia Water and another entity, such as a Franchise Agreement, will be included in Appendix C.

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APPENDIX A
Water Facilities Inventory Form (WFI)

WATER FACILITIES INVENTORY (WFI) FORM

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

ONE FORM PER SYSTEM

Quarter: 1
Updated: 01/31/2023
Printed: 4/12/2023
WFI Printed For: On-Demand
Submission Reason: Owner Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822 or email wfi@doh.wa.gov

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
19210 4	DIAMOND POINT	CLALLAM	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

CULLEY J. LEHMAN [MANAGER]
PO BOX 549
FREELAND, WA 98249

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS 18181 STATE ROUTE 525
CITY FREELAND STATE WA ZIP 98249

7. OWNER NAME & MAILING ADDRESS

CASCADIA WATER, LLC
CULLEY J. LEHMAN
PO BOX 549
FREELAND, WA 98249

GENERAL MANAGER

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 661-7781		Owner Daytime Phone: (360) 661-7781	
Primary Contact Mobile/Cell Phone: (360) 661-7781		Owner Mobile/Cell Phone: (360) 661-7781	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax:	E-mail: cxxxxy@cascadiawater.com	Fax:	E-mail: cxxxxy@cascadiawater.com

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- ☐ Not applicable (Skip to #12)
- ☒ Owned and Managed
- ☐ Managed Only
- ☐ Owned Only

SMA NAME: Cascadia Water, LLC SMA Number: 168

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

252,000

15	16	17	18 SOURCE CATEGORY									19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN TERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL # 1 AGP297		X									X			Y	X						373	150	SW SE	21	30N	02W
S02	WELL # 2 AGP298		X									X			Y	X						372	150	SW SE	21	30N	02W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
19210 4	DIAMOND POINT	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?)		319	452
A. Full Time Single Family Residences (Occupied 180 days or more per year)	319		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	0		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	1	1	1
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	0	0	0
28. TOTAL SERVICE CONNECTIONS		320	452

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 795

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

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?												
B. How many days per month is water accessible to the public?												

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month that are NOT already included in the residential population?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	1	1	1	1	1	1	1	1	1	1	1	1

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

APPENDIX B
Service Area Map

Legend

- County Land Boundary
- Parcels

Diamond Point Retail Service Area

Sunshine Acres Group-A Community

Diamond Point Retail Service Area

Diamond Point Overall Service Area

Gardiner Lud 1 Group-A Community

Diamond Point Beach
Diamond Point Airport
Miller Peninsula State Park Property
Miller Peninsula State Park
Cape George Beach
Beckett Point Fishermens Club
Cat Lake
Gardiner Beach Rd
Old Gardiner Rd
Bachelor Rd
Cat Lake Rd
Farnsworth Pl
W Rd
Sunshine Dr
Jilsey King Rd
Rondelay Rd
Pierce Rd
Thompson Rd
Knapp Rd
Ginger Rd
Yarrow Rd
Canyon Estates Dr
Discovery Bay Dr
334 ft
294 ft
425 ft
411 ft
411 ft

Clallam County, WA

7/10/2023 2:35 PM

0 0.2 0.4 mi

N W E S

1:36,112

We are happy to share our maps and hope that you find them helpful. Please be advised, however, that these maps are intended to serve as a guide to the general location of features shown. The accuracy of the individual layers varies and layers may not align with one another. Determination of actual regulatory location of features shown on this map typically requires a field examination by qualified staff. Any person or entity that relies on any information contained herein does so at their own risk. Clallam County makes no warranty of the accuracy or usefulness of this data.

APPENDIX C
Miscellaneous System Documents

Utility Franchise Documents

DRAFT

DRAFT

UTILITIES FRANCHISE

Granted by Clallam County Board of Commissioners
to

Aquarius Utilities, LLC

This non-exclusive franchise to construct, extend, connect, repair, maintain, operate and remove waterline facilities over, under, along, across, and upon the county roads (located in the Plat of Diamond Point, Diamond Point First Addition, and Johnson's Discovery Bay View Tracts) as described in Attachment A within Clallam County ("County") is granted to Aquarius Utilities ("Grantee"), a corperation organized under the laws of the State of Washington, its successors and assigns,

1. DEFINITIONS:

A. "County road" or "road" as used herein shall include, but not be limited to, county roads, avenues, alleys, streets, boulevards, viaducts, bridges, public ways, and public rights of ways including but not limited to deeded land, easements, prescriptive rights, and dedications and shall include their appurtenances including, but not limited to , asphalt, turnouts, gutters, curbs, ditches, sidewalk, paths, trails, drain pipe, culverts, catch basins, manhole, utiltities, hand and guard rails, retaining walls, bridges, trestles, wharves or landings, property corners, or fences and shall embrace the plural. Specifically, the roads included in this franchise are Diamond Point Road, No. 58250; West Street, No. 59810; South Street, No. 59760; Discovery View Drive No. 59830; Discovery Way, No. 59790; Beach Drive, No. 59950; South Diamond Shore Lane, No. 59850; North Diamond Shore Road, North Street, No.59860; Kaufman Dirve, No. 59930; Spring View Place, No. 59920; and Comorant Drive, No. 59900;.

B. "Construction" or "Construct" as used herein shall include, in addition to construction, extension, connection, repair, maintenance, operation, installation and removal.

C. "Within the road" or "within a road" shall mean over, under along, across, or upon a county road..

D. "Claims" shall include, but not be limited to, claims, demands, suits, actions, losses, costs, expenses, attorney fees, damage judgements, and decrees whether at law or in equity.

2. LOSS OF JURISDICTION:

Whenever any of the roads as designated in this franchise shall fall outside the County's authority by reason of change in political jurisdiction such as by subsequent incorporation or

annexation, then all the rights and privileges herein granted shall terminate in respect to said roads; but this franchise shall continue in force and effect in respect to all roads not so removed from County authority. Requirements of state and federal law and other county permits may, however, continue in effect as to the roads removed.

3. POWERS:

The Grantee shall have the right and authority to enter over, under, along, across, and upon the above-mentioned roads for the purpose of construction of facilities as authorized herein in conformity with such county, state, and federal codes, regulations and standards, as now or later enacted or hereafter amended, governing such facilities. This franchise merely authorizes the Grantee to occupy and use the county roads above-mentioned and nothing contained herein shall be construed to grant or convey any right, title, or interest in or to such county roads to the Grantee. Such franchise shall in no way prevent or prohibit the County from using any of said roads or effect its jurisdiction over them or any part of them, and the County shall retain power to make all necessary changes, relocations, repairs, maintenance, establishment, improvement, dedication, or vacation of the same as the County may deem fit, including the dedication, establishment, maintenance, and improvement of all new rights-of-way, thoroughfares and other public properties of every type and description.

4. TERM:

The term of this franchise shall be for a period of five (5) years, beginning on the effective date of this franchise, unless terminated, revoked or modified under the provisions of this franchise. This franchise shall be automatically renewed for additional five (5) year terms up to a total of twenty (20) years from the effective date of this franchise, UNLESS, the County gives notice of its intention to renegotiate the terms or conditions of the franchise, in which case, the franchise shall not renew unless and until the County and the Grantee reach agreement on terms and conditions acceptable to both parties. If the County and the Grantee are unable to reach agreement on new terms and conditions, the franchise shall terminate and the Grantee shall remove its facilities from the County roads unless otherwise allowed under Section No. 17, Abandonment or Removal.

The County reserves for itself the right at any time upon forty-eight hours notice to the Grantee to change, amend, modify, or amplify any of the provisions or conditions herein enumerated to conform to any local, state or federal law or regulation or recognized engineering practice relating to the public welfare, health, environmental compliance, safety, or highway design as may hereinafter be adopted or recognized. Additionally, at any time after the initial five year period of this franchise, the County may direct the Grantee to meet and discuss in good faith amendments to this franchise or enter into separate agreements, provided that in the event that mutual agreement is not attained, the County may schedule before the Board of County Commissioners the consideration of such amendments and the Board may take such action as it deems appropriate. The authority of the County to consider mutually agreed amendments and, after the initial five (5) year period, to consider and take unilateral

action on amendments in the event the parties do not reach mutual agreement, shall be in addition to, and shall in no way limit, the ability of the County to make amendments and changes to the franchise conditions, negotiate renewals or extensions of the franchise term, or take action pursuant to any other sections of this franchise.

5. PERMITS:

5.1 No construction within a road shall commence until a Right of Way Permit has been submitted to and approved by the County for a site-specific location or installation, including but not limited to, relocations. Before any work is done by the Grantee under this franchise, it shall first file with the Clallam County Engineer (hereinafter the "Engineer") an application for a permit to do such work, accompanied by design drawings in triplicate showing the position, location, and type of facilities sought to be constructed, extended, connected, repaired, maintained, operated or removed, showing the relative positions to existing roads and property lines. Prints shall be submitted on 11 by 17 inch or smaller paper (but not smaller than 8-1/2"x11"). Drawings shall be drawn in a professional manner and to a scale of 1 inch = 50 feet (unless otherwise approved). Drawings shall give an accurate graphic representation of local improvements including, but not limited to, sidewalks, roadways, driveways, property lines, turnouts, parking strips, paths, trails, telephone lines, electric lines, other utilities, conduits, culverts, ditches, drainage facilities, sewer lines, and water lines, as may exist over, under, along, across, and upon the roads sought to be occupied and immediately adjacent thereto. Said locations shall be drawn in such a manner that identification in the field is possible. Drawings shall indicate the nature of the materials being installed (e.g., concrete, PVC , HDPE, asbestos cement, copper, steel, treated wood, etc.). Drawings shall also show the location by cross sections of the utility to be installed by the Grantee. Drawings shall show all critical and sensitive areas within 300 feet of the work area. If Grantee desires to attach a facility to a bridge or other structure of the County, drawings shall include details of the proposed method of attachment and, if requested by the County, shall be supplemented with structural calculations as requested.

5.2 The Engineer shall apply the following considerations and other relevant considerations in reviewing proposed utility routes and in the issuance, conditioning, or denial of a Right of Way Permit:

A. the capacity of the roads to accommodate the Grantee's proposed facilities;
B. the capacity of the roads to accommodate additional utility, cable, telecommunications, or other public facilities if the Right of Way Permit is granted;
C. the damage or disruption, if any, to public or private facilities, improvements, service, travel, or landscaping if the Right of Way Permit is granted;
D. the impact upon sensitive areas, species, or their habitats;
E. the public interest in minimizing the cost and disruption of construction within the roads, including but not limited to, coordination with future utility installation or county improvement projects and use of common conduits and structures;

F. recent construction and/or improvements to the road and/or proposed construction and/or improvements to the road which is proposed for location of facilities;
G. the availability and County's preference of alternate routes, locations, and/or methods of construction for the proposed facilities, including, but not limited to, boring or directional drilling instead of open cuts;
H. whether the Grantee has received all requisite licenses, certificates, and authorizations from applicable federal, state, and local agencies with jurisdiction over the activities proposed by the Grantee;
I. whether the Grantee is in compliance with the terms of this franchise;
J. if a facility is proposed to be attached to a bridge or other structure, consideration will be given to its affect on the load rating, strength, serviceability, aesthetics, maintenance access and other impacts.

The Engineer will either approve and issue the permit, approve subject to conditions, or reject the application. If the application is rejected, the Engineer will provide the Grantee an explanation of the reasons that the application was rejected.

5.3 In the event any of the Grantee's facilities located in, above or under any road, breaks, becomes damaged, or becomes endangered, and such break, damage, or endangerment threatens the property, life, health or safety of any individual, the Grantee shall immediately take such measures as are necessary to repair its facilities, to cure or remedy the dangerous conditions for the protection of property, life, health or safety of individuals without first applying for and obtaining a permit. However, this shall not relieve the Grantee from the requirement of obtaining any permits necessary for this purpose, and the Grantee shall apply for all such permits and mitigation not later than the next business day. Moreover, it will not relieve the Grantee from the requirement of performing such work in a professional manner with appropriate materials and compaction and for traffic control and safety. Mitigation measures shall be performed by the Grantee as specified in the conditions of the permits or other authorizations. Any such emergency repairs may be directed to be removed or replaced by the Engineer and the Grantee shall comply forthwith.

6. COMPLIANCE WITH LAW AND STANDARDS:

6.1 Grantee shall comply with all federal, state, and local laws, rules, standards and regulations applicable to any work, facility or operation of the Grantee during the period of this franchise. All work performed by the Grantee and all of Grantee's facilities within the roads shall comply with the comprehensive plan, zoning code and development regulations of the County. Grantee's facilities may require additional project permits and approvals under County land use codes and development regulations. All work shall be performed by the Grantee in a manner to avoid or minimize impacts on critical areas contained within, adjacent to, or downstream from the County road. Prior to commencing any work in a critical area, the Grantee shall obtain any and all necessary permits and approvals required. The granting of this franchise shall in no way relieve the Grantee from its responsibility for avoiding "take of any threatened or endangered species" as defined by the Endangered Species Act of 1973, 16 US

§1531, et seq., as amended, in the performance of any work authorized by this franchise and any right of way permits. All construction, maintenance and repair activities performed within the limits of the County roads, shall be performed in strict compliance with the Endangered Species Act.

6.2 For all construction which may fall within or affect county roads, the Grantee shall as a minimum and under the direct control of a qualified responsible individual (1) make a determination whether the work area involves a sensitive area as identified for ESA listed species; and if so (2) determine what Best Management Practices (BMP's) are required to protect said sensitive areas; (3) insure that these BMP's are implemented, effective and maintained for the duration of said work activity; (4) perform all monitoring and reporting subsequently required and (5) remove, if applicable, the BMP's after completion. For all work activities not clearly covered by Clallam County Standard Operating Procedures (SOP's) within areas designated sensitive to ESA listed species, the Grantee shall apply directly to the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service to obtain all additional required permits and authorizations prior to commencement of work. A responsible individual shall be designated by the Grantee who shall subsequently insure that all work performed within sensitive areas is performed in a manner consistent with all aspects of the Clallam County SOP's and/or the individual permit or authorization issued for said specific project.

6.3 With the application, Grantee shall file proof of all environmental approvals and permits required accompanied by the procedures to be utilized in accomplishing its work. In addition to the terms and conditions of this franchise, all work shall be performed in accordance with the current County standards, the approved plans and specifications, and the terms and conditions of the Right of Way Permit and other permits and approvals necessary to accomplish the work or otherwise applicable. The Grantee shall remain solely responsible for compliance with all applicable laws, regulations, codes, and standard plans and specifications in the design and construction of Grantee's facilities.

6.4. The Grantee shall construct its facilities at its own risk. The Engineer may inspect said work to determine whether it materially or adversely impacts the county road. Approval by the County of the Grantee's work shall not be construed as an approval of the nature, extent, quality, or workmanship of the work and shall be construed to mean nothing other than that the Grantee's work is not found to materially adversely impact the physical characteristics of the county road. The location of all the Grantee's facilities, their depth below or height above the surface of the ground or grade of any road, and their lateral location in relation to the road centerline shall be in compliance with all county, state, and federal permits, codes, regulations, and standards, including, but not limited to, WAC 136-40. All underground facilities except electrical power lines and copper telephone lines which can be otherwise traced shall be installed with a locate wire of 10-gauge stranded copper wire with 600 volt insulation; Essex, or approved equal. Where the locate wire extends to the surface for tapping it shall be adequately protected. Where conflicts occur between the aforesaid codes, regulations, and standards and the terms of this franchise, the stricter of the two shall apply. The Grantee shall

at all times insure that its construction, extension, connection, repair, maintenance, operation, and removal of its facilities does not diminish the safety of the public using, or in proximity to, county roads and their clear zones.

6.5 During any period of construction all work performed by the Grantee or its contractors shall be accomplished in a safe and workmanlike manner, so as to minimize interference with the free passage of traffic and the free use of adjoining property, whether public or private. The Grantee shall at all times post and maintain proper signs, cones, and barricades and comply with all applicable safety regulations during such period of construction as required by county, state or federal codes, regulations, standards or laws, including but not limited to, RCW 39.04.180 for the construction of trench safety systems and the Manual on Uniform Traffic Control Devices (MUTCD).

7. RECORDS:

7.1. The Grantee shall maintain adequate records to document obligations performed under this franchise. The County shall have the right to review the Grantee's records, at reasonable times, with regard to the subject matter of this franchise, upon reasonable notice. The right to review records shall last for six (6) years from the termination date of this franchise, including any extensions or renewals. In addition to the maps and records of facility location under this Section, the Grantee shall provide the County, upon the County's request, with copies of records of construction inspections, or regulatory compliance for all facilities subject to this franchise as deemed necessary by the County to manage the county roads, or to protect the public health, safety, and welfare. Nothing in this Section shall be construed to require Grantee to violate state or federal law concerning subscriber privacy, nor shall this Section be construed to require Grantee to disclose proprietary or confidential information without adequate safeguards for its confidential or proprietary nature subject to RCW 42.17 et seq as now or hereafter amended.

7.2. Grantee shall at all times keep at its principal place of business full and complete plans, maps, and records showing the as-built location and details of all franchise facilities located over, under, along, across, or upon the roads. Grantee shall make copies of the maps, plans, and records available, free of charge, to County at any time upon request. Such maps and plans shall be drawn in the same manner as design drawings as set forth in Section 5 of this franchise, showing the location of all franchise facilities installed over, under, along, across, or upon the roads within the limits of Clallam County. One complete set of said maps, plans, and records shall be provided on reproduction quality Mylar or, alternatively, may be provided on paper, with the number of copies as requested by the County. Maps, plans, and records may be provided in electronic form, instead of Mylar or paper, if approved by the County.

7.3. In addition to the above described plans, maps, and records the Grantee shall maintain a paper or Mylar map at a scale of 1 inch = 2000 feet (or other scale approved by the County) showing all county roads within the bounds of this franchise and showing where Grantee's

facilities are located in respect to said roads. An up to date copy of this map shall be provided, free of charge, to the County upon completion of construction and after any alterations.

8. RESTORATIONS AND MAINTENANCE:

8.1 The Grantee shall leave all roads in as good and safe condition in all respects as they were before the commencement of construction by the Grantee, its officers, agents, contractors, or employees, or in such condition as meets with the approval of the Engineer. The Grantee shall comply with all restoration conditions of applicable permits or approvals.

The Engineer shall have final approval to determine that the condition of roads after restoration meets these requirements. The Grantee agrees to promptly complete all restoration work and to promptly repair all damage caused by the work to the roads and to other affected areas at its sole cost and expense.

8.2 The Grantee shall maintain its facilities in accordance with accepted standards of practice. The grantee shall trim brush, grass, trees, and all other vegetative matter from within the county road within a 10-foot radius of all aboveground appurtenances so as to aid in visual location of the utilities by county personnel. Trimming shall be performed as necessary to keep vegetative growth shorter than the appurtenance. Herbicides and other chemical agents shall not be used. The cost and the repair of damage caused by the County, its officers, agents, and employees to a facility that is not accordingly made readily visible shall be the responsibility of the Grantee.

8.3 In case of any damage to said roads or to the property of third parties, resulting from any work performed or failed to be performed by the Grantee, the Grantee agrees to immediately repair said damage at its own cost and expense to the satisfaction of the Engineer. Clallam County may at any time, do, order, and have done any and all work considered necessary to restore to a good and safe condition any such roads left by the Grantee, its officers, agents, contractors, or employees in a condition different from that which existed prior to the work and the Grantee, upon demand, shall pay to the County all costs of such construction or repair and of doing such work; provided, that Clallam County shall have first made written demand upon the Grantee to perform the work necessary to return the road to the condition which they existed prior to the work by the Grantee, and the Grantee shall have failed, for a period of forty-eight (48) hours after receipt of such written demand, to commence the work necessary to return the road to its pre-existing condition. Provided further, that in the event it is reasonably determined by Clallam County that an emergency exists, which requires immediate restoration, then the County may perform such work and the Grantee shall pay all reasonable costs thereof. In addition, the Grantee shall reimburse the County for any and all documented costs the County reasonably incurs in response to an emergency involving the Grantees' facilities.

8.4. The Grantee shall promptly reimburse the County, upon submittal by the County of an itemized billing, for the Grantee's proportionate share of all actual, identified costs and expenses incurred by the County in repairing or altering any County or Grantee facility, if at

the Grantee's request or as the result of the presence of the Grantee's facilities in the right of way. Such costs and expenses shall include, but not be limited to, the Grantee's proportionate share of the costs of County personnel assigned to oversee or engage in any work in the road or outside the road if damage to a critical resource or site requires repair as a result of the Grantee's activities or presence in the road. Such costs and expenses shall also include the Grantee's proportionate share of County time spent reviewing construction plans in order to either accomplish the relocation of the Grantee's facilities or the routing or rerouting of any utilities so as not to interfere with the Grantee's facilities. Any and all costs will be billed on an actual cost basis, including overhead and indirect costs. The County will provide the Grantee with the County's itemization of costs for information purposes.

9. RELOCATION OF FACILITIES

9.1 The Grantee agrees and covenants at its sole cost and expense, to protect, support, temporarily disconnect, relocate, or remove from any road any of its facilities when so required by the County by reason of traffic conditions, public safety, acquisition of new rights-of-way and the establishment and improvement thereof, widening and improvement of existing roads, right of way vacations, change or establishment of road grade, or the construction of any public improvement or structure by any governmental agency acting in a governmental capacity; PROVIDED, that upon approval by the Engineer, Grantee shall generally have the privilege to temporarily bypass, in the authorized portion of the same road or any facilities required to be temporarily disconnected or removed. This section applies to all of Grantee's facilities wheresoever situated within the road, regardless of whether the Grantee's facilities were previously located therein through an easement or other property interest prior to the property becoming County road.

9.2 Upon the request of the County and in order to facilitate County road improvements, the Grantee agrees at its sole cost and expense, to locate, and, if reasonably determined necessary by the County, to excavate and expose portions of its facilities for inspection so that the location of the facilities may be taken into account in the improvement design; PROVIDED, that Grantee shall not be required to excavate and expose its facilities for inspection if the Grantee's as-built plans and maps of its facilities submitted pursuant to Section 7 of this franchise are reasonably determined by the Engineer to be adequate for purposes of evaluating improvements. The decision to relocate Grantee's facilities in order to accommodate road improvements shall be made by the Engineer upon review of the location and construction of the Grantee's facilities. Where additional costs accrue to the County during maintenance, operation, or improvement of public facilities related to avoidance of damage or accommodation of the Grantee's facilities, Grantee agrees to pay the County the full amount of additional costs, if any, as identified by the County.

9.3 If, at any time, County, deems it advisable to improve any of its roads by, including, but not limited to, grading, regrading, paving, altering, repairing, realigning, widening, or draining, the Grantee, upon advance notice by County, shall, at its own expense, except as detailed below, promptly raise, lower, or move its facilities to allow County to complete its

road improvements and to conform to such improved roads and the County shall in no way be held liable for any damages to Grantee that may occur by reason of the County's improvements or by the exercise of any rights so reserved in this Section or grant, except as a result of negligence or fault on the part of the County. Said advance notice shall indicate the date by which the Grantee is required to raise, lower, or move its facilities and said notice will be given to the Grantee in advance of said date by a length of time consistent with the urgency of the situation (less time for emergencies and more time for scheduled projects). County will strive for as much advance notice as is practical so as to allow time for designing, bidding, and completing the work.

9.4 Any condition or requirement imposed by the County upon any person or entity (including, without limitation, any condition or requirement imposed pursuant to any contract or in conjunction with approvals for permits for zoning, land use, construction or development) which reasonably necessitates the relocation of the Grantee's facilities within the franchise area shall be required relocation for purposes of subsections 9.1, 9.2 and 9.3 above.

9.5 The Grantee may, after receipt of written notice requesting a relocation of its facilities, submit to the County written alternatives to such relocation. The County may evaluate such alternatives and advise the Grantee in writing if one or more of the alternatives is suitable to accommodate the work, which would otherwise necessitate relocation of the facilities. If requested by the County, the Grantee shall submit additional information to assist the County in making such evaluation. In the event the County ultimately determines that there is no other reasonable or feasible alternative, the Grantee shall relocate its facilities as otherwise provided in this Section.

9.6 The provisions of this Section shall in no manner preclude or restrict the Grantee from making any arrangements it may deem appropriate when responding to a request for relocation of its facilities by any person or entity other than the County, where the facilities to be constructed by said person or entity are not or will not become County-owned, operated or maintained facilities, provided that such arrangements do not unduly delay any County construction projects and are otherwise in full conformance with this franchise.

9.7 Grantee shall be responsible for timely relocation of its facilities and coordination of relocation with the County or the Contractor for the project. The Grantee shall be fully responsible for the costs of any delays to County projects resulting from relocations of the Grantee's facilities. In the event the Grantee fails or refuses to relocate its facilities in a timely manner, the County may do, order, or have done, any and all work required to perform the facilities relocation and the Grantee, upon demand, shall pay to the County all costs of such work including all damages and additional costs incurred by the County as a result of Grantee's failure or refusal. Grantee shall hold harmless, indemnify and defend the County against all claims, lawsuits, or damages caused in whole or in part by location or relocation of Grantee's facilities, as more fully set forth in Section 11 of this franchise ordinance. Failure of

the Grantee to raise, lower or move its facilities by the date set forth in the written notice shall entitle Clallam County to liquidated damages in the amount of Two Hundred Fifty Dollars ($250.00) per day (to be adjusted for inflation per Section 19, INFLATION ADJUSTMENTS) for each day of non-compliance.

10. UNDERGROUNDING OF FACILITIES.

10.1 In any area of the County in which there are no aerial facilities, in any area in which telephone, electric power wires or other cables have been placed underground, or in any area where the Board of Commissioners requires conversion of aerial to underground facilities, the Grantee will not be permitted to erect poles or to run or suspend wires, cables or other facilities thereon, but shall lay such wires, cables or other facilities underground in the manner required by the County at no cost to the County. The Grantee acknowledges and agrees that, even if the County does not require the undergrounding of its facilities at the time of right of way use permit application, the County may, at any time in the future, require the conversion of the Grantee's aerial facilities to underground installation at the Grantee's expense. Whenever the County may require the undergrounding of the aerial facilities in any area of the County, the Grantee shall underground its aerial facilities in the manner specified by the County.

11. HOLD HARMLESS:

11.1 The Grantee shall assume the risk of, be liable for, and pay all damage, loss, cost and expense of any party arising out of the Grantee's use of the road, to the extent of their negligent actions, errors, omissions, or breach of any obligations. The Grantee hereby releases, covenants not to bring suit, and agrees to indemnify, defend and hold harmless the County, its elected and appointed officials, officers, employees, agents and representatives from any and all claims, including claims by the Grantee's own employees for which the Grantee might otherwise be immune under Title 51 RCW, for injury or death of any person or damage to property caused by or arising out of the negligent acts or omissions of the Grantee, its agents, servants, officers or employees in the performance of this franchise, and any rights granted hereunder. This indemnification provision constitutes the Grantee's waiver of immunity under Title 51 RCW and has been mutually negotiated by the parties.

11.2 The Grantee shall hold harmless from, defend, and indemnify the County, its elected and appointed officials, officers, employees, and volunteers, against all claims by reason of damage to any property or business or environmentally critical species or habitat, and/or any death, injury or disability to or of any person or party of any nature arising out of or suffered, directly or indirectly, in whole or in part, from the actions, errors, omissions, or breach of any common law, statutory, regulatory or contractual obligations in connection with the activities of the Grantee, its sub-contractors, assigns, agents, contractors, or employees, under this franchise, any permit, or in connection with the use of the right of way; PROVIDED, that nothing herein shall require the Grantee to hold harmless from, defend, and indemnify the County, its elected and appointed officials, officers, employees, and volunteers, against claims

based solely upon the negligence of the County, its elected and appointed officials, officers, employees, and volunteers; and PROVIDED FURTHER, that if the claims are caused by or result from the concurrent negligence of (a) the County, its elected and appointed officials, officers, employees, and volunteers and (b) the Grantee, its sub-contractors, assigns, agents, contractors, or employees, and involve those actions covered by RCW 4.24.115, this indemnity provision, with respect to liability for damages arising out of bodily injury to persons or damage to property based upon such concurrent negligence, shall be valid and enforceable only to the extent of the Grantee's negligence or the negligence of their sub-contractors, assigns, agents, contractors, or employees, except as limited below. This indemnification provision constitutes the Grantee's waiver of immunity under Title 51 RCW and has been mutually negotiated by the parties.

11.3 The Grantee further agrees to process and defend at its own expense all claims arising in whole or in part from the actions, errors, omissions, or breach of any obligations of the Grantee, its sub-contractors, assigns, agents, contractors, or employees, arising out of or in connection with any activities related to this franchise or the Grantee's use of the road. The Grantee's duty to assume the defense and to pay all expenses thereof shall apply to all claims where any duty to provide indemnification in whole or in part potentially applies, whether or not the injuries or damages are ultimately found to be due to the negligence of the Grantee arising out of the franchise or any use of the road.

11.4 In the event that the Grantee refuses the tender of defense in any claim, said tender having been made pursuant to the indemnification provision contained herein, and said refusal is subsequently determined by the Superior Court or other court, tribunal, or agency having competent jurisdiction, to have been a wrongful refusal on the part of the Grantee, then the Grantee shall pay all of the County's costs for defense of the action, including all expert witness fees, costs, and reasonable attorney's fees, including costs and fees incurred in recovering under this indemnification provision.

11.5 The County shall notify Grantee, in writing, as soon as practicable after the presentation of any claims made or accrued against the County on account of any fault on the part of Grantee. Failure by the County to notify Grantee properly in accordance with the foregoing of any such claims against the County shall not release Grantee from its obligation to defend or indemnify the County unless Grantee can establish that it has been materially prejudiced by such failure. Inspection, approval or acceptance by the County of any work performed by the Grantee shall not be grounds for avoidance by the Grantee of any of its obligations under this Section.

11.6 The Grantee agrees that it will not cause nor permit in any manner, including negligent or intentional acts or omissions, release of any hazardous substance, waste, or pollutant or contaminant into or upon any county road contrary to any state or federal law or local regulation with respect thereto. Grantee shall notify the Washington State Department of Ecology, and other necessary agencies, and County in writing immediately upon any such release. Grantee shall indemnify, hold harmless, defend and covenant not to sue the County,

from and against any and all claims, actions or suits in equity or at law and any judgements, damages, awards, penalties or fines, including reasonable attorneys' fees and costs incurred in the defense thereof, arising out of the release or spill of any such hazardous materials, dangerous waste, or pollutant or contaminant within the County right of way or on private property. Grantee shall be responsible for completely cleaning up and remediating, as required by any government agency, any and all hazardous substance, waste or pollutants or contaminants released or spilled into or upon the County roador private property. The County shall be entitled to indemnification by Grantee for all costs incurred by it as the result of any release or spill of such materials by Grantee, its agents, officials, officers, and employees.

Upon any release or spill of any such materials mentioned herein, the County may give notice of intent to immediately terminate this franchise and, where it deems necessary to protect the public health, safety and welfare, the County may immediately take whatever steps it deems necessary and advisable to contain, clean up or remediate the release or spill. The County shall be entitled to repayment from the Grantee of any costs or expenses incurred in responding to such a release or spill.

12. CONCURRENT POWERS:

The construction of the Grantee's facilities shall not preclude Clallam County, its officers, agents, contractors, or employees from blasting, grading, or doing other necessary road work contiguous to the Grantee's facilities, provided that the Grantee shall have advance notice of said blasting, grading or other necessary road work in order that the Grantee may protect its facilities.

13. DANGEROUS CONDITIONS, AUTHORITY FOR COUNTY TO ABATE

13.1 Whenever the Grantee's construction, relocation, or abandonment of facilities authorized by this franchise has caused or contributed to a condition that substantially impairs, in the opinion of the Engineer, the lateral support of the adjoining road , or endangers the public, an adjoining public place, an environmentally critical area, road facilities or County property, the Engineer may direct the Grantee, at the Grantee's own expense, to take actions to protect the public, adjacent public places, County property or road facilities, and such action may include compliance within a prescribed time.

13.2 In the event that the Grantee fails or refuses to promptly take the actions directed by the County, or fails to fully comply with such directions, or if emergency conditions exist which require immediate action, the County may enter upon the property and take such actions as are necessary to protect the above interests, and the Grantee shall be liable to the County for the costs thereof.

14. FRANCHISE NOT EXCLUSIVE:

This grant or privilege shall not be deemed or held to be an exclusive franchise. It shall in no manner prohibit Clallam County from granting other franchises of a like nature or of an un-like nature for public or private purposes over, under, along, upon, or across any of the county roads and shall in no way prevent or prohibit Clallam County from using any of said roads or affect its jurisdiction over them or any part of them, with full power to make all necessary changes, relocation, repairs, maintenance, etc., as it deems fit.

15. ASSIGNMENT:

Except for assignment or hypothecation for security purposes, Grantee shall not have the right to assign the franchise or otherwise transfer it in any manner whatsoever, or sell, lease, license, or permit others to use or transfer in any manner whatsoever any interest in all or any part of its facilities that are installed or operated hereunder, except on prior written approval of the Board of Clallam County Commissioners, which consent shall not be unreasonably withheld.

16. FORFEITURE:

The franchise may be forfeited, at the option of the County, upon failure or violation by Grantee to observe the material terms and conditions set forth herein. Forfeiture may be exercised only following written notice to Grantee of failure to observe the terms and conditions hereof, detailing the breach of this franchise with specificity, followed by Grantee's failure or refusal to eliminate or correct such failure or to commence correction of such within the amount of time specified by the County. In the event of any failure or violation, the County may bring suit in the manner provided by law for the forfeiture of the franchise without the necessity of resorting to procedures in quo warranto, and the exercise of such remedy of forfeiture shall not preclude exercise of any other right or remedy given to the County by law, whether exercised concurrently or subsequently.

17. ABANDONMENT OR REMOVAL:

17.1 No facilities located within the road by the Grantee or Grantee's agents may be abandoned in place without a written plan and the express agreement and written consent of the County. Any plan for removal must be first approved by the County, and all necessary permits must be obtained prior to such work and all roads occupied by Grantee's facilities must be restored to the condition specified by the County.

17.2 Except as otherwise provided herein, within one hundred eighty (180) days after the use of any facilities has been permanently discontinued or this franchise expires or is otherwise terminated, Grantee shall forthwith remove its facilities from the roads and shall restore roads to that condition specified by the Engineer; provided that such property shall not be removed if the Engineer shall reasonably determine that such removal will cause

unreasonable damage to such roads or the environment. The Engineer may, at his discretion, permit or require facilities to be abandoned in place. If utilties are to be abandoned in place the Grantee shall at Grantees cost:

1) provide the Engineer with a detailed description of the facilities being abandoned (type of material, condition, size, extent, etc.);
2) provide a detailed as-built map of the utility to be abandoned showing the precise location with measurements to reliable landmarks;
3) purge its facilities of any hazardous product or other additive substances and render them safe in accordance with applicable law or standards deemed appropriate by the County;
4) submit to the Engineer an instrument transferring to the County ownership of such facilities.

Said instrument shall certify that the utilities being abandoned are disconnected from service and are inactive. Facilities may not be abandoned in place if the Engineer considers them hazardous, problematic, or otherwise undesirable.

Abandoning facilities in place shall not relieve the Grantee of the obligation and costs to remove or alter such facilities in the event the County later determines and requests Grantee to remove or alter such facilities as is necessary for the installation, operation, upgrade, or maintenance of any County road or utilities or facilities, including, but not limited to, drainage facilities, or for the health and safety of the public, in which cases the Grantee shall perform such work in a timely manner at no cost to the County.

Grantee shall be responsible for any environmental review required for the abandonment or removal of any facility and payment of any costs of such environmental review.

In the event Grantee does not perform above work within a reasonable time following notice from the County, the County may do, order, or have done, any and all work on such abandoned facilities, and the Grantee, upon demand, shall pay to the County all costs of such work.

18. MONUMENT REFERENCE:

Before any work is performed under this franchise, the Grantee shall have referenced all monuments and markers of every nature relating to subdivision plats, roadways, and all other surveys that might be affected by such work. The reference points shall be so located that they will not be disturbed during the Grantee's operations under this franchise nor by other reasonable maintenance or construction activities. All such monuments or markers disturbed during the Grantee's operation shall be replaced as expeditiously as conditions permit. The cost of replacement of monuments shall be borne by the Grantee. Said reference and replacement of monuments shall be performed by a surveyor licensed by the State of Washington.

19. INFLATION ADJUSTMENTS:

The dollar amounts fixed under this franchise in Section No. 9, Relocation of Facilities, and Section No. 31,Compensation shall be increased annually on the anniversary date of this franchise by Three and One-Half percent (3.5%) of the then current amount. The inflation adjustment for Section No. 21, Insurance and Section No. 23, Surety Bond shall be reviewed and modified at each five-year anniversary (see Section No. 4, Term).

20. LIMITATION OF COUNTY LIABILITY.

Administration of this franchise shall not be construed to create the basis for any liability on the part of the County, its elected and appointed officials, officers, employees, and agents, for any injury or damage from the failure of the Grantee to comply with the provisions of this franchise; by reason of any plan, schedule or specification review, inspection, notice and order, permission, or other approval or consent by the County; for any action or inaction thereof authorized or done in connection with the implementation or enforcement of this franchise by the County; or for the accuracy of plans submitted to the County.

21. INSURANCE.

21.1 The Grantee shall procure and maintain for the duration of the franchise, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the exercise of the rights, privileges and authority granted by this franchise and Right of Way Permits to the Grantee, its agents, representatives or employees. The Grantee shall provide a certificate of insurance to the County for its inspection prior to performance of any permitted work within the County rights of way, and such insurance shall include:

A. Automobile Liability insurance with limits no less than $1,000,000 Combined Single Limit per occurrence for bodily injury and property damage; and
B. Commercial General Liability insurance, written on an occurrence basis with limits no less than $1,000,000 combined single limit per occurrence and $2,000,000 aggregate for personal injury, bodily injury including death, and property damage.

21.2 The insurance policies obtained by the Grantee shall name the County, its elected and appointed officers, officials, employees, agents, and volunteers as additional insureds with regard to activities performed by or on behalf of the Grantee. The coverage shall contain no special limitations on the scope of protection afforded to the County, its elected and appointed officers, officials, employees, agents, or volunteers. In addition, the insurance policy shall contain a clause stating that coverage shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability. The Grantee's insurance shall be primary insurance as respects the County, its elected and appointed officers, officials, employees, agents and volunteers. Any insurance maintained by the County, its elected and appointed officials, officers, employees, agents or volunteers shall be excess of the Grantee's insurance and shall not contribute with it. The insurance policy or

policies required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the County. Any failure to comply with the reporting provisions of the policies required herein shall not affect coverage provided to the County, its elected and appointed officials, officers, employees, agents or volunteers. If Grantee's insurance policy is suspended, voided, cancelled, or otherwise becomes ineffective or reduced or limited, the Grantee shall immediately obtain replacement insurance so as to be in conformance with these franchise requirements.

21.3 The complete policy with all endorsements shall be provided to the County at any time upon request. Any deductibles or self-insured retentions must be declared to and approved by the County. Payment of deductible or self-insured retention shall be the sole responsibility of the Grantee. Proof of all insurance shall be in a form acceptable to the County. The Grantee's insurance provider shall be authorized to do business in Washington. If the Grantee is self-insured, Grantee shall provide such information as required by the County sufficient to demonstrate its ability to meet the requirements of this Section; the determination as to its sufficiency is within the sole judgment of the County. All insurance documentation shall be submitted to and reviewed by the County prior to final execution of the franchise. The County may from time to time review the amount of insurance and require additional amounts based upon Grantee's facilities and the Grantee's performance of the covenants, terms, conditions and obligations under this franchise and any right of way use permits or approvals.

21.4 Failure to provide a certificate of insurance to the County or to maintain insurance as required herein shall constitute failure of consideration and this franchise shall be void and a nullity provided that the County shall have first given written notice to Grantee of its failure to provide certificate of insurance, and Grantee shall not, within ten working days of the receipt of such notice, have corrected the deficiency.

22. VACATION.

Whenever a county road or portion thereof is vacated the County may include in the resolution authorizing the vacation a provision that the County retain an easement in respect to the vacated land for the construction of public utilities, and services which at the time the resolution is adopted are authorized or are physically located on a portion of the land being vacated. The County shall not convey such easement to any public utility or other entity or person but may convey a permit or franchise to a public utility. The term "public utility" as used in this section shall include utilities owned, operated, or maintained by every gas company, electrical company, telephone company, telegraph company, communication company, and water company whether or not such company is privately owned or owned by a government entity.

Where the County determines to abandon or vacate any right of way or other permitted area, it is the Grantee's responsibility to resolve any question of Grantee's continued occupancy or use

of such areas directly with the owner of such areas, and the County has no obligation with respect thereto.

23. SURETY BOND:

Before undertaking any construction authorized by this franchise and the separate Right of Way Permits under Section 5, Permits, the Grantee shall, prior to performance of any permitted work within the County roads, furnish a bond executed by the Grantee and a corporate surety authorized to do a surety business in the State of Washington, in the amount of Fifty Thousand Dollars ($50,000.00) to ensure performance of the Grantee's obligations under this franchise generally and under any specific Right of Way Permits or approvals. The bond shall remain in effect for the life of the franchise and shall be retained by the County. The bond shall be conditioned so that the Grantee shall observe all the covenants, terms and conditions and faithfully perform all of the obligations of this franchise and any right-of-use permits or approvals, and to correct or replace any defective work or materials discovered in the replacement of the County's roads within a period of two (2) years from the date of the replacement and acceptance of such repaired roads or property by the County. The County may from time to time review the amount of surety and require an additional amount based upon Grantee's facilities and the Grantee's performance of the covenants, terms, conditions and obligations under this franchise and any Right of Way Permits or approvals. The bond shall be provided to Clallam County before the franchise may enter into effect.

As an option to furnishing an executed bond as provided for above, the Grantee may deposit the sum of Fifty Thousand Dollars ($50,000.00) with Clallam County. The deposit shall be retained in a fund by the County in an interest bearing escrow account in a bank, mutual savings bank, or saving and loan association. Escrow instructions shall be established by Clallam County directing that upon written request of the Grantee any earned interest remaining after deductions for escrow fees and inflation adjustments shall be released to the Grantee on each anniversary date of this franchise agreement, for the life of this franchise agreement; Provided that said funds and interest shall not be returned to the Grantee if there are claims by Clallam County outstanding; further provided that payment of any escrow fees charged by the institution shall be the responsibility of the Grantee. The cash bond shall be provided to Clallam County prior to performance of any permitted work within the County roads. The County may from time to time review the amount of surety and require an additional amount based upon Grantee's facilities and the Grantee's performance of the covenants, terms, conditions and obligations under this franchise and any right of way use permits or approvals.

The Grantee or any entity actions on behalf of the Grantee shall be licensed and bonded in the State of Washington prior to performing work in the road. The bond shall be for an amount not less than 150% of the value of the work undertaken. Said license shall be in addition to the above mentined surety bond.

24. SEVERABILITY:

If any article, section, sentence, clause, or phrase of this franchise or its application to any person or entity is for any reason held illegal, invalid, or unconstitutional, such invalidity or unconstitutionality shall not affect the validity or constitutionality of any other article, section, sentence, clause or phrase of this franchise nor its application to any other person or entity. The invalidity of any portion of this franchise shall not abate, reduce, or otherwise affect any consideration or other obligation required of Grantee. All of the provisions, conditions and requirements of Sections 5, Permits; 7, Records; 8, Restorations and Maintenance; 9, Relocation of Facilities; 10, Undergrounding of Facilities; 11, Hold Harmless; 13, Dangerous Conditions, Authority for County to Abate; 17, Abandonment or Removal; and 25, Governing Law and Stipulation of Venue, of this franchise shall be in addition to any and all other obligations and liabilities the Grantee may have to the County at common law, by statute, or by contract, and shall survive the expiration, revocation, termination, or forfeiture of the County's franchise to the Grantee and any renewals or extensions thereof. All of the provisions, conditions, regulations and requirements contained in this franchise shall further be binding upon the successors and assigns of the Grantee and all privileges, as well as all obligations and liabilities of the Grantee shall inure to its successors and assigns equally as if they were specifically mentioned wherever the Grantee is named herein.

25. GOVERNING LAW AND STIPULATION OF VENUE.

This franchise and use of roads shall be governed by the laws of the State of Washington, unless preempted by federal law. The Grantee agrees to be bound by the laws of the State of Washington and subjected to the jurisdiction of the Courts of the State of Washington. Any action relating to this franchise must be brought in the Superior Court of Washington for Clallam County, or in the case of a federal action, the United States District Court for the Western District of Washington at Seattle, unless an administrative agency has primary jurisdiction.

26. ADDITIONAL POWERS:

This franchise shall be subject to the power of eminent domain and the right of the Board of Clallam County Commissioners or the people acting for themselves through the initiative or referendum to repeal, amend, or modify the franchise in the interests of the public. In any proceeding under eminent domain, the franchise itself shall have no value.

27. REMEDIES TO ENFORCE COMPLIANCE.

The County may elect, in lieu of forfeiture and without any prejudice to any of its other legal rights and remedies, to obtain an order from the Superior Court or other court, tribunal, or agency having competent jurisdiction compelling the Grantee to comply with the provisions of this franchise and to recover damages and costs incurred by the County by reason of the Grantee's failure to comply. In the event that Clallam County seeks judicial enforcement of

any term of this agreement, the Grantee shall reimburse Clallam County for all disbursements and costs incurred, including, if Clallam County prevails, reasonable attorney fees and expert witness fees. In addition to any other remedy provided herein, the County reserves the right to pursue any remedy to compel or force the Grantee and/or its successors and assigns to comply with the terms hereof, and the pursuit of any right or remedy by the County shall not prevent the County from thereafter declaring a forfeiture for breach of the conditions herein.

28. NONWAIVER OF RIGHTS OR REMEDIES.

Failure of the County to exercise any rights or remedies under this franchise shall not be a waiver of any obligation by the County and shall not prevent the County from pursuing that right at any future time.

29. COUNTY ORDINANCES AND REGULATIONS – RESERVATION OF POLICE POWER.

Nothing in this franchise shall be deemed to restrict the County's ability to adopt and enforce all necessary and appropriate ordinances regulating the performance of the conditions of this franchise, including, but not limited to, any valid ordinance made in the exercise of its police powers in the interest of public safety and for the welfare of the public. The County shall have the authority at all times to control by appropriate regulations, including design standards, and utility accommodation policies, the location, elevation, manner of construction, and maintenance of any facilities of the Grantee within the road or affecting the road, and the Grantee shall promptly conform with all such regulations, unless compliance would cause the Grantee to violate other requirements of law. In the event of a conflict between the regulatory provisions of this franchise and any other ordinance(s) enacted under the County's police power authority, the County will determine which shall take precedence.

DRAFT

30 COMPENSATION:

30.1 Advance Deposit. In consideration for the granting of this franchise, Grantee shall pay Clallam County for the actual costs including overhead and indirect costs incurred by the County in the processing and administration of this franchise. An advance deposit of $1,000.00 shall be paid with submittal of the franchise application. Said $1,000.00 deposit will be placed in a non-interest bearing Treasurer's suspense fund to be dispersed to County or partially refunded to Grantee after the Grantee's facilities are installed and approved by the County. Payment to cover costs over $1,000.00 shall be paid by Grantee within 30 days of billing by Clallam County. If $1,000.00 has not been expended, the difference between the actual costs and $1,000.00 shall be refunded to Grantee.

30.2 Annual Fee. As additional consideration for the granting of this franchise the Grantee shall pay Clallam County the sum of <u>One Thousand Two Hundred Dollars ($1,200.00)</u> per year (to be adjusted for inflation) each and every year that this franchise is in effect. The first Annual Fee shall be paid within 30 days after the franchise is passed and adopted by the

Board of Clallam County Commissioners and annually within 30 days of each anniversary date thereof. Said dollar amount shall increase in accordance with Section 19, INFLATION ADJUSTMENTS.

30.3 Usage Fee. As additional consideration for the granting of this franchise the Grantee shall pay Clallam County an amount of Sixty Cents($0.60) per One Thousand (1,000) cubic feet of water use or [Eight point Zero Two Cents ($0.0802) per One Thousand (1,000) gallons of water use] by Grantee for all of its system services to customers served by this franchise. This compensation shall be paid at the same time as the Annual Fee and shall begin with the second annual fee to account for the preceding twelve-month period. With each payment, Grantee shall furnish the County with a report showing the basis for the Grantee's computation, in a written statement, under oath, executed by an officer of the Grantee, verifying the amount of water use of Grantee customers within the areas served by this franchise for the period covered by the payment. Said dollar amounts shall increase in accordance with Section 19, Inflation Adjustments.

30.4 Revisit Fee. In the event the County finds it necessary to revisit this franchise and/or the ordinance granting it for any reason and the County's costs to revisit exceed Two Hundred and Fifty Dollars ($250.00) the Grantee agrees to reimburse the County for the County's costs. Such revisits may be due to considerations of Section No. 4, Term, such as renewals, amendments, or changes to conform to new laws, regulations, or practices, or for other reasons. In the event the Grantee initiates an action that necessitates a revisit of this franchise and/or the ordinance granting it, such as for reassignment to new owners, for expansion of services, or for other reasons, the Grantee shall reimburse the County for the County's costs. An advance deposit may be required by the County prior to considering changes.

31 CONTACTS/NOTICES: Any notices required to be given under this franchise shall be given by certified mail, return receipt requested, to the designated contact and shall be deemed complete on the third day following mailing. The following identified persons shall be the designated contact persons for administration of this franchise:

FOR GRANTEE:	Contact Name:	Gregory G. Roats
Mailing Address		225 N.W. Lindvig Way, Suite 8 P.O. Box 1085 Poulsbo,Wa 98370
Billing Address		Aquarius Utilities, LLC 225 N.W. Lindvig Way, Suite 8 P.O. Box 1085 Poulsbo, Wa 98370
	Phone Number	(360) 417-2319
	Fax Number	(360) 779-4189

FOR COUNTY	County Engineer Clallam County Courthouse 223 East 4th Street, Suite 6 Port Angeles, WA 98362-3015
Phone Number -	(360) 417-2319 Fax Number (360) 417-2513

Notice of any changes in the contact person, addresses, or telephone numbers for the Grantee shall be communicated to the County, in writing, within 3 business days. The Grantee shall also provide the County a current emergency contact name (or title) and phone number available 24 hours a day, seven days a week. The Grantee shall promptly notify the County of any change in the notice address or emergency contact name (or title) and phone number.

32. ACCEPTANCE.

Within thirty (30) days after the passage and approval of this Ordinance, this franchise may be accepted by the Grantee by its filing with the County Auditor an unconditional written acceptance thereof. Failure of the Grantee to accept this franchise within said period of time shall be deemed a rejection thereof by the Grantee, and the rights and privileges herein granted shall, after the expiration of the thirty (30) day period, absolutely cease and terminate, unless the time period is extended by ordinance duly passed for that purpose.

33. EFFECTIVE DATE.

This franchise shall take effect only upon satisfaction of the following conditions, but not sooner than ten (10) days after passed and adopted by the Board of Clallam County Commissioners: (1) the Grantee files its unconditional acceptance with the County Auditor and provides a copy to the Engineer within the time provided in Section 32, Acceptance; (2) the Grantee presents to the County acceptable evidence of insurance and security as required in Section 21, Insurance and Section 23, Performance Bond of this franchise; and (3) the Grantee pays all applicable fees set forth in Section 30, Compensation above. However, should Grantee fail to satisfy all conditions within one year of the date of adoption of this franchise, the rights and privileges herein granted, shall absolutely cease and terminate, unless the time period is extended by ordinance duly passed for that purpose.

34. APPLICATION: The undersigned hereby applies for this franchise, subject to all the terms, conditions, stipulations, and obligations contained herein.

COMPANY NAME _____

BY (SIGNATURE) _____ _____
(Date)

(PRINT) _____

TITLE _____

Seal or Stamp:

For a Company

State of Washington
County of Clallam

I certify that I know or have satisfactory evidence that
_____ is
the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the
_____ of
(type authority, e.g. officer, president, trustee, etc.)
_____ to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

Signature: _____

Title: _____

Residing at: _____

My appointment ends: _____

Seal or Stamp:

For an Individual

State of Washington
County of Clallam

I certify that I know or have satisfactory evidence that _____
is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument and acknowledged it to be (his/her) free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: _____

Signature: _____

Title: _____

Residing at: _____

My appointment ends: _____

PASSED AND ADOPTED BY:

BOARD OF CLALLAM COUNTY COMMISSIONERS

_____
Stephen P. Tharinger

_____
Michael C. Chapman, Chair

_____
Howard V. Doherty, Jr.

Date: _____

ATTEST:

_____
Trish Perrott
Clerk of the Board

Approved as to Form:

_____
Deputy Prosecuting Attorney
Clallam County

J:\Users\LFOX\Franchises\FRANCHISE FORMS\FranchiseMaster2004.DOC

Deeds & Easements

FILED FOR RECORD AT THE REQUEST OF G. ROATS
RECORDED IN RECORDS/CLALLAM CO

2005 JUL 27 PM 1:49

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

2005 1161531 Clallam County

(1)

WATER MAIN EASEMENT
LOT 8, TAX PARCEL 023021-210160

For valuable consideration, receipt of which is hereby acknowledged, the Grantors, Gary W. Winnop and Patti Winnop, hereby grant and convey to the Grantee, Aquarius Utilities, LLC, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over, and upon a strip of the following land, located in Clallam County, State of Washington, to wit:

The South 10 feet of Lot 8, Tax Parcel 023021-210160, Winnop Subdivision, Section 21, Township 30 N, Range 2W, W.M., Clallam County, Washington.

The Grantors shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair, and maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and repass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair, and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Gary W. Winnop GRANTOR Patti Winnop GRANTOR

CHARMAYNE ELIAS NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 4-7-07

STATE OF WASHINGTON)
County of Clallam)

I, Charmayne Elias, Notary Public in and for the State of Washington, do hereby certify that on this 1st day of April, 2005, personally appeared before me Gary W. Winnop and Patti Winnop, to me known to be the individuals described in and who executed the within instrument and acknowledged that they signed the same as their free and voluntary acts and deeds for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 1st day of April, 2005. Charmayne Elias Printed Name Charmayne Elias Notary Public in and for the State of Washington, residing at Sequim My Commission Expires April 7, 2007

Unofficial Copy

FILED FOR RECORD AT THE REQUEST OF G-ROATS RECORDED IN OFFICIAL RECORDS CLALLAM CO

2005 JUL 27 PM 1:49

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

2005 1161532 Clallam County

(1)

WATER MAIN EASEMENT
LOT 5, TAX PARCEL 023021-210160

For valuable consideration, receipt of which is hereby acknowledged, the Grantors, Gary W. Winnop and Patti Winnop, hereby grant and convey to the Grantee, Aquarius Utilities, LLC, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over, and upon a strip of the following land, located in Clallam County, State of Washington, to wit:

The North 5 feet of Lot 5, Tax Parcel 023021-210160, Winnop Subdivision, Section 21, Township 30 N, Range 2W, W.M., Clallam County, Washington.

The Grantors shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair, and maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and repass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair, and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Gary W. Winnop GRANTOR

Patti Winnop GRANTOR

STATE OF WASHINGTON)
County of Clallam)

I, Charmayne Elias, Notary Public in and for the State of Washington, do hereby certify that on this 1 day of April, 2005, personally appeared before me Gary W. Winnop and Patti Winnop, to me known to be the individuals described in and who executed the within instrument and acknowledged that they signed the same as their free and voluntary acts and deeds for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 1 day of April, 2005.

Charmayne Elias
Residing @ Sequim
Commission Expires April 7, 2007

CHARMAYNE ELIAS NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 4-7-07

UNOFFICIAL COPY

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

FILED FOR RECORD AT THE REQUEST
OF G. ROATS
RECORDED IN RECORDS OF CLALLAM CO

2005 JUL 27 PM 1:49

2005 1161533 Clallam County

(1)

WATER MAIN EASEMENT
LOT 10, TAX PARCEL 023021-210170

For valuable consideration, receipt of which is hereby acknowledged, the Grantors, Gary W. Winnop and Patti Winnop, hereby grant and convey to the Grantee, Aquarius Utilities, LLC, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over, and upon a strip of the following land, located in Clallam County, State of Washington, to wit:

The South 10 feet of Lot 10, Tax Parcel 023021 210170, Winnop Subdivision, Section 21, Township 30 N, Range 2W, W.M., Clallam County, Washington.

The Grantors shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair, and maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and repass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair, and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Gary W. Winnop (signature) GRANTOR | Patti Winnop (signature) GRANTOR

Gary W. Winnop GRANTOR

Patti Winnop GRANTOR

STATE OF WASHINGTON)
County of Clallam)

I, Charmayne Elias, Notary Public in and for the State of Washington, do hereby certify that on this 1 day of April, 2005, personally appeared before me Gary W. Winnop and Patti Winnop, to me known to be the individuals described in and who executed the within instrument and acknowledged that they signed the same as their free and voluntary acts and deeds for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 1 day of April 2005.

CHARMAYNE ELIAS
COMMISSION EXPIRES
NOTARY
PUBLIC
4-7-07
STATE OF WASHINGTON

Charmayne Elias
Charmayne Elias
Residing @ Sequim
Commission Expires April 7, 2007

"Unofficial Copy"

FILED FOR RECORD AT THE REQUEST OF G. ROATS
RECORDED IN CLALLAM CO. WA
2005 JUL 27 PM 1:49

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

2005 1161530 Clallam County

(1)

WATER MAIN EASEMENT
LOT 11, TAX PARCEL 023021-210170

For valuable consideration, receipt of which is hereby acknowledged, the Grantors, Gary W. Winnop and Patti Winnop, hereby grant and convey to the Grantee, Aquarius Utilities, LLC, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over, and upon a strip of the following land, located in Clallam County, State of Washington, to wit:

The North 5 feet of Lot 11, Tax Parcel 023021-210170, Winnop Subdivision, Section 21, Township 30 N, Range 2W, W.M., Clallam County, Washington.

The Grantors shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair, and maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and repass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair, and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Gary W. Winnop GRANTOR

Patti Winnop GRANTOR

STATE OF WASHINGTON)
County of Clallam)

I, Charmayne Elias, Notary Public in and for the State of Washington, do hereby certify that on this 1 day of April, 2005, personally appeared before me Gary W. Winnop and Patti Winnop, to me known to be the individuals described in and who executed the within instrument and acknowledged that they signed the same as their free and voluntary acts and deeds for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 1 day of April, 2005.

Charmayne Elias
Residing @ Seabeck
Notary Expires April 7, 2007

CHARMAYNE ELIAS NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 4-7-07

UNOFFICIAL COPY

2009-1239833
Page 1 of 2 Easement
David Cummins & Associates
Clallam County Washington 07/10/2009 10:52:00 AM

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

WATER MAIN EASEMENT
LOT 8, Cummins Plat

For valuable consideration, receipt of which is hereby acknowledged, the Grantors, Daniel and Margaret Mellenthin, hereby grant and convey to the Grantee, Aquarius Utilities, LLC, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over, and upon a strip of the following land, located in Clallam County, State of Washington, to wit:

The East 5 feet of Lot 8, Tax Parcel 023021520080, Cummins Plat, Section 21, Township 30 N, Range 2W, W.M., Clallam County, Washington.

The Grantors shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair, and maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and repass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair, and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Unofficial Copy

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

Water Main Easement (Lot 8)

GRANTOR

Daniel Mellenthin

GRANTOR

Margaret Mellenthin

STATE OF ~~WASHINGTON~~ CALIFORNIA)
)
County of VENTURA)

I, AMARJIT SANDHU, Notary Public in and for the State of California, do hereby certify that on this 11TH day of MAY, 2006, personally appeared before me Daniel Mellenthin and Margaret Mellenthin, to me known to be the individuals described in and who executed the within instrument and acknowledged that they signed the same as their free and voluntary acts and deeds for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 11TH day of MAY, 2006.

AMARJIT SANDHU
Comm. # 1588339
NOTARY PUBLIC - CALIFORNIA
Ventura County
My Comm. Expires June 18, 2009

Amarjit Sandhu

Printed Name AMARJIT SANDHU

Notary Public in and for the State of California, residing at 4845 Avenue Rd Moorpark CA 93021

My Commission Expires 06-18-09

Unofficial Copy

2009-1239834
Page 1 of 2 Easement
David Cummins & Associates
Clallam County Washington 07/10/2009 10:52:00 AM

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

WATER MAIN EASEMENT
LOT 5, Cummins Plat

For valuable consideration, receipt of which is hereby acknowledged, the Grantors, Daniel and Margaret Mellenthin, hereby grant and convey to the Grantee, Aquarius Utilities, LLC, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over, and upon a strip of the following land, located in Clallam County, State of Washington, to wit:

The West 15 feet of Lot 5, Tax Parcel 023021520050, Cummins Plat, Section 21, Township 30 N, Range 2W, W.M., Clallam County, Washington.

The Grantors shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair, and maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and repass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair, and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Unofficial Copy

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

Water Main Easement (Lot 5)

GRANTOR

Daniel Mellenthin

GRANTOR

Margaret Mellenthin

STATE OF ~~WASHINGTON~~ CALIFORNIA)
)
County of VENTURA)

I, AMARJIT SANDHU, Notary Public in and for the State of California, do hereby certify that on this 11TH day of MAY, 2006, personally appeared before me Daniel Mellenthin and Margaret Mellenthin, to me known to be the individuals described in and who executed the within instrument and acknowledged that they signed the same as their free and voluntary acts and deeds for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 11TH day of MAY, 2006.

AMARJIT SANDHU
Comm. # 1588339
NOTARY PUBLIC - CALIFORNIA
Ventura County
My Comm. Expires June 18, 2009

Amarjit Sandhu

Printed Name AMARJIT SANDHU

Notary Public in and for the State of California, residing at 4845 Avedon Rd Moor Park CA 93021

My Commission Expires 06-18-09

Unofficial Copy

2009-1239835
Page 1 of 3 Easement
David Cummins & Associates
Clallam County Washington 07/10/2009 10:52:00 AM

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

WATER MAIN EASEMENT
LOT 9, Cummins Plat

For valuable consideration, receipt of which is hereby acknowledged, the Grantor, David Cummins, hereby grants and conveys to the Grantee, Aquarius Utilities, LLC, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over, and upon a strip of the following land, located in Clallam County, State of Washington, to wit:

The West 20 feet of Lot 9, Tax Parcel 023021520090, Cummins Plat, Section 21, Township 30 N, Range 2W, W.M., Clallam County, Washington.

The Grantor shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair, and maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and repass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair, and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Unofficial Copy

Unofficial Copy

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

Water Main Easement (Lot 9)

GRANTOR

David Cummins

STATE OF WASHINGTON)
County of Clallam)

I, Tyler D. Medley, Notary Public in and for the State of Washington, do hereby certify that on this 7 day of July, 2009, personally appeared before me David Cummins, to me known to be the individual described in and who executed the within instrument and acknowledged that he signed the same as his free and voluntary act and deed for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 7 day of July, 2009.

TYLER D. MEDLEY NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 1-12-11

Tyler D. Medley

Printed Name Tyler D. Medley

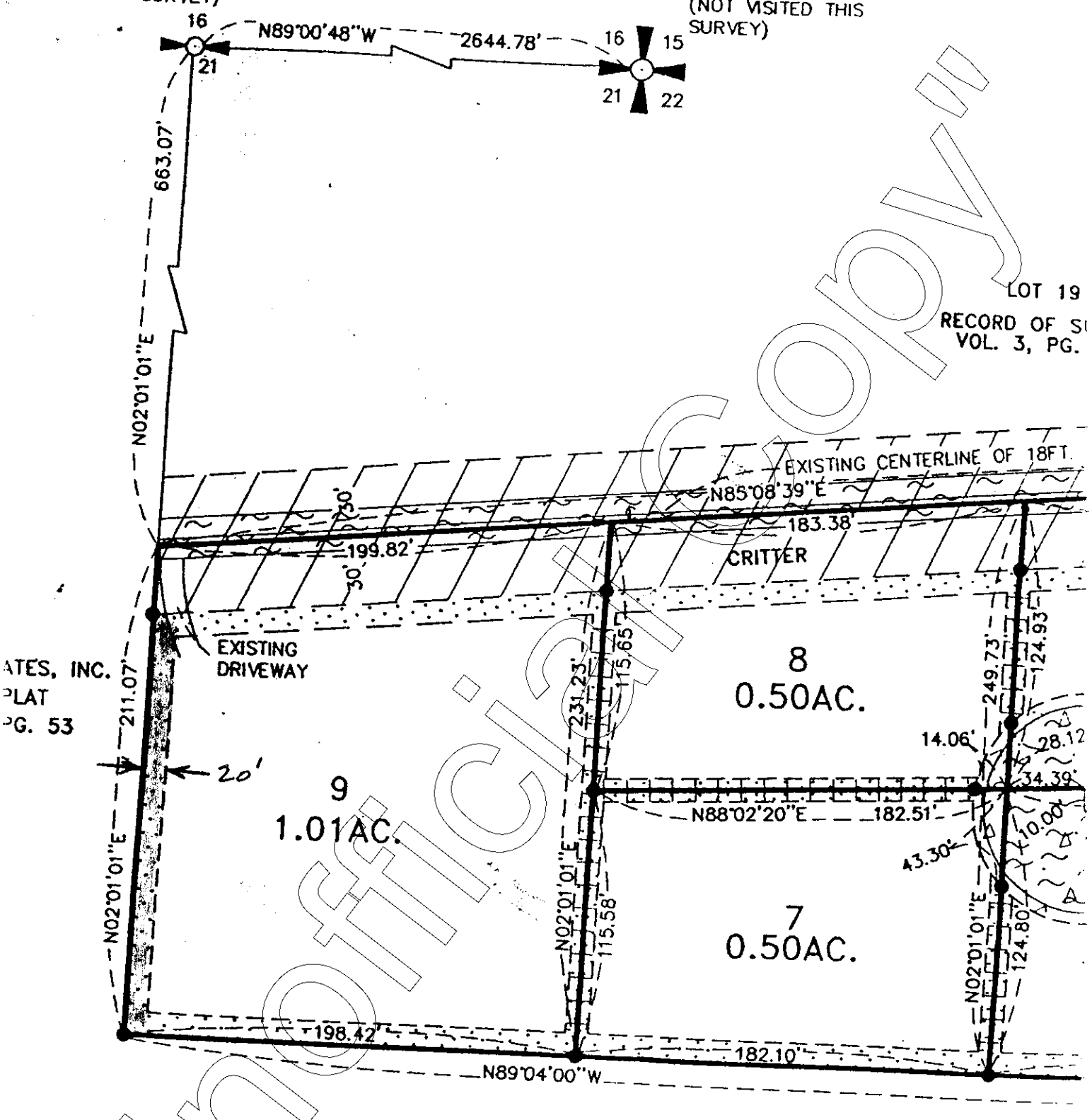
Notary Public in and for the State of Washington, residing at Clallam

My Commission Expires 1-12-11

RASS CAP (2002)
VISITED THIS SURVEY)

ASSOCIATES

CONC. POST W/ CO.
ENGR'S. BRASS CAP
(NOT VISITED THIS
SURVEY)



Easement Sketch
6. Roats 5/2/06

LOT 1
RECORD OF SURVEY
VOL. 3, PG. 129

C

LET.	RAD BRG IN	DELT
A	N64°50'31"W	Δ=30°00
B	N64°50'31"W	Δ=04°23
C	N69°14'09"W	Δ=25°37

Unofficial Copy

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

2017-1346987
Page 1 of 3 Easement
Gregory G Roats
Clallam County Washington 03/16/2017 12:58:00 PM

WATER MAIN EASEMEMT
Parcel No. 02-30-21-12-0040-0000

For valuable consideration, receipt of which is hereby acknowledged, the Grantors, Gregory G. Roats and Woodleigh M. Hubbard, husband and wife, and as joint tenants, hereby grant and convey to the Grantee, Aquarius Utilities, LLC, a Washington limited liability company, its successors and assigns, the right, privilege and authority to construct, improve, repair and maintain a water line and appurtenances across, over and upon a strip of the following land, located in Clallam County, Washington, to wit:

The West 20 feet of Parcel B of the BLA survey recorded on April 12, 2010 in Vol. 69 of Surveys, Pg. 93, under Auditor's File No. 2010-1250596, Clallam County records, being a portion of the NW ¼ of the NE ¼, Sec. 21, T. 30N., R. 2W, W.M., Clallam County, Washington.

The Grantors shall make no use of the land occupied by said water line and appurtenances which, in the opinion of the Grantee, interferes with construction, improvement, repair and/or maintenance of said water line and appurtenances.

In exercising the rights herein granted, the Grantee, its successors and assigns, may pass and re-pass over said water line easement and may remove obstructions which in the opinion of the Grantee interfere with construction, improvement, repair and maintenance of said water line and appurtenances.

The covenants herein contained shall run with the land and are binding upon all subsequent owners thereof.

Unofficial Copy

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

Water Main Easement

GRANTOR

_____)
Gregory G. Roats

STATE OF WASHINGTON)
)
County of Kitsap)

I, Anne Reid, Notary Public in and for the State of Washington, do hereby certify that on this 23rd day of February, 2017, personally appeared before me Gregory G. Roats, to me known to be the individual described in and who executed the within instrument and acknowledged that he signed the same as his free and voluntary act and deed for the uses and purposes herein stated.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 23rd day of February, 2017.

ANNE REID
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
NOVEMBER 19, 2019

Anne Reid

Printed Name Anne Reid

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

My Commission Expires 11/19/19

Unofficial Copy

Aquarius Utilities, LLC
Gregory G. Roats
P.O. Box 1085
Poulsbo, WA 98370

Water Main Easement

GRANTOR

_____)
Woodleigh M. Hubbard

STATE OF WASHINGTON)
)
County of Kitsap)

I, Kristen M. Shipstad, Notary Public in and for the State of Washington, do hereby certify that on this 22nd day of February, 2017, personally appeared before me Woodleigh Mary Hubbard, to me known to be the individual described in and who executed the within instrument and acknowledged that she signed the same as her free and voluntary act and deed for the uses and purposes herein stated.

GIVEN UNDER MY HAND AND OFFICIAL SEAL this 22nd day of February 2017 2017.

KRISTEN M. SHIPSTAD
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
SEPTEMBER 19, 2019

KRISTEN M SHIPSTAD

Printed Name Kristen M Shipstad

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

My Commission Expires September 19, 2019

Unofficial Copy

2022-1441877
Page 1 of 3 Deed
FIDELITY NATIONAL TITLE PORTLAND
Clallam County Washington 08/24/2022 09:10:04 AM
ELECTRONICALLY RECORDED

AFTER RECORDING RETURN TO:

Schroeder Law Offices, P.C.
1915 NE Cesar E. Chavez Boulevard
Portland, OR 97213

NO E 131501
CLALLAM COUNTY
TRANSACTION EXCISE TAX
SALE PRICE $80,903.00
DATE PAID AUG 24 2022
EXCISE AMOUNT $1,299.45
COUNTY TREASURER
BY J Landes

STATUTORY BARGAIN AND SALE DEED

THE GRANTOR, Aquarius Utilities, L.L.C., a Washington limited liability company, for and in consideration of $80,903 (EIGHTY THOUSAND NINE HUNDRED THREE DOLLARS) plus the assumption of the Assumed Liabilities, in hand paid, bargains, sells, and conveys to **GRANTEE,** Cascadia Water, LLC, a Washington limited liability company, its entire interest in the following described real property, together with all system appurtenances, buildings, fixtures, structures, and improvements, situated in County of Clallam, State of Washington, together with all after acquired title of the Grantor herein:

Legal Description: See Exhibit A attached hereto.

Including those Washington Department of Ecology water rights identified specifically as: Certificates Nos., G2-*08484C/6196-A, G2-25283C, G2-25897C, and G2-23909C,

and;

Including easements and rights-of-way of record or in use, including but not limited to: Clallam County Record Nos. 2005-1161530, 2005-1161531, 2005-1161532, 2005-1161533, 2009-1239833, 2009-1239834, 2009-1239835, and 2017-1346987;

All part of and related to the Diamond Water System ID #192104.

Abbreviated Legal: PCL A BLA SV V69 P93, PTN NW4 NE4 S21-T30N-R2W; LT 18 BLK 5 DIAMOND PT PLAT V5 P28.

Tax Parcel Numbers: 023021120030 and 023015510551

[SPACE INTENTIONALLY BLANK]

Fidelity National Title of Oregon

Escrow # 45142201239
Title # 125530

Unofficial Copy

[CONTINUED FROM PREVIOUS PAGE]

Dated this 18th day of August, 2022.

Aquarius Utilities, LLC., Grantor
By: Gregory G. Roats, as Trustee of the Roats-Hubbard Trust dated December 9, 2021, as Member

STATE OF WASHINGTON)
) ss.
COUNTY OF KITSAP)

On this day personally appeared before me Gregory G. Roats, known to be the Trustee of the Roats-Hubbard Trust dated December 9, 2021, as Member of Aquarius Utilities, LLC., and on oath verified that he was authorized to execute this document on behalf of such corporation for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 18th day of August, 2022.

TORY A TURNER
NOTARY PUBLIC #196923
STATE OF WASHINGTON
COMMISSION EXPIRES
JANUARY 9, 2026

Tory A Turner
Notary Public in and for the State of Washington
Residing at Poulsbo, WA

Dated this 18th day of August, 2022.

Aquarius Utilities, LLC., Grantor
By: Woodleigh Marx Hubbard, as Trustee of the Roats-Hubbard Trust dated December 9, 2021, as Member

STATE OF WASHINGTON)
) ss.
COUNTY OF KITSAP)

On this day personally appeared before me Woodleigh Marx Hubbard, known to be the Trustee of the Roats-Hubbard Trust dated December 9, 2021, as Member of Aquarius Utilities, LLC., and on oath verified that he was authorized to execute this document on behalf of such corporation for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 18th day of August, 2022.

TORY A TURNER
NOTARY PUBLIC #196923
STATE OF WASHINGTON
COMMISSION EXPIRES
JANUARY 9, 2026

Tory A Turner
Notary Public in and for the State of Washington
Residing at Poulsbo, WA

Unofficial Copy

EXHIBIT "A"

PARCEL A:

PARCEL A OF BOUNDARY LINE ADJUSTMENT SURVEY, RECORDED APRIL 12, 2010 IN VOLUME 69 OF SURVEYS, PAGE 93, UNDER CLALLAM COUNTY RECORDING NO. 2010 1250596, BEING A PORTION OF LOT 1 DIAMOND POINT ESTATES SURVEY RECORDED IN VOLUME 3 OF SURVEY, PAGE 129 AND A PORTION OF LOT 9 OF CUMMINS PLAT RECORDED IN VOLUME 14 OF PLATS, PAGE 45, ALL IN THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 30 NORTH, RANGE 2 WEST, W.M., CLALLAM COUNTY, WASHINGTON.
SITUATE IN CLALLAM COUNTY, STATE OF WASHINGTON.

PARCEL B:

LOT 18, BLOCK 5, PLAT OF DIAMOND POINT, ACCORDING TO THE PLAT THEREOF FILED IN VOLUME 5 OF PLATS, PAGES 28 AND 28A, RECORDS OF CLALLAM COUNTY, WASHINGTON;
SITUATE IN THE COUNTY OF CLALLAM, STATE OF WASHINGTON.

Unofficial Copy

Sanitary Survey

STATE OF WASHINGTON

DEPARTMENT OF HEALTH

SOUTHWEST DRINKING WATER REGIONAL OPERATIONS

P.O. Box 47823 Olympia, Washington 98504-7823

TDD Relay 1-800-833-6388

July 24, 2018

Gregory G. Roats
Aquarius Utilities, LLC
Post Office Box 1085
Poulsbo, Washington 98370

Diamond Point Water System ID #192104	
County:	Clallam
System Type:	Community
Operating Permit Color:	Green
Surveyor:	Jocelyne Gray Mark Mazeski
Inspection Date:	June 26, 2018

Thank you for meeting with Mark and me to conduct a survey of this water system. Sanitary surveys are the Office of Drinking Water's (ODW) way to inspect public water systems through a field visit. ODW is also able to offer technical assistance to help utilities improve their system operations and ensure that public health is protected.

This report documents the findings of this survey. Deficiencies that need your attention are summarized below. As you correct the items, send me documentation that demonstrates the items have been completed as directed. Include the system name, ID number, and the date the deficiencies were corrected. You can send them to me by e-mail at jocelyne.gray@doh.wa.gov or by mail at PO Box 47823, Olympia, Washington 98504-7823.

If you are not able to correct these deficiencies, you must submit a Corrective Action Plan by the date assigned describing how and when the work will be completed.

SIGNIFICANT DEFICIENCIES* - NONE FOUND

SIGNIFICANT FINDINGS - NONE FOUND**

OBSERVATIONS

1. Install a sample tap on the outlet side of Tank 1, WAC 246-290-235.
2. The state Department of Labor and Industries (L&I) and ODW agree that an adequately sized ASME Section VIII pressure relief valve (PRV) must be installed in the water piping between each pressure tank and its shut off valve. When installing a PRV, be sure there is no isolation valve between the PRV and the pressure tank, WAC 246-290-200.

RECOMMENDATIONS

3. Screen the drain hole on the front of the enclosure for Well 2.
4. Apply leak detection to the transmission main and the distribution system to identify and repair any leaks contributing to the distribution system leakage (DSL).
5. Locate the drain for Tank 1 and ensure it has a screen.
6. Clear any dirt, debris, and brush from around the combined drain outlet for Tanks 2 and 3.
7. Clear the vegetation away from Tank 1 for better access for inspections.

8. Clear the moss from the Tank 1 foundation.
9. Replace the two water-logged tanks or submit a Project Report with the calculations for bladder tank sizing showing the Protection Point Booster Pump Station (BPS) can function with less than 602 gallons of bladder tanks.
10. If you decide to install a variable frequency drive (VFD) to replace the bladder tanks at the BPS, please submit a Project Report.
11. Revise the Coliform Monitoring Plan so there is one sample from each pressure zone and complies with the Revised Total Coliform Rule and the Ground Water Rule.
12. Submit an updated Water System Plan (WSP). The last update was approved in 2008.
13. Install a screen on the PRV drain at the BPS.

SYSTEM INFORMATION

The system was originally constructed in 1961 along the Miller Peninsula east of the City of Sequim serving 305 residential connection and one recreation connection. The system consists of two wells, three reservoirs, two pressure reducing stations, and a booster pump station.

SECTION 1: SOURCE

The system has two sources that alternate and fill the Tank 3 via a 4-inch transmission main. The wells are located on undeveloped land leased from Washington State Parks with no potential sources of contamination within the sanitary control areas. Well 1 and Well 2 alternate pumping to Tank 3 through the transmission main along Diamond Point Road.

S01 (Well 1) is an 8-inch cased well drilled to 393 feet in 1975. Screens were installed from 373 feet to the bottom and a 24-foot bentonite and cement surface seal was installed.

S02 (Well 2) is an 8-inch cased well drilled to 392 feet in 1981. Screens were installed from 372 feet to the bottom and a 20-foot bentonite surface seal was installed.

Source ID #	Name	Description	Ecology Tag #	Listed on WFI Yes	No
S01	Well 1	Drilled to 393 ft in 1975; 150 gpm pump replaced 2004	AGP297	☒	☐
S02	Well 2	Drilled to 292 ft in 1981; 150 gpm pump replaced 2004	AGP298	☒	☐

WELLHEAD	Source ID #01		Source ID #02	
	Yes	No	Yes	No
System has well log	☒	☐	☒	☐
*Wellcap sealed	☒	☐	☒	☐
*Openings sealed	☒	☐	☒	☐
*Vent screened	☒	☐	☒	☐
Terminates 6" above grade	☒	☐	☒	☐
*Protected from flooding	☒	☐	☒	☐
Source meter	☒	☐	☒	☐
Pressure gauge	☒	☐	☒	☐

WELLHEAD	Source ID #01		Source ID #02	
	Yes	No	Yes	No
**Raw water sample tap	☒	☐	☒	☐
Check valve	☒	☐	☒	☐
**Protected from unauthorized access	☒	☐	☒	☐
Structure in good condition	☒	☐	☐	☒
*Sanitary control area has no unmitigated contaminants	☒	☐	☒	☐
**Protected from physical damage	☒	☐	☒	☐
Frequency of routine site visit	Weekly		Weekly	
Frequency of source meter reading	Weekly		Weekly	

The enclosure for Well 2 has a drain hole on the front of the enclosure. Screen this opening.

WELL PUMP EQUIPMENT	Source ID #01		Source ID #02	
	Yes	No	Yes	No
*Functional and reliable pump and pump controls	☒	☐	☒	☐
*Pump control valve or vacuum relief valve with a protected air gap at discharge	☒	☐	☒	☐
Generator available	☐	☒	☐	☒
Generator has automatic startup	☐	☐	☐	☐
Generator fuel source				

The pump house for the wells has a connection for a portable generator. The water system is planning to install a propane generator at this site.

SECTION 2: DISINFECTION

This system does not have disinfection.

SECTION 3: OTHER TREATMENTS

This is no other treatment installed.

SECTION 4: DISTRIBUTION SYSTEM

The distribution system was installed piecemeal as the need arose for extensions to serve developments on the Miller Peninsula east of the City of Sequim and approximately 2 miles north of the wells. The distribution system contains five pressure zones. The wells pump directly to Tank 3, which is then boosted to the steel Tank 2 serving Zone 1 via gravity. Zone 1 is a large lot plat. All other zones are smaller lots. Zone 2 is fed from the Tank 3 through pressure reducing valve (PRV) 1. Tank 3 feeds the lower concrete reservoir (Tank 1), which then feeds Zone 3 via gravity and Zone 4 through PRV 2. The booster pump station (BPS) which serves Zone 5 is provided water from Tank 3. According to the most recent WSP, the distribution system consists of: PVC class 160/200 installed from 1970 to 1990, black plastic installed in 1961, PVC C900 class 150 installed from 1990 to the present, asbestos cement installed from 1965 to 1970, and PVC schedule 80 installed from 2000 to 2005.

FEATURES	Yes	No
Service area and facility map	☒	☐
Minimum pressure requirements met	☒	☐
Service meters (reading frequency monthly)	☒	☐
Leak detection program	☒	☐
Water system leakage (%)	21% 3-yr RAA 18%	
Adequate valving for flushing and pipe repair	☒	☐
Blow-offs on dead ends	☒	☐
Routine flushing (frequency 2x/year)	☒	☐
Routine valve exercise (frequency annually)	☒	☐

Water Use Efficiency (WUE) goals were last set in 2008. Goals are supposed to be re-established every six years. Please schedule a public forum for reviewing and adopting WUE goals. The system met its goal of reduce average daily water consumption by five percent by 2016. By 2012, water usage declined by over 20 percent. Service meters are read manually each month. Aquarius Utilities collaborates with Washington Water Systems Company to repair leaks on the transmission main, which shares a trench with the Washington Water transmission mains.

Distribution system leakage (DSL) has held steady around 14% to 15% for several years and began increasing in 2015. Based on the 2017 Water Quality Report, the 2017 DSL was 20%. Please focus on leak detection to work towards the state goal of 10% or less DSL.

Year	Distribution System Leakage (% DSL)	3 Year Running Average (% DSL)
2016	21.0	18.0
2015	18.4	16.2
2014	14.7	15.1
2013	15.4	14.9
2012	15.1	-
2011	14.3	-

CROSS CONNECTION CONTROL (Community Systems)	Yes	No
System has enabling authority	☒	☐
Ongoing hazard inspections	☒	☐
High hazards identified	ND	
High hazards protected	N/A	
Annual testing	☒	☐
System has installation standards	☒	☐
CCS on staff or under contract	☒	☐
Cross connections observed have been eliminated	N/A	

Due to the nature of the water system, no high hazard connections have been identified.

SECTION 5: FINISHED WATER STORAGE

The system has three reservoirs in operation. Tank 1 is a concrete standpipe was constructed in 1974 to serve the original service area of the Diamond Point subdivisions. This tank was upgraded with a new overflow, ladder, and emergency overflow sump in 2012. The emergency overflow kicks in when the overflow is active, but the tank continues to fill. The overflow water drains to a vault; if that overflows, the water will flow downhill to the roadside ditch. The overflow drain vault is pumped out as needed. This emergency overflow is also the tank drain. The tank site also includes a PRV, an altitude valve, and a visual/auditory alarm. The alarm is triggered by high level and low level in the tank. The neighbors would be alerted by the alarm and contact the water system manager.

Tank 2 was an elevated steel tank purchased from the City of Grandview, Washington, and erected in 1986. The full tank volume is approximately 100,000 gallons, but due to building codes, the system has been limited to 57,000 gallons. The tank interior and exterior were sandblasted and recoated at the time of installation, it has not been recoated since installation.

Tank 3 is concrete reservoir located adjacent to Tank 2 and constructed in 2012. Tanks 2 and 3 have a common drain buried to the outlet. The drain outlet is screened and flows to a wooded area.

RESERVOIR	RESERVOIR NAME	DESCRIPTION	YEAR BUILT	TOTAL VOLUME (GAL)
1	Tank 1	20 ft dia x 50 ft concrete standpipe	1974	125,000
2	Tank 2	Elevated steel at transfer station	1986	57,000
3	Tank 3	30 ft high concrete standpipe at transfer station	2012	70,500

TOP OF RESERVOIR	Res #1		Res #2		Res #3	
	Yes	No	Yes	No	Yes	No
**Hatch: Locked	☒	☐	☒	☐	☒	☐
*Hatch: Watertight seal or gasket	☒	☐	☒	☐	☒	☐
Hatch: Over-lapping cover	☒	☐	☒	☐	☒	☐
*Screened air vent	☒	☐	☒	☐	☒	☐
*Openings sealed/protected	☒	☐	☒	☐	☒	☐

Thank you for the photos of the tops of all three tanks.

FEATURES	Res #1		Res #2		Res #3	
	Yes	No	Yes	No	Yes	No
Separate inlet/outlet	☒	☐	☐	☒	☒	☐
Protected drain outlet	☒	☐	☒	☐	☒	☐
*Protected overflow outlet	☒	☐	☒	☐	☒	☐
Operational water level gauge	☒	☐	☐	☒	☒	☐
Bypass piping or isolation possibility	☒	☐	☒	☐	☒	☐
**Protected from unauthorized entry	☒	☐	☒	☐	☒	☐
Low level alarms	☒	☐	☒	☐	☒	☐

FEATURES	Res #1		Res #2		Res #3	
	Yes	No	Yes	No	Yes	No
Sample tap at outlet	☐	☒	☒	☐	☒	☐

Install a sample tap on the outlet side of Tank 1.

MAINTENANCE	Res #1		Res #2		Res #3	
	Yes	No	Yes	No	Yes	No
Frequency of structural and coating inspection	Never		Never		Never	
Frequency of cleaning	Never		Never		Never	
Frequency of appurtenance inspection	Quarterly		Quarterly		Quarterly	
Frequency of routine site visit	Weekly		Weekly		Weekly	
**Structure in good condition	☒	☐	☒	☐	☒	☐
Clear of excessive vegetation	☐	☒	☒	☐	☒	☐

There is heavy tree coverage around Tank 1. Clear the branches away from Tank 1. Clear the moss from the tank foundation.

SECTION 6: PRESSURE TANKS

This system has seven 86-gallon bladder tanks providing pump protection at the BPS.

Site	Location	# and size of Bladder Tanks
1	Protection Point BPS	Seven – 86 gal

BLADDER	Site: 1	
	Yes	No
Isolation valve	☒	☐
Pressure relief valve	☒	☐
Pressure gauge	☐	☒
In good condition	☐	☒

Bladder Tanks 1 (closest to the door) and 7 are waterlogged. Replace the two tanks or submit a Project Report with the calculations for bladder tank sizing showing the BPS can function with less than 602 gallons of bladder tanks.

There is a single PRV for all seven tanks. If you replumb the BPS, install a PRV at each tank between the tank and its isolation valve.

I understand you are thinking of removing the bladder tanks and installing a variable frequency drive (VFD). If you decide to install a VFD, please submit a Project Report.

BUILDINGS/ENCLOSURE	Site: 1	
	Yes	No
**Facility secure	☒	☐

BUILDINGS/ENCLOSURE	Site: 1	
	Yes	No
Structure in good condition	☒	☐

Install a screen on the PRV drain.

SECTION 7: BOOSTER PUMPS AND FACILITIES

There is a BPS and a transfer station. The BPS provides pressure to the Protection Point area homes and is located just inside the gate of this secured community. The transfer station is located on Diamond Point Road at the tank site; it moves water from Tank 3 to Tank 2.

Facility	Name	Description	Total Capacity (gpm)
1	Transfer Station	(2) Baldor Reliance 7.5 HP, 150 gpm, 1750 rpm, 208-230/460 volt, 3 Phase pumps	300
2	Protection Point BPS	Berkley 1-1/2 HP, 40 gpm, 3460 rpm, 115/230 volt, 1 Phase pump	40

BOOSTER PUMPS	Facility 1		Facility 2	
	Yes	No	Yes	No
Number of pumps	2		1	
Frequency of routine site visit	Weekly		Weekly	
Isolation valves	☒	☐	☒	☐
Pressure gauge(s)	☒	☐	☒	☐
Pressure relief valve	☒	☐	☒	☐
Pump failure alarm	☒	☐	☒	☐
*Functional pump and pump controls	☒	☐	☒	☐
Protected from flooding	☒	☐	☒	☐
Redundant pumps	☒	☐	☐	☒
Equipment in good condition	☒	☐	☒	☐
Generator available	☒	☐	☐	☒
Generator has automatic startup	☐	☒	☐	☐
Generator fuel source	gasoline			

Protection Point BPS PRV shared with bladder tanks.

BUILDINGS/ENCLOSURE	Facility 1		Facility 2	
	Yes	No	Yes	No
**Facility secure	☒	☐	☒	☐
Structure in good condition	☒	☐	☒	☐

SECTION 8: WATER QUALITY MONITORING AND REPORTING

Refer to the Water Quality Monitoring Schedule for your monitoring requirements and status. If you have any questions on source monitoring, please contact Sophia Petro at (360) 236-3046.

CHEMICAL	
Sample Point	**Description**
1	S01
2	S02

CHEMICAL	Sample Points	
	Yes	**No**
Monitoring adequate	☒	☐
ODW WQ data reviewed	☒	☐
Sample collection sites correct	☒	☐
System has prior: ☐ Nitrate results above 5 mg/L ☐ Nitrite results above 0.5 mg/L ☐ Primary MCL ☐ Secondary MCL exceedance(s) ☐ Organic detections ☐ Other _____		

COLIFORM	Yes	No
Monitoring adequate	☒	☐
Monitoring plan adequate	☐	☒
Monitoring plan followed	☒	☐
# of violations since last survey	0	

There are currently three distribution sample sites and the Coliform Monitoring Plan (CMP) has not been updated since 2008. Since there are five pressure zones, there should be a sample site in each pressure zone. The plan should comply with the Revised Total Coliform Rule and the Ground Water Rule. Work with Charese Cryderman on the CMP update.

Review Publication 331-036 Preparing a Coliform Monitoring Plan:
https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-036.pdf.

The CMP template is located here: https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-036_template.doc.

LEAD & COPPER	Yes	No
Monitoring adequate	☒	☐

LEAD & COPPER	Yes	No
Results below action level	☒	☐

SECTION 9: SYSTEM MANAGEMENT AND OPERATIONS

The system is owned and operated by Aquarius Utilities, LLC, which is a privately owned water utility managed by its members. Mr. Gregory Roats is a member as well as general manager, staff engineer, and certified operator listed for this water system. Mr. Roats operates the system along with a water foreman and water technician. The water system plan (WSP) update is past due. Mr. Roats came in for a pre-plan in 2017. If there are no plans to expand the water system, the WSP could be converted to a Small Water System Management Program (SWSMP).

PROJECT/PLANNING	Yes	No
System approved	☒	☐
Current WSP	☐	☒
Year WSP approved	2008	
Emergency response plan	☐	☒

The owner is in the process of completing the WSP update. This update will include a revised CMP and an emergency response plan.

REPORTING	Yes	No	N/A
WFI reviewed and updated with purveyor	☒	☐	---
Consumer confidence report (Community only)	☒	☐	☐
Water use efficiency report (Municipal Water Suppliers)	☒	☐	☐
Cross connection control annual report (> 1000 conn)	☐	☐	☒

OPERATOR CERTIFICATION

This system is required to have one WDM1 certified operator. Greg Roats fulfills this requirement. He has a work crew of two people, but neither is certified. The system has an established relationship with Washington Water who could act as backup, should it be needed.

If you have any questions or this information is inaccurate, please contact Operator Certification at (800) 525-2536.

NAME OF OPERATOR	CERTIFICATION NUMBER	CERTIFICATIONS	MANDATORY OPERATOR
Greg Roats	007341	WDM2, CCS	☒

WDS-Water Distribution Specialist; WDM-Water Distribution Manager; WTPO-Water Treatment Plant Operator, BTO-Basic Treatment Operator; CCS-Cross Connection Specialist; BAT-Backflow Assembly Tester

OPERATIONS	Yes	No
Operational records maintained	☒	☐
Complaints followed up	☒	☐

OPERATIONS	Yes	No
Complaints documented	☒	☐
# of complaints recorded at ODW (since last survey)	0	
Operation and maintenance program	☒	☐
Previous survey deficiencies/findings corrected, if no list below.	☒	☐

CLOSING

Your system has significant deficiencies identified in this current survey.

Your next survey is due in 3 years.

You can qualify for the reduced frequency of sanitary surveys under WAC 246-290-416 of once every 5 years, if all the identified significant deficiencies are addressed by the due date indicated in this report.

Regulations establishing a schedule of fees, including fees for sanitary surveys, were adopted March 18, 2012 (WAC 246-290-990). The amount due is $1,173. An itemized worksheet is enclosed with the invoice.

If you have any questions, please contact me at (360) 236-3034 or by e-mail at jocelyne.gray@doh.wa.gov.

Sincerely,

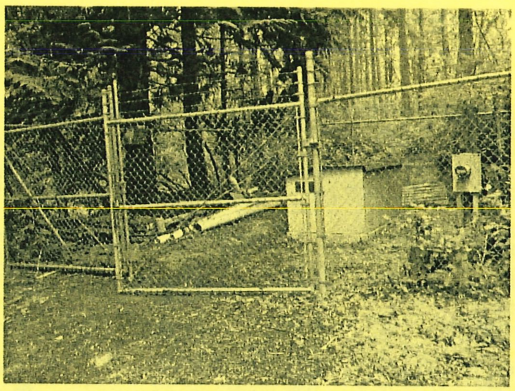
Jocelyne Gray

Jocelyne Gray, PE
Office of Drinking Water, Regional Engineer

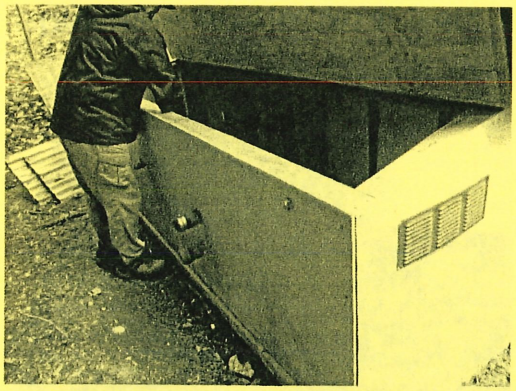
Enclosures

cc: Sue Waldrip, Clallam County Health and Human Services
Denise Miles, ODW
Mark Mazeski, ODW

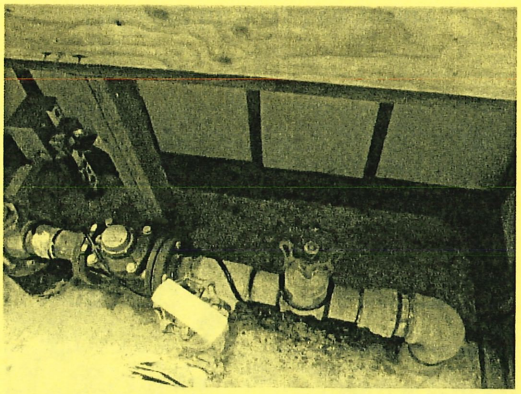
Well Site



Well 1



Well 1 enclosure



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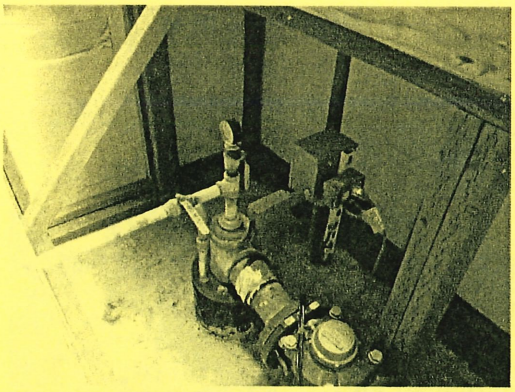

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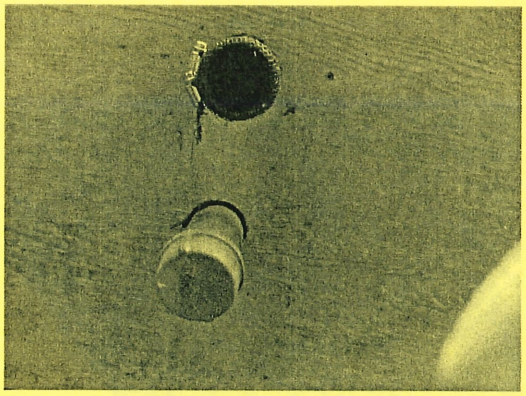
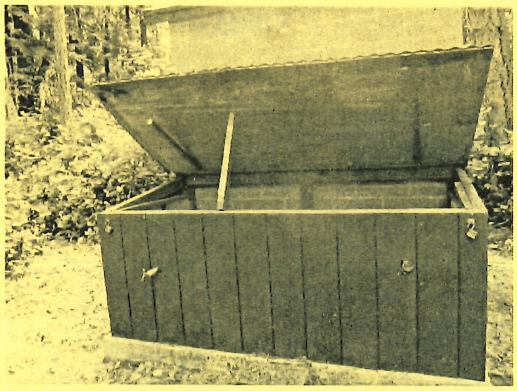
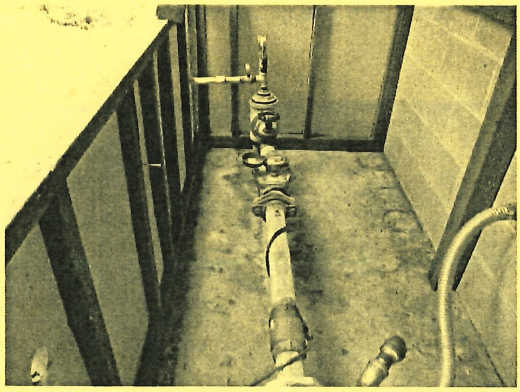


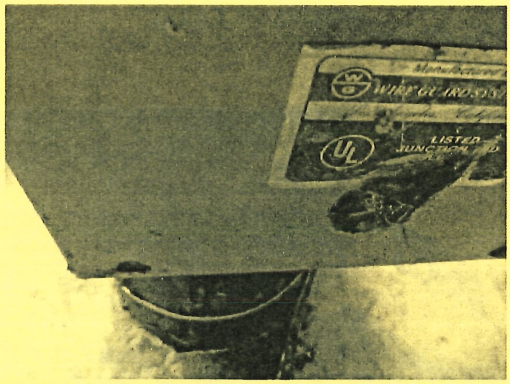
Well 1 enclosure drain and vent



Well 2 enclosure

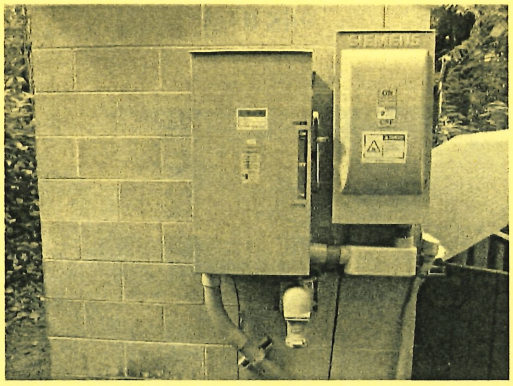


Well 2



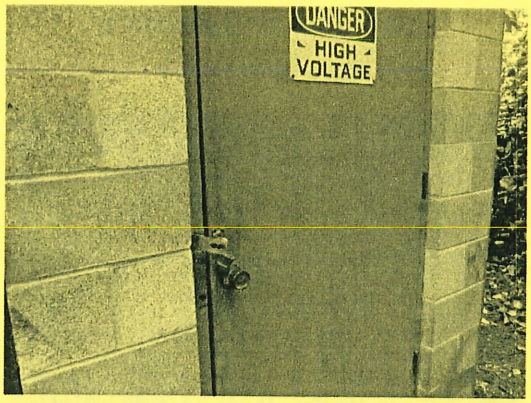
Openings in electrical box at Well 2

Opening in Well 2 enclosure

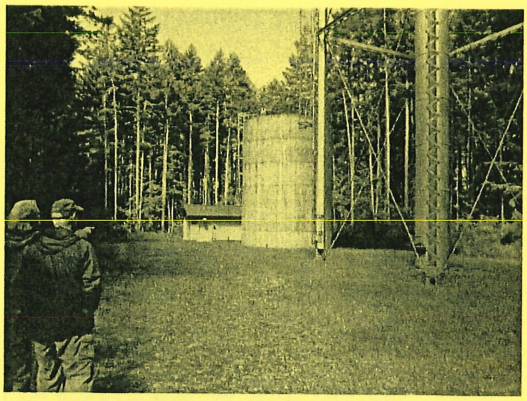


Portable generator connection & controls

Electrical controls for both wells

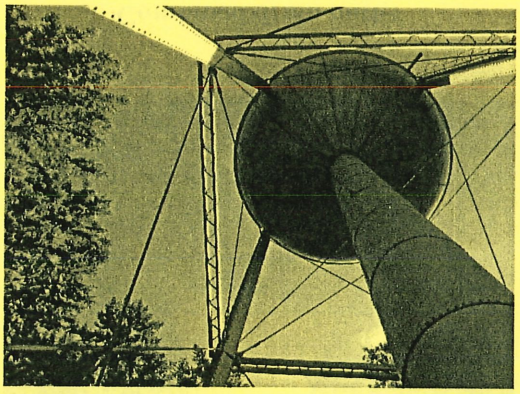


Well Control House

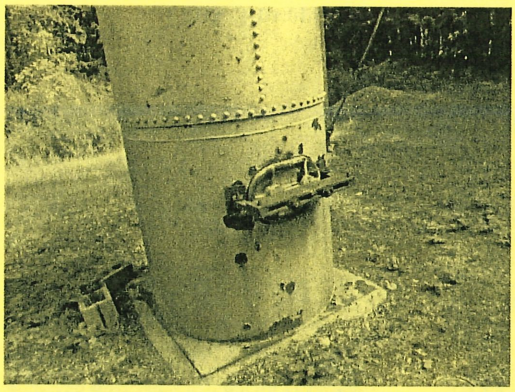


Diamond Point Rd Tank Site – Tank 3

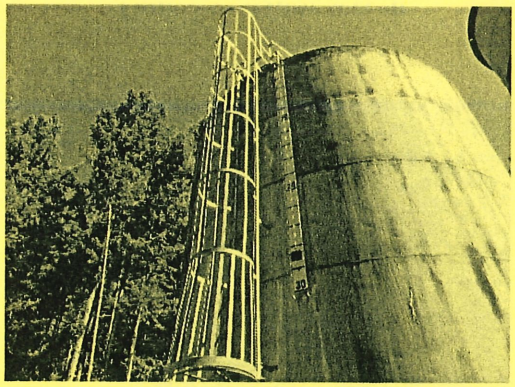
Diamond Point Rd – Tank 2



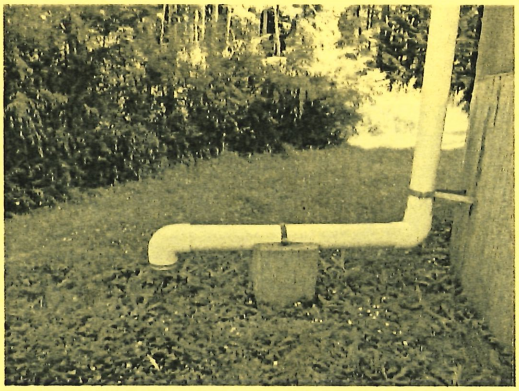
Tank 2



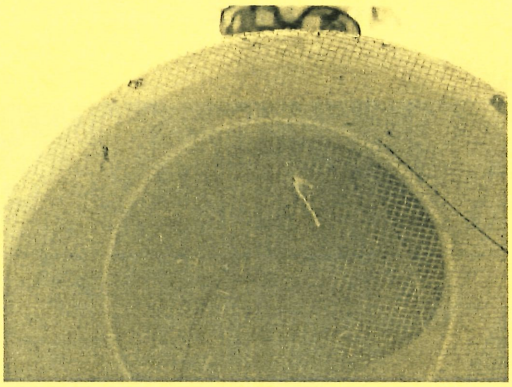
Tank 2 base



Tank 3

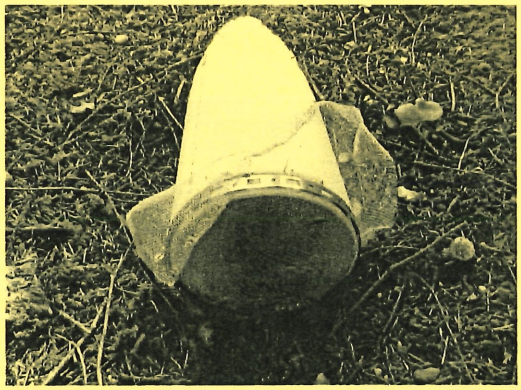


Tank 3 overflow



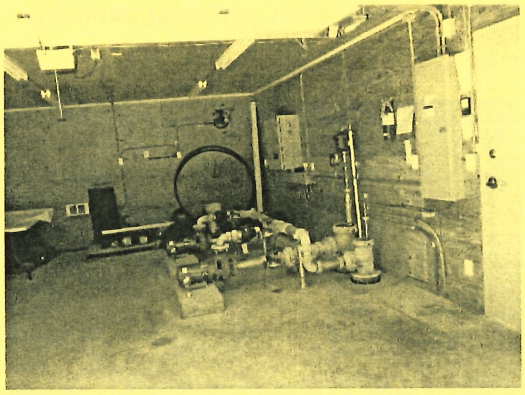
Tank 3 overflow screen

Combined drain for Tanks 2 & 3

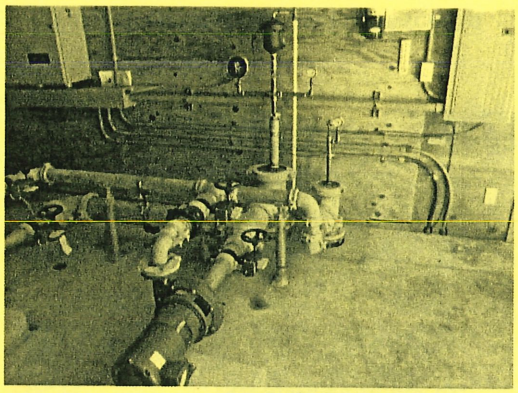


Combined drain outlet

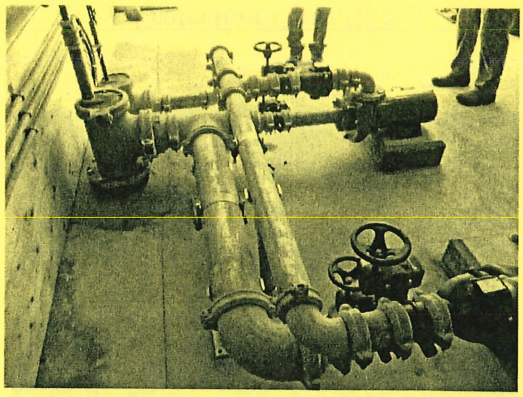
Tank site from drain outlet



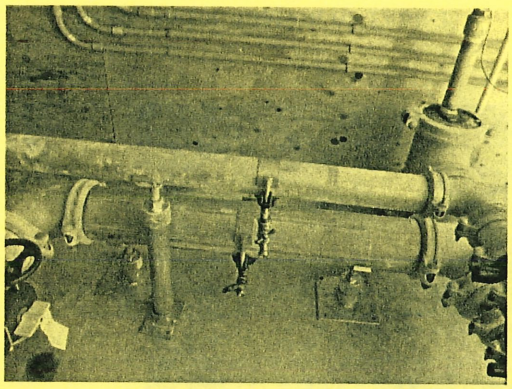
Transfer Station



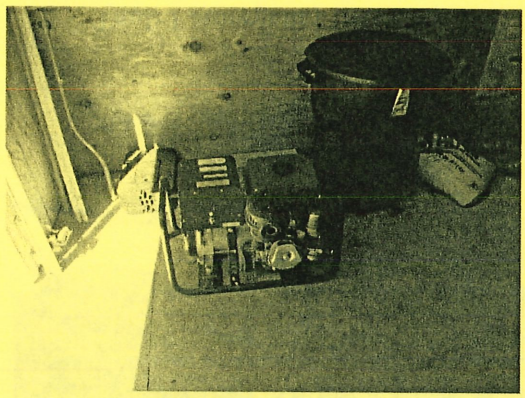
Transfer Station Pump 1



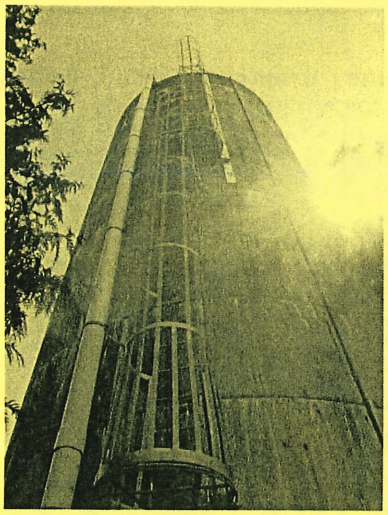
Transfer Station piping & pumps



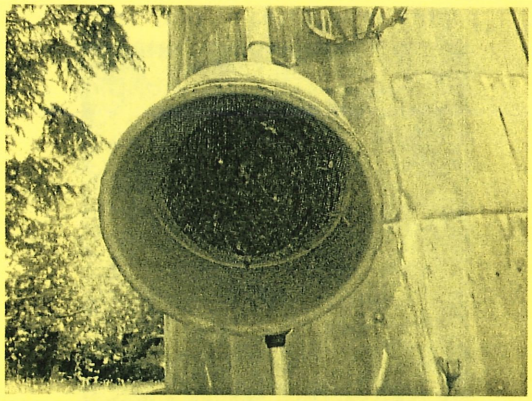
Transfer Station – pumps' sample taps



Generator for Transfer Station



Tank 1 at North Street

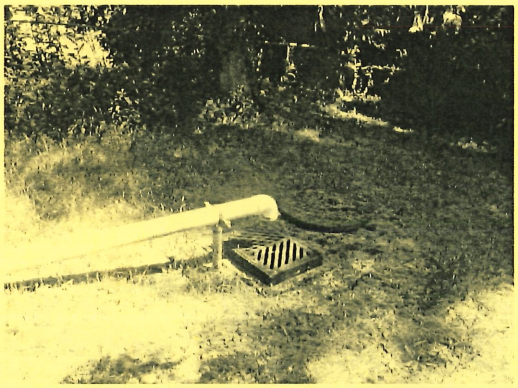


Tank 1 overflow screen

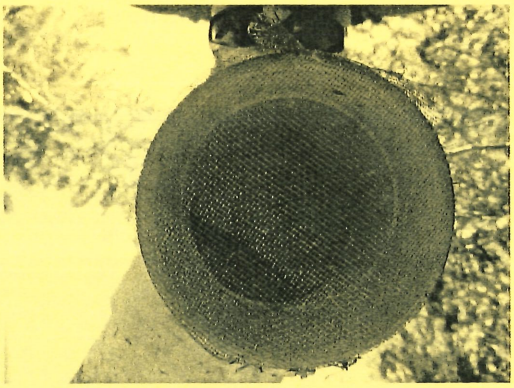
Vegetation on west side of Tank 1

Vegetation on east side of Tank 1

Moss on foundation of Tank 1

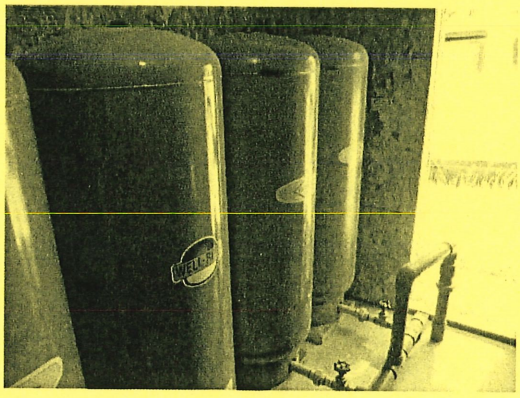


Tank 1 emergency overflow

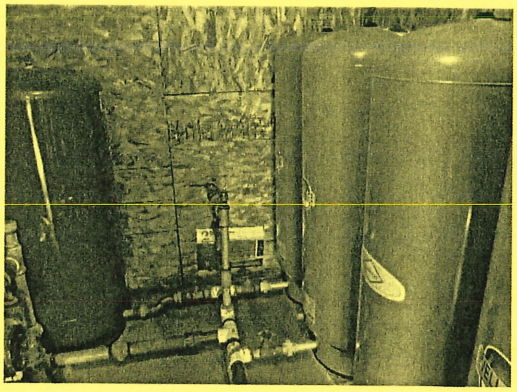


Tank 1 emergency overflow screen

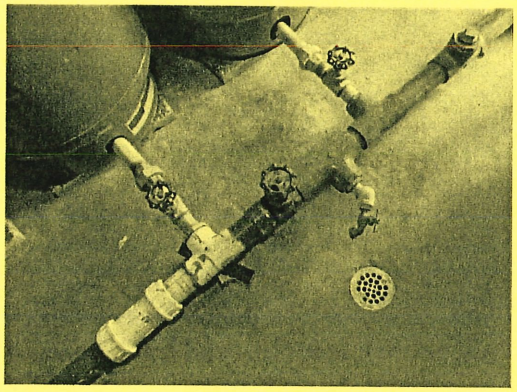
Protection Point BPS



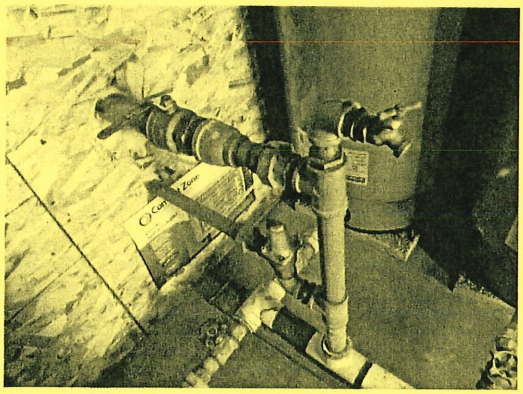
Bladder Tanks (r-l) 1-3
Bladder Tank 1 waterlogged & off



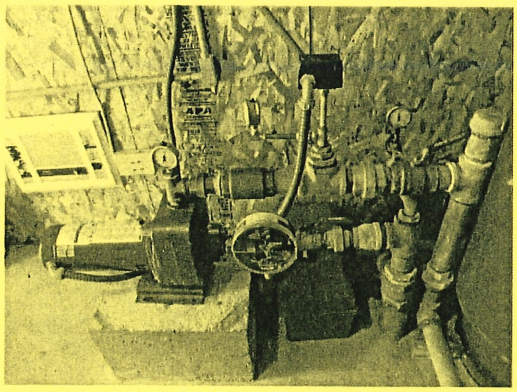
Bladder Tanks (r-l) 4-7
Bladder Tank 7 waterlogged & off



Bladder tank system connections



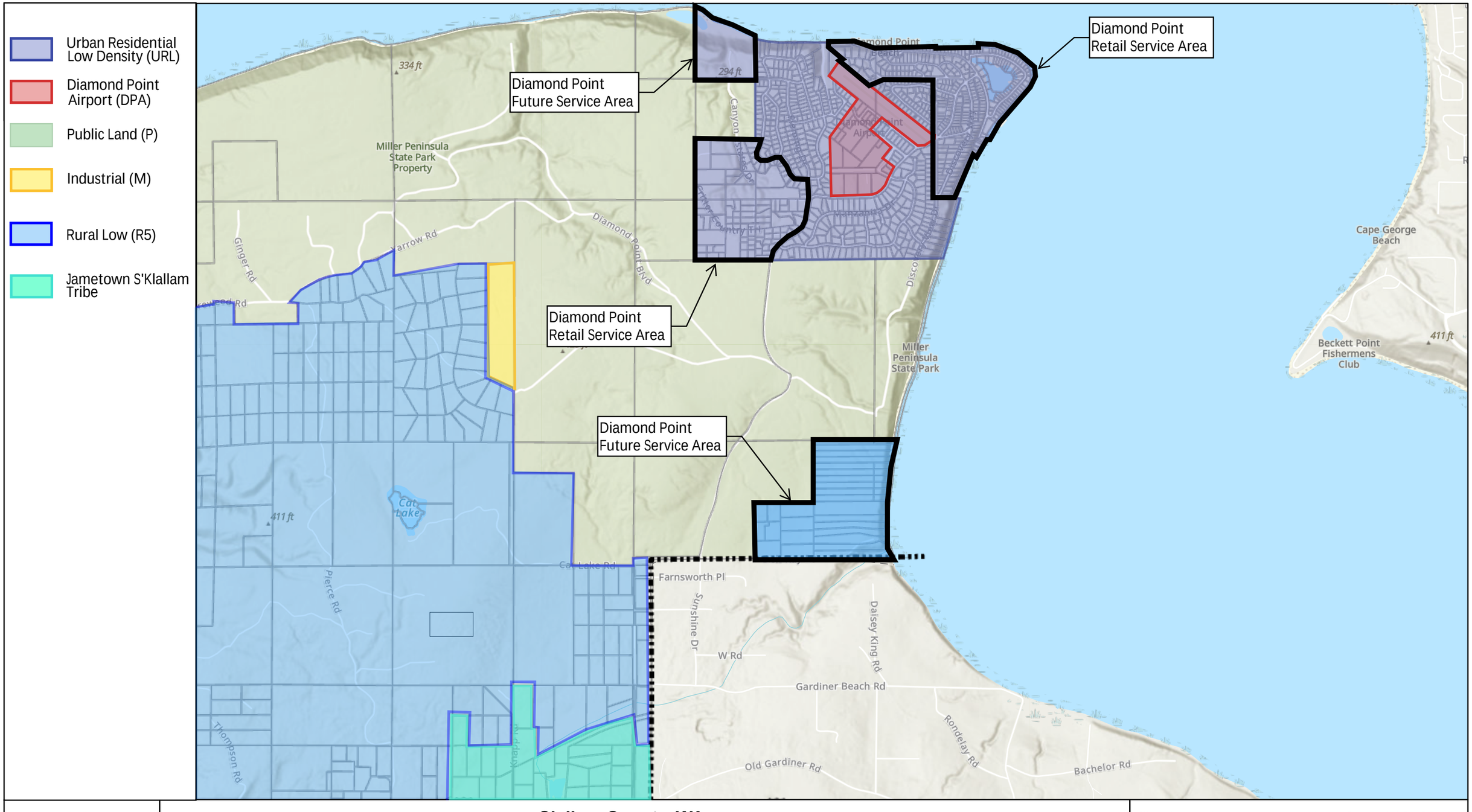
PRV for bladder tanks and booster pump



Protection Point booster pump

Drain outlet for PRV - needs screen

APPENDIX D
County Zoning and Land Use Maps



Clallam County, WA

7/10/2023 2:35 PM

0 0.2 0.4 mi

N W E S

1:36,112

We are happy to share our maps and hope that you find them helpful. Please be advised, however, that these maps are intended to serve as a guide to the general location of features shown. The accuracy of the individual layers varies and layers may not align with one another. Determination of actual regulatory location of features shown on this map typically requires a field examination by qualified staff. Any person or entity that relies on any information contained herein does so at their own risk. Clallam County makes no warranty of the accuracy or usefulness of this data.

APPENDIX E
Water Right Certificates

S. F. No. 7361—OS—6-67.

CERTIFICATE RECORD NO. 13 PAGE NO. 6196-A

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 Department of Water Resources thereunder.

THIS IS TO CERTIFY *That* GEORGE ROATS d/b/a DIAMOND POINT WATER COMPANY

of Poulsbo, Washington, *has made proof to the satisfaction of the Department of Water Resources of Washington, of a right to the use of the ground waters of a* well *located within* Lot 29, Block 3, of Unrecorded Plat of Diamond Point and within right-of-way of Diamond Point Boulevard abutting thereon, within Gov't. Lot 3 *Sec.* 15, *Twp.* 30 *N., R.* 2 W. *W.M.,* *for the purpose of* community domestic supply *under and subject to provisions contained in Ground Water Permit No.* 8053 *issued by the Department 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 Department of Water Resources of Washington and entered of record in Volume* 13 *at page* 6196-A; *that the right hereby confirmed dates from* January 17, 1967; *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* 18 gallons per minute; 29 acre-feet per year, continuously during entire year for community domestic supply for 256 lots.

Special provisions required by the Department of Water Resources:

A description of the lands to which such ground water right is appurtenant:

Community of Diamond Point, within Sec. 15, T. 30 N., R. 2 W.W..M.

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 Sections 6 and 7, Chapter 122, Laws of 1929.

This certificate of ground water right is specifically subject to relinquishment for nonuse of water as provided in Section 18, Chapter 233, Laws of 1967.

WITNESS the seal and signature of the Assistant Director, Division of Water Management, Department of Water Resources affixed this 26th *day of* September, *19* 68

Glen H. Fiddler

Assistant Director
Division of Water Management
Department of Water Resources

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

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

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

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
G2-23909C	G2-23909P	G2-23909	July 24, 1975

NAME
GEORGE ROATS d/b/a/ DIAMOND POINT WATER CO.

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 995	Poulsbo	Washington	98370

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

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	100	150

QUANTITY, TYPE OF USE, PERIOD OF USE
150 acre-feet per year — community domestic supply — continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
250 feet east and 450 feet north of the south quarter corner of Sec. 21

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SW¼SE¼	21	30	2 W	17	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by Diamond Point Water Company within T. 30 N., R. 2 W.W.M.

PROVISIONS

The access port as required on your permit, shall be maintained at all times.

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

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

Given under my hand and the seal of this office at Olympia, Washington, this 28th *day of* May, *19* 76

JOHN A. BIGGS, *Director*
Department of Ecology

by E. W. Asselstine

E. W. Asselstine, Regional Manager

ENGINEERING DATA
OK P

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

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

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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 25, 1979	G 2-25283	G 2-25283 P	G 2-25283 C

NAME
George Roats dba Diamond Point Water Company

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P. O. Box 995	Poulsbo	Washington	98370

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 WATER TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	200	100

QUANTITY, TYPE OF USE, PERIOD OF USE
71 acre-feet per year (Primary) community domestic supply continuously as needed
29 acre-feet per year (Supplemental) (200 services)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
150 feet East and 500 feet North from the South Quarter Corner of Section 21.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SW¼SE¼	21	30	2W	17	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The Plats of Diamond Point; Diamond Point 1st Addition; Johnsons Discovery Bay View Tracts, all in Section 15, T. 30 N., R. 2 W.W.M.

NE¼NW¼ Section 21, T. 30 N., R. 2 W.W.M.

NW¼NE¼ Section 21, T. 30 N., R. 2 W.W.M., lying West of Diamond Point Road.

SE¼SW¼ Section 16, T. 30 N., R. 2 W.W.M., except any portion that lies within the Plat of Sunshine Acres.

SW¼SE¼ Section 16, T. 30 N., R. 2 W.W.M., lying West of Diamond Point Road and except any portion that lies within the Plat of Sunshine Acres.

PROVISIONS

Ground Water Certificate No. G 2-25283 is for 200 gallons per minute and 100 acre-feet per year with the 71 acre-feet being primary and 29 acre-feet being supplemental to Ground Water Certificate 6196-A.

The total annual withdrawal from Well No. 30N/2W-21P1 and the well under Certificate No. 6196-A shall not exceed 218 gallons per minute and 100 acre-feet per year for 200 services.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508.64.020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

In all cases, applicants are urged to locate their wells as far inland as is reasonable because of the uncertainty of the amount of seawater intrusion that may be experienced in the future.

When the chloride concentration exceeds 250 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 250 mg/L.

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

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

Given under my hand and the seal of this office at Olympia *Washington, this* 1 *day of* September, *19* 88.

Christine O. Gregoire, Director
Department of Ecology

by Clark Haberman
Clark Haberman, Regional Manager

ENGINEERING DATA
OK WB

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

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

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

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
May 21, 1981	G 2-25897	G 2-25897 P	G 2-25897 C

NAME
George Roats/dba/Diamond Point Water Company

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P. O. Box 995	Poulsbo	Washington	98370

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 WATER TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	200	100

QUANTITY, TYPE OF USE, PERIOD OF USE
100 acre-feet per year community domestic supply continuously as needed

(supplemental) (200 services)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
300 feet East and 400 feet North of the South Quarter Corner of Section 21.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SW¼SE¼	21	30	2W	17	Clallam

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Back up for: 1. The plats of Diamond Point; Diamond Point 1st Addition, Johnson's Discovery Bay View Tracts, all in Section 15, T. 30 N., R. 2 W.W.M. 2. NE¼NW¼ and NW¼NE¼, lying West of Diamond Point, Section 21, T. 30 N., R. 2 W.W.M. 3. SE¼SW¼, except to Plat of Sunshine Acres and SW¼SE¼, lying West of Diamond Point Road, except to Plat of Sunshine Acres, Section 16, T. 30 N., R. 2 W.W.M.

(SEE REVERSE SIDE)

PROVISIONS

Ground Water Certificate No. G 2-25897 is for 200 gallons per minute and 100 acre-feet per year as a totally supplemental supply to G 2-25283 P and Certificate No. 6196-A with the total withdrawal under all rights not to exceed 218 gallons per minute and 100 acre-feet.

"The total withdrawal under all rights not exceed 218 gallons per minute and 100 acre-feet annually."

At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through WAC 508-64-040.

In all cases, applicants are urged to locate their wells as far inland as is reasonable because of the uncertainty of the amount of seawater intrusion that may be experienced in the future.

When the chloride concentration exceeds 250 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 250 mg/L.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Issuance of this permit was based on sufficient waters available, at least during portions of the year. However, it is pointed out to the permittee that his use of the water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

The service area shall be limited to the same as that under Ground Water Permit G 2-25283 P.

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

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

Given under my hand and the seal of this office at Olympia *Washington, this* 1 *day of* September, *19* 88.

Christine O. Gregoire, Director
Department of Ecology

by Clark Haberman

Clark Haberman, Regional Manager

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FOR COUNTY USE ONLY

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

September 26, 2006

Ms. Karen Klocke
Washington State Department of Health
Southwest Drinking Water Operations
P.O. Box 47823
Olympia WA 98504-7823

Dear Ms. Klocke:

Re: Diamond Point Water System, ID #19210, Clallam County, ODW Project #06-0701

Thank you for the opportunity to review the Water System Plan (WSP) for the Diamond Point Water System. Consistent with the Memorandum of Understanding between our agencies, I reviewed the relevant portions of the Plan and offer the following comments.

Water Rights – Annual Quantity

The WSP shows that the Diamond Point Water System is operating under two water rights, G2-25283 and G2-25897. However, Ecology's records show the system as having four water rights. The oldest, primary right (Certificate 6196) is not included in the WSP. Also, the second right is not included (G2-23909), which was issued to add a well and instantaneous and some annual quantity to the primary right.

Though Ecology's records are not clear regarding the relationships between the water rights, the final two water rights (G2-25283 and G2-25897) appear to provision that all the rights allocated to the system shall not exceed 218 gpm and 100 afy.

The table below shows Ecology's records and some of the inconsistencies within the calculations between the rights.

Cert #	Priority Date	Source	Qi (Additive)	Qa (Additive)	Qi (Non-additive)	Qa (Non-additive)
6196	1/17/67	1 well (T30/R2W/Sec15)	18	29		
G2-23909**	7/24/75	1 well (T30N/R2W/Sec21)	100**	121**		29**
G2-25283	6/25/79	Same well as G2-23909 above	200	71		29
G2-25897	5/21/81	1 well (T30N/R2W/Sec21), very near the above-referenced well			200	100
Total**			**218**	**100**		

G2-23909 was issued for 150 acre-feet per year, partially non-additive to Cert 6196. However, the succeeding water rights appear to have **not included the water right in the final calculations of water to be allocated.

The water rights analysis in Appendix I only shows two water right certificates that allocate 400 gpm and 100 afy. This table does not include the oldest primary water right number 6196, although it does indicate that there is some non-additive (supplemental) water. It would be helpful to include the oldest certificate in order to relate the succeeding rights to it. Also, as indicated above, the total Qi available under both rights is limited to 218 gpm.

> **Action:** Add Certificate 6196 to the water rights assessment table in Appendix I and change the Qi total available to 218 gpm.

Despite the inconsistencies in Ecology's records regarding annual quantity allocated under the water rights, it appears the Diamond Point Water System holds more than adequate annual quantity (100 afy) for the projected demand of 20 years and beyond. In fact, the WSP indicates there will be a large amount of inchoate water at "ultimate" build out.

Wells and associated Qi

Well Source Facilities, Page 55 shows the two active wells are currently capable of producing 150 gpm each, for a total of 300 gpm. The WSP recommends that pumps be installed in each well to increase production to 200 gpm each.

Ecology's records show the water right certificate for Well #2 (G2-25897) was issued as a back up source to Well #1 (G2-25283) and that the total instantaneous that can be pumped from all wells is 218 gpm. Therefore, it appears that if both wells 1 and 2 are pumped simultaneously, the system is exceeding their water rights.

> **Action:** The WSP should be edited to show that the total Qi allowed under the water rights is 218 gpm. If the system requires more Qi, they will need to secure additional water rights.

Well associated with Certificate 6196

There is no mention of the original well that was drilled under Certificate 6196. This well appears to have been located in Lot 29 of the Diamond Point Water System. Since this water right is the original primary right for the system, it should be included in the plan along with the status of the well.

> **Action:** Add information regarding the original water right and well to the WSP

Inchoate water

The WSP projects that there may be around 40 acre-feet per year of extra water from their rights that can be made available for other uses, specifically for an anticipated state park. Please note that this would require a water right change application, a review of the extent and validity of the existing right, and a determination whether the right is a valid inchoate right that is available for transfer, as required by RCW 90.03.330, RCW 90.44.100, and RCW 90.03.380.

Please contact me at (360) 407-0290 if you have questions regarding my comments.

Sincerely,

Deb Hunemuller
Water Resources Program

DH:th

cc: Andy Anderson, ODW
Gregory Roats, Aquarius Utilities LLC

APPENDIX F
Water Right Self-Assessment

Water Right Self-Assessment Form for Diamond Point

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

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1 6196-A	1 Well	18 gpm	---	29.0 ac-ft	---												
2 G2-23909	1 Well	100 gpm	---	121 ac-ft	29 ac-ft												
3 G2-25283	Same as G2-23909	200 gpm	---	71 ac-ft	29 ac-ft												
4 G2-25897	1 Well	---	200 gpm	---	100 ac-ft												
5																	
6																	
	TOTALS =	218 gpm		100.0 ac-ft		147 gpm	71 gpm	53.8 ac-ft	46.2 ac-ft	218 gpm	0 gpm	59.4 ac-ft	40.6 ac-ft	218 gpm	0 gpm	65.6 ac-ft	34.4 ac-ft
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

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

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

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

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

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

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

ADDITIONAL COMMENTS:

Diamond Point. (Water System ID: 19210 4)

APPENDIX G
Well Logs

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

WELL #1

WATER WELL REPORT
STATE OF WASHINGTON

Application No. G2-23909
Permit No. ....

(1) OWNER: Name Diamond Point Water Company Address P.O. Box 995 Poulsbo, Wa 98370 21Q1

(2) LOCATION OF WELL: County Clallam — SW ¼ SE ¼ Sec 21 T. 30 N., R. 2W W.M.
Bearing and distance from section or subdivision corner N 79° 21' 41" W 2546.34 ft from SE cor Section 21

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒ Irrigation ☐ Test Well ☐ Other ☐

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

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 393 ft. Depth of completed well 393 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8" Diam. from 0 ft. to 393 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Stainless Steel Model No.
Diam. 8" Slot size 20 from 373 ft. to 383 ft.
Diam. 8" Slot size 14 from 383 ft. to 393 ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 24 ft.
Material used in seal Bentonite Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Jacuzzi
Type: Submersible turbine H.P. 15

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 266 ft. below top of well Date 6-2-75
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 310 gal./min. with 27 ft. drawdown after 10 hrs.
" " "
" " "

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

Time	Water Level	Time	Water Level	Time	Water Level
(immediately)					

Date of test June 6, 1975
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 48°F Was a chemical analysis made? Yes ☒ No ☐

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

MATERIAL	FROM	TO
Hardpan and rocks	0	23
Sand and gravel	23	38
Blue Hardpan	38	41
Blue Clay	41	121
Brown Dry Sand	121	129
Brown Gravely Hardpan	129	164
Brown dry sand	164	182
Brown Silty Clay	182	188
Large Gravel and sand (dry)	188	226
Large Gravel, sand and water	226	243
Brown Clay	243	245
Blue Clay	245	253
Hardpan gravely (blue)	253	271
Blue Clay	271	363
Gray Sand and Water	363	393
Fine Sand	393	

Work started 5-1, 1975. Completed 6-2, 1975

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Burt Well Drilling
(Person, firm, or corporation) (Type or print)
Address Route 1, Box 283 Poulsbo, Wa. 98370
[Signed] George D. Burt
(Well Driller)
License No. 223-02-6084 Date July 18, 1975

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71). 223909

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

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

3370

PHONE
779-4645

DIAMOND POINT
WELL
219-30N/2W

Bunt Well Drilling

DIAMOND POINT

TIME	INCHES	G.P.M	D.D.
		0	270
		0	274
8:29	7½		274
8:30	7½	119	274-4
9:30	7½	119	"
10:30	7½	119	"
11:30	7½	119	274-4"
12:30	7½	119	279-4
1:30	28"	222	281-1
1:35	28"	222	287-2
2:30	39	263	
2:35	51	300	
2:45	54	307	
3:40	55	310	
5:00	55		
5:30			

223909

Diamond Pt

riginal and First Copy with
epartment of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WELL #2

WATER WELL REPORT

STATE OF WASHINGTON

Application No. G2-25283

Permit No. ....

(1) OWNER: Name Diomond Point Water Co P.O. Box Address 995 Poulsbo Wash- 98370

(2) LOCATION OF WELL: County [redacted] Clallam — ¼ ¼ Sec 21 T 30 N., R 2 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .... #-2

New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☒ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8" inches. Drilled 392 ft. Depth of completed well 392 ft.

(6) CONSTRUCTION DETAILS: Plus 1'4" Above Ground

Casing installed: 8" Diam. from 0 ft. to 372" ft.
Threaded ☐ 7½" Diam. from 370 ft. to 372 ft.
Welded ☒ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used ____
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name ____
Type ____ Model No ____
Diam. 7½" Slot size 15 from 372 ft. to 382 ft.
Diam. 7½" Slot size 20 from 382 ft. to 392 ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ____
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite & Puddle Clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

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

(8) WATER LEVELS: Land-surface elevation above mean sea level APPROX 285 ft.
Static level 272' 6" ft. below top of well Date 4-8-81
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc.)

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

" 300	"	10	" 6 Hr 30 min"
"	"	"	"

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

Time	Water Level	Time	Water Level	Time	Water Level
30 PM	Static Pump			4:30	274
35"	356'4"			5	276"
40	275			7PM	278"

Date of test 4-8-81
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water 49 Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG:

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

MATERIAL	FROM	TO
Brown Cemented Sand & Gravel Clay	0	36
Brown Muddy Sand & Gravel	36	45
Gray Clay Mixed Gravel	45	126
Brown Sand & Gravel	126	154
Gray Loose Sand & Gravel	154	170
Brown Cemented Sandy Clay Cobbles	170	192
Brown Firm Sand & Gravel	192	223
Brown Sand Mixed with Larger Cobbles	223	260
Gray Gravelly Clay	260	357
Gray Fine Sand W-B 273 Sterling	357	392

RECEIVED
APR 24 1981
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

Work started 3-2 19 81 Completed 4-15 19 81

WELL DRILLER'S STATEMENT:

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

NAME Stoican Drilling Co Inc (Person, firm, or corporation) (Type or print)

Address P.O. Box 161 Sequim Wash- 98382

[Signed] Valeri Stoican (President 6473 Robert Tilla (Well Driller)

License No. 0868 Date 4-17 19 81

JOC 6/82 0391

(USE ADDITIONAL SHEETS IF NECESSARY)

EGY 050-1-20

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

Page No. 1

PUMPING LOG No. I

Date 4-8-81

For Diamond Point Water Co. P.O.Box 995 Poulsbo, WN. 98370 Job No. Well #2

By STOICAN DRILLING COMPANY Contract No. I

P.O. Box 161, Sequim, Wash. - Phone 683-5580 Application # G 2-25283

Rt 3, Box 175, Port Orchard, Wash - Phone TR6-2057 Sec. 21 T. 30N R. 2 W.W.M.

Static Water Level 272'6" Clallam Co.

DATE

TIME	G.P.M.	Pumping Level	DRAWDOWN	Water Temp.	Pump R.P.M.	Remarks
Start Pump						
8:30 AM	300	280'	7'6"	49		Cloudy
9:00 "		280'4"	7'8"	"		" "
9:15 "		281'6"	9'	"		" "
9:30 "		282'	9'6"	"		Clear
10:00 "		282'6"	10'	"		" "
10:30 "		282'6"	10'	"		" "
11:00 "		282'6"	10'	"		" "
11:30 "		282'6"	10'	"		" "
12:00 Noon	300	282'6"	10'	49		Clear
12:30 PM		282'6"	10'	"		" "
1:00 "		282'6"	10'	"		" "
1:30 "		282'6"	10'	"		" "
2:00 "		282'6"	10'	"		" "
2:30 "		282'6"	10'	"		" "
3:00 "		282'6"	10'	"		" "
3:30 "		282'6"	10'	"		" "
4:00 "		282'6"	10'	"		" "
4:30 "	300	282'6"	10'	49		Clear
4:30 PM	Stopped pump					
4:35 PM	Recovered to 276'4"					
4:40 PM	" " " 275'					
4:50 PM	" " " 274'					
5:00 PM	Recovered to 273'6"					
7:00 PM	4-8-81.....272'8"					

Note: The above statements are true and correct to the best of my knowledge.

Signed: Valier Stoican 4-22-81

Valier Stoican, Pres. Lic. #0473

Stoican Drilling Co. Inc.
P.O. Box 161
Sequim, Washington. 98382

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

APPENDIX H
Well Site Approval

AFTER RECORDING RETURN TO:
Washington State Parks and Recreation Commission
Lands Program
PO Box 42650
Olympia, WA 98504-2650

JAN 0 3 2008

RESTRICTIVE COVENANT – Miller Peninsula State Park

WHEREAS, the Washington State Parks and Recreation Commission (herein "State") is the owner of the following described real estate situated in Clallam County, State of Washington, to wit: Miller Peninsula State Park, located in portions of Sections 13, 15, 16, 17, 18, 19, 20, 21, 22, 24, 28, and 29, all in Township 30 N, Range 3 W, and illustrated in Exhibit A;

WHEREAS, Aquarius Utilities, LLC owns and operates a well which supplies water for private use, located upon the following described real estate situated in Clallam County, State of Washington, to wit: within Miller Peninsula State Park, within a portion of the NW ¼ of the SW ¼ of the SE ¼ in Section 21, Township 30 N, Range 3 W, and as illustrated in Exhibit A attached hereto;

WHEREAS, said well and waterworks are on State's land;

NOW THEREFORE, pursuant to Department of Health requirements to protect the sanitary control area as shown in Exhibit A, State, its successors and assigns, will not construct, maintain, or suffer to be constructed or maintained within one-hundred (100) feet of the said well and waterworks, so long as the same is operated to furnish water for public consumption, any potential source of contamination, such as septic tanks and drainfields, sewerlines, underground storage tanks, roads, railroad tracks, vehicles, structures, barns, feed stations, grazing animals, enclosures

JAN 0 3 2008

for maintaining fowl or animal manure, liquid or dry chemical storage, herbicides, insecticides, hazardous waste, or garbage of any kind or description.

EXECUTED as of the date hereinabove set forth.

State

Title_____
Larry Fairleigh, Assistant Director
by Delegation 2004-43(7) dated October 11, 2004

WASHINGTON STATE PARKS & RECREATION COMMISSION ACKNOWLEDGMENT

STATE OF WASHINGTON)
) ss.
County of THURSTON)

THIS IS TO CERTIFY that on this day, before me the undersigned Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Larry Fairleigh to me known to be the Assistant Director of the Washington State Parks and Recreation Commission that executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said Commission, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute the said instrument.

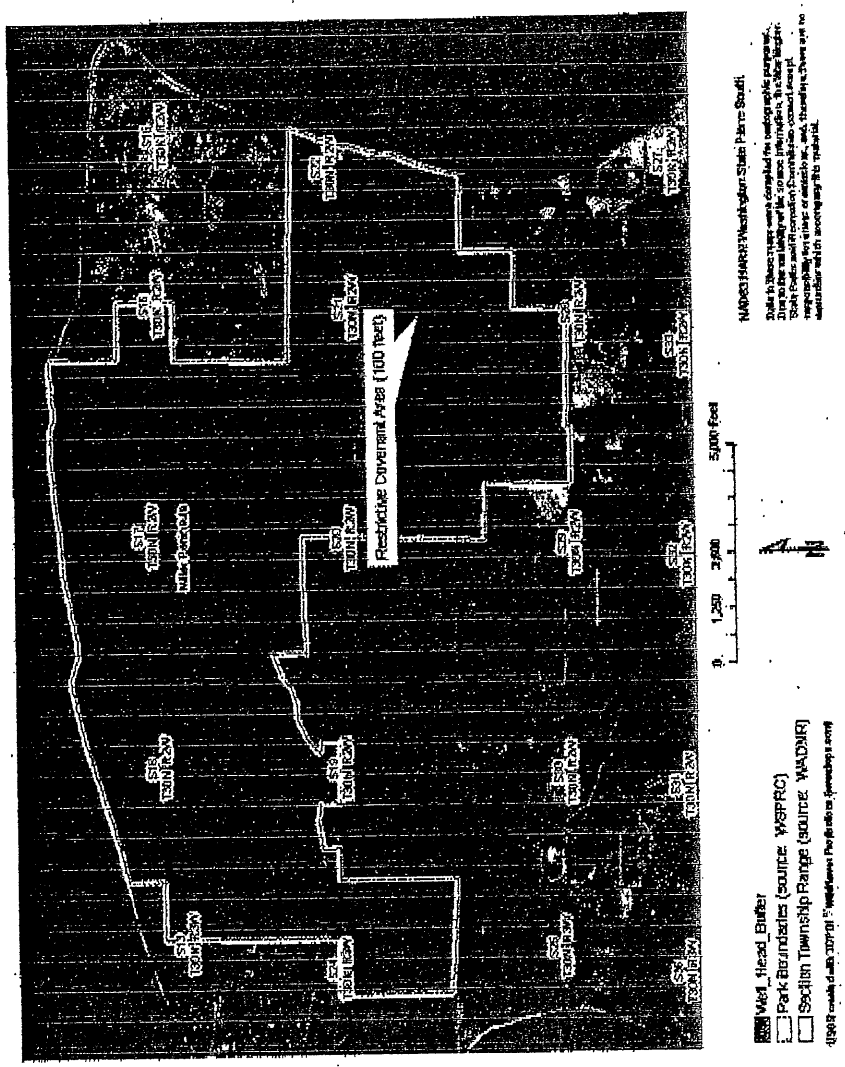
WITNESS my hand and official seal this _____day of _
_____, 2008.

_____
Notary Public in and for the State of Washington

residing at _____
My commission expires _____

JAN 0 3 2008

EXHIBIT A



M:\Projects\Miller Peninsula\RPA\Restrictive covenant\Diamond head covenant.doc

APPENDIX I
Well Head Protection Plan

1. OVERVIEW

The Diamond Point water system (192104) is within Clallam County. The service area for Diamond Point is encompassed within Sections 15, 16, 21, and 22 of Township 30 North, Range 2 West, Willamette Meridian. The system is served by two existing groundwater wells, Well 1 and Well 2 with well tags AGP297, and AGP298 respectively. These two sources are located on the east side of Diamond Point Road approximately 4,000 ft south of the primary distribution system. Well information is summarized in Table 1.

Table 1 – Well Information

Diamond Point	Well 1	Well 2
Source Type	Well (Non GWI)	Well (Non GWI)
DOE Tag	AGP297	AGP298
Source Location	Sec 21 T30N R02W	Sec 21 T30N R02W
Purpose of Use	Domestic Water Supply – Primary	Domestic Water Supply – Primary
Place of Use	See Water Right	See Water Right
Year of Installation	1975	1981
Capacity (gpm)	300	310
Pumping Rate (gpm)	150	150
Casing Size (in)	8	7.5
Ground Elev. (ft)	305	305
Bottom Well Depth (bgs, ft)	393	392
Static Water Depth (ft)	266	273
Top of Screens (ft)	373	372
Bottom of Screens (ft)	393	392
Drawdown (ft)	27	10

1.1 Well Information

Diamond point is served by two groundwater wells that are located on Clallam County parcel 023021130010 on lands leased from Washington State Parks.

Well 1 was drilled in 1975 to a depth of 393 ft to serve as a primary source. The initial pump test for Well 1 was conducted in 1975. That test recorded a static water level of 266 ft below the top of Well 1. It also conducted a stepped pump test with a maximum withdrawal rate of 310 gpm, corresponding to a drawdown of 27 ft. Well 1 has a 25-HP submersible pump (model number unknown) installed in 2004. The 8 in well casing extends from 24 in above the land surface to 393 ft below ground surface (bgs). An 8in screen with 20in slots were installed from 373 ft below ground surface (bgs) to 383 ft bgs, followed by

an 8 in diameter 14 slot screen from 383 ft bgs to 393 ft bgs. The identified well pump supplies approximately 150 gpm at a total dynamic head of 399 ft. Water is pumped to a concrete reservoir located approximately 4,000 ft away.

Well 2 was drilled in 1981 to a depth of 392 ft to serve as a supplemental primary source. The initial pump test for Well 2 was conducted in 1981. That test recorded a static water level of 273 ft below the top of Well 2. It also conducted a stepped pump test with a maximum withdrawal rate of 300 gpm, corresponding to a drawdown of 10 ft. Well 2 has a 25-HP submersible pump (model number unknown) installed in 2004. The 8 in well casing extends from 24 in above the surface to 372 ft bgs. A 7.5 in diameter 15 slot screen was installed from 372 ft to 382 ft bgs, followed by an 8 in diameter 20 slot screen from 382 ft to 392 ft bgs. The identified well pump supplies approximately 150 gpm at a total dynamic head of 443 ft. Water is pumped to a concrete reservoir located approximately 4,000 ft away.

Well pump tests for Well 1 and Well 2 are included in Appendix A.

1.1.1 Water Rights

The Washington State Department of Ecology has issues two water rights to the Diamond Point Water System. Water Right Certificate G 2-25283 C (Priority Date: June 25, 1979) and G 2-25897 C (Priority Date: May 21, 1981) allow the system a maximum instantaneous withdrawal (Qi) of 218gpm and a maximum withdrawal volume of 100 acre-ft per year (ac-ft/yr).

Well 1 is located 150 ft East and 500 ft North from the Southeast Quarter Corner of Section 21. Well 2 is located 300 ft East and 400 ft North from the Southeast Quarter Corner of Section 21. Figure 1 below shows the well locations relative to the rest of the water system.

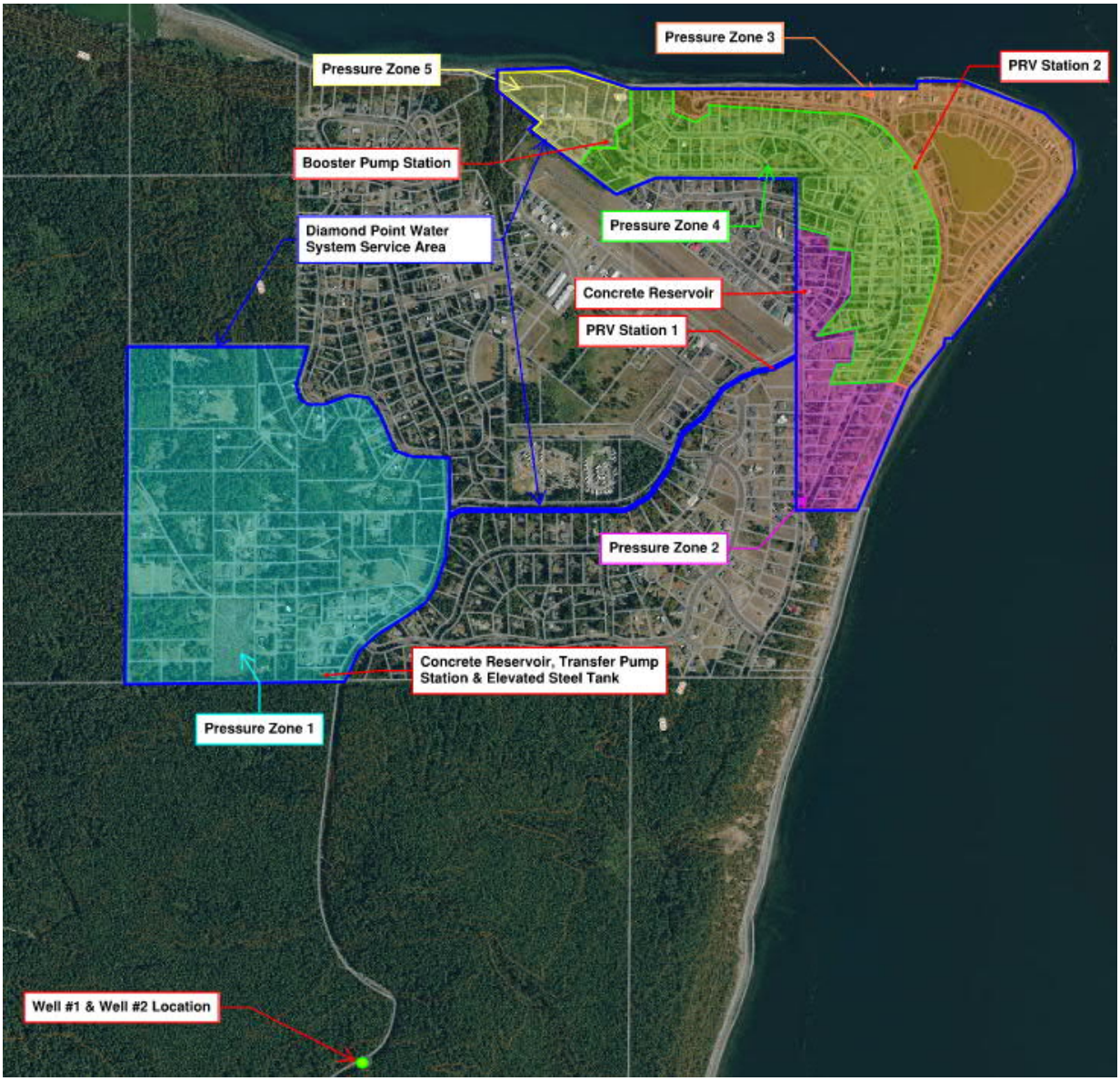
1.1.2 Seawater Intrusion

Due to the existence of seawater intrusion (SWI) in many wells located on the shorelines of Washington State, the possibility of SWI into the potable water aquifers must be investigated on a regular basis. The DOE may condition water right permits to provide for reduced pumping rates or may require a water system to abandon sources if seawater intrusion threatens senior water right permits.

Department of Health Water System Design Manual 2019, hereon referred to as The Design Manual, identifies wells are at risk for intrusion if the well is located within ½ mile of the shoreline and pump water from a depth below sea level, and within ½ mile of a groundwater source with chloride concentrations over 100mg/L.

The measurements of chloride, 5.53 mg/L for Well 1 and 5.54 mg/L for Well 2, are much lower than the threshold. The wells are a little over ½ mile from the shoreline. According to these measurements, the two wells are not considered “at risk for intrusion” per The Design Manual’s criteria.

Figure 1 – Well Locations



1.2 Sanitary Control Area

Clallam County has inspected and approved Well 1 and Well 2 well site locations. The wells are located to minimize the possibility of contamination and to prevent surface water from entering the well. The existing wells have an established declaration of covenant recorded with the County. The 100-foot pollution control radius for both wells is contained within a system owned parcel.

As a result of site topology, and a well casing 2 ft above the ground surface for each well, surface water has not affected the existing wells. Additionally, the wells are completed in a confined aquifer whose confining layer protects the wells from surface water contamination. The potential for subsurface domestic contamination from the nearby residence is also low because of the confining layer protecting the aquifer. If domestic contamination did occur, it could include septic, gas, pesticides, fertilizers, etc. See Contaminant Source Inventory in Appendix D for more information regarding potential contaminants.

2. WELLHEAD PROTECTION AREA

2.1 Wellhead Protection Area Delineation

The wellhead protection area (WHPA) delineation was calculated using the calculated fixed radius method. Table 2 summarizes the results of the calculations. The system's annual demand at full build-out is calculated below. This was determined using the following equation:

$$ADD\ \left(\frac{gpd}{ERU}\right) * Maximum\ ERUs * 365\ days$$

$$150\,\frac{gpd}{ERU} * 472\ ERUS * 365\ days = \ 25{,}842{,}000\ gal = \ 3{,}454{,}813\ cf$$

The existing wells share the annual demand by the water system, thus, the estimated annual volume of water pumped from the wells is about 3,454,813 cf/year. Since the two wells are located quite near each other, a single calculation treating them as 1 well will suffice. The equation from the DOH Wellhead Protection Program Guidance Document was used for calculated fixed radii as follows:

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

Where:
r = Calculated Fixed Radii (feet)
Q = Pumping Rate of Well (cubic feet per year)
t = Travel Time to Well (0.5, 1, 5, 10 years)
n = Aquifer Porosity = 0.22
H = Open Interval of Length of Well Perforations

Table 2 shows the results of Well 1 and Well 2 calculated fixed radius based on the different travel times. The site topology indicated no complicated geologic factors or ground/surface water interactions that would necessitate a calculation method other than the calculated fixed radius method for delineating the source water protection areas. The areas to be protected are shown in Appendix C.

					Calculated Fixed Radius (ft) Based on Travel Times			
Condition	Source	Water Usage (cf/yr)	n	H (ft)	6 mo	1-yr	5-yr	10-yr
Anticipated Withdrawal	S01	3,454,813	.22	5	707	1,000	2,236	3,162
Anticipated Withdrawal	S02	3,454,813	.22	5	707	1,000	2,236	3,162

Table 2 – Calculated Fixed Radii

2.2 Land Use and Zoning

Land use and zoning within the wellhead protection areas can help identify contaminants related to certain land uses. The land use within Zone 1 (1 year) and Zone 3 (10 year) wellhead protection areas of the existing sources is public land and a zoning of P. The results are summarized in Table 3. The land contained within the wellhead protection areas is all undeveloped forested public land. Within Zone 3, there is risk for on-site septic systems, residential contamination, and fertilizers as detailed in Appendix D.

Table 3 – Land Use Within Wellhead Protection Areas

	Zone 1 (1 year travel time)	Zone 3 (10 year travel time)
Source	P – Public Land	P – Public Land
S01	86.31 acres	864 acres
S02	86.31 acres	864 acres

2.3 Potential Contaminants

A Contaminant Source Inventory was completed to best account for any possible sources of groundwater contamination within the wellhead protection area. The inventory includes all potential contaminant sources within Zone 1 (the 1-year time of travel total) and high-risk potential contaminant sources within Zone 3 (the 10-year total).

The following information was used for developing the contaminant source inventory:

- Department of Health Source Water Assessment Program (SWAP) maps
- Department of Ecology Toxic Cleanup Program maps
- US EPA Drinking Water Mapping Application to Protect Source Waters (DWMAPS)
- Knowledge of Septic System Use in the Area
- Map Field Searches

The potential contaminants list from the Washington State Department of Health (WSDOH) *Wellhead Protection Program Guidance Document (June 2017)* was used in identifying the potential contaminants for the well field. The potential contaminants grouped in a high, medium, and low risk ranking and prioritization system are shown in Appendix D.

2.4 Groundwater Contaminant Susceptibility Assessment

A susceptibility assessment form was previously prepared and submitted to DOH. The form is required of all groundwater-based Group A systems and is useful in determining the minimum delineation for the WHPA. The existing well field is classified as low susceptibility. This form is attached in Appendix E.

2.5 Notifications

Regulatory agencies, local government entities, facility operators, customers, and landowners within the identified capture zones will receive notification letters from the WHPA. Sample letters can be found in Appendix F. All notification letters should discuss the well's susceptibility rating, what the rating means, and the number of people the System serves.

Within one year of defining WHPA boundaries, water systems must notify in writing the potential groundwater contaminant sources identified within their WHPA – and the agencies or jurisdictions that regulate those sources within the WHPA. The potential groundwater contaminant sources identified within the System's WHPA are listed in Table 4 along with the relevant regulators.

Table 4 – Potential Groundwater Contaminant Sources and Regulators

Potential Groundwater Contaminant Source	Owner/Operator of Source	Regulatory Agency
Septic Tanks/Pipes, Lawn Fertilizers/Pesticides, Residential Disposal, Water/Gas Pipes	Residents Diamond Point Water Association	Cascadia Water, LLC

Appendix A – Source Information

See Appendix G of Diamond Point - Water System Plan for Well Logs

See Appendix F of Diamond Point - Water System Plan for Water Rights

Appendix B – Fixed Radius Calculations & Map

FIXED RADIUS CALCULATIONS

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

Equation:
CR = sqrt[(prod.)/(3.14*n*H)]

Where:
H = Height of open interval (well screen)
n = Porosity (assumed value of 0.22)

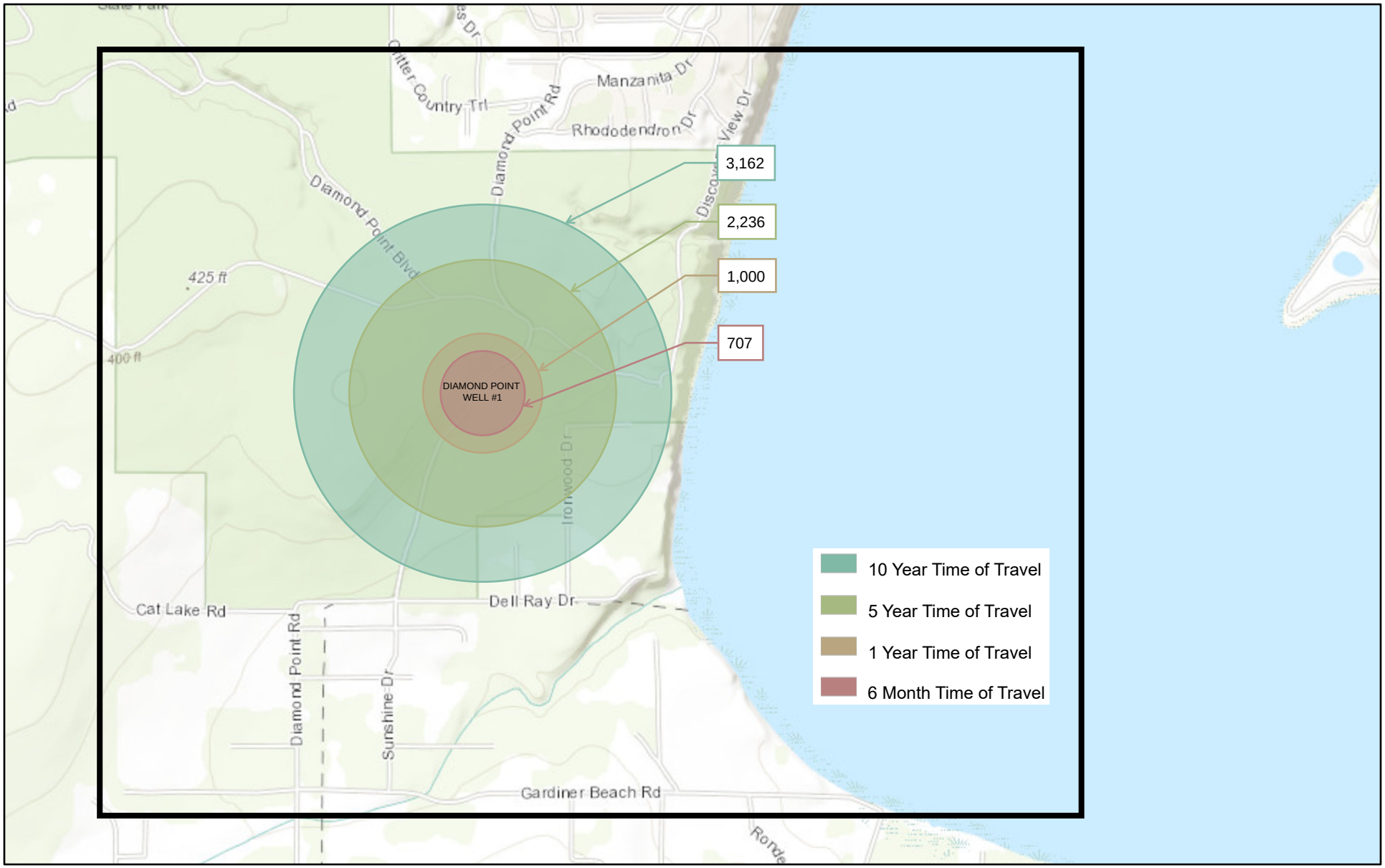
Source: Well #1

Interval (year)	Production (ft^3)	Porosity (n)	Height (H) of Open Interval (ft)	Capture Radius (feet)
0.5	1,727,406	0.22	5	707
1	3,454,813	0.22	5	1,000
5	17,274,064	0.22	5	2,236
10	34,548,128	0.22	5	3,162

Source: Well #2

Interval (year)	Production (ft^3)	Porosity (n)	Height (H) of Open Interval (ft)	Capture Radius (feet)
0.5	1,727,406	0.22	5	707
1	3,454,813	0.22	5	1,000
5	17,274,064	0.22	5	2,236
10	34,548,128	0.22	5	3,162

DIAMOND POINT - WELLHEAD PROTECTION AREAS MAP
FIXED RADII CALCULATION METHOD FOR SOURCES 1



September 20, 2023

1:36,112

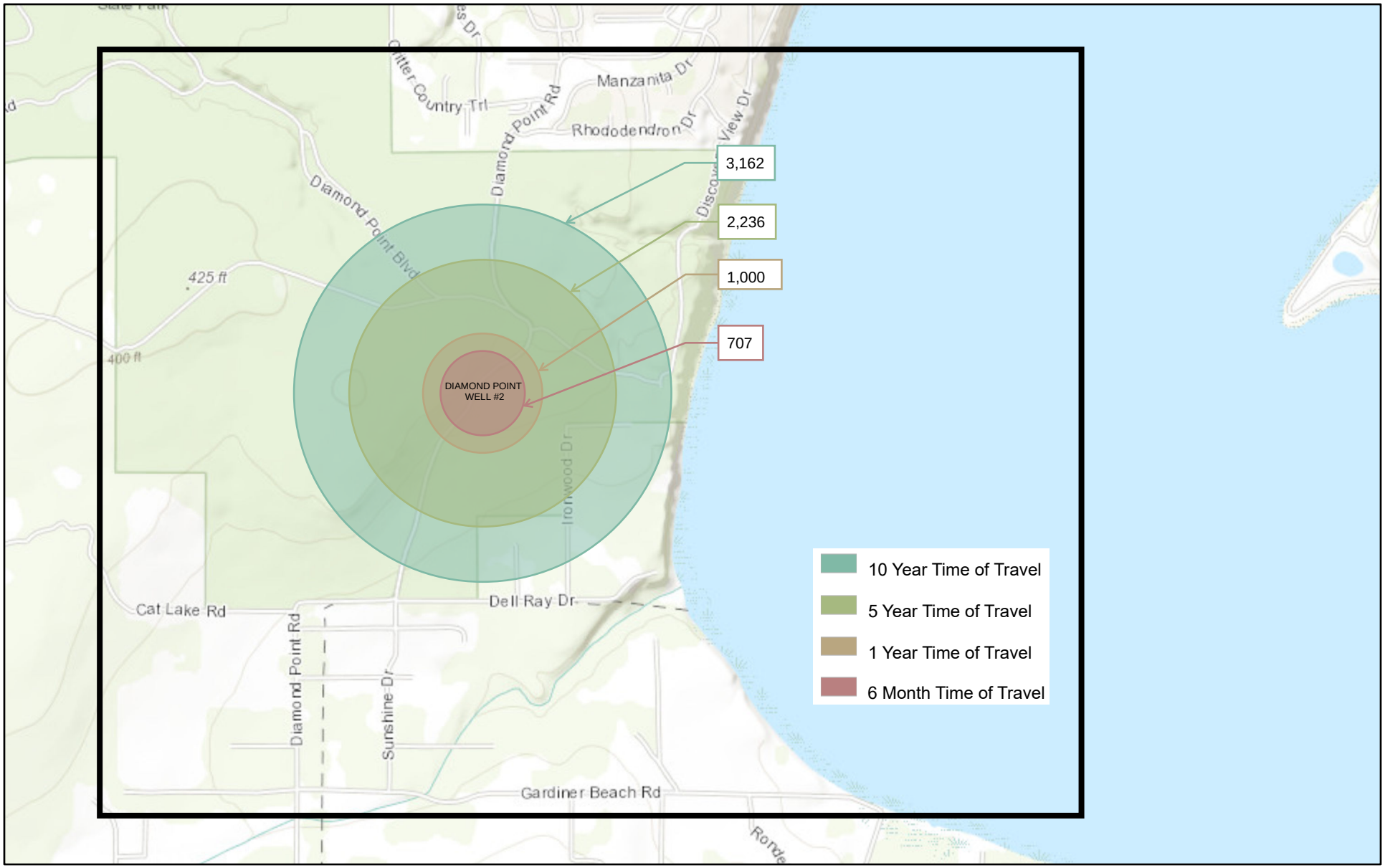
0 1,000 2,000 4,000 ft

0 330 660 1,320 m

Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

The DOH does not warrant the accuracy of any information published on this map.

DIAMOND POINT - WELLHEAD PROTECTION AREAS MAP
FIXED RADII CALCULATION METHOD FOR SOURCES 2



September 20, 2023

1:36,112

0 1,000 2,000 4,000 ft

0 330 660 1,320 m

Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

The DOH does not warrant the accuracy of any information published on this map.

Appendix C – Contamination Source Inventory

Groundwater Contaminant Source Inventory
Project:Monterra Water System Plan
Water System Name: Diamond Point
Water System ID No. 19210 4
Source: S01 (AGP297)
Source: S02 (AGP298)

Description: List of potential groundwater contaminants for well(s) in Zone 1 (1-yr radius) and Zone 3 (10-yr radius). All contaminants are grouped into categories (see category definitions at bottom of this page), assigned a level of threat (low, medium, or high) based on the risk each potential contaminant poses to the wellhead, and ranked from highest threat to lowest threat with 1 being the highest.

		Source 1						Source 2						
		Zone 1 (440 feet)			Zone 3 (1966 feet)			Zone 1 (691 feet)			Zone 3 (3091 feet)			
Potential Groundwater Contaminant	Category	Existence	Threat	Rank	Existence	Threat	Rank	Existence	Threat	Rank	Existence	Threat	Rank	Description
Subsurface Percolation (Septic Tanks and Cesspools)					X	1	Low				X	1	Low	Residential homes in the surrounding areas
Injection Wells - Hazardous Waste														
Injection Wells - Non-Hazardous Waste (Brine Disposal and Drainage)														
Injection Wells - Non-Waste (e.g. Enhanced Recovery, Artificial Recharge Solution Mining, and In-Site Mining)	Category 1													
Land Application - Wastewater (e.g. Spray Irrigation)														
Land Application - Wastewater By-Products (e.g. Sludge)														
Land Application - Hazardous Waste														
Land Application - Non-Hazardous Waste														
Landfills - Industrial Hazardous Waste														
Landfills - Industrial Non-Hazardous Waste														
Landfills - Municipal Sanitary														
Open Dumps, Including Illegal Dumping (Waste)														
Residential (or local) Disposal (Waste)					X	1	Low				X	1	Low	Multiple residential homes in the surrounding areas with potenital to dispose waste
Surface Impoundments - Hazardous Waste														
Surface Impoundments - Non-Hazardous Waste														
Materials Stockpiles (Non-Waste)					X	1	Low				X	1	Low	Multiple residential homes in the surrounding areas with potenital to stock pile materials
Graveyards														
Animal Burial														
Above Ground Storage Tanks - Hazardous Waste	Category 2													
Above Ground Storage Tanks - Non-Hazardous Waste														
Above Ground Storage Tanks - Non-Waste														
Underground Storage Tanks - Hazardous Waste														
Underground Storage Tanks - Non-Hazardous Waste														
Underground Storage Tanks - Non-Waste														
Containers - Hazardous Waste														
Containers - Non-Hazardous Waste														
Containers - Non-Waste														
Open-Burning Sites					X	2	Low				X	2	Low	Multiple residential homes in the surrounding areas with potenital to have open-burning sites
Detonation Sites														
Radioactive Disposal Sites														
Pipelines - Hazardous Waste														
Pipelines - Non-Hazardous Waste		X	4	Low	X	4	Low	X	4	Low	X	4	Low	Multiple residential homes in the surrounding areas with distribution water piping & potential for gas piping
Pipelines - Non-Waste	Category 3				X	3	Low				X	3	Low	Multiple residential homes in the surrounding areas with distribution water piping & potential for gas piping
Materials Transport and Transfer Operations - Hazardous Waste														
Materials Transport and Transfer Operations - Non-Hazardous Waste														
Materials Transport and Transfer Operations - Non-Waste														
Irrigation Practices (e.g. Return Flow)		X	3	Medium	X	3	Medium	X	3	Medium	X	3	Medium	Large surrounding area of open land with high potential of irrigation practices
Pesticide Applications		X	2	Medium	X	2	Medium	X	2	Medium	X	2	Medium	Large surrounding area of open land with high potential of pesticide applications
Fertilizer Applications		X	2	Medium	X	2	Medium	X	2	Medium	X	2	Medium	Large surrounding area of open land with high potential of fertilizer applications
Animal Feeding Operations														
De-icing Salts Application	Category 4				X	1	Low				X	1	Low	Multiple residential homes in the surrounding areas with potenital to de-ice during winter months
Urban Runoff					X	2	Low				X	2	Low	Multiple residential homes in the surrounding areas with potenital of urban runoff from surrounding homes
Percolation of Atmospheric Pollutants														
Mining and Mine Drainage - Surface Mine-Related														
Mining and Mine Drainage - Underground Mine-Related														
Productions Wells - Oil (and Gas) Wells														
Productions Wells - Geothermal and Heat Recovery Wells														
Productions Wells - Water Supply Wells														
Other Wells (Non-Waste) - Monitoring Wells	Category 5													
Other Wells (Non-Waste) - Exploration Wells														
Construction Excavation														
Improperly Abandoned Wells														
Groundwater - Surface Water Interactions														
Natural Leaching	Category 6													
Saltwater Intrusion/Brackish Water Upconing (or Intrusion of Other Poor-Quality Natural Water)					X	3	Low				X	3	Low	Ocean area nearby wells with potential for seawater intrustion
Total Number of Potential Groundwater Contaminants			4			12			4			12		

Potential Groundwater Contaminants Categories (From DOH *Wellhead Protection Program Guidance Document, June 2017*):
Category 1 - Sources Designed to Discharge Substances
Category 2 - Sources Designed to Store, Treat, and/or Dispose of Substances; Discharge through Unplanned Release
Category 3 - Sources Designed to Retain Substances During Transport or Transmission
Category 4 - Sources Discharging Substances as a Consequence of Other Planned Activities
Category 5 - Sources Providing Conduit or Inducing Discharge through Altered Flow Patterns
Category 6 - Naturally Occurring Sources whose Discharge is Created and/or Exacerbated by Human Activity

Appendix D – Susceptibility Assessment

Source Water Protection

Ground Water Contamination Susceptibility Assessment Survey

331-274 • Revised 7/21/2022

Instructions

Complete one form for each ground water source (well, well of a wellfield, spring, spring of a springfield) used in your water system (make copies as necessary). Contact your regional office if you need a copy of the instruction packet.

Part 1: System Information					
Well Owner/Manager	Cascadia Water				
Water System Name	Diamond Point Water System		PWSID	192104	
County	Clallam		Source Number	SO1/SO2	
Well Depth (Feet)	393				
Source Name	Well #1 / Well #2				
WA Well Tag ID Number					
Well Not Tagged	☒				
Number of Connections	187		Population Served	468	
Township	30N		Range	2W	
Section	21		¼ ¼ Section	SW ¼ SE ¼	
Latitude/Longitude	48.074666	/	-122.937921		
How was latitude/longitude determined?					
☐ GPS	☒ Survey	☒ Topographical Map			
Other					

Note: Please see instruction packet for details and explanations of all questions in Parts 2 through 5.

Part 2: Well Construction and Source Information									
1. Original well construction date	4/15/1981								
Latest well reconstruction date	N/A								
☐ Information Unavailable									
2. Well Driller	Burt Well Drilling / Stoican Drilling Co., Inc.								
☐ Well Driller Unknown									
3. Type of Well									
☒ Drilled	☐ Rotary	☐ Bored	☒ Cable (Percussion)	☐ Dug					
☐ Other	☐ Spring(s)	☐ Lateral Collector (Ranney)							
☐ Driven	☐ Jetted	☐ Other							
4. Well Report Available									
☒ Yes (attach copy to form)	☐ No								

5. Average Pumping Rate	200	Gallons/Minute
Information Source	Master Meter & Water Right Certificate	
If not documented, how was pumping rate determined?		
☐	Pumping Rate Unknown	

6. Is this source treated?									
If so, what type of treatment?									
☐	Disinfection	☐	Filtrations	☐	Carbon Filter	☐	Air Stripper	☐	Other
Purpose of treatment (describe materials removed or controlled by treatment).									
7. If source is chlorinated, is a chlorine residual maintained?				☐	Yes	☐	No		
Residual level (at point closest to source).									

Part 3: Hydrogeologic Information

1. Depth to top of open interval (check one)					
☐	Less than 20 feet	☐	20-49 feet	☐	50-99 feet
☐	100-200 feet	☒	Greater than 200 feet	☐	Information Unavailable
2. Depth to Groundwater (static water level)					
☐	Less than 20 feet	☐	20-49 feet	☒	Greater than 100 feet
☐	Flowing well/spring (artesian)				
How was water level determined?					
☒	Well Log	☐	Other		
☐	Depth to Groundwater Unknown				

3. If source is flowing well or spring, what is the confining pressure?	
	PSI (pounds per square inch) ~OR~
	Feet above wellhead

4. If source is flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source?			
☐	Yes	☐	No

5. Wellhead elevation in feet (height above mean sea level.)					
290					
How was elevation determined?					
☒	Topographic Map	☐	Drilling/Well Log	☐	Altimeter
☐	Other				
☐	Information Unavailable				

6. Confining Layers *(This can be completed only for those sources with a drilling log, well log, or geologic report describing subsurface conditions. Please refer to Instruction Packet for example.)*	
Yes	Evidence of confining layer(s) in well log.
	No evidence of confining layer(s) in well log.

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the bottom of the lowest confining layer?

☒	Yes	☐	No
☐	Information Unavailable		

7. Sanitary Setback							
☐	Less than 100 feet*	☒	100-120 feet	☐	120-200 feet	☐	Greater than 200 feet

*If less than 100 feet, describe the site conditions.

Click or tap here to enter text.

8. Wellhead Construction	
☒	Wellhead enclosed in wellhouse
☐	Controlled access (describe in box below.)

Click or tap here to enter text.

Other uses for wellhouse (describe in box below.)

Click or tap here to enter text.

☐	No wellhead control.

9. Surface Seal							
☐	18 feet	☒	Greater than 18 feet	☐	Less than 18 feet (No ECY approval)		
☐	Less than 18 feet (ECY approval copy attached)	☐	Depth of seal unknown	☐	No surface seal		

10. Annual Rainfall (inches per year)					
☐	Less than 10 in/yr	☒	10-25 in/yr	☐	Greater than 15 in/yr

Part 4: Mapping Your Groundwater Resource

1. Annual volume of water pumped in gallons	25 Million

How was this determined?

☐	Meter	☒	Estimated	☐	Pumping rate
				☐	Pump capacity
				☐	Pump rate and capacity

Other (describe in box below)

Assumed full buildout and ADD

2. Determined time of travel using:

☐	Calculated Fixed Radius estimate of groundwater movement (see instruction packet)
☐	Alternate Numerical Model

Six-month groundwater travel time (in feet)	707
One-year groundwater travel time (in feet)	1000
Five-year groundwater travel time (in feet)	2236
Ten-year groundwater travel time (in feet)	3162

Information available on length of screened/open interval?

☒	Yes	☐	No

Length of screened/open interval (in feet)	5

3. Is there a river, lake, pond, stream, or other obvious surface water body within the six-month time of travel boundary? (Mark and identify on map.)

☐	Yes	☒	No

4. Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the six-month time of travel boundary?

☐	Yes	☒	No

Comments

Click or tap here to enter text.

Part 5: Assessment of Water Quality

1. Regional sources of risk to groundwater

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five-year ground water travel time. If you do not know if one of the following is present, mark the "unknown" space.

	Six-Month	One-Year	Five-Year	Unknown
Likely pesticide application	☐	☐	☐	☐
Stormwater injection well	☐	☐	☐	☐
Other injection wells	☐	☐	☐	☐
Abandoned groundwater well	☐	☐	☐	☐
Landfills, dumps, disposal areas	☐	☐	☐	☐
Known hazardous materials clean-up site	☐	☐	☐	☐
Known water quality problems	☐	☐	☐	☐
Population density less than one house/acre	☐	☐	☐	☐
Residences commonly have septic tanks	☐	☐	☐	☐
Wastewater treatment lagoons	☐	☐	☐	☐
Sites used for land application of waste	☐	☐	☐	☐

Please include a map of the wellhead and time of travel areas with this form. Mark and identify on the map any of the risks listed above.

If other recorded or potential sources of ground water contamination exist within the ten-year time of travel circular zone around your water supply, please describe in the box below.

Diamond point road, a paved county road, runs north/south approx. 100-120ft. west of wells #1 & #2

2. Source-specific water quality records. For each type of test below, mark the row that applies to the sample results for this source. Consider all sample results from the past 12 years. Maximum Contaminant Levels (MCLs) and State Advisory Levels (SALs) are noted next to the specific test and are listed in the instruction packet.

A. Nitrate (Nitrate MCL = 10 mg/liter)	
☐	Results greater than MCL
☐	Less than 2 mg/liter nitrate
☒	2-5 mg/liter nitrate
☐	Greater than 5 mg/liter nitrate
B. VOCs (VOC detection level is 0.5 ug/liter or 0.0005 mg/liter)	
☐	Results greater than MCL or SAL
☐	VOCs detected at least once
☒	VOCs never detected
☐	VOC sampling records unavailable

C. EDB/DBCP (EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)	
☐	EDB/DBCP detected below MCL at least once
☐	EDB/DBCP detected above MCL at least once
☐	EDB/DBCP never detected
☒	EDB/DBCP tests not required
D. Other SOCs (pesticides, herbicides, or SOCs other than EDB/DBCP	
☐	Other SOCs detected (pesticides, herbicides or other synthetic organic chemicals)
☐	Other SOC tests performed but none detected (list test methods in comments)
☒	Other SOC tests not performed

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods in box below.

Click or tap here to enter text.

E. Bacterial Contamination

Any bacterial detection(s) in the past three years in samples taken from the source (not distribution sampling records)?

☐	Yes	☒	No

Any bacterial detection(s) in the past three years in the distribution system attributed to the source?

☐	Yes	☒	No

Source sampling records for bacteria unavailable.

☐	Yes	☒	No

Part 6: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water sources that the calculated fixed radius (CFR) method described in Part 4 may not accurately represent. For these sources, use the CFR areas as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, consider a more detailed delineation method.

1. Is there evidence of obvious hydrologic boundaries within the ten-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

☐	Yes	☒	No

Describe in the box below, with references to map produced in Part 4.

Click or tap here to enter text.

2. Aquifer Material		
A. does the drilling log, well log, or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?		
☐ Yes	☒	No
B. Does the drilling log, well log, or other geologic/engineering reports indicate that the well is located in an area where underground conditions are primarily identified as coarse sand and gravel?		
☐ Yes	☒	No

3. Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)		
☐ Yes	☒	No

4. Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

A. Presence of groundwater extraction wells removing more than approximately 500 gal/min within...

	Yes	No	Unknown
Less than six-month travel time	☐	☒	☐
Six-month to one-year travel time	☐	☒	☐
One to five-year travel time	☐	☒	☐
Five to ten-year travel time	☐	☒	☐

B. Presence of groundwater recharge wells (dry wells) or heavy irrigation within...

	Yes	No	Unknown
Less than one-year travel time	☐	☒	☐
One to five-year travel time	☐	☒	☐
Five to ten-year travel time	☐	☒	☐

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part 4.

None known or identified

Form Completed By	
Name of Authorized Person	
Signature	
Title	
Date	

For more information

Questions? Contact Nikki Guillot, Source Water Protection Program Manager, 360-236-3114.

Contact our nearest regional office from 8 AM to 5 PM, Monday through Friday.
Eastern Region, Spokane Valley, 509-329-2100.
Northwest Region, Kent, 253-395-6750.
Southwest Region, Tumwater, 360-236-3030.

To request this document in another format, call 1-800-525-0127. Deaf or hard of hearing customers, please call 711 (Washington Relay) or email civil.rights@doh.wa.gov.

Appendix E – Notifications

Cascadia Water, LLC
PO Box 549
Freeland, WA 98249
Phone: (360) 661-7781

Date: 5/1/2025

Re: Diamond Point – Wellhead Protection Program

Dear Emergency Responders,

Diamond Point is updating their wellhead protection program as required by DOH for the Diamond Point Water System. The Diamond source wells are located on the east side of Diamond Point Road, on a parcel associated with Miller Peninsula State Park, approximately two miles north of the intersection with State Route 101 in Clallam County, Washington.

As part of this program, we are required to provide wellhead protection information to agencies responsible for incident/spill response procedures. Attached are copies of our wellhead protection area boundaries, a potential contaminant source inventory, a groundwater contamination susceptibility assessment survey, and our emergency response plan.

Local emergency responders are asked to review these documents and evaluate whether changes in incident/spill response procedures are needed to better protect groundwater within our wellhead protection area. As stated in the Washington State Department of Health's *Wellhead Protection Program Guidance Document, June 2010*: "If a public water system's source water is determined to be vulnerable to surface activities, special procedures may need to be incorporated into local emergency response plans."

The Diamond Point system has 320 service connections and serves about 795 people. The wells have been given a "low" susceptibility rating. This means that based on location, well construction, local geological factors, and regional sources of risk to groundwater, there is low risk of the well becoming contaminated.

Thank you for your support in protecting our drinking water. If you have any questions regarding the documents included or would like to collaborate on further development of incident/spill response procedures, you may contact us at the listed address or phone number.

Sincerely,

Culley Lehman
General Manager

Date: 7/22/2025

Re: Diamond Point – Wellhead Protection Program

Dear Property Owner,

To protect the drinking water supply for the customers of Diamond Point, we are developing a wellhead protection program as required by state law. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an inventory of potential groundwater contamination sources within the area. Your residential property is located within the wellhead protection area. The following features/activities on residential properties have the potential to affect groundwater quality and our customers' drinking water supply.

- Septic tanks/drainfields
- Open dumps
- Animal burial
- Open burning
- Pesticide/fertilizer application

To prevent groundwater contamination, customers should:

- Be aware of common household hazardous chemicals, such as gasoline, household cleaning products, paint, anti-freeze, pesticides, fertilizers, batteries, etc.
- Properly dispose of all hazardous wastes including leftover chemicals and their storage containers.
- Avoid spilling chemicals by utilizing proper storage containers.
- Avoid applying hazardous chemicals during rainy weather.
- When applicable, use non-toxic alternatives.

We realize you are already careful to protect the environmental character of your residential property and the surrounding area. We hope that learning that you are in our wellhead protection area will result in more precautions to ensure that your activities will not affect our drinking water quality.

Sincerely,
Culley Lehman
General Manager

Date: 7/22/2025

Re: Diamond Point – Wellhead Protection Program

Dear Property Owner,

To protect the drinking water supply for the customers of Diamond Point, we are developing a wellhead protection program as required by state law. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an inventory of potential groundwater contamination sources within the area. Your residential property is located within the wellhead protection area. The following features/activities on residential properties have the potential to affect groundwater quality and our customers' drinking water supply.

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To prevent groundwater contamination, customers should:

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- Avoid spilling chemicals by utilizing proper storage containers.
- Avoid applying hazardous chemicals during rainy weather.
- When applicable, use non-toxic alternatives.

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Sincerely,
Culley Lehman
General Manager

Date: 7/22/2025

Re: Diamond Point – Wellhead Protection Program

Dear Property Owner,

To protect the drinking water supply for the customers of Diamond Point, we are developing a wellhead protection program as required by state law. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an inventory of potential groundwater contamination sources within the area. Your residential property is located within the wellhead protection area. The following features/activities on residential properties have the potential to affect groundwater quality and our customers' drinking water supply.

- Septic tanks/drainfields
- Open dumps
- Animal burial
- Open burning
- Pesticide/fertilizer application

To prevent groundwater contamination, customers should:

- Be aware of common household hazardous chemicals, such as gasoline, household cleaning products, paint, anti-freeze, pesticides, fertilizers, batteries, etc.
- Properly dispose of all hazardous wastes including leftover chemicals and their storage containers.
- Avoid spilling chemicals by utilizing proper storage containers.
- Avoid applying hazardous chemicals during rainy weather.
- When applicable, use non-toxic alternatives.

We realize you are already careful to protect the environmental character of your residential property and the surrounding area. We hope that learning that you are in our wellhead protection area will result in more precautions to ensure that your activities will not affect our drinking water quality.

Sincerely,
Culley Lehman
General Manager

Date: 7/22/2025

Re: Diamond Point – Wellhead Protection Program

Dear Property Owner,

To protect the drinking water supply for the customers of Diamond Point, we are developing a wellhead protection program as required by state law. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an inventory of potential groundwater contamination sources within the area. Your residential property is located within the wellhead protection area. The following features/activities on residential properties have the potential to affect groundwater quality and our customers' drinking water supply.

- Septic tanks/drainfields
- Open dumps
- Animal burial
- Open burning
- Pesticide/fertilizer application

To prevent groundwater contamination, customers should:

- Be aware of common household hazardous chemicals, such as gasoline, household cleaning products, paint, anti-freeze, pesticides, fertilizers, batteries, etc.
- Properly dispose of all hazardous wastes including leftover chemicals and their storage containers.
- Avoid spilling chemicals by utilizing proper storage containers.
- Avoid applying hazardous chemicals during rainy weather.
- When applicable, use non-toxic alternatives.

We realize you are already careful to protect the environmental character of your residential property and the surrounding area. We hope that learning that you are in our wellhead protection area will result in more precautions to ensure that your activities will not affect our drinking water quality.

Sincerely,
Culley Lehman
General Manager

Name	Parcel	Mailing Address	City, State, Zip
WA DEPT OF PARKS AND RECREATION (Miller State Park)	23021130000 / 23021130010 / 23028120000 / 23028200000 / 23022230000	PO BOX 42650	OLYMPIA, WA 98504-2650
JENNIFER W PATTISON	23028110100	2919 SE 2ND AVE	CAMAS, WA 98607
TIMOTHY HABERER & DEBRA GILBREATH TTES	23028110110	PO BOX 3476	SEQUIM, WA 98382
NICHOLAS STUCKY ET AL	23028110120 / 23028110130	1228 V ST	PORT TOWNSEND, WA 98368-2742
STEVEN & SUSAN SMULLEN TTES	23028110130	PO BOX 3547	SEQUIM, WA 98382
CARRIE G PATTISON ET AL	23027220200	1518 NE 3RD PLACE	CAMAS, WA 98607
GRETA NADINE BERRY TTE	23028110030 / 23027230030 / 23028110040 / 23027230040 / 23027230050	11530 HILLCREST ST	LOMA LINDA, CA 92354
THOMAS B AND LINDA TIFFANY	23028110050	20609 SE 216TH ST	MAPLE VALLEY, WA 98038
GRETA NADINE BERRY TTE	23028110060 / 23027230060	11530 HILLCREST ST	LOMA LINDA, CA 92354

APPENDIX J
Well Loss Control Action Plan

1. WATER LOSS CONTROL ACTION PLAN (WLCAP)

The Distribution System Leakage (DSL) of the Diamond Point water system has been steady increasing over the past few years per their Water Use Efficiency (WUE) Annual Performance Reports. Over the past three years the DSL has increased yearly from 25.4% in 2020 to 32.6% in 2022. A water system's DSL of greater than 10% is greater than the threshold which requires a Water Loss Control Action Plan (WLCAP).

Diamond Point is required to establish a water use reduction goal as part of its WLCAP to address distribution system losses. The action plan to be implemented contains various aspects with the intent of obtaining accurate data, identifying real losses, and improving the system efficiency. The water systems will implement several water use efficiency measures

1.1 History of Past WLCAP Goals

Prior to ownership transferring to Cascadia Water, the system had not adopted a Water Use Efficiency (WUE) goal for over a decade (since 2008 according to the 2022 WUE Annual Performance Report). As part of the newly developed Water System Plan being submitted in 2024 the system will establish a new goal with plan to implement improvements to meet their stated objective(s).

2. WATER LOSS CONTROL ACTION ITEMS

2.1 Accurate Data Collection – Water Metering

The System sources are metered and the source meters are read multiple times a week. The meters will be periodically tested and repaired or replaced as needed.

Cascadia requires the installation of water meters on all service connections. An estimate is made for the water used for flushing, system cleaning, and fire department use. Meter readings are taken on a bimonthly basis and are used to determine customer water use and charges. Replacement of old/outdated meters on an on-going basis will occur to assist in obtaining accurate consumption usage data. The replacement of meters will be incorporated into the system's WLCAP.

2.2 Identify Real Water Losses

With the newly installed, accurate meters Cascadia will be able to identify real water losses in the system. The accurate data will allow the prioritization of proposed water line replacement projects. Accurate consumption data will also allow for large consumers of the water to be billed appropriate for their water use and encourage conservancy throughout the systems.

2.3 Leak Detection Program

Water lost through a utility's transmission and distribution system is typically referred to as "Distribution System Leakage (DSL)". A system audit compares the amount of water produced from the source to the amount of water sold to customers. Cascadia performs a bimonthly analysis of source water produced in comparison with water sold to detect increases in the DSL.

Cascadia's leak detection program includes monitoring for leaks in the system and quickly repairing them when identified. Cascadia promptly investigates any reports of leaks from customers and actively investigates aberrations in consumption by customers.

The WUE Annual Performance Reports for the system is submitted to the state. The most recent WUE indicates that the 3-year annual average for DSL at Estates is 28.4% which exceen the 10% DSL threshold indicated by the DOH.

This Water System Plan includes various projects to assess and reduce potential factors contributing to the water loss in the Diamond Point distribution systems including replacement of aging water lines and replacement of older meters that may no longer be functioning properly.

2.4 Water Pressure

The water pressure within the system must be at a minimum of 30-psi at all service connections during peak demand. The System is also required to provide fire flow maintain a minimum of 20-psi at all points throughout the distribution system during a fire suppression event. A maximum pressure of 80-psi in the distribution system is advisable to prevent water loss through over-pressurized services.

2.5 Flushing Mains

A portion of the routine maintenance performed on the System is to periodically flush the distribution systems. Silt and organic debris accumulate in the system over time and must be flushed out on a regular basis. Estimates on the amount of water used during flushing operations will be used to determine the DSL rate.

2.6 Informational Messages

Cascadia will include informational brochures and/or letters on the need for conservation with customer billing statements on occasion. Billing statements will also include periodic messages encouraging conservation.

Cascadia will relay information about upcoming water conservation meetings to their customers. Cascadia will capitalize on studies conducted by larger water systems, such as the Snohomish County PUD and the City of Everett, and the DOH. These studies will be used to evaluate the latest water conservation techniques. These techniques will be analyzed for their applicability to the Water System and how they may best be implemented.

2.7 Plumbing Fixture Replacement

Cascadia, through the attachment of informational literature to the customer billing statement, can encourage the use of low water use fixtures in homes. It also plans to provide new customers with informational materials on water saving plumbing.

2.8 Water Use For Landscaping

Lawn and landscape watering are the largest uses of water during the summer months. Education on the amount of water needed to sustain healthy plant life is an effective conservation tool. Cascadia plans to provide customers with literature on lawn watering during the spring of each year. Cascadia also plans to distribute literature offering recommendations for establishing a water conserving landscape. A listing of drought tolerant plants will be provided along with suggestions for plant placement and watering.

Cascadia is working with the UTC to established an updated rate structure, as shown in their tariff, that encourages prudent use of water in the yard and garden.

3. WATER USE EFFICIENCY GOALS

The Diamon Point system has established a WUE goal with the adoption of their Water System Plan. The intent of the goal is to establish a conservation program that will reduce distribution system leakage and, as a result, reduce the growth adjusted maximum day demand.

The System would like to reduce distribution system losses by 10.0% within six years. Reductions in the DSL will be accomplished though the Capital Improvements Program that proposes the replacement of aging infrastructure in the Water System based on analyzed and observed deficiencies.

APPENDIX K
Water Quality Monitoring Schedule

Water Quality Monitoring Schedule

System: DIAMOND POINT
Contact: Culley J Lehman
SMA ID: 168

PWS ID: 19210 4
Group: A - Comm
SMA Name: Cascadia Water, LLC

Region: SOUTHWEST
County: CLALLAM

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

Coliform Monitoring Requirements

	May 2024	Jun 2024	Jul 2024	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025
Coliform Monitoring Population	763	763	763	763	763	763	763	763	763	763	763	763
Number of Routine Samples Required	1	1	1	1	1	1	1	1	1	1	1	1

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

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Lead and Copper	10	Jan 2023 - Dec 2025	standard - 3 year	09/08/2022	Sep 2025	
Asbestos	1	Jan 2020 - Dec 2028	standard - 9 year	12/14/2015	***Oct 2024***	

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but we recommend no more than 12 hours (e.g. overnight).
- If your sampling frequency is annual or every 3 years, samples must be collected between June 1 and September 30. Samples collected outside this time frame for systems with an annual or triennial schedule are invalid and may lead to a monitoring violation.

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

Water Quality Monitoring Schedule

Source Monitoring

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

Source S01 *WELL # 1 AGP297* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Nitrate	1	Jan 2024 - Dec 2024	standard - 1 year	03/28/2023	***Jun 2024***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	12/12/2016	Oct 2025
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	11/01/2022	
Herbicides	1	Jan 2023 - Dec 2031	waiver - 9 year	11/01/2018	Sep 2027
Pesticides	0	Jan 2023 - Dec 2025	waiver - 3 year	07/16/2010	
PFAS	1	Jan 2023 - Dec 2025	standard - 3 year		***May 2024***
Soil Fumigants	0	Jan 2023 - Dec 2025	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	12/17/2020	
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	12/17/2020	

Source S02 *WELL # 2 AGP298* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Nitrate	1	Jan 2024 - Dec 2024	standard - 1 year	03/28/2023	***Jun 2024***
Complete Inorganic (IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	12/12/2016	Oct 2025
Volatile Organics (VOC)	1	Jan 2020 - Dec 2025	waiver - 6 year	11/01/2022	
Herbicides	1	Jan 2023 - Dec 2031	waiver - 9 year	11/01/2018	Sep 2027
Pesticides	0	Jan 2023 - Dec 2025	waiver - 3 year	07/16/2010	
PFAS	1	Jan 2023 - Dec 2025	standard - 3 year		***May 2024***
Soil Fumigants	0	Jan 2023 - Dec 2025	waiver - 3 year		
Gross Alpha	1	Jan 2020 - Dec 2025	standard - 6 year	12/17/2020	
Radium 228	1	Jan 2020 - Dec 2025	standard - 6 year	12/17/2020	

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2024
Submit CCR certification form to ODW (Community systems only):	10/01/2024
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2024
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers
Submit Lead Service Line Inventory	10/16/2024
Homeowner notification of LSLI status for those with LSL, GRR or unknown	11/15/2024 or 30 days after completion

Special Notes

None

Southwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Sophia Petro: (564) 669-0856 or sophia.petro@doh.wa.gov
For questions regarding DBPs:	Regina Grimm, p.e.: (564) 669-0857 or regina.grimm@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Southwest Office: (360) 236-3030 or SWRO.Coli@doh.wa.gov

Additional Notes

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

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

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

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

APPENDIX L
Water Quality Results

Well 1 - Water Quality

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	12/12/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	57002
Source	01
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	whd s/t
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0004	ARSENIC	EQ	0.0040	0.0104	0.0010	mg/L
0014	SODIUM	EQ	7.3000		5.0000	mg/L
0015	HARDNESS	EQ	110.0000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	223.0000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.2000		0.1000	NTU
0019	FLUORIDE	EQ	0.1100	4.0000	0.2000	mg/L
0020	NITRATE-N	EQ	0.2000	10.0000	0.5000	mg/L
0021	CHLORIDE	EQ	5.5300	250.0000	20.0000	mg/L
0161	TOTAL NITRATE/NITRITE	EQ	0.2000		0.5000	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.0200		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L

Records 1 - 25 of 28

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	3/28/2023
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	13401
Source	01
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	wh
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	LT	0.5000	10.0000	0.5000	mg/L

Records 1 - 1 of 1

Department of Health, Office of Drinking Water

Street Address:
243 Israel Road S.E. 2nd floor
Tumwater, WA 98501

Mail:
PO BOX 47822
Olympia, WA 98504-7822

Comments or questions regarding this Web site? Send email to Environmental Health Application Testing and Support

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	11/1/2022
Lab Number	218
Lab Name	BSK Associates
Sample Number	10001
Source	01
Analyte Group	VOC-VOLATILE ORGANIC CONTAMINANTS
Test Panel	VOC1-VOLATILE ORGANIC
Sample Location	well 1 s/t
Sample Type	Unknown

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0027	CHLOROFORM	LT	0.5000		0.5000	ug/L
0028	BROMODICHLOROMETHANE	LT	0.5000		0.5000	ug/L
0029	DIBROMOCHLOROMETHANE	LT	0.5000		0.5000	ug/L
0030	BROMOFORM	LT	0.5000		0.5000	ug/L
0045	VINYL CHLORIDE	LT	0.5000	2.0000	0.5000	ug/L
0046	1,1 DICHLOROETHYLENE	LT	0.5000	7.0000	0.5000	ug/L
0047	1,1,1 TRICHLOROETHANE	LT	0.5000	200.0000	0.5000	ug/L
0048	CARBON TETRACHLORIDE	LT	0.5000	5.0000	0.5000	ug/L
0049	BENZENE	LT	0.5000	5.0000	0.5000	ug/L
0050	1,2 DICHLOROETHANE	LT	0.5000	5.0000	0.5000	ug/L
0051	TRICHLOROETHYLENE	LT	0.5000	5.0000	0.5000	ug/L
0052	1,4 DICHLOROBENZENE	LT	0.5000	75.0000	0.5000	ug/L
0053	CHLOROMETHANE	LT	0.5000		0.5000	ug/L
0054	BROMOMETHANE	LT	0.5000		0.5000	ug/L
0056	METHYLENE CHLORIDE(DICHLOROMETHANE)	LT	0.5000	5.0000	0.5000	ug/L
0057	TRANS- 1,2 DICHLOROETHYLENE	LT	0.5000	100.0000	0.5000	ug/L
0058	1,1 DICHLOROETHANE	LT	0.5000		0.5000	ug/L
0060	CIS- 1,2 DICHLOROETHYLENE	LT	0.5000	70.0000	0.5000	ug/L
0062	1,1 DICHLOROPROPENE	LT	0.5000		0.5000	ug/L
0063	1,2 DICHLOROPROPANE	LT	0.5000	5.0000	0.5000	ug/L
0064	DIBROMOMETHANE	LT	0.5000		0.5000	ug/L
0066	TOLUENE	LT	0.5000	1000.0000	0.5000	ug/L
0067	1,1,2 TRICHLOROETHANE	LT	0.5000	5.0000	0.5000	ug/L
0068	TETRACHLOROETHYLENE	LT	0.5000	5.0000	0.5000	ug/L
0070	1,3 DICHLOROPROPANE	LT	0.5000		0.5000	ug/L

Records 1 - 25 of 58

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	11/1/2018
Lab Number	046
Lab Name	Edge Analytical - Burlington
Sample Number	83716
Source	01
Analyte Group	SOC-SYNTHETIC ORGANIC CONTAMINANTS
Test Panel	HERB1-CHLOROPHENOXY HERBICIDES
Sample Location	well 1 s/t
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0037	2,4 - D	LT	0.1000	70.0000	0.1000	ug/L
0038	2,4,5 TP (SILVEX)	LT	0.2000	50.0000	0.2000	ug/L
0134	PENTACHLOROPHENOL	LT	0.0400	1.0000	0.0400	ug/L
0135	2,4 DB	LT	1.0000		1.0000	ug/L
0137	DALAPON	LT	1.0000	200.0000	1.0000	ug/L
0138	DICAMBA	LT	0.2000		0.2000	ug/L
0139	DINOSEB	LT	0.2000	7.0000	0.2000	ug/L
0140	PICLORAM	LT	0.1000	500.0000	0.1000	ug/L
0223	ACIFLUORFEN	LT	2.0000		2.0000	ug/L
0225	DCPA ACID METABOLITES	LT	0.1000		0.1000	ug/L
0226	3,5 DICHLORBENZOIC ACID	LT	0.5000		0.5000	ug/L

Records 1 - 11 of 11

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	7/16/2010
Lab Number	089
Lab Name	Water Management Laboratory Inc
Sample Number	89604
Source	01
Analyte Group	SOC-SYNTHETIC ORGANIC CONTAMINANTS
Test Panel	PEST1-GENERAL PESTICIDE SUITE
Sample Location	n st ph s/t
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0124	DI (ETHYLHEXYL) ADIPATE	LT	1.3000	400.0000	0.6000	ug/L
0125	DI (ETHYLHEXYL) PHTHALATE	LT	1.3000	6.0000	0.6000	ug/L
0258	BENZYL BUTYL PHTHALATE	LT	0.6000		1.0000	ug/L
0259	DI-N-BUTYL PHTHALATE	LT	0.6000		1.0000	ug/L
0260	DIETHYL PHTHALATE	LT	0.6000		1.0000	ug/L
0261	DIMETHYL PHTHALATE	LT	0.6000		1.0000	ug/L

Records 1 - 6 of 6

Links to external resources are provided as a public service and do not imply endorsement
by the Washington State Department of Health

Well 2 - Water Quality

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	12/12/2016
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	57003
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	IOC-COMPLETE INORGANIC ANALYSIS
Sample Location	whd s/t
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0004	ARSENIC	EQ	0.0040	0.0104	0.0010	mg/L
0014	SODIUM	EQ	7.3500		5.0000	mg/L
0015	HARDNESS	EQ	109.0000		10.0000	mg/L
0016	CONDUCTIVITY	EQ	229.0000	700.0000	70.0000	Umhos/cm
0017	TURBIDITY	EQ	0.0500		0.1000	NTU
0019	FLUORIDE	EQ	0.1000	4.0000	0.2000	mg/L
0020	NITRATE-N	EQ	0.2100	10.0000	0.5000	mg/L
0021	CHLORIDE	EQ	5.5400	250.0000	20.0000	mg/L
0161	TOTAL NITRATE/NITRITE	EQ	0.2100		0.5000	mg/L
0005	BARIUM	LT	0.1000	2.0000	0.1000	mg/L
0006	CADMIUM	LT	0.0010	0.0050	0.0010	mg/L
0007	CHROMIUM	LT	0.0070	0.1000	0.0070	mg/L
0008	IRON	LT	0.1000	0.3000	0.1000	mg/L
0009	LEAD	LT	0.0010		0.0010	mg/L
0010	MANGANESE	LT	0.0100	0.0500	0.0100	mg/L
0011	MERCURY	LT	0.0002	0.0020	0.0002	mg/L
0012	SELENIUM	LT	0.0020	0.0500	0.0020	mg/L
0013	SILVER	LT	0.1000	0.1000	0.1000	mg/L
0018	COLOR	LT	15.0000	15.0000	15.0000	CU
0022	SULFATE	LT	50.0000	250.0000	50.0000	mg/L
0023	COPPER	LT	0.0200		0.0200	mg/L
0024	ZINC	LT	0.2000	5.0000	0.2000	mg/L
0110	BERYLLIUM	LT	0.0003	0.0040	0.0003	mg/L
0111	NICKEL	LT	0.0050	0.1000	0.0050	mg/L
0112	ANTIMONY	LT	0.0030	0.0060	0.0030	mg/L

Records 1 - 25 of 28

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	3/28/2023
Lab Number	010
Lab Name	Spectra Laboratories - Kitsap, LLC
Sample Number	13301
Source	02
Analyte Group	IOC-INORGANIC CONTAMINANTS
Test Panel	NIT-NITRATE SUITE
Sample Location	wh
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0020	NITRATE-N	LT	0.5000	10.0000	0.5000	mg/L

Records 1 - 1 of 1

Department of Health, Office of Drinking Water

Street Address:
243 Israel Road S.E. 2nd floor
Tumwater, WA 98501

Mail:
PO BOX 47822
Olympia, WA 98504-7822

Comments or questions regarding this Web site? Send email to Environmental Health Application Testing and Support

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	11/1/2022
Lab Number	218
Lab Name	BSK Associates
Sample Number	10003
Source	02
Analyte Group	VOC-VOLATILE ORGANIC CONTAMINANTS
Test Panel	VOC1-VOLATILE ORGANIC
Sample Location	well 2 s/t
Sample Type	Unknown

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0027	CHLOROFORM	LT	0.5000		0.5000	ug/L
0028	BROMODICHLOROMETHANE	LT	0.5000		0.5000	ug/L
0029	DIBROMOCHLOROMETHANE	LT	0.5000		0.5000	ug/L
0030	BROMOFORM	LT	0.5000		0.5000	ug/L
0045	VINYL CHLORIDE	LT	0.5000	2.0000	0.5000	ug/L
0046	1,1 DICHLOROETHYLENE	LT	0.5000	7.0000	0.5000	ug/L
0047	1,1,1 TRICHLOROETHANE	LT	0.5000	200.0000	0.5000	ug/L
0048	CARBON TETRACHLORIDE	LT	0.5000	5.0000	0.5000	ug/L
0049	BENZENE	LT	0.5000	5.0000	0.5000	ug/L
0050	1,2 DICHLOROETHANE	LT	0.5000	5.0000	0.5000	ug/L
0051	TRICHLOROETHYLENE	LT	0.5000	5.0000	0.5000	ug/L
0052	1,4 DICHLOROBENZENE	LT	0.5000	75.0000	0.5000	ug/L
0053	CHLOROMETHANE	LT	0.5000		0.5000	ug/L
0054	BROMOMETHANE	LT	0.5000		0.5000	ug/L
0056	METHYLENE CHLORIDE(DICHLOROMETHANE)	LT	0.5000	5.0000	0.5000	ug/L
0057	TRANS- 1,2 DICHLOROETHYLENE	LT	0.5000	100.0000	0.5000	ug/L
0058	1,1 DICHLOROETHANE	LT	0.5000		0.5000	ug/L
0060	CIS- 1,2 DICHLOROETHYLENE	LT	0.5000	70.0000	0.5000	ug/L
0062	1,1 DICHLOROPROPENE	LT	0.5000		0.5000	ug/L
0063	1,2 DICHLOROPROPANE	LT	0.5000	5.0000	0.5000	ug/L
0064	DIBROMOMETHANE	LT	0.5000		0.5000	ug/L
0066	TOLUENE	LT	0.5000	1000.0000	0.5000	ug/L
0067	1,1,2 TRICHLOROETHANE	LT	0.5000	5.0000	0.5000	ug/L
0068	TETRACHLOROETHYLENE	LT	0.5000	5.0000	0.5000	ug/L
0070	1,3 DICHLOROPROPANE	LT	0.5000		0.5000	ug/L

Records 1 - 25 of 58

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	7/16/2010
Lab Number	089
Lab Name	Water Management Laboratory Inc
Sample Number	89604
Source	02
Analyte Group	SOC-SYNTHETIC ORGANIC CONTAMINANTS
Test Panel	PEST1-GENERAL PESTICIDE SUITE
Sample Location	n st ph s/t
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0124	DI (ETHYLHEXYL) ADIPATE	LT	1.3000	400.0000	0.6000	ug/L
0125	DI (ETHYLHEXYL) PHTHALATE	LT	1.3000	6.0000	0.6000	ug/L
0258	BENZYL BUTYL PHTHALATE	LT	0.6000		1.0000	ug/L
0259	DI-N-BUTYL PHTHALATE	LT	0.6000		1.0000	ug/L
0260	DIETHYL PHTHALATE	LT	0.6000		1.0000	ug/L
0261	DIMETHYL PHTHALATE	LT	0.6000		1.0000	ug/L

Records 1 - 6 of 6

Links to external resources are provided as a public service and do not imply endorsement
by the Washington State Department of Health

Washington State Department of Health

Division of Environmental Health
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Help

View Sample Detail - WSID 192104 - DIAMOND POINT

Collect Date	11/1/2018
Lab Number	046
Lab Name	Edge Analytical - Burlington
Sample Number	83717
Source	02
Analyte Group	SOC-SYNTHETIC ORGANIC CONTAMINANTS
Test Panel	HERB1-CHLOROPHENOXY HERBICIDES
Sample Location	well 2 s/t
Sample Type	Pre-Treatment / Raw

Result Range, A/P, Units: Mouse over for full description

Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	State Reporting Limit	Units
0037	2,4 - D	LT	0.1000	70.0000	0.1000	ug/L
0038	2,4,5 TP (SILVEX)	LT	0.2000	50.0000	0.2000	ug/L
0134	PENTACHLOROPHENOL	LT	0.0400	1.0000	0.0400	ug/L
0135	2,4 DB	LT	1.0000		1.0000	ug/L
0137	DALAPON	LT	1.0000	200.0000	1.0000	ug/L
0138	DICAMBA	LT	0.2000		0.2000	ug/L
0139	DINOSEB	LT	0.2000	7.0000	0.2000	ug/L
0140	PICLORAM	LT	0.1000	500.0000	0.1000	ug/L
0223	ACIFLUORFEN	LT	2.0000		2.0000	ug/L
0225	DCPA ACID METABOLITES	LT	0.1000		0.1000	ug/L
0226	3,5 DICHLORBENZOIC ACID	LT	0.5000		0.5000	ug/L

Records 1 - 11 of 11

APPENDIX M
Coliform Monitoring Plan

Coliform Monitoring Plan for: Diamond Point Water System

A. System Information **Plan Date:** 2023

Water System Name: Diamond Point	**County:** Clallam	**System I.D. Number:** 19210 4
Name of Plan Preparer: Culley Lehman	**Position:** Manager	**Daytime Phone:** (360) 331-5336
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S01 – Well #1, 393-ft, 150 gpm S02 – Well #2, 392-ft, 150 gpm	
Storage: List and Describe	Reservoir 1: 70,000-gal Concrete Tank Reservoir 2: 57,000-gal Elevated Steel Tank Reservoir 3: 125,000-gal Concrete Tank	
Treatment: Source Number & Process	S01: Chlorination for continuous disinfection S02: Chlorination for continuous disinfection	
Pressure Zones: Number and name	Pressure Zone 1: Diamond Point Estates Pressure Zone 2: Diamond Point Plats Pressure Zone 3: D.P. Plats Pressure Zone 4: Diamond Point Plats Beach Area Pressure Zone 5: Protection Point Subdivision	
Population by Pressure Zone:	Pressure Zone 1: 221 Pressure Zone 2: 131 Pressure Zone 3: 188 Pressure Zone 4: 195 Pressure Zone 5: 28	
Number of Routine Samples Required Monthly by Regulation:		1 (One)
Number of Sample Sites Needed to Represent the Distribution System:		3 (three)
***Request DOH Approval of Triggered Source Monitoring Plan?**		**Yes** ☐ **No** ☒

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name Spectra Laboratories	**Office Phone:** (360) 779-5141 **After Hours Phone** 360-779-5150
Address 26276 Twelve Trees Ln NW Ste. C Poulsbo, WA 98370	**Cell Phone:** 360-779-5141 **Email:** AngelaK@Spectra-Lab.com
Hours of Operation: Monday- Friday 8 am – 5 pm	
Contact Name: Angela Kaelin	
Emergency Laboratory Name Clallam County Enviro Health Services	**Office Phone:** (360) 417-2258 **After Hours Phone:** n/a
Address 223 E 4th Street, Room 130	**Cell Phone:** (360) 417-2334 **Email:**

Port Angeles, WA 98362	
Hours of Operation: 8 am – 3:30 pm (Mon – Wed), 8 am – 12 pm (Thur)	
Contact Name:	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: n/a		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: n/a		

D. Routine, Repeat, and Triggered Source Sample Locations

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
X1. 323 Critter Country Trail Front hose bibb	**1-1. 323 Critter Country Trail** Front hose bibb **1-2. 10 Greta's Place** Front hose bibb **1-3. 481 Critter Country Trail** Front hose bibb	**S01, S02**
X2. 10 Eagles Rest Ln. Front hose bibb	**2-1. 10 Eagles Rest Lane** Front hose bibb **2-2. Diamond Point Rd & Discovery View Ln** Stand Pipe **2-3. 100 West Street** Front hose bibb	**S01, S02**
X3. 51 S Diamond Shore Ln. Side hose bibb	**3-1. 51 S Diamond Shore Lane** Side hose bibb **3-2. 41 Bluff Lane** Front hose bibb **3-3. 111 S Diamond Shore Lane** Front hose bibb	**S01, S02**

**** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.**

E. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1	July	X1
February	X2	August	X2
March	X3	September	X3
April	X1	October	X1
May	X2	November	X2
June	X3	December	X3

F. Level 1 and Level 2 Assessment Contact Information

Name: Culley Lehman	**Office Phone:** (360) 331-7388 **After Hours Phone:** (360) 661-7781
Address 18181 State Route 525 Freeland, WA 98249	**Email:** Culley@cascadiawater.com
Name: Dale Metzger	**Office Phone:** (360) 477-9704 **After Hours Phone:**
Address PO Box 92 Sequim, WA 98382	**Email:** djmetzger5@gmail.com

G. *E. coli*-Present Sample Response

Distribution System *E. coli* Response Checklist				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We inform staff members about activities within the distribution system that could affect water quality.	☒	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.	☒	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	☒	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	☐	☐	☒	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	☒	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	☒	☐	☐	☐
We can activate an emergency intertie with an adjacent water system in an emergency.	☐	☒	☐	☐
We have a map of our service area boundaries.	☒	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☐	☒	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☐	☒	☐	☐
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☒	☐	☐	☐
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	☐	☒	☐
We have the capacity to print and distribute the required number of notices in a short time period.	☒	☐	☐	☐
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of *E. coli*-present sample results with our policy makers.	☒	☐	☐	☐
If we find *E. coli* in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	☐	☒	☐	☐
(Cont.)				

Distribution System *E. coli* Response Checklist				
Potential Public Notice Delivery Methods	**Yes**	**No**	**N/A**	**To Do List**
It is feasible to deliver a notice going door-to-door.	☒	☐	☐	☐
We have a list of all of our customers' addresses.	☒	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☒	☐	☐	☐
We have a list of customer email addresses.	☒	☐	☐	☐
We encourage our customers to remain in contact with us using social media.	☐	☐	☒	☐
We have an active website we can quickly update to include important messages.	☒	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☐	☒	☐	☐
We need a news release to supplement our public notification process.	☒	☐	☐	☐

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary.
3. If samples confirm E. Coli, immediately send out a Health Advisory to alert all users that there is a health risk associated with the water supply and the use of boiled or bottled water is strongly recommended.
4. Schedule inspection of system with Department of Health representative.
5. Flush and chlorinate the entire system.
6. After chlorine is eliminated from the system, schedule two sets of five coliform tests to confirm elimination of contamination.
7. After two sets of five coliform tests come back clear and DOH confirms elimination, lift advisory.

***E. coli*-Present Triggered Source Sample Response Checklist – All Sources**				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	☒	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	☒	☐	☐	☐
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them.	☐ ☐	☒ ☐	☐ ☐	☐ ☐
We routinely inspect our well site(s).	☒	☐	☐	☐
We have a good raw water sample tap installed at each source.	☒	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	☒	☐	☐	☐
Public Notice	**Yes**	**No**	**N/A**	**To Do List**
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	☒	☐	☐	☐
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our wholesale customers and encouraged them to develop a response plan.	☐	☐	☒	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☒	☐	☐	☐

***E. coli*-Present Triggered Source Sample Response Checklist – Sources**				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☐	☒	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☐	☒	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? _____ mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

***E. coli*-Present Triggered Source Sample Response Plan – Sources**
If we have *E. coli* in a source we will immediately: Notify DOH and discuss how to proceed

H. System Map

H. System Map


3-2: 41 Bluff Ln
3-1: 51 S Diamond Shore Ln
3-2: 111 S Diamond Shore Ln
2-3: 100 West Street
2-1: 10 Eagles Rest Lane
2-2: Diamond Point Rd & Discovery View Ln
1-3: 481 Critter County Trail
1-1: 323 Critter County Trail
1-2: 10 Greta's Place
N Diamond Shore Ln
Spring View Pl
Kaufman Dr
Access Rd
Beach Dr
North St
Lupine Dr
Barberry Ln
Shipview Ln
Bluff Ln
S Diamond Shore Ln
West St
South St
Discovery View Dr
Huckleberry Crest Rd
Hemlock Way
Mussel Beach Rd
Juniper Ln
Madrona Way
Sherwood Rd
Flight Aly
Sunshine Ave
Airport Way
Aero Pl
Fleming Dr
Salal Way
Sunshine Plz
Industrial Pkwy
Berry Cir
Blue Ice Ter
Manzanita Dr
Poplar Ct
Timber Rd
Cascade Dr
Redwood Ln
Rhododendron Dr
Conifer Ct
October Ct
Gilbertson Ln
Dragonfly Way
Yakob Way
Critter County Trail

APPENDIX N
Water System Inventory

Component Inventory and Assessment

Operator:	Cascadia Water
Operator Address:	PO Box 549, Freeland, WA 98249
Prepared By:	Robert Bennion, PE.

Water System:	Diamond Point
System ID:	19210 4

Component	Component Information	Installed Date	Effective Life	Condition Rating	Critical Number	Remaining Life	Replacement Cost/Unit	Quantity	Unit	Total Cost	Inflation Rate	Replace in 6 Years?	Future Cost	6-Year Replacement Cost
Well #1	8", 633' Depth AGP297	1975	80	2	2	29.5	$ 60,000	1	LS	$ 60,000	2.0%	No	$ 107,504	$ -
Well #1 Pump (Drop Pipe, Spacers, Valves, etc.)	Berkeley Model 15LT2	2004	20	1	2	0	$ 35,000	1	LS	$ 35,000	2.0%	Yes	$ 35,000	$ 35,000
Well #2	8", 392' Depth AGP298	1981	80	1	2	37	$ 40,000	1	LS	$ 40,000	2.0%	No	$ 83,227	$ -
Well #2 Pump (Drop Pipe, Spacers, Valves, etc.)	Berkeley Model 15LT2	2004	20	1	2	0	$ 35,000	1	LS	$ 35,000	2.0%	Yes	$ 35,000	$ 35,000
Well Source Meter		2023	25	2	1	22.8	$ 2,500	2	EA	$ 5,000	2.0%	No	$ 7,853	$ -
Well Controls		2004	15	1	2	0	$ 7,500	2	LS	$ 15,000	2.0%	Yes	$ 15,000	$ 15,000
Reservoir #1	Concrete (pg. 364) 70,500 gallons	1974	80	5	5	15	$ 350,000	1	LS	$ 350,000	2.0%	No	$ 471,054	$ -
Reservoir #2	Steel (WSP_Notes pg. 359) 125,000 gallons	1986	80	1	1	42	$ 600,000	1	LS	$ 600,000	2.0%	No	$ 1,378,347	$ -
Reservoir #3	Concrete (2018 SS pg 8) 122,200 gallons	2008	80	1	1	64	$ 600,000	1	LS	$ 600,000	2.0%	No	$ 2,130,896	$ -
Reservoir Controls		2012	25	1	2	13	$ 5,000	2	EA	$ 10,000	2.0%	No	$ 12,936	$ -
Pressure Tanks	81.0 Gallon WX-255	2004	30	1	3	10	$ 12,500	7	EA	$ 87,500	2.0%	No	$ 106,662	$ -
Wellhouse Enclousure (Including Chlorine Buildings)		2000	75	2	5	48.45	$ 50,000	3	EA	$ 150,000	2.0%	No	$ 391,534	$ -
Transfer Station Pump	Goulds 2656	2012	30	1	2	18	$ 15,000	2	EA	$ 30,000	2.0%	No	$ 42,847	$ -
Booster Pumps	Berkley 1-1/2 HP (2018 SS pg 10)	2023	25	1	3	24	$ 7,000	1	EA	$ 7,000	2.0%	No	$ 11,259	$ -
Booster Pump Controls		2023	25	1	2	24	$ 10,000	1	LS	$ 10,000	2.0%	No	$ 16,084	$ -
Distribution System Piping	8" PVC	2008	85	3	4	55	$ 175	1,860	LF	$ 325,500	2.0%	No	$ 971,137	$ -
Distribution System Piping	6" PVC	2008	85	3	4	55	$ 150	7,255	LF	$ 1,088,250	2.0%	No	$ 3,246,820	$ -
Distribution System Piping	4" PVC	1980	85	4	5	29	$ 150	3,475	LF	$ 521,250	2.0%	No	$ 920,176	$ -
Distribution System Piping	2" PVC	2000	85	4	5	43	$ 100	220	LF	$ 22,000	2.0%	No	$ 51,245	$ -
Distribution System Piping	4" Asbestos Cement	1965	85	4	5	18.2	$ 100	12,650	LF	$ 1,265,000	2.0%	No	$ 1,813,901	$ -
Distribution System Piping	6" Asbestos Cement	1970	85	4	5	21.7	$ 100	755	LF	$ 75,500	2.0%	No	$ 116,030	$ -
Distribution System Piping	4" Plastic Line	1960	85	4	5	14.7	$ 100	12,130	LF	$ 1,213,000	2.0%	No	$ 1,622,868	$ -

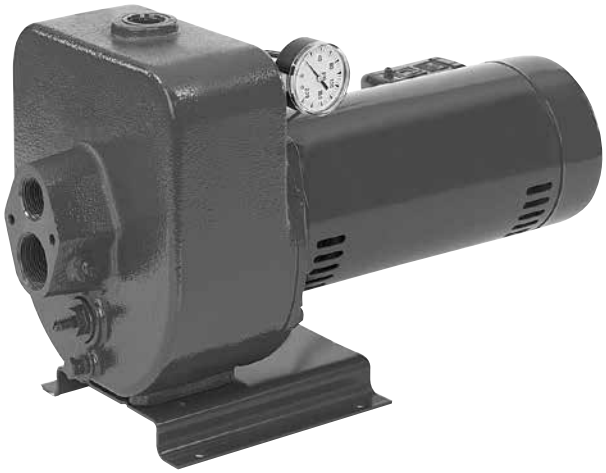
PRV Stations	Pressure Reducing Valves	1980	75	1	5	31	$ 100,000	2.00	EA	$ 500	2.0%	No	$ 924	$ -
Hydrants		1980	50	4	4	4	$ 5,000	8	EA	$ 40,000	2.0%	Yes	$ 43,469	$ 40,000
Gate Valves	8" Valve	2008	75	3	4	47.2	$ 2,500	9.00	EA	$ 22,500	2.0%	No	$ 57,294	$ -
Gate Valves	6" Valve	2008	75	3	4	47.2	$ 2,500	15.00	EA	$ 37,500	2.0%	No	$ 95,490	$ -
Gate Valves	4" Valve	1965	75	4	5	11.2	$ 2,500	42.00	EA	$ 105,000	2.0%	No	$ 131,072	$ -
Gate Valves	2" Valve	2000	75	4	5	35.7	$ 2,500	2.00	EA	$ 5,000	2.0%	No	$ 10,139	$ -
Altitude Valve (Including Vault, Piping, Valves)	Reservoir 3 Control	1980	75	4	5	21.7	$ 100,000	1.00	EA	$ 100,000	2.0%	No	$ 153,682	$ -
Meters		2020	20	4	5	11.2	$ 500	305	EA	$ 152,500	2.0%	No	$ 190,367	$ -
Air Release		1982	20	3	4	0	$ 5,000	5.00	EA	$ 25,000	2.0%	Yes	$ 25,000	$ 25,000
Blow-offs		1982	20	3	4	0	$ 5,000	10	EA	$ 50,000	2.0%	Yes	$ 50,000	$ 50,000
Upper Pumphouse		1986	70	1	3	32	$ 80,000	1	EA	$ 80,000	2.0%	No	$ 150,763	$ -
Lower Pumphouse		1974	70	2	4	19	$ 50,000	1	EA	$ 50,000	2.0%	No	$ 72,841	$ -
Generator		2023	50	1	3	49	$ 50,000	3	EA	$ 150,000	2.0%	No	$ 395,822	$ -
Propane Tank		2023	30	1	3	29	$ 5,000	3	EA	$ 15,000	2.0%	No	$ 26,638	$ -
Misson Controls	SCADA Data Logger	2023	30	1	3	29	$ 20,000	1	EA	$ 20,000	2.0%	No	$ 35,517	$ -
									Total System Value:	$ 7,398,000		Estimated Near-Term Upgrade Costs:		$ 200,000

APPENDIX O
Water Equipment Specifications

Pressure Zone 5 - Booster Pump

BERKELEY® LT2 Series

Cast iron, horizontal multi-stage



C US
UL778/CSA108

LT2 Series Multi-Stage Jet Pumps are the highest performing pumps available in its category. The LT2 Series Convertible Jets utilize the built-in regulator, offering easier priming and better range of performance from a complete line of Shallow Well, 4" Double Pipe, 2" and 3" Single Pipe Jet Packages. Pump may also be operated as a self-priming centrifugal (to 25 ft.) to provide a wide range of high pressure applications.

APPLICATIONS

Water systems and sprinkling... for homes, farms and cottages.

SPECIFICATIONS

Body: One-piece rugged cast iron

Pump and Motor Shaft: 416 stainless steel

Impeller: Polycarbonate

Diffuser: Corrosion-resistant cast iron

Pressure Switch Pre-Set: 30–50 PSI

Suction Ports: Drive-over-Suction

7LT2	3/4	Deep Well Jet	1-1/4"	1"	1"	2	115/230	50
10LT2	1	Deep Well Jet	1-1/4"	1"	1"	2	115/230	80
15LT2	1-1/2	Deep Well Jet	1-1/4"	1"	1"	2	115/230	85

PKG 107	Regulator, tubing, pipe plug and compression fitting	Required for ALL deep well installations	4

FEATURES

Automatic Pressure Regulator: Faster-acting and quieter, design eliminates "hunting" for correct drive pressure. New improved stem and guide are precisely molded to assure efficient, trouble-free performance on all deep wells. See ordering information (deep well only).

Quality Construction: Close-grained cast iron pump body is rugged, one-piece unit, specially treated to resist corrosion. Drain port provided for easy winterizing.

Precision-Machined Diffusers: Assure faster priming.

Mechanical Shaft Seal: Precision-lapped and highly polished carbon-ceramic, stainless steel construction. Internal design guarantees continuous water lubrication for maximum protection.

Polycarbonate Impellers: Precision-molded for perfect balance, and ultra-smooth for highest performance and efficiency.

Motor Windings: Superior insulation materials protect against excessive moisture and contaminants to ensure prolonged motor life.

Dustproof Cover: All electrical components are protected from dirt, dust and insects by a dustproof canopy. Ventilating air cannot contaminate vital switching components. This eliminates the most common cause of motor failure.

Balanced Rotor: Diecast under high pressures for uniform performance and greater efficiency...dynamically balanced.

Heavy-Duty Ball Bearings: Shielded, permanently lubricated bearings are extensively tested to ensure extended life and smooth, quiet operation.

Pump and Motor Shaft: Stainless steel for maximum corrosion resistance;. one-piece threaded shaft for positive impeller drive and alignment.

Order pump and pressure regulator, if required, from ordering information tables above.

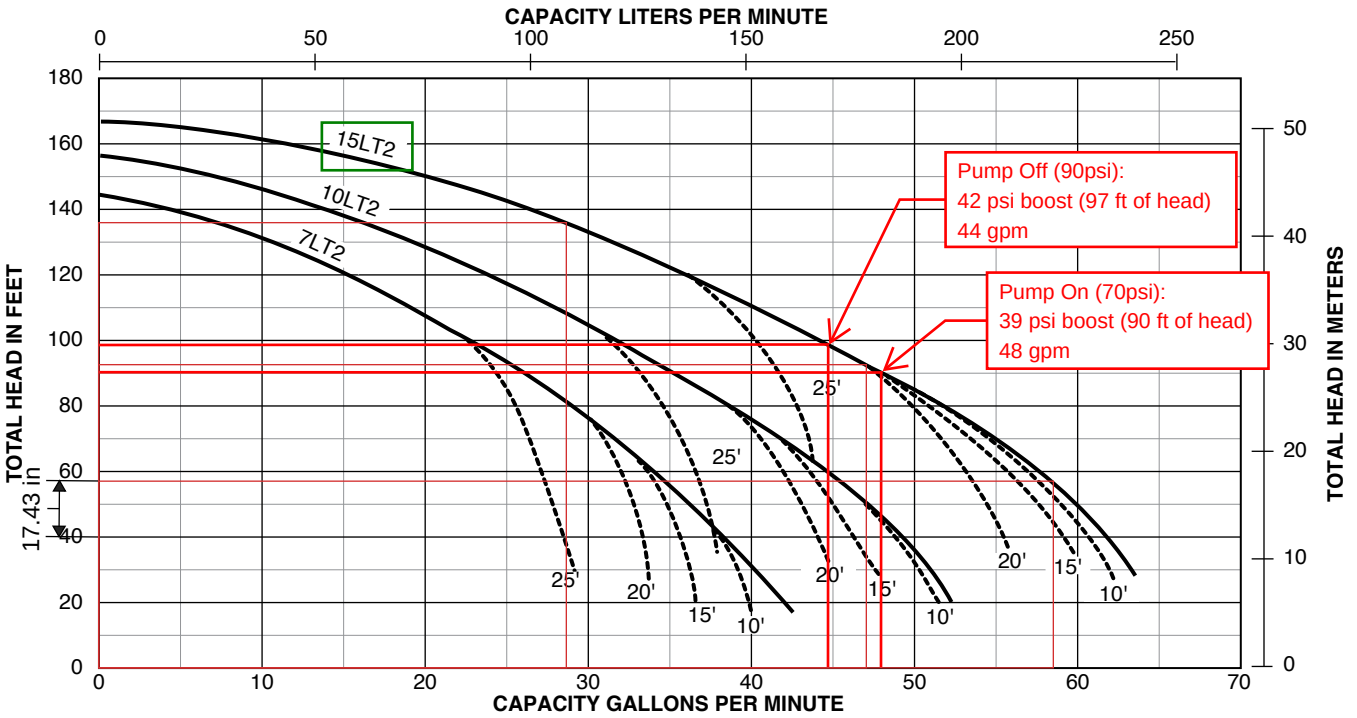
A Jet Package and the Automatic Pressure Regulator, described above, are required on all deep well installations.

Pressure switch: 70/90 psi (45/31 psi inlet pressure)
(25 min/59 max psi pressure boost on pump curve)

BERKELEY® LT2 Series

Cast iron, horizontal multi-stage

PUMP PERFORMANCE



NOTE: Dotted lines indicate performance reduction at high suction lift.

PUMP PERFORMANCE (Capacity in gallons per minute) CENTRIFUGAL APPLICATION

CATALOG NUMBER	HP	TOTAL SUCTION LIFT FT.	DISCHARGE PRESSURE PSI					SHUT-OFF PRESSURE PSI
			20'	30'	40'	50'	60'	
7LT2	3/4	5	37	30	24	15		60
		10	35	29	21	13		60
		15	33	27	19	9		60
		20	32	26	17	6		60
		25	31	24	15			60
10LT2	1	5	47	40	33	24	10	65
		10	46	38	31	21	7	65
		15	44	36	28	18		65
		20	42	35	26	15		65
		25	41	33	24	12		65
15LT2	1-1/2	5	60	53	46	36	23	68
		10	58	52	43	33	21	68
		15	56	49	41	30	16	68
		20	55	47	39	27	12	68
		25	54	41	36	25		68

Tested and rated in accordance with Water Systems Council Standards.

NOTE: Pumps installed with a Pro-Source® tank require a 100 PSI relief valve. Pumps installed with a conventional tank require a 75 PSI relief valve. Relief valve must be capable of relieving entire flow of pump at relief pressure. PKG 107 Regulator, tubing, pipe plug and compression fitting is required for all DEEP WELL installations.

BERKELEY® LT2 Series

Cast iron, horizontal multi-stage

7LT2	3/4	PKG 1 - 29SD	N32P-66B	J34P-41	20	9.6	8.2	7.0	5.8	3.9
					30	9.1	7.9	6.5	5.6	3.9
					40	8.8	7.7	6.3	5.6	3.9
					50	8.5	7.6	6.2	5.6	3.9
					60	7.7	7.3	6.2	5.6	3.9
					70	5.5	5.1	4.7	4.2	3.6
					80	3.5	3.1	2.8	2.3	1.9
					Shut-off	102	96	96	96	90
10LT2	1	PKG 1 - 10SD	N32P-67B	J34P-44	20	13.0	11.2	9.8	7.8	5.8
					30	12.5	11.0	9.5	7.6	5.7
					40	12.2	10.9	9.4	7.6	5.7
					50	12.1	10.8	9.2	7.6	5.7
					60	12.0	10.8	9.2	7.6	5.7
					70	10.2	9.6	8.6	7.4	5.7
					80	7.4	6.8	6.2	5.5	4.8
					Shut-off	108	108	108	102	102
15LT2	1-1/2	PKG 1 - 10SD	N32P-67B	J34P-44	20	15.9	13.3	12.2	9.6	7.0
					30	15.6	13.2	12.2	9.5	7.0
					40	15.3	13.1	12.1	9.4	6.9
					50	14.9	13.0	11.9	9.3	6.8
					60	14.4	12.9	11.7	9.2	6.7
					70	13.7	12.7	11.5	9.0	6.6
					80	12.6	12.1	10.8	8.7	6.4
					90	9.5	8.5	7.8	7.2	5.7
					100	5.9	5.0	4.4	3.8	3.2
					Shut-off	120	120	114	114	108

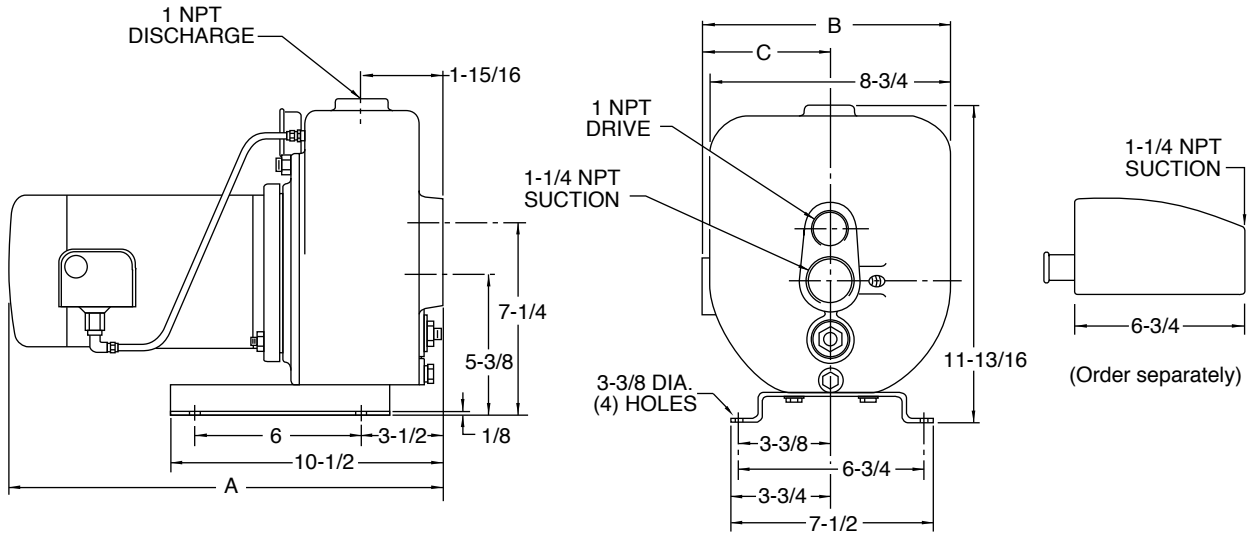
* Order Jet Package separately.

Tested and rated in accordance with Water Systems Council Standards.

NOTE: Pumps installed with a Pro-Source® tank require a 100 PSI relief valve.
Pumps installed with a conventional tank require a 75 PSI relief valve.
Relief valve must be capable of relieving entire flow of pump at relief pressure.

OUTLINE DIMENSIONS

7LT2	16-7/8	9-1/2	5-1/8
10LT2	17-3/4	9-1/2	5-1/8
15LT2	18-1/4	10	5-5/8



Dimensions (in inches) are for estimating purposes only.

BERKELEY® LT2 Series

Cast iron, horizontal multi-stage

CAT. NO.	HP	JET NO.	USES VENTURI	USES NOZZLE	PUMPING DEPTH IN FEET														
					20'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'	160'
7LT2	3/4	13AP	J32P-26	J34P-44	12.0	10.8	9.6	8.1	6.9	5.5									
		22AP	J32P-22	J34P-43					7.9	6.7	5.5	4.7	3.9	3.0					
		8AP	J32P-18	J34P-42									4.0	3.6	3.1	2.7	2.2		
10LT2	1	5AP	J32P-29	J34P-41	16.3	15.6	14.1	12.0	9.9	8.2	6.0								
		4AP	J32P-24	J34P-41					8.9	7.9	7.0	5.8	4.7	3.6	2.5				
		19AP	J32P-20	J34P-43											4.0	3.2	2.3	1.8	1.3
15LT2	1-1/2	15AP	J32P-33	J34P-41	20.0	18.5	17.0	13.6	10.4	7.6	5.0								
		9CP	J32P-26	J34P-41					10.6	9.2	8.0	6.0	4.5	3.7	3.0	2.2			
		23AP	J32P-20	J34P-44											4.3	3.5	2.7	2.4	2.0
DEEP WELL 3" SINGLE PIPE: 40 PSI																			
7LT2	3/4	17CP	J32P-29	J34P-44	12.8	11.5	10.2	8.9	7.6	6.1									
		18CP	J32P-24	J34P-44					7.8	6.9	6.0	5.3	4.5	3.6					
		16CP	Factory Installed										5.0	4.4	3.9	3.4	3.0	2.5	2.0
10LT2	1	7CP	J32P-32	J34P-41	17.8	16.2	14.6	13.0	11.4	9.6	7.7								
		9CP	J32P-26	J34P-41					10.7	9.8	9.0	7.9	6.7	5.8	5.0	4.1			
15LT2	1-1/2	10CP	J32P-38	J34P-45	21.7	19.7	17.9	15.9	14.0	11.0	8.0								
		9CP	J32P-26	J34P-41					11.1	10.8	10.6	9.7	8.9	7.5	6.5	5.5			
		19CP	Factory Installed	J34P-41											6.9	6.1	5.3	4.6	4.1
DEEP WELL 4" DOUBLE PIPE: 40 PSI																			
7LT2	3/4	CK2	J32P-29	J34P-44	12.8	11.5	10.2	8.9	7.6	6.1									
		CK2	J32P-24	J34P-44					7.8	6.9	6.0	5.3	4.5	3.6					
		15SD	Factory Installed										5.0	4.4	3.9	3.4	3.0	2.5	2.0
10LT2	1	CK3	J32P-32	J34P-41	17.8	16.2	14.6	13.0	11.4	9.6	7.7								
		CK3	J32P-26	J34P-41					10.7	9.8	9.0	7.9	6.7	5.8	5.0	4.1			
		CK1	J32P-20	J34P-43											5.0	4.5	3.9	3.5	3.0
15LT2	1-1/2	CK4	J32P-38	J34P-45	21.7	19.7	17.9	15.9	14.0	11.0	8.0								
		CK3	J32P-26	J34P-41					11.1	10.8	10.6	9.7	8.9	7.5	6.5	5.5			
		4SD	Factory Installed												6.9	6.1	5.3	4.6	4.1

Tested and rated in accordance with Water Systems Council Standards.

NOTE: Pumps installed with a Pro-Source® tank require a 100 PSI relief valve. Pumps installed with a conventional tank require a 75 PSI relief valve. Relief valve must be capable of relieving entire flow of pump at relief pressure.

PKG 107	Regulator, tubing, pipe plug and compression fitting	Required for ALL deep well installations	4

PENTAIR

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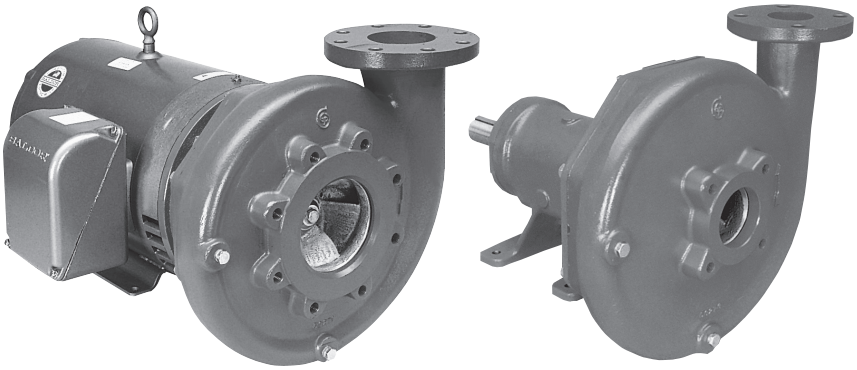

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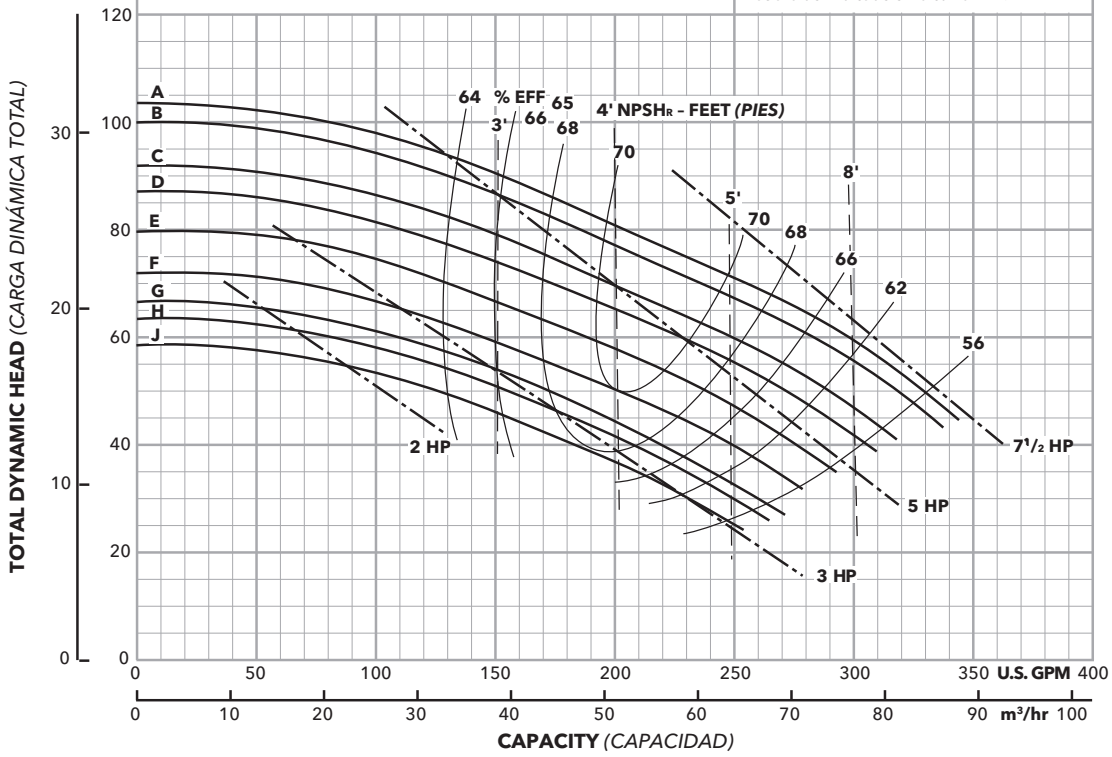
GOULDS WATER TECHNOLOGY
a xylem brand

PERFORMANCE CURVES – 60 HZ, 1750 RPM
CURVAS DE DESEMPEÑO – 60 HZ, 1750 RPM

Model 21AI/BF / Size *(Tamaño)* 2½ x 3 – 9
RPM 1750 Curve *(Curva)* CN0674R00
IMP. DWG. No. 279-15

NOTE: Not recommended for operation beyond printed H-Q curve.
NOTA: *No se recomienda para funcionamiento más allá del indicado en la curva H-Q.*

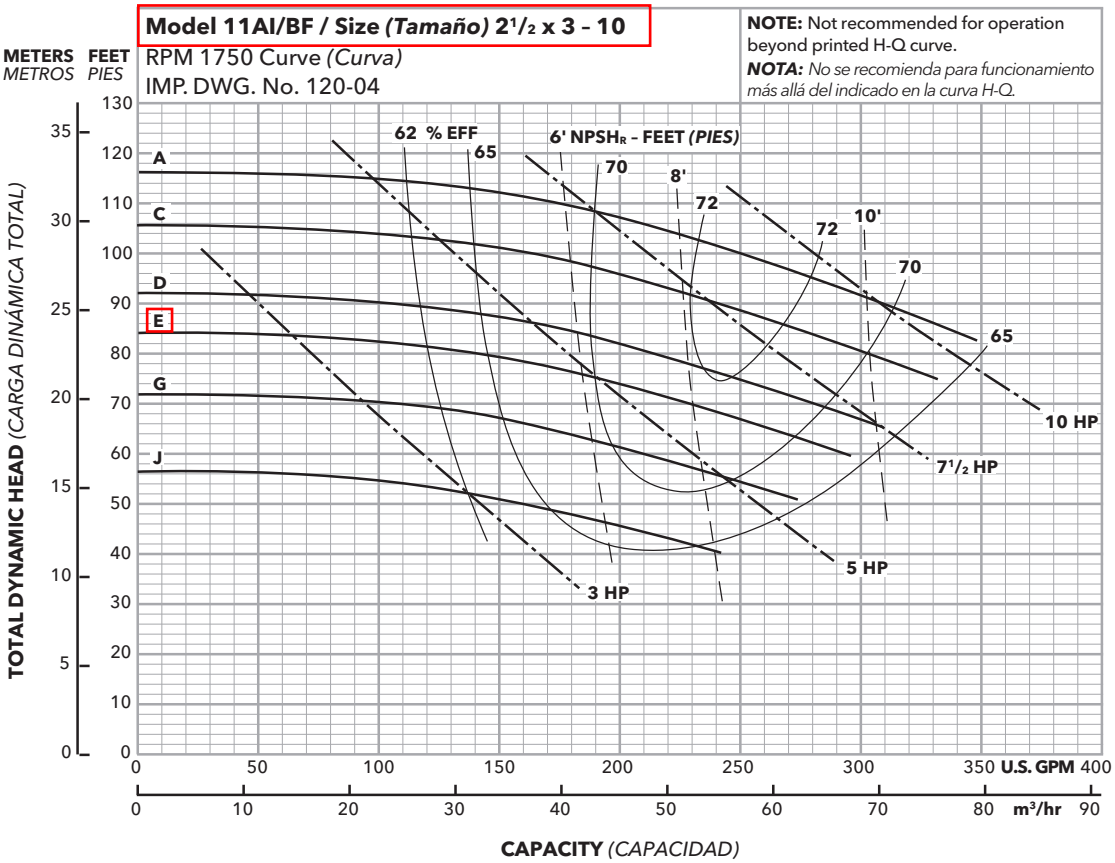


Optional Impeller *Impulsor optativo*	
Ordering Code *Código de pedido*	**Dia.** *Diá.*
A	10 1/16"
B	9 7/8
C	9 1/2
D	9 1/4
E	8 15/16
F	8 1/2
G	8 3/16
H	8
J	7 11/16

NOTE: Pump will pass a sphere to 5/16" diameter.
NOTA: *La bomba dejará pasar una esfera de hasta 5/16 de pulgada de diámetro.*

Model 11AI/BF / Size *(Tamaño)* 2½ x 3 – 10
RPM 1750 Curve *(Curva)*
IMP. DWG. No. 120-04

NOTE: Not recommended for operation beyond printed H-Q curve.
NOTA: *No se recomienda para funcionamiento más allá del indicado en la curva H-Q.*



Optional Impeller *Impulsor optativo*	
Ordering Code *Código de pedido*	**Dia.** *Diá.*
A	10 1/16"
C	9 5/8
D	9
E	8 5/8
G	8
J	7 1/8

NOTE: Pump will pass a sphere to 5/16" diameter.
NOTA: *La bomba dejará pasar una esfera de hasta 5/16 de pulgada de diámetro.*

Pressure Tanks

AMTROL

WELLXTROL

InLine Models

Model Number	Tank Volume (Gallons)	Max. Acceptance Factor	Diameter (Inches)	Height (Inches)	System Connection (NPTM)	System Drawdown (gallons)			Shipping Weight (lbs.)
						30/50	40/60	50/70	
WX-101	2.0	.45	8	13	¾	0.6	0.6	0.5	5
WX-102	4.4	.55	11	15	¾	1.4	1.2	1.0	9
WX-103	7.6	.43	11	22	¾	2.4	2.0	1.8	15
WX-104	10.3	1.00	15	18	1	3.2	2.8	2.4	20
WX-200	14.0	.81	15	22	1	4.3	3.8	3.3	22

Tan and Gray: Available on all models. Use suffix T or G.

Stand Models

Model Number	Tank Volume (Gallons)	Max. Acceptance Factor	Diameter (Inches)	Height (Inches)	System Connection (NPTF)	System Drawdown (gallons)			Shipping Weight (lbs.)
						30/50	40/60	50/70	
WX-201	14.0	.81	15	25	1	4.3	3.8	3.3	25
WX-202	20.0	.57	15	32	1	6.2	5.4	4.7	33
WX-202XL	26.0	.44	15	39	1	8.0	7.0	6.1	36
WX-203	32.0	.35	15	47	1	9.9	8.6	7.6	43
WX-205	34.0	1.00	22	30	1¼	10.5	9.1	8.0	61
WX-250	44.0	.77	22	36	1¼	13.6	11.8	10.4	69
WX-251	62.0	.55	22	47	1¼	19.2	16.6	14.6	92
WX-255	81.0	.41	22	57	1¼	25.0	21.7	19.1	103
WX-252	86.0	.39	22	62	1¼	26.6	23.0	20.3	114
WX-302	86.0	.54	26	47	1¼	26.6	23.0	20.3	123
WX-350	119.0	.39	26	62	1¼	36.8	31.9	28.1	166

DuraBase®: Available on all models except WX-252. Use suffix D.
Pro Access®: Available on all models except WX-201, WX-252 and DuraBase® models. Use suffix PA.
Tan and Gray: Available on all models except WX-252. Use suffix T or G.

Underground Models

Model Number	Tank Volume (Gallons)	Max. Acceptance Factor	Diameter (Inches)	Height (Inches)	System Connection (NPTF)	System Drawdown (gallons)			Shipping Weight (lbs.)
						30/50	40/60	50/70	
WX-200UG	14.0	.81	15	22	1	4.3	3.8	3.3	22
WX-202UG	20.0	.57	15	30	1	6.2	5.4	4.7	30
WX-250UG	44.0	.77	22	33	1¼	13.6	11.8	10.4	60
WX-251UG	62.0	.55	22	44	1¼	19.2	16.6	14.6	83

Note: System Drawdown can be affected by various ambient and system conditions, including temperature and pressure.

APPENDIX P
System Capacity Calculations

WATER SYSTEM INFORMATION

System:	Diamond Point
PWS ID No.:	19210 4
Location:	Sequim, WA
Owner:	Cascadia Water, LLC
Operator:	Culley Lehman, Cascadia Water, LLC

Operating Permit	
Issue Date	6/1/2024
Color	Green

Water Facilities Inventory (WFI) Form	
Date Printed	4/12/2023
Date Updated	1/31/2023
Active Residential Connections	305
Active Residential Population	763
Active Non-Residential Connections	1
Average Non-Residential Population	0
Approved Connections	324

SOURCE METER READINGS

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

			Source Meter Readings (Gallons)		Source Production (Gallons)		
Month	**Date of Meter Reading [1]**	**Days in Cycle**	**Well #1 [1]**	**Well #2 [1]**	**Well #1**	**Well #2**	**Total**
	12/31/2019		49,116,200	68,255,200			
January	1/31/2020	31	49,380,700	68,481,900	264,500	226,700	491,200
February	2/29/2020	29	49,772,000	68,858,200	391,300	376,300	767,600
March	3/31/2020	31	50,074,800	69,180,700	302,800	322,500	625,300
April	4/30/2020	30	50,449,700	69,563,500	374,900	382,800	757,700
May	5/31/2020	31	50,906,000	69,985,000	456,300	421,500	877,800
June	6/30/2020	30	51,436,000	70,462,100	530,000	477,100	1,007,100
July	7/31/2020	31	51,938,900	70,998,200	502,900	536,100	1,039,000
August	8/31/2020	31	52,767,100	71,595,800	828,200	597,600	1,425,800
September	9/30/2020	30	53,383,000	72,171,900	615,900	576,100	1,192,000
October	10/31/2020	31	53,820,400	72,717,400	437,400	545,500	982,900
November	11/30/2020	30	54,193,700	73,060,800	373,300	343,400	716,700
December	12/31/2020	31	54,743,800	73,703,200	550,100	642,400	1,192,500
January	1/31/2021	31	55,084,700	74,009,400	340,900	306,200	647,100
February	2/28/2021	28	55,579,800	74,433,200	495,100	423,800	918,900
March	3/31/2021	31	55,948,600	74,801,600	368,800	368,400	737,200
April	4/30/2021	30	56,381,400	75,187,000	432,800	385,400	818,200
May	5/31/2021	31	56,975,200	75,802,700	593,800	615,700	1,209,500
June	6/30/2021	30	57,577,500	76,317,500	602,300	514,800	1,117,100
July	7/31/2021	31	58,336,800	77,045,600	759,300	728,100	1,487,400
August	8/31/2021	31	59,277,300	77,934,000	940,500	888,400	1,828,900
September	9/30/2021	30	59,934,000	78,586,200	656,700	652,200	1,308,900
October	10/31/2021	31	60,388,700	78,994,700	454,700	408,500	863,200
November	11/30/2021	30	60,842,700	79,415,400	454,000	420,700	874,700
December	12/31/2021	31	61,167,200	79,799,600	324,500	384,200	708,700
January	1/31/2022	31	61,653,400	80,282,800	486,200	483,200	969,400
February	2/28/2022	28	62,053,200	80,671,300	399,800	388,500	788,300
March	3/31/2022	31	62,453,400	81,034,000	400,200	362,700	762,900
April	4/30/2022	30	62,852,900	81,451,500	399,500	417,500	817,000
May	5/31/2022	31	63,374,800	81,934,000	521,900	482,500	1,004,400
June	6/30/2022	30	63,861,800	82,405,200	487,000	471,200	958,200
July	7/31/2022	31	64,581,700	83,124,000	719,900	718,800	1,438,700
August	8/31/2022	31	65,510,200	84,011,100	928,500	887,100	1,815,600
September	9/30/2022	30	66,226,400	84,719,800	716,200	708,700	1,424,900
October	10/31/2022	31	66,925,200	85,404,000	698,800	684,200	1,383,000
November	11/30/2022	30	67,383,000	85,835,300	457,800	431,300	889,100
December	12/31/2022	31	67,827,800	86,246,500	444,800	411,200	856,000

Notes:
[1] *Only monthly source production data is available. Assumed all source meter readings occurred on the final day of the month.*

MONTHLY SOURCE PRODUCTION DATA

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

	2020		2021		2022	
Month	**Production (gal)**	**Days**	**Production (gal)**	**Days**	**Production (gal)**	**Days**
January	491,200	31	647,100	31	969,400	31
February	767,600	29	918,900	28	788,300	28
March	625,300	31	737,200	31	762,900	31
April	757,700	30	818,200	30	817,000	30
May	877,800	31	1,209,500	31	1,004,400	31
June	1,007,100	30	1,117,100	30	958,200	30
July	1,039,000	31	1,487,400	31	1,438,700	31
August	1,425,800	31	1,828,900	31	1,815,600	31
September	1,192,000	30	1,308,900	30	1,424,900	30
October	982,900	31	863,200	31	1,383,000	31
November	716,700	30	874,700	30	889,100	30
December	1,192,500	31	708,700	31	856,000	31
Yearly Total	11,075,600	366	12,519,800	365	13,107,500	365

Connections

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

Year	Residential Connections	Full-Time Single-Family Residential Connections [1]	Non-residential Connections	Total Connections	Existing Connections Metered	Existing Connections Unmetered
2020	305	199	1	306	306	0
2021	305	209	1	306	306	0
2022	305	199	1	306	306	0

Notes:
[1] *Connections consuming 2,000 cubic feet of water per year or more are considered full-time single-family residential connections.*

Existing Connections	306
Existing ERUs	306
Proposed Connections	472
Proposed ERUs	472

DEMAND BASED ON WATER USE DATA

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

								Based on Source Production			Based on Active Consumption (without DSL and non-active consumption)					DSL ERUs	
Year	Full-Time Residential Connections [1]	Full-Time Residential Consumption [2] (gal)	Total Consumption (gal)	Source Production (gal)	Distribution System Leakage (gal)	Distribution System Leakage (%)	Maximum Month Source Production (gal)	Annual ADD (gpd)	MMADD (gpd)	MMD [3] (gpd)	ERU_{ADD} (gpd)	ERU_{MMADD} (gpd)	Annual ERU_{ADD} (gpd/ERU)	ERU_{MMADD} (gpd/ERU)	ERU_{MDD} [3] (gpd/ERU)	Based on ADD (ERUs)	Based on MDD (ERUs)
2020	199	8,255,482	8,781,228	11,075,600	2,294,372	20.7%	1,425,800	30,261	45,994	75,889	22,556	37,542	113	189	311	56	21
2021	209	9,487,722	10,060,794	12,519,800	2,459,006	19.6%	1,828,900	34,301	58,997	97,345	25,994	49,559	124	237	391	55	18
2022	199	7,704,146	8,329,646	13,107,500	4,777,854	36.5%	1,815,600	35,911	58,568	96,637	21,107	42,683	106	214	354	124	37
	Average	8,482,450	9,057,223	12,234,300	3,177,077	25.6%	1,690,100	33,491	54,519	89,957	23,219	43,261	115	213	352	78	25
	Minimum	7,704,146	8,329,646	11,075,600	2,294,372	19.6%	1,425,800	30,261	45,994	75,889	21,107	37,542	106	189	311	55	18
	Maximum	9,487,722	10,060,794	13,107,500	4,777,854	36.5%	1,828,900	35,911	58,997	97,345	25,994	49,559	124	237	391	124	37

Notes:

[1] *Connections consuming 2,000 cubic feet of water per year or more.*

[2] *Annual consumption for full-time single-family residential connections.*

[3] *MDD = 1.65 (MMADD) for systems serving fewer than 1,000 people.*

ERU_{ADD}	150	gpd/ERU
ERU_{MDD}	400	gpd/ERU
DSL ERUs (Based on MDD)	37	ERUs

WATER RIGHTS SUMMARY [1]

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

					Q_i (gpm)		Q_a (acre-ft/yr)	
Certificate No.	**Name**	**Priority Date**	**Source Name**	**Primary or Supplemental**	**Additive**	**Non-Additive**	**Additive**	**Non-Additive**
6196		1/17/1967	1 well (T30/R2W/Sec15)		18		29	
G2-23909 [1]		7/24/1975	1 well (T30N/R2W/Sec21)		100		121	29
G2-25283		06/25/79	Same well as G2-23909 above		200		71	29
G2-25897		05/21/81	1 well (T30N/R2W/Sec21), very near the above-referenced well			200		100
				Total [2]	**218**		**100**	**Total** [2]
Q_i = Maximum Instantaneous Flow Rate				max. flow per day (gal)	313,920		4,356,000	annual water rights (cf/yr)
Q_a = Maximum Annual Withdrawal				max. flow per year (gal)	114,580,800		32,582,880	annual water rights (gal/yr)
							89,268	avg. available daily water rights (gal/day)

Conversion Factors	
square feet per acre	43,560
gallons per cf	7.48
days per year	365
hours per day	24

Notes:

[1] *Water rights shown in this table are taken from the 2006 DOE letter.*

[2] *2006 DOE letter indicates water rights shall not exceed 218 gpm and 100 acre-ft/yr.*

SOURCE INFORMATION

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

Source		
Status	Active	
Source Number	S01	S02
Source Name	Well #1	Well #2
DOE Well Tag	AGP297	AGP298
Category	Well	Well
Use	Permanent	Permanent
Treatment	None	None
Initial Pump Test Capacity (gpm)	310	300
Current Pumping Rate (gpm)	136	147
Depth to First Interval (ft)	373	372
Casing (in)	8	8
Screen Diameter (in)	8	7.5
Location		
1/4, 1/4	SW, SE	SW, SE
Section	21	21
Township	30N	30N
Range	02W	02W
Elevation (ft)		
Ground	280	280
Top of Casing	281	281
Depth Below Top of Casing (TOC) (ft)		
Top of Screen	373	372
Bottom of Screen	393	392
Bottom of Well	393	392
Pump Test Data		
Static Water Level (ft below TOC)	266	273
Elevation of Static Water Level (ft)	15	8
Pumping Water Level (ft below TOC)	293	283
Drawdown (ft)	27	10
Yield (gpm/ft)	11	30

PEAK HOUR DEMAND (PHD) CALCULATION

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

From DOH Water System Design Manual (Section 3.4.2)

Equation 3-1: PHD = (MDD/1440)[(C)(N) + F] + 18

Where:
PHD = Peak Hourly Demand, (gpm)
C = Coefficient Associated with Ranges of ERUs
N = Number of ERUs
F = Factor Associated with Ranges of ERUs
MDD = Maximum Day Demand, (gpd/ERU)

Table 3-1:

Range of N (ERUs)		C	F
0	50	3.0	0
51	100	2.5	25
101	250	2.0	75
251	500	1.8	125
501	1,000,000	1.6	225

MDD (gpd/ERU)	N (ERUs)	C	F	PHD (gpm)	
400	306	1.8	125	**206**	Current Existing ERUs
400	472	1.8	125	**289**	Proposed ERUs
400	162	2	75	**129**	Proposed Pressure Zone 1
400	45	3	0	**56**	Proposed Pressure Zone 2
400	138	2	75	**116**	Proposed Pressure Zone 3
400	114	2	75	**102**	Proposed Pressure Zone 4
400	13	3	0	**29**	Proposed Pressure Zone 5
400	207	2	75	**154**	Proposed Pressure Zones 1 - 2
400	265	1.8	125	**185**	Proposed Pressure Zones 3 - 5

CAPACITY CALCULATIONS

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

WATER RIGHT CALCULATIONS

Based on Annual Volume & Average Day Demand (Eqn 4-4b):

$N = Q_a/(365*ADD)$

Where: N = Number of Service Connections, ERUs
Q_a = Annual Volume of Water Available from All Sources, as limited by Water Right (gallons/year)
ADD = Average Daily Demand per ERU (gpd/ERU)

	Q_a (gal/year)	ADD (gpd/ERU)	N (ERUs)
Potential Connections	32,582,880	150	**595**

Based on Instantaneous Flow & Maximum Day Demand (Eqn 4-4a):

$N = V_d/MDD = (Q_i*t_d)/MDD$

Where: N = Number of Service Connections, ERUs
V_d = Total Volume of Water Available for Maximum Day's Demand (gpd)
MDD = Maximum Daily Demand per ERU (gpd/ERU)
Q_i = Instantaneous Maximum Water Right Flow Rate (gpm)
t_d = Time that source operates per day (minutes/day)

	Q_i (gpm)	Minutes Pumped/hr	t_d (min/day)	MDD (gpd/ERU)	N (ERUs)
Potential Connections	218	60	1440	400	**784**

CAPACITY CALCULATIONS

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

SOURCE CALCULATIONS

Individual Source Capacity (Eqn 4-1):

$V_j = Q_j * t_j$

Where: Vj = Total volume for source "j" over a specified period of time (gal/specified time period)
Qj = Delivery rate of source (gal/unit time)
tj = Time that flow (Qj) was delivered from source "j"

Total Source Capacity (Eqn 4-2):

$V_T = \text{sum}(Q_j * T_j)$

Where: V_T = Total volume of water available to the system over a specified period of time (gal/specified time period)
Q_j = Delivery rate of source (gal/unit time)
t_j = Time that flow (Q_j) was delivered from source "j"

Source Number	S01	S02			
Source ID	Well #1	Well #2			
Q_j Delivery Rate (gpm)	136	147			
Max Pump Time (min/day)	720	720			
Max Days Pumped (days/yr)	365	365			
V_j Source Capacity (gal/yr)	35,740,800	38,631,600			
	97,920	105,840			

Q_s = 283 gpm

V_T = 74,372,400 gal/yr

203,760

Based on Source Production & Maximum Day Demand (Eqn 4-3):

$N = V_T/MDD = (Q_s * t_d)/MDD$

Where: N = Number of Service Connections, ERUs
V_T = Total Volume of Water Available for Maximum Day's Demand (gpd)
MDD = Max Daily Demand per ERU (gpd/ERU)
Q_s = Total Well Production Flow rate (gpm)
t_d = Time that source operates per day (minutes/day)

	Q_s (gpm)	**Minutes Pumped/Hr**	**t_d (min/day)**	**MDD (gpd/ERU)**	**N (ERUs)**
Potential Connections	142	60	1440	400	**509**

Based on Current Source Operation & Maximum Day Demand (Eqn 4-3):

$N = V_T/MDD = (Q_s * t_d)/MDD$

Where: N = Number of Service Connections, ERUs
V_T = Total Volume of Water Available for Maximum Day's Demand (gpd)
MDD = Max Daily Demand per ERU (gpd/ERU)
Q_s = Total Well Production Flow rate (gpm)
t_d = Time that source operates per day (minutes/day)

CAPACITY CALCULATIONS

System: Diamond Point
PWS ID No.: 19210 4
Location: Sequim, WA

BOOSTER PUMP CALCULATIONS (PRESSURE ZONE 5 ONLY)

Based on Booster Pump Production & Maximum Day Demand:

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

Where: N = Number of Service Connections, ERUs
PHD = Peak Hour Demand (gallons/minute) (or Q_B - Booster Pump Capacity with largest pump out of service)
MDD =Maximum Daily Demand per ERU (gpd/ERU)
F = PHD Coefficient from Table 3-1
C = PHD Coefficient from Table 3-1

	Q_B (gpm)	C	F	MDD (gpd/ERU)	N (ERUs)
Potential Connections	50	3.0	0	400	**38**

SUMMARY

ERUs	Condition	Limiting Factor
595	Water Right	Q_a & ADD
784	Water Right	Q_i & MDD
509	Source Production	Q_s & MDD

System Capacity: **509** ERUs

Limited by: **Qs & MDD** *Source Production*

DSL ERUs: **37** ERUs

Proposed ERUs: **472** ERUs

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Demands (Equalizing Storage)	
ADD (gpd/ERU)	150
MDD (gpd/ERU)	400
PHD, PZ 1 & 2 (gpm)	154
Max. Flow to Res. 3 (gpm)	50

Demands (Standby Storage)	
N, Pressure Zone 2 (ERUs)	45
ADD (gpd/ERU)	150
MDD (gpd/ERU)	400

Sources

Source ID	Delivery Rate (gpm)	
Well #1	136	
Well #2	147	
Q_s =	283	
Q_s =	218	*water right limited*
Q_L =	147	*largest source*

Reservoirs

Reservoir ID	Diameter (ft)	Area (ft^2)	Height (ft)	Base Elevation (ft)	Volume (gal)	VF (gal/ft)
#1: Conc. Tank (West Side)	20.0	314.2	30	375	70,497	2,350
				Total	70,500	2,350

Top Dead Storage (TDS)

Depth (ft)	Volume (gal)
1.0	2,350

Operational Storage (OS)

Depth (ft)	Volume (gal)
1.0	2,350

Required Equalizing Storage (ES)

PHD (gpm)	Q_s [1] (gpm)	Volume (gal)	Depth (ft)
204	136	10,200	4.3

*ES = (PHD-Q_s)*150 or Zero*

[1] *Smallest source capacity used in calculation.*

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Recommended Standby Storage (SB)					
	SB_i (gpd/ERU)	T_d (days)	N (ERUs)	Volume (gal)	Depth (ft)
Recommended [1]	400	1	45	18,000	7.7
Minimum [2]	200	1	45	9,000	3.8
			Recommended SB	18,000	7.7

$SB = (N)(SB_i)(T_d)$

SB_i = Recommended standby storage per ERU

T_d = Number of days for which standby storage should be provided

[1] *Section 7.1.1.3, SB_i = MDD*

[2] *Section 7.1.1.3, SB_i = 200 gpd/ERU*

Available Standby Storage (SB)				
SB_i (gal/ERU)	T_d (days)	N (ERUs)	Volume (gal)	Depth (ft)
1,209	1	45	54,425	23.2

SB = Total Storage Volume -TDS-OS -ES-BDS

Fire Suppression Storage (FSS)		
Fire Flow (gpm)	t_m (min)	Volume (gal)
0	0	0

$FSS = FF * t_m$

FF = Required fire flow rate (gpm)

t_m = Duration of FF rate (minutes)

Bottom Dead Storage (BDS)	
Depth (ft)	Volume (gal)
0.5	1,175

Available Storage Summary		
Component	Volume (gal)	Depth of Storage Component (ft)
TDS	2,350	1.0
OS	2,350	1.0
ES	10,200	4.3
SB/FSS [1]	54,425	23.2
BDS	1,175	0.5
Total	70,500	30.0

[1] *Standby Storage can be nested with Fire Suppression Storage.*

Is the available SB/FSS...		
greater than recommended SB?	greater than minimum SB?	greater than required FSS?
yes	yes	yes

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Available Storage Depths and Elevations

Component	Depth of Storage Component (ft)	Bottom Elevation (ft)	Top Elevation (ft)	Minimum Pressure Requirement (psi)	Highest Allowable Gravity Service Elevation (ft)	Highest Actual Gravity Service Elevation (ft)
TDS	1.0	404.0	405.0			
OS	1.0	403.0	404.0			
ES	4.3	398.7	403.0	30	329	240
SB/FSS	23.2	375.5	398.7	20	329	240
BDS	0.5	375.0	375.5			
Total	30.0	375.0	405.0			

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Demands (Equalizing Storage)	
ADD (gpd/ERU)	150
MDD (gpd/ERU)	400
PHD, PZ 1 (gpm)	129

Demands (Standby Storage)	
N, Pressure Zone 1 (ERUs)	162
ADD (gpd/ERU)	150
MDD (gpd/ERU)	400

Sources	
Source ID	**Delivery Rate (gpm)**
Transfer Pump #1	300
Transfer Pump #2	300
Q_s =	600
Q_L =	300

largest source

Reservoirs						
Reservoir ID	**Diameter (ft)**	**Area (ft^2)**	**Height (ft)**	**Base Elevation (ft)**	**Volume (gal)**	**VF (gal/ft)**
#2: Elevated Steel Tank	28.7	645.4	22	433	106,211	4,828
				Total	106,200	4,830

Top Dead Storage (TDS)	
Depth (ft)	**Volume (gal)**
10.0	48,300

Operational Storage (OS)	
Depth (ft)	**Volume (gal)**
1.0	4,830

Required Equalizing Storage (ES)			
PHD (gpm)	**Q_s [1] (gpm)**	**Volume (gal)**	**Depth (ft)**
129	300	0	0.0

*ES = (PHD-Q_s)*150 or Zero*

[1] *Smallest source capacity used in calculation.*

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Recommended Standby Storage (SB)					
	SB_i (gpd/ERU)	T_d (days)	N (ERUs)	Volume (gal)	Depth (ft)
Recommended [1]	400	1	162	64,800	13.4
Minimum [2]	200	1	162	32,400	6.7
SB = (N)(SB $_i$)(T $_d$)			Recommended SB	64,800	13.4

SB $_i$ = Recommended standby storage per ERU

T $_d$ = Number of days for which standby storage should be provided

[1] *Section 7.1.1.3, SB $_i$ = MDD*

[2] *Section 7.1.1.3, SB $_i$ = 200 gpd/ERU*

Available Standby Storage (SB)				
SB_i (gal/ERU)	T_d (days)	N (ERUs)	Volume (gal)	Depth (ft)
313	1	162	50,655	10.5

SB = Total Storage Volume -TDS-OS -ES-BDS

Fire Suppression Storage (FSS)		
Fire Flow (gpm)	t_m (min)	Volume (gal)
500	45	22,500

*FSS = FF*t $_m$*

FF = Required fire flow rate (gpm)

t $_m$ = Duration of FF rate (minutes)

Bottom Dead Storage (BDS)	
Depth (ft)	Volume (gal)
0.5	2,415

Available Storage Summary		
Component	Volume (gal)	Depth of Storage Component (ft)
TDS	48,300	10.0
OS	4,830	1.0
ES	0	0.0
SB/FSS [1]	50,655	10.5
BDS	2,415	0.5
Total	106,200	22.0

[1] *Standby Storage can be nested with Fire Suppression Storage.*

Is the available SB/FSS…		
greater than recommended SB?	greater than minimum SB?	greater than required FSS?
no	yes	yes

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Available Storage Depths and Elevations

Component	Depth of Storage Component (ft)	Bottom Elevation (ft)	Top Elevation (ft)	Minimum Pressure Requirement (psi)	Highest Allowable Gravity Service Elevation (ft)	Highest Actual Gravity Service Elevation (ft)
TDS	10.0	445.0	455.0			
OS	1.0	444.0	445.0			
ES	0.0	444.0	444.0	30	375	370
SB/FSS	10.5	433.5	444.0	20	387	370
BDS	0.5	433.0	433.5			
Total	22.0	433.0	455.0			

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Demands (Equalizing Storage)	
ADD (gpd/ERU)	150
MDD (gpd/ERU)	400
PHD, PZ 3 - 5 (gpm)	185

Demands (Standby Storage)	
N, Pressure Zones 3 - 5 (ERUs)	265
ADD (gpd/ERU)	150
MDD (gpd/ERU)	400

Sources

Source ID	Delivery Rate (gpm)
Transmission Main from Res. 1	50
Q_s =	50
Q_L =	50 *largest source*

Reservoirs

Reservoir ID	Diameter (ft)	Area (ft^2)	Height (ft)	Base Elevation (ft)	Volume (gal)	VF (gal/ft)
#3: Conc. Tank (East Side)	20.0	314.2	52	235	122,195	2,350
				Total	122,200	2,350

Top Dead Storage (TDS)

Depth (ft)	Volume (gal)
1.0	2,350

Operational Storage (OS)

Depth (ft)	Volume (gal)
0.5	1,175

Required Equalizing Storage (ES)

PHD (gpm)	Q_s [1] (gpm)	Volume (gal)	Depth (ft)
185	50	20,250	8.6

*ES = (PHD-Q_s)*150 or Zero*

[1] *Smallest source capacity used in calculation.*

STORAGE CAPACITY CALCULATIONS

System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Recommended Standby Storage (SB)					
	SB_i (gpd/ERU)	T_d (days)	N (ERUs)	Volume (gal)	Depth (ft)
Recommended [1]	400	1	265	106,000	45.1
Minimum [2]	200	1	265	53,000	22.6
SB = (N)(SB_i)(T_d)			Recommended SB	106,000	45.1

SB_i = Recommended standby storage per ERU

T_d = Number of days for which standby storage should be provided

[1] *Section 7.1.1.3, SB_i = MDD*

[2] *Section 7.1.1.3, SB_i = 200 gpd/ERU*

Available Standby Storage (SB)				
SB_i (gal/ERU)	T_d (days)	N (ERUs)	Volume (gal)	Depth (ft)
367	1	265	97,250	41.4

SB = Total Storage Volume -TDS-OS -ES-BDS

Fire Suppression Storage (FSS)		
Fire Flow (gpm)	t_m (min)	Volume (gal)
0	0	0

FSS = FFt_m*

FF = Required fire flow rate (gpm)

t_m = Duration of FF rate (minutes)

Bottom Dead Storage (BDS)	
Depth (ft)	Volume (gal)
0.5	1,175

Available Storage Summary		
Component	Volume (gal)	Depth of Storage Component (ft)
TDS	2,350	1.0
OS	1,175	0.5
ES	20,250	8.6
SB/FSS [1]	97,250	41.4
BDS	1,175	0.5
Total	122,200	52.0

[1] *Standby Storage can be nested with Fire Suppression Storage.*

Is the available SB/FSS…		
greater than recommended SB?	greater than minimum SB?	greater than required FSS?
no	yes	yes

STORAGE CAPACITY CALCULATIONS

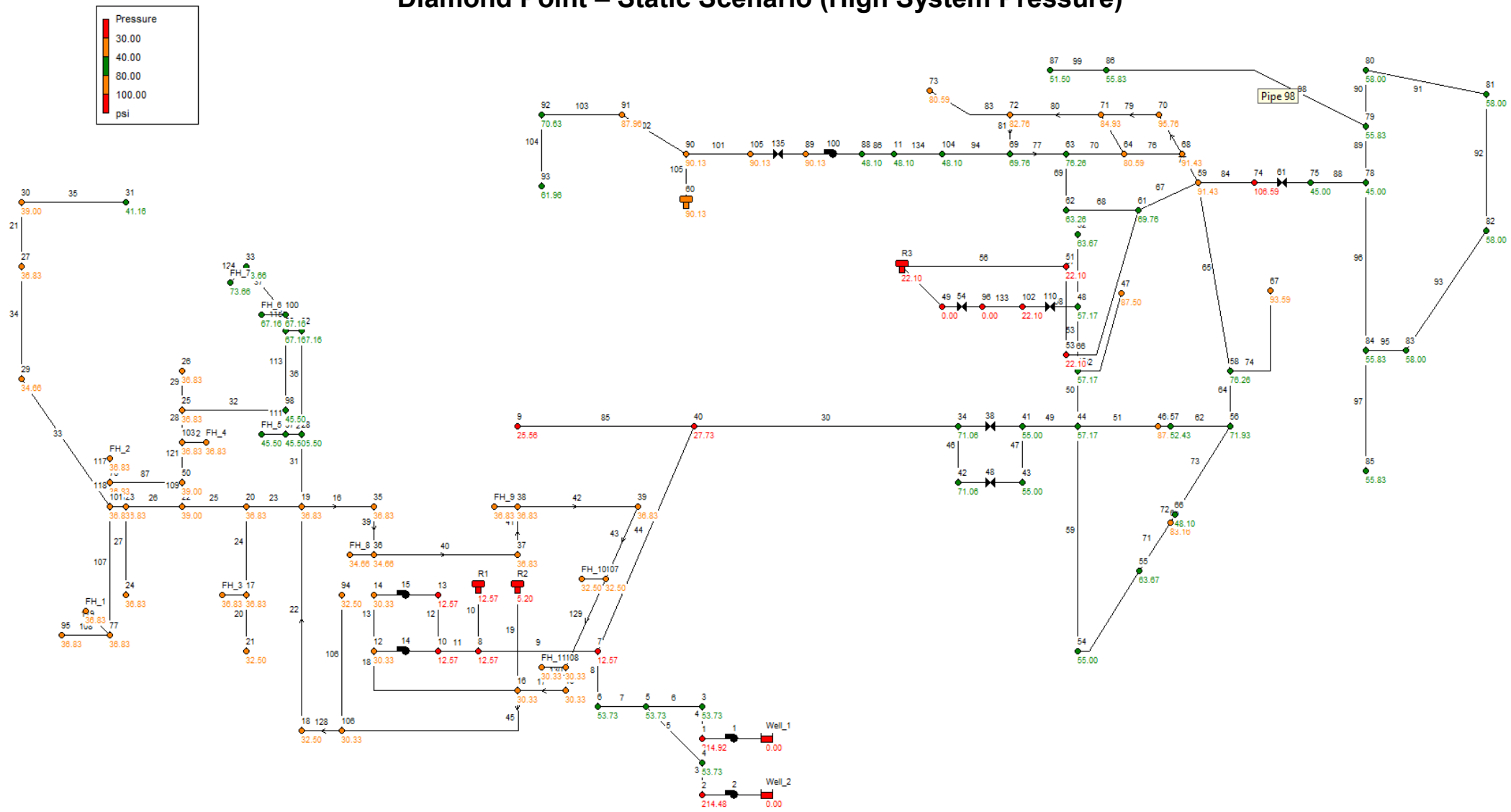
System: Diamond Point
ID No.: 19210 4
Location: Sequim, WA

Available Storage Depths and Elevations

Component	Depth of Storage Component (ft)	Bottom Elevation (ft)	Top Elevation (ft)	Minimum Pressure Requirement (psi)	Highest Allowable Gravity Service Elevation (ft)	Highest Actual Gravity Service Elevation (ft)
TDS	1.0	286.0	287.0			
OS	0.5	285.5	286.0			
ES	8.6	276.9	285.5	30	208	175
SB/FSS	41.4	235.5	276.9	20	189	175
BDS	0.5	235.0	235.5			
Total	52.0	235.0	287.0			

APPENDIX Q
Hydraulic Models

Diamond Point – Static Scenario (High System Pressure)



Diamond Point – Static Scenario (High System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 1	-92	0	404.00	214.92
Junc 2	-91	0	404.00	214.48
Junc 3	280	0	404.00	53.73
Junc 4	280	0	404.00	53.73
Junc 5	280	0	404.00	53.73
Junc 6	280	0	404.00	53.73
Junc 7	375	0	404.00	12.57
Junc 8	375	0	404.00	12.57
Junc 10	375	0	404.00	12.57
Junc 12	375	0	445.00	30.33
Junc 13	375	0	404.00	12.57
Junc 14	375	0	445.00	30.33
Junc 16	375	0	445.00	30.33
Junc 18	370	0	445.00	32.50
Junc 19	360	0	445.00	36.83
Junc 20	360	0	445.00	36.83
Junc 21	370	0	445.00	32.50

Diamond Point – Static Scenario (High System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 22	355	0	445.00	39.00
Junc 23	360	0	445.00	36.83
Junc 24	360	0	445.00	36.83
Junc 25	360	0	445.00	36.83
Junc 26	360	0	445.00	36.83
Junc 28	340	0	445.00	45.50
Junc 29	365	0	445.00	34.66
Junc 30	355	0	445.00	39.00
Junc 31	350	0	445.00	41.16
Junc 32	290	0	445.00	67.16
Junc 33	275	0	445.00	73.66
Junc 35	360	0	445.00	36.83
Junc 36	365	0	445.00	34.66
Junc 37	360	0	445.00	36.83
Junc 38	360	0	445.00	36.83
Junc 39	360	0	445.00	36.83
Junc 40	340	0	404.00	27.73
Junc 15	375	0	445.00	30.33

Diamond Point – Static Scenario (High System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 17	360	0	445.00	36.83
Junc 27	360	0	445.00	36.83
Junc 34	240	0	404.00	71.06
Junc 41	240	0	366.93	55.00
Junc 42	240	0	404.00	71.06
Junc 43	240	0	366.93	55.00
Junc 44	235	0	366.93	57.17
Junc 45	235	0	366.93	57.17
Junc 46	165	0	366.93	87.50
Junc 47	165	0	366.93	87.50
Junc 48	235	0	366.93	57.17
Junc 49	286	0	286.00	0.00
Junc 51	235	0	286.00	22.10
Junc 52	220	0	366.93	63.67
Junc 53	235	0	286.00	22.10
Junc 54	240	0	366.93	55.00
Junc 56	120	0	286.00	71.93
Junc 55	220	0	366.93	63.67

Diamond Point – Static Scenario (High System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 57	165	0	286.00	52.43
Junc 58	110	0	286.00	76.26
Junc 59	75	0	286.00	91.43
Junc 61	125	0	286.00	69.76
Junc 62	140	0	286.00	63.26
Junc 63	110	0	286.00	76.26
Junc 64	100	0	286.00	80.59
Junc 65	175	0	366.93	83.16
Junc 66	175	0	286.00	48.10
Junc 67	70	0	286.00	93.59
Junc 68	75	0	286.00	91.43
Junc 69	125	0	286.00	69.76
Junc 70	65	0	286.00	95.76
Junc 71	90	0	286.00	84.93
Junc 72	95	0	286.00	82.76
Junc 73	100	0	286.00	80.59
Junc 74	40	0	286.00	106.59
Junc 75	40	0	143.85	45.00

Diamond Point – Static Scenario (High System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 78	40	0	143.85	45.00
Junc 79	15	0	143.85	55.83
Junc 80	10	0	143.85	58.00
Junc 81	10	0	143.85	58.00
Junc 82	10	0	143.85	58.00
Junc 83	10	0	143.85	58.00
Junc 84	15	0	143.85	55.83
Junc 85	15	0	143.85	55.83
Junc 86	15	0	143.85	55.83
Junc 87	25	0	143.85	51.50
Junc 88	175	0	286.00	48.10
Junc 89	175	0	383.00	90.13
Junc 91	180	0	383.00	87.96
Junc 92	220	0	383.00	70.63
Junc 93	240	0	383.00	61.96
Junc 90	175	0	383.00	90.13
Junc 94	370	0	445.00	32.50
Junc 9	345	0	404.00	25.56

Diamond Point – Static Scenario (High System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 11	175	0	286.00	48.10
Junc 50	355	0	445.00	39.00
Junc 76	360	0	445.00	36.83
Junc 77	360	0	445.00	36.83
Junc 95	360	0	445.00	36.83
Junc 97	340	0	445.00	45.50
Junc 98	340	0	445.00	45.50
Junc 99	290	0	445.00	67.16
Junc 100	290	0	445.00	67.16
Junc 101	360	0	445.00	36.83
Junc FH_2	360	0	445.00	36.83
Junc FH_1	360	0	445.00	36.83
Junc FH_3	360	0	445.00	36.83
Junc 103	360	0	445.00	36.83
Junc FH_4	360	0	445.00	36.83
Junc FH_5	340	0	445.00	45.50
Junc FH_7	275	0	445.00	73.66
Junc FH_6	290	0	445.00	67.16

Diamond Point – Static Scenario (High System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc FH_8	365	0	445.00	34.66
Junc FH_9	360	0	445.00	36.83
Junc 106	375	0	445.00	30.33
Junc 107	370	0	445.00	32.50
Junc 108	375	0	445.00	30.33
Junc FH_10	370	0	445.00	32.50
Junc FH_11	375	0	445.00	30.33
Junc 96	286	0	286.00	0.00
Junc 102	235	0	286.00	22.10
Junc 104	175	0	286.00	48.10
Junc 105	175	0	383.00	90.13
Resvr Well_1	15	#N/A	15.00	0.00
Resvr Well_2	8	#N/A	8.00	0.00
Tank R1	375	#N/A	404.00	12.57
Tank R2	433	#N/A	445.00	5.20
Tank R3	235	#N/A	286.00	22.10
Tank 60	175	#N/A	383.00	90.13

Diamond Point – Static Scenario (High System Pressure)

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 3	372	4	120	0.00	0.00	Open
Pipe 4	373	4	120	0.00	0.00	Open
Pipe 5	45	4	150	0.00	0.00	Open
Pipe 6	20	4	150	0.00	0.00	Open
Pipe 7	80	4	150	0.00	0.00	Open
Pipe 8	4100	4	150	0.00	0.00	Open
Pipe 9	150	8	150	0.00	0.00	Open
Pipe 10	60	8	150	0.00	0.00	Open
Pipe 11	100	8	150	0.00	0.00	Open
Pipe 12	20	8	120	0.00	0.00	Open
Pipe 13	20	6	120	0.00	0.00	Open
Pipe 18	130	6	150	0.00	0.00	Open
Pipe 19	100	8	150	0.00	0.00	Open
Pipe 22	670	6	150	0.01	0.00	Open
Pipe 23	190	6	150	0.00	0.00	Open
Pipe 24	270	8	150	0.00	0.00	Open
Pipe 25	300	6	150	0.00	0.00	Open

Diamond Point – Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 26	160	6	150	0.00	0.00	Open
Pipe 27	360	4	150	0.00	0.00	Open
Pipe 28	160	6	150	0.00	0.00	Open
Pipe 29	90	2	150	0.00	0.00	Open
Pipe 31	320	6	150	0.00	0.00	Open
Pipe 32	460	6	150	0.00	0.00	Open
Pipe 33	1110	6	150	0.00	0.00	Open
Pipe 34	420	6	150	0.00	0.00	Open
Pipe 35	280	4	150	0.00	0.00	Open
Pipe 36	640	4	150	0.00	0.00	Open
Pipe 37	370	6	150	0.00	0.00	Open
Pipe 39	130	6	150	0.01	0.00	Open
Pipe 40	310	6	150	0.01	0.00	Open
Pipe 41	140	6	150	0.01	0.00	Open
Pipe 42	290	6	150	0.01	0.00	Open
Pipe 43	610	8	150	0.01	0.00	Open
Pipe 44	1630	4	150	0.00	0.00	Open
Pipe 45	130	6	150	0.01	0.00	Open

Diamond Point – Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 16	360	6	150	0.01	0.00	Open
Pipe 17	80	8	150	-0.01	0.00	Open
Pipe 20	240	4	150	0.00	0.00	Open
Pipe 21	300	4	150	0.00	0.00	Open
Pipe 30	3090	4	150	0.00	0.00	Open
Pipe 46	10	2	120	0.00	0.00	Open
Pipe 47	10	2	120	0.00	0.00	Open
Pipe 49	315	8	150	0.00	0.00	Open
Pipe 50	105	8	150	0.00	0.00	Open
Pipe 51	530	6	150	0.00	0.00	Open
Pipe 52	720	4	150	0.00	0.00	Open
Pipe 53	250	8	150	0.00	0.00	Open
Pipe 55	.1	99999	150	0.00	0.00	Open
Pipe 56	50	4	150	0.00	0.00	Open
Pipe 57	520	4	150	0.00	0.00	Open
Pipe 58	200	4	150	0.00	0.00	Open
Pipe 59	1150	4	150	0.00	0.00	Open
Pipe 60	365	4	150	0.00	0.00	Open

Diamond Point – Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 62	255	4	150	0.00	0.00	Open
Pipe 63	10	4	150	0.00	0.00	Closed
Pipe 64	225	4	150	0.00	0.00	Open
Pipe 65	915	4	150	0.00	0.00	Open
Pipe 66	1250	4	150	0.00	0.00	Open
Pipe 67	390	4	150	0.00	0.00	Open
Pipe 68	490	4	150	0.00	0.00	Open
Pipe 69	310	4	150	0.00	0.00	Open
Pipe 70	200	4	150	0.00	0.00	Open
Pipe 71	490	4	150	0.00	0.00	Open
Pipe 72	10	4	150	0.00	0.00	Closed
Pipe 73	805	4	150	0.00	0.00	Open
Pipe 74	650	4	150	0.00	0.00	Open
Pipe 75	140	4	150	0.00	0.00	Open
Pipe 76	280	4	150	0.00	0.00	Open
Pipe 77	415	4	150	-0.01	0.00	Open
Pipe 78	355	4	150	0.01	0.00	Open
Pipe 79	355	4	150	0.01	0.00	Open

Diamond Point – Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 80	560	4	150	0.01	0.00	Open
Pipe 81	390	4	150	-0.01	0.00	Open
Pipe 82	340	4	150	0.00	0.00	Open
Pipe 83	750	4	150	0.00	0.00	Open
Pipe 84	270	6	150	0.00	0.00	Open
Pipe 88	25	6	150	0.00	0.00	Open
Pipe 89	300	4	150	0.00	0.00	Open
Pipe 90	150	4	150	0.00	0.00	Open
Pipe 91	800	4	150	0.00	0.00	Open
Pipe 92	1010	4	150	0.00	0.00	Open
Pipe 93	810	4	150	0.00	0.00	Open
Pipe 95	150	4	150	0.00	0.00	Open
Pipe 96	990	4	150	0.00	0.00	Open
Pipe 97	1220	4	150	0.00	0.00	Open
Pipe 98	1350	4	150	0.00	0.00	Open
Pipe 99	120	2	150	0.00	0.00	Open
Pipe 94	1050	4	150	0.00	0.00	Open
Pipe 101	10	2	120	0.00	0.00	Open

Diamond Point – Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 102	300	4	150	0.00	0.00	Open
Pipe 103	390	4	150	0.00	0.00	Open
Pipe 104	420	4	150	0.00	0.00	Open
Pipe 105	10	2	120	0.00	0.00	Open
Pipe 106	490	4	150	0.00	0.00	Open
Pipe 85	490	2	150	0.00	0.00	Open
Pipe 86	10	2	120	0.00	0.00	Open
Pipe 87	180	8	150	0.00	0.00	Open
Pipe 107	500	8	150	0.00	0.00	Open
Pipe 108	420	4	150	0.00	0.00	Open
Pipe 109	10	6	150	0.00	0.00	Open
Pipe 111	70	6	150	0.00	0.00	Open
Pipe 112	40	6	150	0.00	0.00	Open
Pipe 113	570	8	150	0.00	0.00	Open
Pipe 114	40	6	150	0.00	0.00	Open
Pipe 115	60	6	150	0.00	0.00	Open
Pipe 116	20	6	150	0.00	0.00	Open
Pipe 117	10	6	150	0.00	0.00	Open

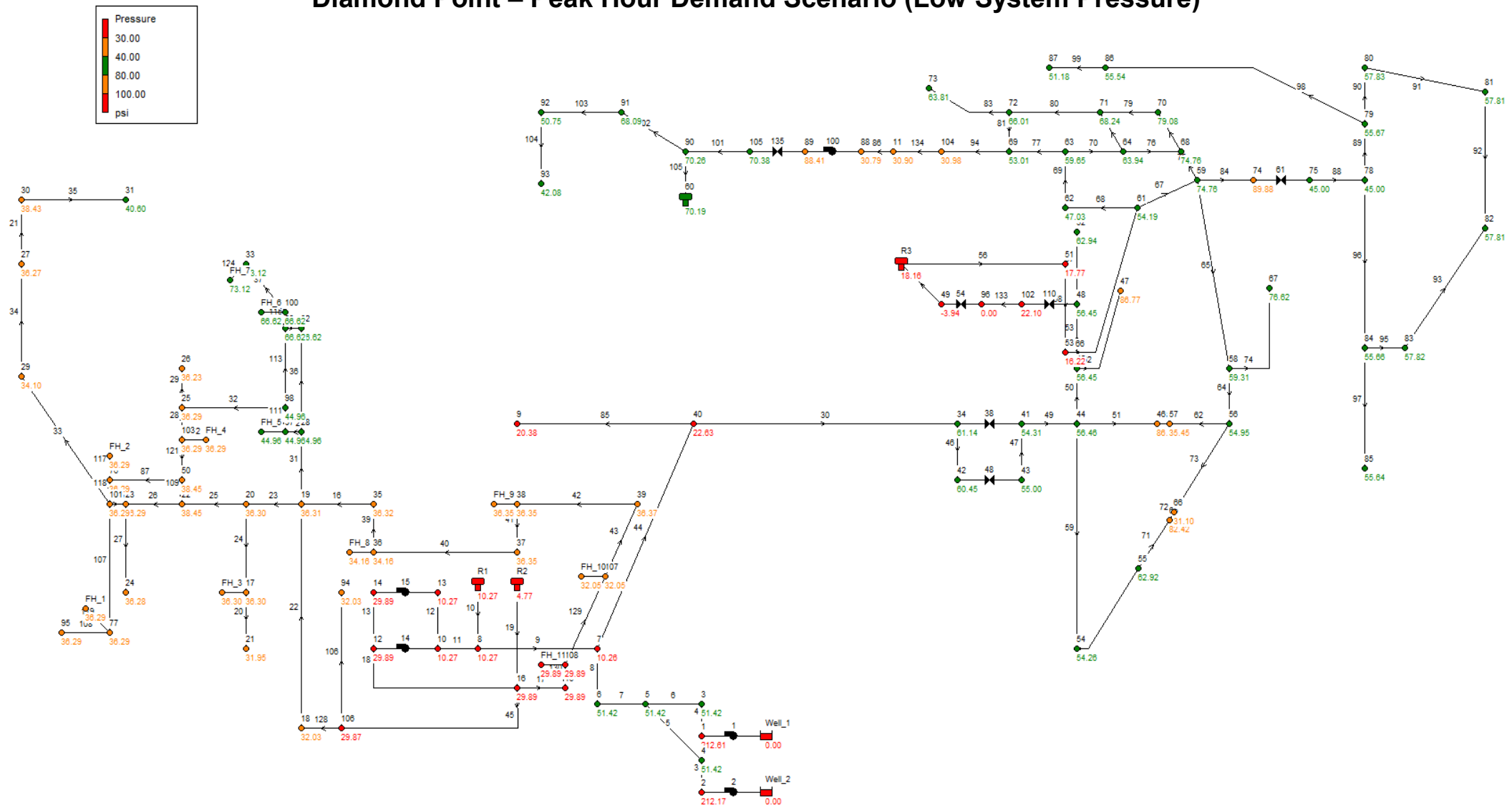
Diamond Point – Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 118	10	8	150	0.00	0.00	Open
Pipe 119	10	6	150	0.00	0.00	Open
Pipe 120	10	6	150	0.00	0.00	Open
Pipe 121	230	6	150	0.00	0.00	Open
Pipe 122	10	6	150	0.00	0.00	Open
Pipe 123	10	6	150	0.00	0.00	Open
Pipe 124	10	6	150	0.00	0.00	Open
Pipe 125	10	6	150	0.00	0.00	Open
Pipe 126	10	6	150	0.00	0.00	Open
Pipe 127	10	6	150	0.00	0.00	Open
Pipe 128	140	6	150	0.01	0.00	Open
Pipe 129	310	8	150	0.01	0.00	Open
Pipe 130	50	8	150	0.01	0.00	Open
Pipe 131	10	6	150	0.00	0.00	Open
Pipe 132	10	6	150	0.00	0.00	Open
Pipe 133	100	8	150	0.00	0.00	Open
Pipe 134	290	4	150	0.00	0.00	Open
Pump 1	#N/A	#N/A	#N/A	0.00	0.00	Closed

Diamond Point – Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pump 2	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 14	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 15	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 100	#N/A	#N/A	#N/A	0.00	0.00	Closed
Valve 38	#N/A	4	#N/A	0.00	0.00	Closed
Valve 48	#N/A	2	#N/A	0.00	0.00	Active
Valve 54	#N/A	8	#N/A	0.00	0.00	Active
Valve 61	#N/A	2	#N/A	0.00	0.00	Active
Valve 110	#N/A	8	#N/A	0.00	0.00	Closed
Valve 135	#N/A	2	#N/A	0.00	0.00	Open

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)



Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 1	-92	0	398.67	212.61
Junc 2	-91	0	398.67	212.17
Junc 3	280	0	398.67	51.42
Junc 4	280	0	398.67	51.42
Junc 5	280	0	398.67	51.42
Junc 6	280	0	398.67	51.42
Junc 7	375	0	398.67	10.26
Junc 8	375	0	398.69	10.27
Junc 10	375	0	398.69	10.27
Junc 12	375	0	443.98	29.89
Junc 13	375	0	398.69	10.27
Junc 14	375	0	443.98	29.89
Junc 16	375	0	443.98	29.89
Junc 18	370	0	443.92	32.03
Junc 19	360	0	443.79	36.31
Junc 20	360	1.9	443.77	36.30
Junc 21	370	11.3	443.74	31.95

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 22	355	2.8	443.74	38.45
Junc 23	360	2.8	443.74	36.29
Junc 24	360	7.6	443.73	36.28
Junc 25	360	0	443.75	36.29
Junc 26	360	7.6	443.62	36.23
Junc 28	340	10.4	443.76	44.96
Junc 29	365	10.4	443.71	34.10
Junc 30	355	0	443.70	38.43
Junc 31	350	4.7	443.69	40.60
Junc 32	290	3.8	443.75	66.62
Junc 33	275	9.4	443.75	73.12
Junc 35	360	0	443.82	36.32
Junc 36	365	10.4	443.84	34.16
Junc 37	360	0	443.88	36.35
Junc 38	360	0	443.90	36.35
Junc 39	360	0	443.94	36.37
Junc 40	340	0	392.24	22.63
Junc 15	375	0	443.98	29.89

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 17	360	0	443.77	36.30
Junc 27	360	2.8	443.70	36.27
Junc 34	240	0	381.10	61.14
Junc 41	240	0	365.34	54.31
Junc 42	240	0	379.50	60.45
Junc 43	240	0	366.93	55.00
Junc 44	235	.9	365.30	56.46
Junc 45	235	1.1	365.29	56.45
Junc 46	165	3.9	365.30	86.79
Junc 47	165	8.3	365.25	86.77
Junc 48	235	0	365.27	56.45
Junc 49	286	0	276.90	-3.94
Junc 51	235	0	276.01	17.77
Junc 52	220	4.5	365.26	62.94
Junc 53	235	0	272.43	16.22
Junc 54	240	6.1	365.22	54.26
Junc 56	120	4.8	246.83	54.95
Junc 55	220	0	365.22	62.92

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 57	165	3	246.82	35.45
Junc 58	110	6	246.88	59.31
Junc 59	75	0	247.54	74.76
Junc 61	125	6	250.06	54.19
Junc 62	140	4.2	248.54	47.03
Junc 63	110	3.6	247.67	59.65
Junc 64	100	3.6	247.55	63.94
Junc 65	175	2.8	365.22	82.42
Junc 66	175	9.6	246.77	31.10
Junc 67	70	9.1	246.83	76.62
Junc 68	75	3.6	247.53	74.76
Junc 69	125	3.6	247.34	53.01
Junc 70	65	3	247.50	79.08
Junc 71	90	4.8	247.49	68.24
Junc 72	95	3	247.34	66.01
Junc 73	100	12.3	247.25	63.81
Junc 74	40	0	247.42	89.88
Junc 75	40	0	143.85	45.00

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 78	40	3.8	143.84	45.00
Junc 79	15	12.1	143.49	55.67
Junc 80	10	3.8	143.47	57.83
Junc 81	10	7.6	143.42	57.81
Junc 82	10	7.6	143.42	57.81
Junc 83	10	3.8	143.44	57.82
Junc 84	15	7.6	143.46	55.66
Junc 85	15	5.7	143.42	55.64
Junc 86	15	14	143.17	55.54
Junc 87	25	3.8	143.12	51.18
Junc 88	175	0	246.05	30.79
Junc 89	175	0	379.05	88.41
Junc 91	180	.5	337.14	68.09
Junc 92	220	5.3	337.12	50.75
Junc 93	240	2.2	337.12	42.08
Junc 90	175	0	337.15	70.26
Junc 94	370	9.4	443.91	32.03
Junc 9	345	3.9	392.03	20.38

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 11	175	0	246.32	30.90
Junc 50	355	0	443.74	38.45
Junc 76	360	0	443.74	36.29
Junc 77	360	0	443.74	36.29
Junc 95	360	0	443.74	36.29
Junc 97	340	0	443.76	44.96
Junc 98	340	0	443.75	44.96
Junc 99	290	0	443.75	66.62
Junc 100	290	0	443.75	66.62
Junc 101	360	0	443.74	36.29
Junc FH_2	360	0	443.74	36.29
Junc FH_1	360	0	443.74	36.29
Junc FH_3	360	0	443.77	36.30
Junc 103	360	0	443.74	36.29
Junc FH_4	360	0	443.74	36.29
Junc FH_5	340	0	443.76	44.96
Junc FH_7	275	0	443.75	73.12
Junc FH_6	290	0	443.75	66.62

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc FH_8	365	0	443.84	34.16
Junc FH_9	360	0	443.90	36.35
Junc 106	375	0	443.95	29.87
Junc 107	370	0	443.97	32.05
Junc 108	375	0	443.98	29.89
Junc FH_10	370	0	443.97	32.05
Junc FH_11	375	0	443.98	29.89
Junc 96	286	0	286.00	0.00
Junc 102	235	0	286.01	22.10
Junc 104	175	4.3	246.50	30.98
Junc 105	175	0	337.43	70.38
Resvr Well_1	15	#N/A	15.00	0.00
Resvr Well_2	8	#N/A	8.00	0.00
Tank R1	375	#N/A	398.70	10.27
Tank R2	433	#N/A	444.00	4.77
Tank R3	235	#N/A	276.90	18.16
Tank 60	175	#N/A	337.00	70.19

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 3	372	4	120	0.00	0.00	Open
Pipe 4	373	4	120	0.00	0.00	Open
Pipe 5	45	4	150	0.00	0.00	Open
Pipe 6	20	4	150	0.00	0.00	Open
Pipe 7	80	4	150	0.00	0.00	Open
Pipe 8	4100	4	150	0.00	0.00	Open
Pipe 9	150	8	150	-81.50	0.52	Open
Pipe 10	60	8	150	-81.50	0.52	Open
Pipe 11	100	8	150	0.00	0.00	Open
Pipe 12	20	8	120	0.00	0.00	Open
Pipe 13	20	6	120	0.00	0.00	Open
Pipe 18	130	6	150	0.00	0.00	Open
Pipe 19	100	8	150	-95.30	0.61	Open
Pipe 22	670	6	150	45.88	0.52	Open
Pipe 23	190	6	150	40.29	0.46	Open
Pipe 24	270	8	150	11.30	0.07	Open
Pipe 25	300	6	150	27.09	0.31	Open

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 26	160	6	150	10.06	0.11	Open
Pipe 27	360	4	150	7.60	0.19	Open
Pipe 28	160	6	150	-4.01	0.05	Open
Pipe 29	90	2	150	7.60	0.78	Open
Pipe 31	320	6	150	35.21	0.40	Open
Pipe 32	460	6	150	11.61	0.13	Open
Pipe 33	1110	6	150	17.90	0.20	Open
Pipe 34	420	6	150	7.50	0.09	Open
Pipe 35	280	4	150	4.70	0.12	Open
Pipe 36	640	4	150	3.30	0.08	Open
Pipe 37	370	6	150	9.40	0.11	Open
Pipe 39	130	6	150	-29.62	0.34	Open
Pipe 40	310	6	150	-40.02	0.45	Open
Pipe 41	140	6	150	-40.02	0.45	Open
Pipe 42	290	6	150	-40.02	0.45	Open
Pipe 43	610	8	150	-40.02	0.26	Open
Pipe 44	1630	4	150	81.50	2.08	Open
Pipe 45	130	6	150	55.28	0.63	Open

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 16	360	6	150	-29.62	0.34	Open
Pipe 17	80	8	150	40.02	0.26	Open
Pipe 20	240	4	150	11.30	0.29	Open
Pipe 21	300	4	150	4.70	0.12	Open
Pipe 30	3090	4	150	77.60	1.98	Open
Pipe 46	10	2	120	77.60	7.92	Open
Pipe 47	10	2	120	77.60	7.92	Open
Pipe 49	315	8	150	77.60	0.50	Open
Pipe 50	105	8	150	63.90	0.41	Open
Pipe 51	530	6	150	3.90	0.04	Open
Pipe 52	720	4	150	8.30	0.21	Open
Pipe 53	250	8	150	54.50	0.35	Open
Pipe 55	.1	99999	150	50.00	0.00	Open
Pipe 56	50	4	150	184.30	4.71	Open
Pipe 57	520	4	150	4.50	0.11	Open
Pipe 58	200	4	150	184.30	4.71	Open
Pipe 59	1150	4	150	8.90	0.23	Open
Pipe 60	365	4	150	2.80	0.07	Open

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 62	255	4	150	3.00	0.08	Open
Pipe 63	10	4	150	0.00	0.00	Closed
Pipe 64	225	4	150	-17.40	0.44	Open
Pipe 65	915	4	150	-32.50	0.83	Open
Pipe 66	1250	4	150	184.30	4.71	Open
Pipe 67	390	4	150	106.56	2.72	Open
Pipe 68	490	4	150	71.74	1.83	Open
Pipe 69	310	4	150	67.54	1.72	Open
Pipe 70	200	4	150	29.38	0.75	Open
Pipe 71	490	4	150	2.80	0.07	Open
Pipe 72	10	4	150	0.00	0.00	Closed
Pipe 73	805	4	150	-9.60	0.25	Open
Pipe 74	650	4	150	9.10	0.23	Open
Pipe 75	140	4	150	4.26	0.11	Open
Pipe 76	280	4	150	-9.60	0.25	Open
Pipe 77	415	4	150	34.56	0.88	Open
Pipe 78	355	4	150	10.26	0.26	Open
Pipe 79	355	4	150	7.26	0.19	Open

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 80	560	4	150	18.64	0.48	Open
Pipe 81	390	4	150	-3.34	0.09	Open
Pipe 82	340	4	150	16.18	0.41	Open
Pipe 83	750	4	150	12.30	0.31	Open
Pipe 84	270	6	150	69.80	0.79	Open
Pipe 88	25	6	150	69.80	0.79	Open
Pipe 89	300	4	150	42.58	1.09	Open
Pipe 90	150	4	150	12.68	0.32	Open
Pipe 91	800	4	150	8.88	0.23	Open
Pipe 92	1010	4	150	1.28	0.03	Open
Pipe 93	810	4	150	-6.32	0.16	Open
Pipe 95	150	4	150	-10.12	0.26	Open
Pipe 96	990	4	150	23.42	0.60	Open
Pipe 97	1220	4	150	5.70	0.15	Open
Pipe 98	1350	4	150	17.80	0.45	Open
Pipe 99	120	2	150	3.80	0.39	Open
Pipe 94	1050	4	150	34.30	0.88	Open
Pipe 101	10	2	120	30.00	3.06	Open

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 102	300	4	150	8.00	0.20	Open
Pipe 103	390	4	150	7.50	0.19	Open
Pipe 104	420	4	150	2.20	0.06	Open
Pipe 105	10	2	120	-22.00	2.25	Open
Pipe 106	490	4	150	9.40	0.24	Open
Pipe 85	490	2	150	3.90	0.40	Open
Pipe 86	10	2	120	30.00	3.06	Open
Pipe 87	180	8	150	18.24	0.12	Open
Pipe 107	500	8	150	0.00	0.00	Open
Pipe 108	420	4	150	0.00	0.00	Open
Pipe 109	10	6	150	-14.23	0.16	Open
Pipe 111	70	6	150	21.51	0.24	Open
Pipe 112	40	6	150	21.51	0.24	Open
Pipe 113	570	8	150	9.90	0.06	Open
Pipe 114	40	6	150	0.50	0.01	Open
Pipe 115	60	6	150	9.40	0.11	Open
Pipe 116	20	6	150	-0.34	0.00	Open
Pipe 117	10	6	150	0.00	0.00	Open

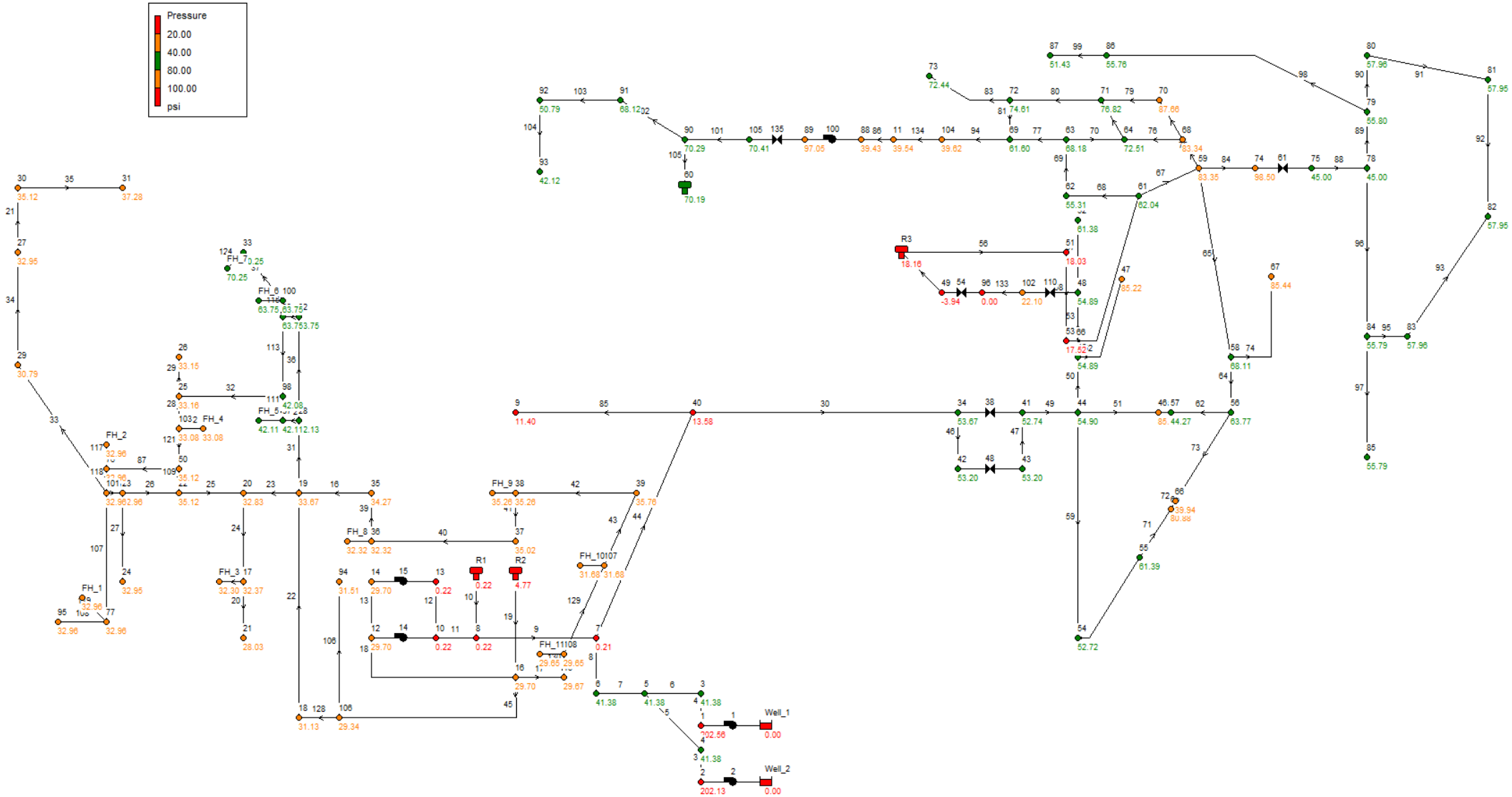
Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 118	10	8	150	18.24	0.12	Open
Pipe 119	10	6	150	0.00	0.00	Open
Pipe 120	10	6	150	0.00	0.00	Open
Pipe 121	230	6	150	4.01	0.05	Open
Pipe 122	10	6	150	0.00	0.00	Open
Pipe 123	10	6	150	0.00	0.00	Open
Pipe 124	10	6	150	0.00	0.00	Open
Pipe 125	10	6	150	0.00	0.00	Open
Pipe 126	10	6	150	0.00	0.00	Open
Pipe 127	10	6	150	0.00	0.00	Open
Pipe 128	140	6	150	45.88	0.52	Open
Pipe 129	310	8	150	-40.02	0.26	Open
Pipe 130	50	8	150	-40.02	0.26	Open
Pipe 131	10	6	150	0.00	0.00	Open
Pipe 132	10	6	150	0.00	0.00	Open
Pipe 133	100	8	150	50.00	0.32	Open
Pipe 134	290	4	150	30.00	0.77	Open
Pump 1	#N/A	#N/A	#N/A	0.00	0.00	Closed

Diamond Point – Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pump 2	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 14	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 15	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 100	#N/A	#N/A	#N/A	30.00	0.00	Open
Valve 38	#N/A	4	#N/A	0.00	0.00	Closed
Valve 48	#N/A	2	#N/A	77.60	7.92	Active
Valve 54	#N/A	8	#N/A	50.00	0.32	Active
Valve 61	#N/A	2	#N/A	69.80	7.13	Active
Valve 110	#N/A	8	#N/A	50.00	0.32	Active
Valve 135	#N/A	2	#N/A	30.00	3.06	Active

Diamond Point – Fire Flow + MDD Scenario



Diamond Point – Fire Flow + MDD Scenario

Network Table - Nodes

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 1	-92	0	375.49	202.56
Junc 2	-91	0	375.49	202.13
Junc 3	280	0	375.49	41.38
Junc 4	280	0	375.49	41.38
Junc 5	280	0	375.49	41.38
Junc 6	280	0	375.49	41.38
Junc 7	375	0	375.49	0.21
Junc 8	375	0	375.50	0.22
Junc 10	375	0	375.50	0.22
Junc 12	375	0	443.55	29.70
Junc 13	375	0	375.50	0.22
Junc 14	375	0	443.55	29.70
Junc 16	375	0	443.55	29.70
Junc 18	370	0	441.85	31.13
Junc 19	360	0	437.71	33.67
Junc 20	360	.9	435.77	32.83
Junc 21	370	5.2	434.69	28.03

Diamond Point – Fire Flow + MDD Scenario

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 22	355	1.3	436.06	35.12
Junc 23	360	1.3	436.06	32.96
Junc 24	360	3.5	436.05	32.95
Junc 25	360	0	436.53	33.16
Junc 26	360	3.5	436.50	33.15
Junc 28	340	4.7	437.24	42.13
Junc 29	365	4.7	436.05	30.79
Junc 30	355	0	436.05	35.12
Junc 31	350	2.2	436.05	37.28
Junc 32	290	1.7	437.12	63.75
Junc 33	275	4.3	437.12	70.25
Junc 35	360	0	439.09	34.27
Junc 36	365	4.7	439.58	32.32
Junc 37	360	0	440.81	35.02
Junc 38	360	0	441.37	35.26
Junc 39	360	0	442.52	35.76
Junc 40	340	0	371.34	13.58
Junc 15	375	0	443.47	29.67

Diamond Point – Fire Flow + MDD Scenario

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 17	360	0	434.70	32.37
Junc 27	360	1.3	436.05	32.95
Junc 34	240	0	363.86	53.67
Junc 41	240	0	361.72	52.74
Junc 42	240	0	362.79	53.20
Junc 43	240	0	362.79	53.20
Junc 44	235	.4	361.69	54.90
Junc 45	235	.5	361.68	54.89
Junc 46	165	1.8	361.69	85.23
Junc 47	165	3.8	361.67	85.22
Junc 48	235	0	361.67	54.89
Junc 49	286	0	276.90	-3.94
Junc 51	235	0	276.61	18.03
Junc 52	220	2	361.67	61.38
Junc 53	235	0	275.45	17.52
Junc 54	240	2.8	361.67	52.72
Junc 56	120	2.2	267.18	63.77
Junc 55	220	0	361.67	61.39

Diamond Point – Fire Flow + MDD Scenario

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 57	165	1.4	267.18	44.27
Junc 58	110	2.8	267.19	68.11
Junc 59	75	0	267.35	83.35
Junc 61	125	2.5	268.17	62.04
Junc 62	140	1.9	267.65	55.31
Junc 63	110	1.7	267.36	68.18
Junc 64	100	1.7	267.34	72.51
Junc 65	175	1.3	361.67	80.88
Junc 66	175	4.5	267.17	39.94
Junc 67	70	4.1	267.18	85.44
Junc 68	75	1.7	267.34	83.34
Junc 69	125	1.7	267.17	61.60
Junc 70	65	1.4	267.32	87.66
Junc 71	90	2.2	267.30	76.82
Junc 72	95	1.4	267.20	74.61
Junc 73	100	5.5	267.18	72.44
Junc 74	40	0	267.32	98.50
Junc 75	40	0	143.85	45.00

Diamond Point – Fire Flow + MDD Scenario

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 78	40	1.7	143.85	45.00
Junc 79	15	5.5	143.77	55.80
Junc 80	10	1.7	143.76	57.96
Junc 81	10	3.5	143.75	57.95
Junc 82	10	3.5	143.75	57.95
Junc 83	10	1.7	143.76	57.96
Junc 84	15	3.5	143.76	55.79
Junc 85	15	2.7	143.75	55.79
Junc 86	15	6.4	143.69	55.76
Junc 87	25	1.7	143.68	51.43
Junc 88	175	0	265.99	39.43
Junc 89	175	0	398.99	97.05
Junc 91	180	.2	337.21	68.12
Junc 92	220	2.4	337.21	50.79
Junc 93	240	1	337.21	42.12
Junc 90	175	0	337.22	70.29
Junc 94	370	4.3	442.71	31.51
Junc 9	345	1.7	371.30	11.40

Diamond Point – Fire Flow + MDD Scenario

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc 11	175	0	266.26	39.54
Junc 50	355	0	436.06	35.12
Junc 76	360	0	436.06	32.96
Junc 77	360	0	436.06	32.96
Junc 95	360	0	436.06	32.96
Junc 97	340	0	437.19	42.11
Junc 98	340	0	437.12	42.08
Junc 99	290	0	437.12	63.75
Junc 100	290	0	437.12	63.75
Junc 101	360	0	436.06	32.96
Junc FH_2	360	0	436.06	32.96
Junc FH_1	360	0	436.06	32.96
Junc FH_3	360	500	434.54	32.30
Junc 103	360	0	436.34	33.08
Junc FH_4	360	0	436.34	33.08
Junc FH_5	340	0	437.19	42.11
Junc FH_7	275	0	437.12	70.25
Junc FH_6	290	0	437.12	63.75

Diamond Point – Fire Flow + MDD Scenario

Node ID	Elevation ft	Base Demand GPM	Head ft	Pressure psi
Junc FH_8	365	0	439.58	32.32
Junc FH_9	360	0	441.37	35.26
Junc 106	375	0	442.72	29.34
Junc 107	370	0	443.12	31.68
Junc 108	375	0	443.42	29.65
Junc FH_10	370	0	443.12	31.68
Junc FH_11	375	0	443.42	29.65
Junc 96	286	0	286.00	0.00
Junc 102	235	0	286.01	22.10
Junc 104	175	1.9	266.44	39.62
Junc 105	175	0	337.49	70.41
Resvr Well_1	15	#N/A	15.00	0.00
Resvr Well_2	8	#N/A	8.00	0.00
Tank R1	375	#N/A	375.51	0.22
Tank R2	433	#N/A	444.00	4.77
Tank R3	235	#N/A	276.90	18.16
Tank 60	175	#N/A	337.00	70.19

Diamond Point – Fire Flow + MDD Scenario

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 3	372	4	120	0.00	0.00	Open
Pipe 4	373	4	120	0.00	0.00	Open
Pipe 5	45	4	150	0.00	0.00	Open
Pipe 6	20	4	150	0.00	0.00	Open
Pipe 7	80	4	150	0.00	0.00	Open
Pipe 8	4100	4	150	0.00	0.00	Open
Pipe 9	150	8	150	-64.30	0.41	Open
Pipe 10	60	8	150	-64.30	0.41	Open
Pipe 11	100	8	150	0.00	0.00	Open
Pipe 12	20	8	120	0.00	0.00	Open
Pipe 13	20	6	120	0.00	0.00	Open
Pipe 18	130	6	150	0.00	0.00	Open
Pipe 19	100	8	150	-543.60	3.47	Open
Pipe 22	670	6	150	301.82	3.42	Open
Pipe 23	190	6	150	395.65	4.49	Open
Pipe 24	270	8	150	505.20	3.22	Open
Pipe 25	300	6	150	-110.45	1.25	Open

Diamond Point – Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 26	160	6	150	-14.31	0.16	Open
Pipe 27	360	4	150	3.50	0.09	Open
Pipe 28	160	6	150	-124.76	1.42	Open
Pipe 29	90	2	150	3.50	0.36	Open
Pipe 31	320	6	150	138.96	1.58	Open
Pipe 32	460	6	150	128.26	1.46	Open
Pipe 33	1110	6	150	8.20	0.09	Open
Pipe 34	420	6	150	3.50	0.04	Open
Pipe 35	280	4	150	2.20	0.06	Open
Pipe 36	640	4	150	15.62	0.40	Open
Pipe 37	370	6	150	4.30	0.05	Open
Pipe 39	130	6	150	-232.78	2.64	Open
Pipe 40	310	6	150	-237.48	2.69	Open
Pipe 41	140	6	150	-237.48	2.69	Open
Pipe 42	290	6	150	-237.48	2.69	Open
Pipe 43	610	8	150	-237.48	1.52	Open
Pipe 44	1630	4	150	64.30	1.64	Open
Pipe 45	130	6	150	306.12	3.47	Open

Diamond Point – Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 16	360	6	150	-232.78	2.64	Open
Pipe 17	80	8	150	237.48	1.52	Open
Pipe 20	240	4	150	5.20	0.13	Open
Pipe 21	300	4	150	2.20	0.06	Open
Pipe 30	3090	4	150	62.60	1.60	Open
Pipe 46	10	2	120	62.60	6.39	Open
Pipe 47	10	2	120	62.60	6.39	Open
Pipe 49	315	8	150	62.60	0.40	Open
Pipe 50	105	8	150	56.30	0.36	Open
Pipe 51	530	6	150	1.80	0.02	Open
Pipe 52	720	4	150	3.80	0.10	Open
Pipe 53	250	8	150	52.00	0.33	Open
Pipe 55	.1	99999	150	50.00	0.00	Open
Pipe 56	50	4	150	100.50	2.57	Open
Pipe 57	520	4	150	2.00	0.05	Open
Pipe 58	200	4	150	100.50	2.57	Open
Pipe 59	1150	4	150	4.10	0.10	Open
Pipe 60	365	4	150	1.30	0.03	Open

Diamond Point – Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 62	255	4	150	1.40	0.04	Open
Pipe 63	10	4	150	0.00	0.00	Closed
Pipe 64	225	4	150	-8.10	0.21	Open
Pipe 65	915	4	150	-15.00	0.38	Open
Pipe 66	1250	4	150	100.50	2.57	Open
Pipe 67	390	4	150	58.05	1.48	Open
Pipe 68	490	4	150	39.95	1.02	Open
Pipe 69	310	4	150	38.05	0.97	Open
Pipe 70	200	4	150	11.46	0.29	Open
Pipe 71	490	4	150	1.30	0.03	Open
Pipe 72	10	4	150	0.00	0.00	Closed
Pipe 73	805	4	150	-4.50	0.11	Open
Pipe 74	650	4	150	4.10	0.10	Open
Pipe 75	140	4	150	11.15	0.28	Open
Pipe 76	280	4	150	1.29	0.03	Open
Pipe 77	415	4	150	24.89	0.64	Open
Pipe 78	355	4	150	8.16	0.21	Open
Pipe 79	355	4	150	6.76	0.17	Open

Diamond Point – Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 80	560	4	150	15.61	0.40	Open
Pipe 81	390	4	150	-8.71	0.22	Open
Pipe 82	340	4	150	11.05	0.28	Open
Pipe 83	750	4	150	5.50	0.14	Open
Pipe 84	270	6	150	31.90	0.36	Open
Pipe 88	25	6	150	31.90	0.36	Open
Pipe 89	300	4	150	19.45	0.50	Open
Pipe 90	150	4	150	5.85	0.15	Open
Pipe 91	800	4	150	4.15	0.11	Open
Pipe 92	1010	4	150	0.65	0.02	Open
Pipe 93	810	4	150	-2.85	0.07	Open
Pipe 95	150	4	150	-4.55	0.12	Open
Pipe 96	990	4	150	10.75	0.27	Open
Pipe 97	1220	4	150	2.70	0.07	Open
Pipe 98	1350	4	150	8.10	0.21	Open
Pipe 99	120	2	150	1.70	0.17	Open
Pipe 94	1050	4	150	31.90	0.81	Open
Pipe 101	10	2	120	30.00	3.06	Open

Diamond Point – Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 102	300	4	150	3.60	0.09	Open
Pipe 103	390	4	150	3.40	0.09	Open
Pipe 104	420	4	150	1.00	0.03	Open
Pipe 105	10	2	120	-26.40	2.70	Open
Pipe 106	490	4	150	4.30	0.11	Open
Pipe 85	490	2	150	1.70	0.17	Open
Pipe 86	10	2	120	30.00	3.06	Open
Pipe 87	180	8	150	27.31	0.17	Open
Pipe 107	500	8	150	0.00	0.00	Open
Pipe 108	420	4	150	0.00	0.00	Open
Pipe 109	10	6	150	97.44	1.11	Open
Pipe 111	70	6	150	118.64	1.35	Open
Pipe 112	40	6	150	118.64	1.35	Open
Pipe 113	570	8	150	-9.62	0.06	Open
Pipe 114	40	6	150	-13.92	0.16	Open
Pipe 115	60	6	150	4.30	0.05	Open
Pipe 116	20	6	150	-19.11	0.22	Open
Pipe 117	10	6	150	0.00	0.00	Open

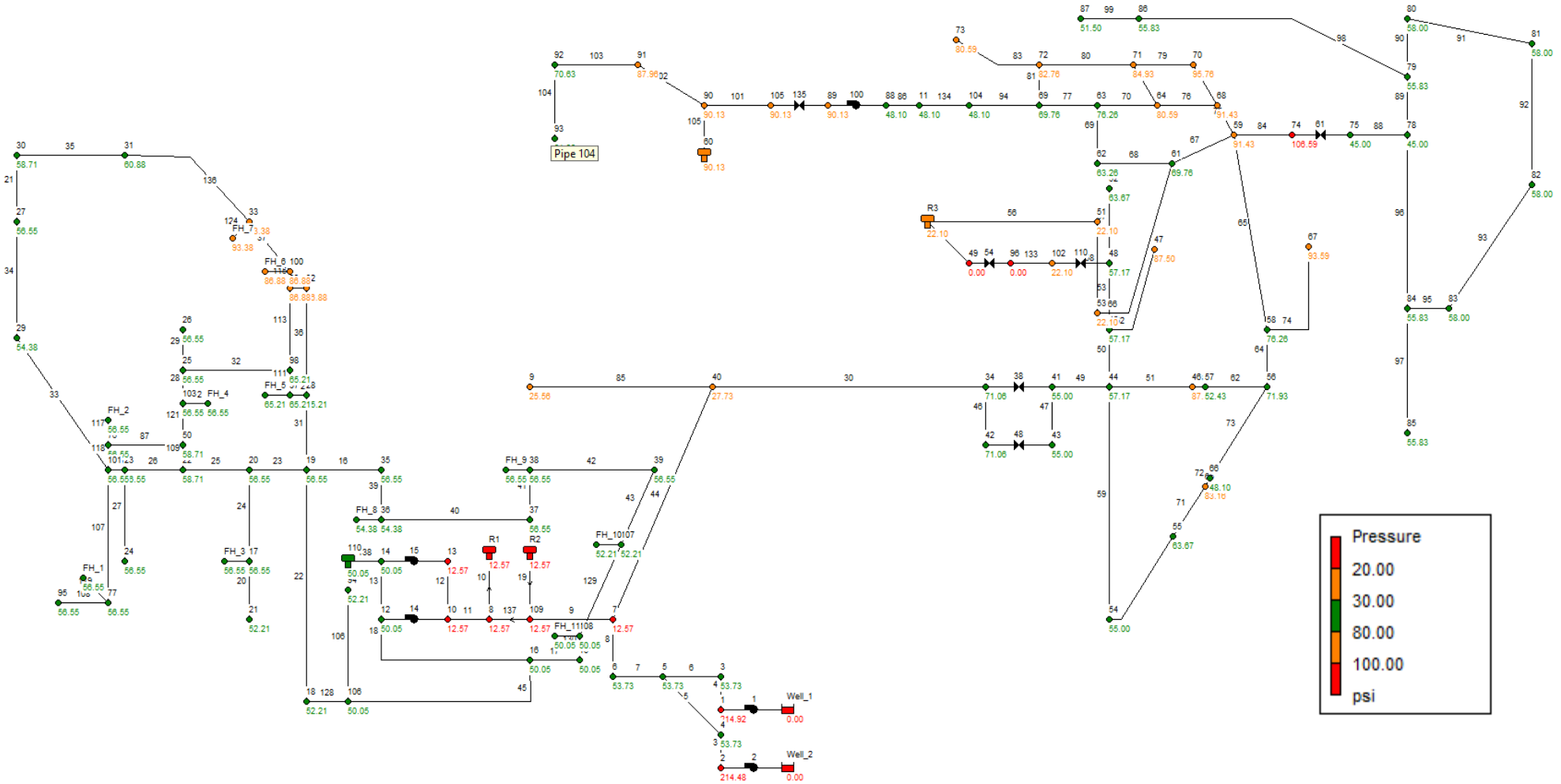
Diamond Point – Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pipe 118	10	8	150	27.31	0.17	Open
Pipe 119	10	6	150	0.00	0.00	Open
Pipe 120	10	6	150	500.00	5.67	Open
Pipe 121	230	6	150	124.75	1.42	Open
Pipe 122	10	6	150	0.00	0.00	Open
Pipe 123	10	6	150	0.00	0.00	Open
Pipe 124	10	6	150	0.00	0.00	Open
Pipe 125	10	6	150	0.00	0.00	Open
Pipe 126	10	6	150	0.00	0.00	Open
Pipe 127	10	6	150	0.00	0.00	Open
Pipe 128	140	6	150	301.82	3.42	Open
Pipe 129	310	8	150	-237.48	1.52	Open
Pipe 130	50	8	150	-237.48	1.52	Open
Pipe 131	10	6	150	0.00	0.00	Open
Pipe 132	10	6	150	0.00	0.00	Open
Pipe 133	100	8	150	50.00	0.32	Open
Pipe 134	290	4	150	30.00	0.77	Open
Pump 1	#N/A	#N/A	#N/A	0.00	0.00	Closed

Diamond Point – Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Status
Pump 2	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 14	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 15	#N/A	#N/A	#N/A	0.00	0.00	Closed
Pump 100	#N/A	#N/A	#N/A	30.00	0.00	Open
Valve 38	#N/A	4	#N/A	0.00	0.00	Closed
Valve 48	#N/A	2	#N/A	62.60	6.39	Open
Valve 54	#N/A	8	#N/A	50.00	0.32	Active
Valve 61	#N/A	2	#N/A	31.90	3.26	Active
Valve 110	#N/A	8	#N/A	50.00	0.32	Active
Valve 135	#N/A	2	#N/A	30.00	3.06	Active

Diamond Point – 2044 Static Scenario (High System Pressure)



Diamond Point – 2044 Static Scenario (High System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 1	-92	0.00	404.00	214.92
Junc 2	-91	0.00	404.00	214.48
Junc 3	280	0.00	404.00	53.73
Junc 4	280	0.00	404.00	53.73
Junc 5	280	0.00	404.00	53.73
Junc 6	280	0.00	404.00	53.73
Junc 7	375	0.00	404.00	12.57
Junc 8	375	0.00	404.00	12.57
Junc 10	375	0.00	404.00	12.57
Junc 12	375	0.00	490.50	50.05
Junc 13	375	0.00	404.00	12.57
Junc 14	375	0.00	490.50	50.05
Junc 16	375	0.00	490.50	50.05
Junc 18	370	0.00	490.50	52.21
Junc 19	360	0.00	490.50	56.55
Junc 20	360	0.00	490.50	56.55
Junc 21	370	0.00	490.50	52.21
Junc 22	355	0.00	490.50	58.71
Junc 23	360	0.00	490.50	56.55
Junc 24	360	0.00	490.50	56.55
Junc 25	360	0.00	490.50	56.55
Junc 26	360	0.00	490.50	56.55
Junc 28	340	0.00	490.50	65.21
Junc 29	365	0.00	490.50	54.38
Junc 30	355	0.00	490.50	58.71
Junc 31	350	0.00	490.50	60.88
Junc 32	290	0.00	490.50	86.88

Diamond Point – 2044 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 33	275	0.00	490.50	93.38
Junc 35	360	0.00	490.50	56.55
Junc 36	365	0.00	490.50	54.38
Junc 37	360	0.00	490.50	56.55
Junc 38	360	0.00	490.50	56.55
Junc 39	360	0.00	490.50	56.55
Junc 40	340	0.00	404.00	27.73
Junc 15	375	0.00	490.50	50.05
Junc 17	360	0.00	490.50	56.55
Junc 27	360	0.00	490.50	56.55
Junc 34	240	0.00	404.00	71.06
Junc 41	240	0.00	366.93	55.00
Junc 42	240	0.00	404.00	71.06
Junc 43	240	0.00	366.93	55.00
Junc 44	235	0.00	366.93	57.17
Junc 45	235	0.00	366.93	57.17
Junc 46	165	0.00	366.93	87.50
Junc 47	165	0.00	366.93	87.50
Junc 48	235	0.00	366.93	57.17
Junc 49	286	0.00	286.00	0.00
Junc 51	235	0.00	286.00	22.10
Junc 52	220	0.00	366.93	63.67
Junc 53	235	0.00	286.00	22.10
Junc 54	240	0.00	366.93	55.00
Junc 56	120	0.00	286.00	71.93
Junc 55	220	0.00	366.93	63.67
Junc 57	165	0.00	286.00	52.43
Junc 58	110	0.00	286.00	76.26

Diamond Point – 2044 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 59	75	0.00	286.00	91.43
Junc 61	125	0.00	286.00	69.76
Junc 62	140	0.00	286.00	63.26
Junc 63	110	0.00	286.00	76.26
Junc 64	100	0.00	286.00	80.59
Junc 65	175	0.00	366.93	83.16
Junc 66	175	0.00	286.00	48.10
Junc 67	70	0.00	286.00	93.59
Junc 68	75	0.00	286.00	91.43
Junc 69	125	0.00	286.00	69.76
Junc 70	65	0.00	286.00	95.76
Junc 71	90	0.00	286.00	84.93
Junc 72	95	0.00	286.00	82.76
Junc 73	100	0.00	286.00	80.59
Junc 74	40	0.00	286.00	106.59
Junc 75	40	0.00	143.85	45.00
Junc 78	40	0.00	143.85	45.00
Junc 79	15	0.00	143.85	55.83
Junc 80	10	0.00	143.85	58.00
Junc 81	10	0.00	143.85	58.00
Junc 82	10	0.00	143.85	58.00
Junc 83	10	0.00	143.85	58.00
Junc 84	15	0.00	143.85	55.83
Junc 85	15	0.00	143.85	55.83
Junc 86	15	0.00	143.85	55.83
Junc 87	25	0.00	143.85	51.50
Junc 88	175	0.00	286.00	48.10
Junc 89	175	0.00	383.00	90.13

Diamond Point – 2044 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 91	180	0.00	383.00	87.96
Junc 92	220	0.00	383.00	70.63
Junc 93	240	0.00	383.00	61.96
Junc 90	175	0.00	383.00	90.13
Junc 94	370	0.00	490.50	52.21
Junc 9	345	0.00	404.00	25.56
Junc 11	175	0.00	286.00	48.10
Junc 50	355	0.00	490.50	58.71
Junc 76	360	0.00	490.50	56.55
Junc 77	360	0.00	490.50	56.55
Junc 95	360	0.00	490.50	56.55
Junc 97	340	0.00	490.50	65.21
Junc 98	340	0.00	490.50	65.21
Junc 99	290	0.00	490.50	86.88
Junc 100	290	0.00	490.50	86.88
Junc 101	360	0.00	490.50	56.55
Junc FH_2	360	0.00	490.50	56.55
Junc FH_1	360	0.00	490.50	56.55
Junc FH_3	360	0.00	490.50	56.55
Junc 103	360	0.00	490.50	56.55
Junc FH_4	360	0.00	490.50	56.55
Junc FH_5	340	0.00	490.50	65.21
Junc FH_7	275	0.00	490.50	93.38
Junc FH_6	290	0.00	490.50	86.88
Junc FH_8	365	0.00	490.50	54.38
Junc FH_9	360	0.00	490.50	56.55
Junc 106	375	0.00	490.50	50.05
Junc 107	370	0.00	490.50	52.21

Diamond Point – 2044 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 108	375	0.00	490.50	50.05
Junc FH_10	370	0.00	490.50	52.21
Junc FH_11	375	0.00	490.50	50.05
Junc 96	286	0.00	286.00	0.00
Junc 102	235	0.00	286.00	22.10
Junc 104	175	0.00	286.00	48.10
Junc 105	175	0.00	383.00	90.13
Junc 109	375	0.00	404.00	12.57
Resvr Well_1	15	0.00	15.00	0.00
Resvr Well_2	8	0.00	8.00	0.00
Tank R1	375	0.07	404.00	12.57
Tank R2	375	-0.07	404.00	12.57
Tank R3	235	0.00	286.00	22.10
Tank 60	175	0.00	383.00	90.13
Tank 110	375	0.00	490.50	50.05

Diamond Point – 2044 Static Scenario (High System Pressure)

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 3	372	4	120	0.00	0.00	0.00
Pipe 4	373	4	120	0.00	0.00	0.00
Pipe 5	45	4	150	0.00	0.00	0.00
Pipe 6	20	4	150	0.00	0.00	0.00
Pipe 7	80	6	150	0.00	0.00	0.00
Pipe 8	4100	6	150	0.00	0.00	0.00
Pipe 9	100	8	150	0.00	0.00	0.00
Pipe 10	60	8	150	0.07	0.00	0.00
Pipe 11	100	8	150	0.00	0.00	0.00
Pipe 12	20	8	120	0.00	0.00	0.00
Pipe 13	20	6	120	0.00	0.00	0.00
Pipe 18	130	6	150	0.00	0.00	0.00
Pipe 19	60	8	150	-0.07	0.00	0.00
Pipe 22	670	6	150	0.00	0.00	0.00
Pipe 23	190	6	150	0.00	0.00	0.00
Pipe 24	270	8	150	0.00	0.00	0.00
Pipe 25	300	6	150	0.00	0.00	0.00
Pipe 26	160	6	150	0.00	0.00	0.00
Pipe 27	360	4	150	0.00	0.00	0.00
Pipe 28	160	6	150	0.00	0.00	0.00
Pipe 29	90	2	150	0.00	0.00	0.00
Pipe 31	320	6	150	0.00	0.00	0.00
Pipe 32	460	6	150	0.00	0.00	0.00
Pipe 33	1110	6	150	0.00	0.00	0.00
Pipe 34	420	6	150	0.00	0.00	0.00
Pipe 35	280	6	150	0.00	0.00	0.00
Pipe 36	640	4	150	0.00	0.00	0.00

Diamond Point – 2044 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 37	370	6	150	0.00	0.00	0.00
Pipe 39	130	6	150	0.00	0.00	0.00
Pipe 40	310	6	150	0.00	0.00	0.00
Pipe 41	140	6	150	0.00	0.00	0.00
Pipe 42	290	6	150	0.00	0.00	0.00
Pipe 43	610	8	150	0.00	0.00	0.00
Pipe 44	1630	8	150	0.00	0.00	0.00
Pipe 45	130	6	150	0.00	0.00	0.00
Pipe 16	360	6	150	0.00	0.00	0.00
Pipe 17	80	8	150	0.00	0.00	0.00
Pipe 20	240	4	150	0.00	0.00	0.00
Pipe 21	300	6	150	0.00	0.00	0.00
Pipe 30	3090	8	150	0.00	0.00	0.00
Pipe 46	10	2	120	0.00	0.00	0.00
Pipe 47	10	2	120	0.00	0.00	0.00
Pipe 49	315	8	150	0.00	0.00	0.00
Pipe 50	105	8	150	0.00	0.00	0.00
Pipe 51	530	6	150	0.00	0.00	0.00
Pipe 52	720	4	150	0.00	0.00	0.00
Pipe 53	250	8	150	0.00	0.00	0.00
Pipe 55	.1	99999	150	0.00	0.00	0.00
Pipe 56	50	4	150	0.00	0.00	0.00
Pipe 57	520	4	150	0.00	0.00	0.00
Pipe 58	200	4	150	0.00	0.00	0.00
Pipe 59	1150	4	150	0.00	0.00	0.00
Pipe 60	365	4	150	0.00	0.00	0.00
Pipe 62	255	4	150	0.00	0.00	0.00
Pipe 63	10	4	150	0.00	0.00	0.00

Diamond Point – 2044 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 64	225	4	150	0.00	0.00	0.00
Pipe 65	915	4	150	0.00	0.00	0.00
Pipe 66	1250	4	150	0.00	0.00	0.00
Pipe 67	390	4	150	0.00	0.00	0.00
Pipe 68	490	4	150	0.00	0.00	0.00
Pipe 69	310	4	150	0.00	0.00	0.00
Pipe 70	200	4	150	0.00	0.00	0.00
Pipe 71	490	4	150	0.00	0.00	0.00
Pipe 72	10	4	150	0.00	0.00	0.00
Pipe 73	805	4	150	0.00	0.00	0.00
Pipe 74	650	4	150	0.00	0.00	0.00
Pipe 75	140	4	150	0.00	0.00	0.00
Pipe 76	280	4	150	0.00	0.00	0.00
Pipe 77	415	4	150	0.00	0.00	0.00
Pipe 78	355	4	150	0.00	0.00	0.00
Pipe 79	355	4	150	0.00	0.00	0.00
Pipe 80	560	4	150	0.00	0.00	0.00
Pipe 81	390	4	150	0.00	0.00	0.00
Pipe 82	340	4	150	0.00	0.00	0.00
Pipe 83	750	4	150	0.00	0.00	0.00
Pipe 84	270	6	150	0.00	0.00	0.00
Pipe 88	25	6	150	0.00	0.00	0.00
Pipe 89	300	4	150	0.00	0.00	0.00
Pipe 90	150	4	150	0.00	0.00	0.00
Pipe 91	800	4	150	0.00	0.00	0.00
Pipe 92	1010	4	150	0.00	0.00	0.00
Pipe 93	810	4	150	0.00	0.00	0.00
Pipe 95	150	4	150	0.00	0.00	0.00

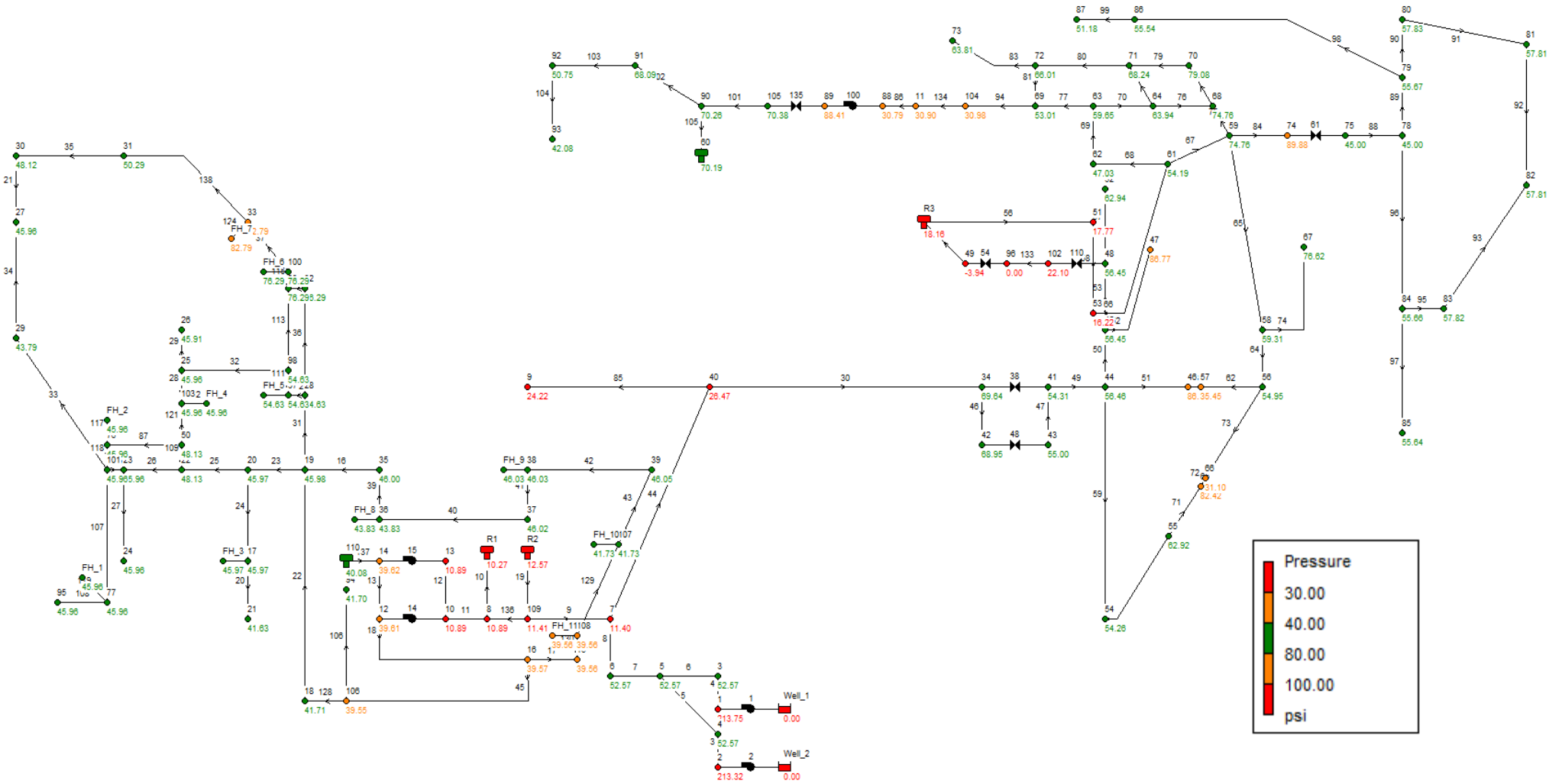
Diamond Point – 2044 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 96	990	4	150	0.00	0.00	0.00
Pipe 97	1220	4	150	0.00	0.00	0.00
Pipe 98	1350	4	150	0.00	0.00	0.00
Pipe 99	120	2	150	0.00	0.00	0.00
Pipe 94	1050	4	150	0.00	0.00	0.00
Pipe 101	10	2	120	0.00	0.00	0.00
Pipe 102	300	4	150	0.00	0.00	0.00
Pipe 103	390	4	150	0.00	0.00	0.00
Pipe 104	420	4	150	0.00	0.00	0.00
Pipe 105	10	2	120	0.00	0.00	0.00
Pipe 106	490	4	150	0.00	0.00	0.00
Pipe 85	490	2	150	0.00	0.00	0.00
Pipe 86	10	2	120	0.00	0.00	0.00
Pipe 87	180	8	150	0.00	0.00	0.00
Pipe 107	500	8	150	0.00	0.00	0.00
Pipe 108	420	4	150	0.00	0.00	0.00
Pipe 109	10	6	150	0.00	0.00	0.00
Pipe 111	70	6	150	0.00	0.00	0.00
Pipe 112	40	6	150	0.00	0.00	0.00
Pipe 113	570	8	150	0.00	0.00	0.00
Pipe 114	40	6	150	0.00	0.00	0.00
Pipe 115	60	6	150	0.00	0.00	0.00
Pipe 116	20	6	150	0.00	0.00	0.00
Pipe 117	10	6	150	0.00	0.00	0.00
Pipe 118	10	8	150	0.00	0.00	0.00
Pipe 119	10	6	150	0.00	0.00	0.00
Pipe 120	10	6	150	0.00	0.00	0.00
Pipe 121	230	6	150	0.00	0.00	0.00

Diamond Point – 2044 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 122	10	6	150	0.00	0.00	0.00
Pipe 123	10	6	150	0.00	0.00	0.00
Pipe 124	10	6	150	0.00	0.00	0.00
Pipe 125	10	6	150	0.00	0.00	0.00
Pipe 126	10	6	150	0.00	0.00	0.00
Pipe 127	10	6	150	0.00	0.00	0.00
Pipe 128	140	6	150	0.00	0.00	0.00
Pipe 129	310	8	150	0.00	0.00	0.00
Pipe 130	50	8	150	0.00	0.00	0.00
Pipe 131	10	6	150	0.00	0.00	0.00
Pipe 132	10	6	150	0.00	0.00	0.00
Pipe 133	100	8	150	0.00	0.00	0.00
Pipe 134	290	4	150	0.00	0.00	0.00
Pipe 136	1085	6	150	0.00	0.00	0.00
Pipe 137	50	8	150	-0.07	0.00	0.00
Pipe 138	1000	12	100	0.00	0.00	0.00
Pump 1	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 2	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 14	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 15	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 100	#N/A	#N/A	#N/A	0.00	0.00	0.00
Valve 38	#N/A	4	#N/A	0.00	0.00	0.00
Valve 48	#N/A	2	#N/A	0.00	0.00	37.07
Valve 54	#N/A	8	#N/A	0.00	0.00	0.00
Valve 61	#N/A	2	#N/A	0.00	0.00	142.15
Valve 110	#N/A	8	#N/A	0.00	0.00	0.00
Valve 135	#N/A	2	#N/A	0.00	0.00	0.00

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)



Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 1	-92	0.00	401.32	213.75
Junc 2	-91	0.00	401.32	213.32
Junc 3	280	0.00	401.32	52.57
Junc 4	280	0.00	401.32	52.57
Junc 5	280	0.00	401.32	52.57
Junc 6	280	0.00	401.32	52.57
Junc 7	375	0.00	401.32	11.40
Junc 8	375	0.00	400.14	10.89
Junc 10	375	0.00	400.14	10.89
Junc 12	375	0.00	466.41	39.61
Junc 13	375	0.00	400.14	10.89
Junc 14	375	0.00	466.43	39.62
Junc 16	375	0.00	466.31	39.57
Junc 18	370	0.00	466.25	41.71
Junc 19	360	0.00	466.12	45.98
Junc 20	360	1.90	466.10	45.97
Junc 21	370	11.30	466.07	41.63
Junc 22	355	2.80	466.08	48.13
Junc 23	360	2.80	466.08	45.96
Junc 24	360	7.60	466.06	45.96
Junc 25	360	0.00	466.08	45.96
Junc 26	360	7.60	465.95	45.91
Junc 28	340	10.40	466.08	54.63
Junc 29	365	10.40	466.06	43.79
Junc 30	355	0.00	466.06	48.12
Junc 31	350	4.70	466.06	50.29
Junc 32	290	3.80	466.08	76.29

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 33	275	9.40	466.06	82.79
Junc 35	360	0.00	466.15	46.00
Junc 36	365	10.40	466.17	43.83
Junc 37	360	0.00	466.21	46.02
Junc 38	360	0.00	466.23	46.03
Junc 39	360	0.00	466.27	46.05
Junc 40	340	0.00	401.10	26.47
Junc 15	375	0.00	466.31	39.56
Junc 17	360	0.00	466.10	45.97
Junc 27	360	2.80	466.06	45.96
Junc 34	240	0.00	400.72	69.64
Junc 41	240	0.00	365.34	54.31
Junc 42	240	0.00	399.12	68.95
Junc 43	240	0.00	366.93	55.00
Junc 44	235	0.90	365.30	56.46
Junc 45	235	1.10	365.29	56.45
Junc 46	165	3.90	365.30	86.79
Junc 47	165	8.30	365.25	86.77
Junc 48	235	0.00	365.27	56.45
Junc 49	286	0.00	276.90	-3.94
Junc 51	235	0.00	276.01	17.77
Junc 52	220	4.50	365.26	62.94
Junc 53	235	0.00	272.43	16.22
Junc 54	240	6.10	365.22	54.26
Junc 56	120	4.80	246.83	54.95
Junc 55	220	0.00	365.22	62.92
Junc 57	165	3.00	246.82	35.45
Junc 58	110	6.00	246.88	59.31

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 59	75	0.00	247.54	74.76
Junc 61	125	6.00	250.06	54.19
Junc 62	140	4.20	248.54	47.03
Junc 63	110	3.60	247.67	59.65
Junc 64	100	3.60	247.55	63.94
Junc 65	175	2.80	365.22	82.42
Junc 66	175	9.60	246.77	31.10
Junc 67	70	9.10	246.83	76.62
Junc 68	75	3.60	247.53	74.76
Junc 69	125	3.60	247.34	53.01
Junc 70	65	3.00	247.50	79.08
Junc 71	90	4.80	247.49	68.24
Junc 72	95	3.00	247.34	66.01
Junc 73	100	12.30	247.25	63.81
Junc 74	40	0.00	247.42	89.88
Junc 75	40	0.00	143.85	45.00
Junc 78	40	3.80	143.84	45.00
Junc 79	15	12.10	143.49	55.67
Junc 80	10	3.80	143.47	57.83
Junc 81	10	7.60	143.42	57.81
Junc 82	10	7.60	143.42	57.81
Junc 83	10	3.80	143.44	57.82
Junc 84	15	7.60	143.46	55.66
Junc 85	15	5.70	143.42	55.64
Junc 86	15	14.00	143.17	55.54
Junc 87	25	3.80	143.12	51.18
Junc 88	175	0.00	246.05	30.79
Junc 89	175	0.00	379.05	88.41

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 91	180	0.50	337.14	68.09
Junc 92	220	5.30	337.12	50.75
Junc 93	240	2.20	337.12	42.08
Junc 90	175	0.00	337.15	70.26
Junc 94	370	9.40	466.24	41.70
Junc 9	345	3.90	400.89	24.22
Junc 11	175	0.00	246.32	30.90
Junc 50	355	0.00	466.08	48.13
Junc 76	360	0.00	466.08	45.96
Junc 77	360	0.00	466.08	45.96
Junc 95	360	0.00	466.08	45.96
Junc 97	340	0.00	466.08	54.63
Junc 98	340	0.00	466.08	54.63
Junc 99	290	0.00	466.08	76.29
Junc 100	290	0.00	466.07	76.29
Junc 101	360	0.00	466.08	45.96
Junc FH_2	360	0.00	466.08	45.96
Junc FH_1	360	0.00	466.08	45.96
Junc FH_3	360	0.00	466.10	45.97
Junc 103	360	0.00	466.08	45.96
Junc FH_4	360	0.00	466.08	45.96
Junc FH_5	340	0.00	466.08	54.63
Junc FH_7	275	0.00	466.06	82.79
Junc FH_6	290	0.00	466.07	76.29
Junc FH_8	365	0.00	466.17	43.83
Junc FH_9	360	0.00	466.23	46.03
Junc 106	375	0.00	466.28	39.55
Junc 107	370	0.00	466.30	41.73

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 108	375	0.00	466.31	39.56
Junc FH_10	370	0.00	466.30	41.73
Junc FH_11	375	0.00	466.31	39.56
Junc 96	286	0.00	286.00	0.00
Junc 102	235	0.00	286.01	22.10
Junc 104	175	4.30	246.50	30.98
Junc 105	175	0.00	337.43	70.38
Junc 109	375	0.00	401.33	11.41
Resvr Well_1	15	0.00	15.00	0.00
Resvr Well_2	8	0.00	8.00	0.00
Tank R1	375	1334.60	398.70	10.27
Tank R2	375	-1416.11	404.00	12.57
Tank R3	235	-134.30	276.90	18.16
Tank 60	175	22.00	337.00	70.19
Tank 110	375	-95.30	467.50	40.08

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 3	372	4	120	0.00	0.00	0.00
Pipe 4	373	4	120	0.00	0.00	0.00
Pipe 5	45	4	150	0.00	0.00	0.00
Pipe 6	20	4	150	0.00	0.00	0.00
Pipe 7	80	6	150	0.00	0.00	0.00
Pipe 8	4100	6	150	0.00	0.00	0.00
Pipe 9	100	8	150	-81.50	0.52	0.13
Pipe 10	60	8	150	1334.60	8.52	23.92
Pipe 11	100	8	150	0.00	0.00	0.00
Pipe 12	20	8	120	0.00	0.00	0.00
Pipe 13	20	6	120	95.30	1.08	1.11
Pipe 18	130	6	150	95.30	1.08	0.73
Pipe 19	100	8	150	-1416.11	9.04	26.69
Pipe 22	670	6	150	45.88	0.52	0.19
Pipe 23	190	6	150	39.18	0.44	0.14
Pipe 24	270	8	150	11.30	0.07	0.00
Pipe 25	300	6	150	25.98	0.29	0.07
Pipe 26	160	6	150	8.13	0.09	0.01
Pipe 27	360	4	150	7.60	0.19	0.05
Pipe 28	160	6	150	1.11	0.01	0.00
Pipe 29	90	2	150	7.60	0.78	1.43
Pipe 31	320	6	150	36.32	0.41	0.12
Pipe 32	460	6	150	6.49	0.07	0.01
Pipe 33	1110	6	150	11.67	0.13	0.01
Pipe 34	420	6	150	1.27	0.01	0.00
Pipe 35	280	6	150	-1.53	0.02	0.00
Pipe 36	640	4	150	3.87	0.10	0.01

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 37	370	6	150	15.63	0.18	0.03
Pipe 39	130	6	150	-29.62	0.34	0.08
Pipe 40	310	6	150	-40.02	0.45	0.15
Pipe 41	140	6	150	-40.02	0.45	0.15
Pipe 42	290	6	150	-40.02	0.45	0.15
Pipe 43	610	8	150	-40.02	0.26	0.04
Pipe 44	1630	8	150	81.50	0.52	0.13
Pipe 45	130	6	150	55.28	0.63	0.27
Pipe 16	360	6	150	-29.62	0.34	0.08
Pipe 17	80	8	150	40.02	0.26	0.04
Pipe 20	240	4	150	11.30	0.29	0.10
Pipe 21	300	6	150	-1.53	0.02	0.00
Pipe 30	3090	8	150	77.60	0.50	0.12
Pipe 46	10	2	120	77.60	7.92	159.48
Pipe 47	10	2	120	77.60	7.92	159.48
Pipe 49	315	8	150	77.60	0.50	0.12
Pipe 50	105	8	150	63.90	0.41	0.09
Pipe 51	530	6	150	3.90	0.04	0.00
Pipe 52	720	4	150	8.30	0.21	0.06
Pipe 53	250	8	150	54.50	0.35	0.06
Pipe 55	.1	99999	150	50.00	0.00	0.00
Pipe 56	50	4	150	184.30	4.71	17.89
Pipe 57	520	4	150	4.50	0.11	0.02
Pipe 58	200	4	150	184.30	4.71	17.89
Pipe 59	1150	4	150	8.90	0.23	0.07
Pipe 60	365	4	150	2.80	0.07	0.01
Pipe 62	255	4	150	3.00	0.08	0.01
Pipe 63	10	4	150	0.00	0.00	0.00

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 64	225	4	150	-17.40	0.44	0.23
Pipe 65	915	4	150	-32.50	0.83	0.72
Pipe 66	1250	4	150	184.30	4.71	17.89
Pipe 67	390	4	150	106.56	2.72	6.49
Pipe 68	490	4	150	71.74	1.83	3.12
Pipe 69	310	4	150	67.54	1.72	2.79
Pipe 70	200	4	150	29.38	0.75	0.60
Pipe 71	490	4	150	2.80	0.07	0.01
Pipe 72	10	4	150	0.00	0.00	0.00
Pipe 73	805	4	150	-9.60	0.25	0.08
Pipe 74	650	4	150	9.10	0.23	0.07
Pipe 75	140	4	150	4.26	0.11	0.02
Pipe 76	280	4	150	-9.60	0.25	0.08
Pipe 77	415	4	150	34.56	0.88	0.81
Pipe 78	355	4	150	10.26	0.26	0.09
Pipe 79	355	4	150	7.26	0.19	0.04
Pipe 80	560	4	150	18.64	0.48	0.26
Pipe 81	390	4	150	-3.34	0.09	0.01
Pipe 82	340	4	150	16.18	0.41	0.20
Pipe 83	750	4	150	12.30	0.31	0.12
Pipe 84	270	6	150	69.80	0.79	0.41
Pipe 88	25	6	150	69.80	0.79	0.41
Pipe 89	300	4	150	42.58	1.09	1.19
Pipe 90	150	4	150	12.68	0.32	0.13
Pipe 91	800	4	150	8.88	0.23	0.07
Pipe 92	1010	4	150	1.28	0.03	0.00
Pipe 93	810	4	150	-6.32	0.16	0.03
Pipe 95	150	4	150	-10.12	0.26	0.08

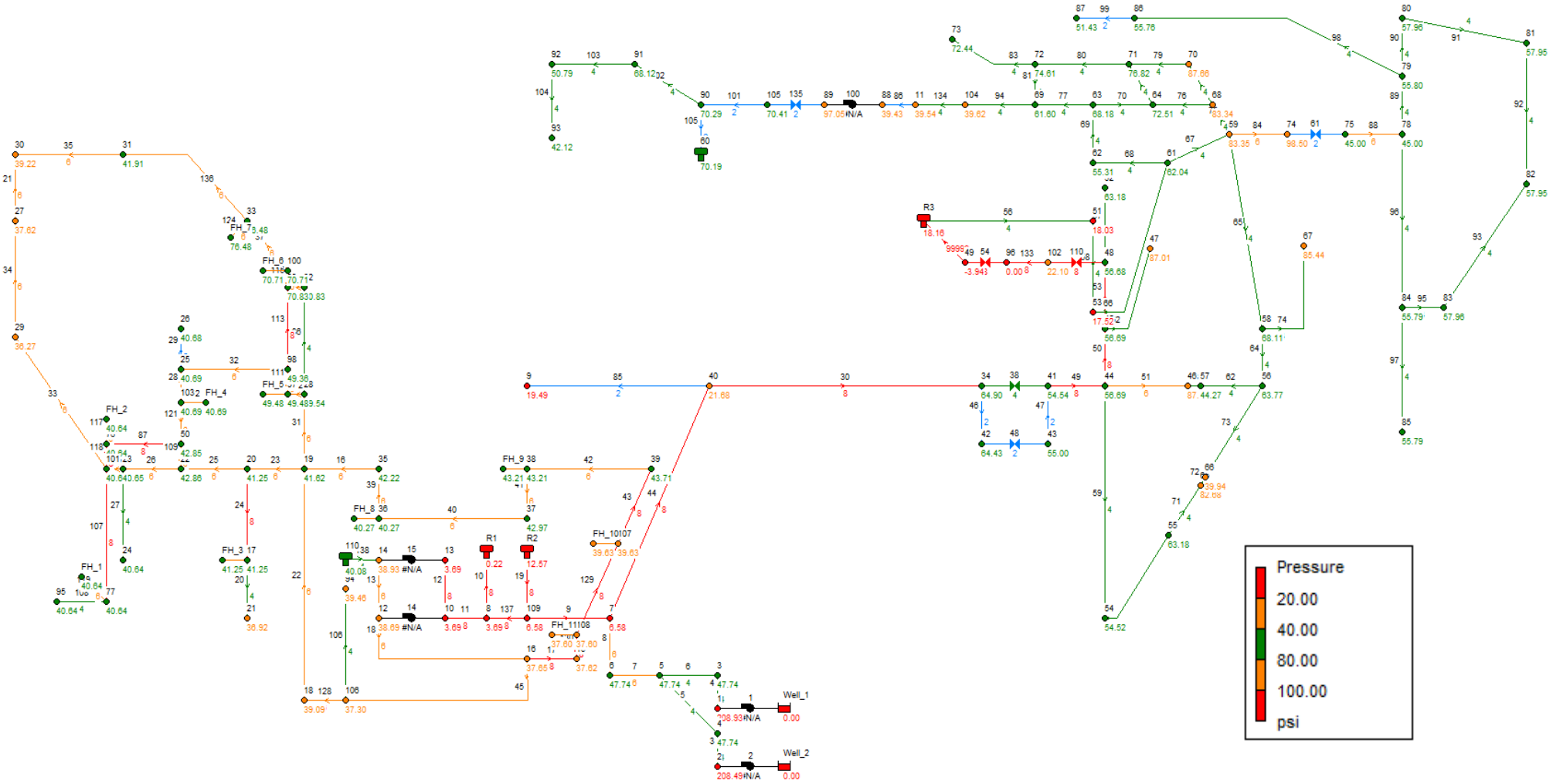
Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 96	990	4	150	23.42	0.60	0.39
Pipe 97	1220	4	150	5.70	0.15	0.03
Pipe 98	1350	4	150	17.80	0.45	0.24
Pipe 99	120	2	150	3.80	0.39	0.40
Pipe 94	1050	4	150	34.30	0.88	0.79
Pipe 101	10	2	120	30.00	3.06	27.43
Pipe 102	300	4	150	8.00	0.20	0.05
Pipe 103	390	4	150	7.50	0.19	0.05
Pipe 104	420	4	150	2.20	0.06	0.00
Pipe 105	10	2	120	-22.00	2.25	15.45
Pipe 106	490	4	150	9.40	0.24	0.07
Pipe 85	490	2	150	3.90	0.40	0.41
Pipe 86	10	2	120	30.00	3.06	27.44
Pipe 87	180	8	150	13.93	0.09	0.01
Pipe 107	500	8	150	0.00	0.00	0.00
Pipe 108	420	4	150	0.00	0.00	0.00
Pipe 109	10	6	150	-15.05	0.17	0.02
Pipe 111	70	6	150	22.05	0.25	0.05
Pipe 112	40	6	150	22.05	0.25	0.05
Pipe 113	570	8	150	15.56	0.10	0.01
Pipe 114	40	6	150	-0.07	0.00	0.00
Pipe 115	60	6	150	15.63	0.18	0.03
Pipe 116	20	6	150	-2.27	0.03	0.00
Pipe 117	10	6	150	0.00	0.00	0.00
Pipe 118	10	8	150	13.93	0.09	0.01
Pipe 119	10	6	150	0.00	0.00	0.00
Pipe 120	10	6	150	0.00	0.00	0.00
Pipe 121	230	6	150	-1.11	0.01	0.00

Diamond Point – 2044 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 122	10	6	150	0.00	0.00	0.00
Pipe 123	10	6	150	0.00	0.00	0.00
Pipe 124	10	6	150	0.00	0.00	0.00
Pipe 125	10	6	150	0.00	0.00	0.00
Pipe 126	10	6	150	0.00	0.00	0.00
Pipe 127	10	6	150	0.00	0.00	0.00
Pipe 128	140	6	150	45.88	0.52	0.19
Pipe 129	310	8	150	-40.02	0.26	0.04
Pipe 130	50	8	150	-40.02	0.26	0.04
Pipe 131	10	6	150	0.00	0.00	0.00
Pipe 132	10	6	150	0.00	0.00	0.00
Pipe 133	100	8	150	50.00	0.32	0.05
Pipe 134	290	4	150	30.00	0.77	0.62
Pipe 136	50	8	150	1334.60	8.52	23.92
Pipe 137	50	3	150	95.30	4.33	21.42
Pipe 138	1085	6	150	6.23	0.07	0.00
Pump 1	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 2	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 14	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 15	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 100	#N/A	#N/A	#N/A	30.00	0.00	-133.00
Valve 38	#N/A	4	#N/A	0.00	0.00	0.00
Valve 48	#N/A	2	#N/A	77.60	7.92	32.19
Valve 54	#N/A	8	#N/A	50.00	0.32	9.10
Valve 61	#N/A	2	#N/A	69.80	7.13	103.57
Valve 110	#N/A	8	#N/A	50.00	0.32	79.27
Valve 135	#N/A	2	#N/A	30.00	3.06	41.62

Diamond Point – 2044 Fire Flow + MDD Scenario



Diamond Point – 2044 Fire Flow + MDD Scenario

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 1	-92	0.00	390.18	208.93
Junc 2	-91	0.00	390.18	208.49
Junc 3	280	0.00	390.18	47.74
Junc 4	280	0.00	390.18	47.74
Junc 5	280	0.00	390.18	47.74
Junc 6	280	0.00	390.18	47.74
Junc 7	375	0.00	390.18	6.58
Junc 8	375	0.00	383.51	3.69
Junc 10	375	0.00	383.51	3.69
Junc 12	375	0.00	464.29	38.69
Junc 13	375	0.00	383.51	3.69
Junc 14	375	0.00	464.85	38.93
Junc 16	375	0.00	461.90	37.65
Junc 18	370	0.00	460.21	39.09
Junc 19	360	0.00	456.06	41.62
Junc 20	360	0.90	455.20	41.25
Junc 21	370	5.20	455.20	36.92
Junc 22	355	1.30	453.91	42.86
Junc 23	360	1.30	453.81	40.65
Junc 24	360	3.50	453.80	40.64
Junc 25	360	0.00	453.90	40.69
Junc 26	360	3.50	453.87	40.68
Junc 28	340	4.70	454.33	49.54
Junc 29	365	4.70	448.70	36.27
Junc 30	355	500.00	445.51	39.22
Junc 31	350	2.20	446.73	41.91
Junc 32	290	1.70	453.48	70.83

Diamond Point – 2044 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 33	275	4.30	451.51	76.48
Junc 35	360	0.00	457.44	42.22
Junc 36	365	4.70	457.93	40.27
Junc 37	360	0.00	459.17	42.97
Junc 38	360	0.00	459.72	43.21
Junc 39	360	0.00	460.87	43.71
Junc 40	340	0.00	390.03	21.68
Junc 15	375	0.00	461.82	37.62
Junc 17	360	0.00	455.20	41.25
Junc 27	360	1.30	446.83	37.62
Junc 34	240	0.00	389.78	64.90
Junc 41	240	0.00	365.86	54.54
Junc 42	240	0.00	388.71	64.43
Junc 43	240	0.00	366.93	55.00
Junc 44	235	0.40	365.84	56.69
Junc 45	235	0.50	365.83	56.69
Junc 46	165	1.80	365.84	87.02
Junc 47	165	3.80	365.82	87.01
Junc 48	235	0.00	365.81	56.68
Junc 49	286	0.00	276.90	-3.94
Junc 51	235	0.00	276.61	18.03
Junc 52	220	2.00	365.81	63.18
Junc 53	235	0.00	275.45	17.52
Junc 54	240	2.80	365.82	54.52
Junc 56	120	2.20	267.18	63.77
Junc 55	220	0.00	365.82	63.18
Junc 57	165	1.40	267.18	44.27
Junc 58	110	2.80	267.19	68.11

Diamond Point – 2044 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 59	75	0.00	267.35	83.35
Junc 61	125	2.50	268.17	62.04
Junc 62	140	1.90	267.65	55.31
Junc 63	110	1.70	267.36	68.18
Junc 64	100	1.70	267.34	72.51
Junc 65	175	1.30	365.82	82.68
Junc 66	175	4.50	267.17	39.94
Junc 67	70	4.10	267.18	85.44
Junc 68	75	1.70	267.34	83.34
Junc 69	125	1.70	267.17	61.60
Junc 70	65	1.40	267.32	87.66
Junc 71	90	2.20	267.30	76.82
Junc 72	95	1.40	267.20	74.61
Junc 73	100	5.50	267.18	72.44
Junc 74	40	0.00	267.32	98.50
Junc 75	40	0.00	143.85	45.00
Junc 78	40	1.70	143.85	45.00
Junc 79	15	5.50	143.77	55.80
Junc 80	10	1.70	143.76	57.96
Junc 81	10	3.50	143.75	57.95
Junc 82	10	3.50	143.75	57.95
Junc 83	10	1.70	143.76	57.96
Junc 84	15	3.50	143.76	55.79
Junc 85	15	2.70	143.75	55.79
Junc 86	15	6.40	143.69	55.76
Junc 87	25	1.70	143.68	51.43
Junc 88	175	0.00	265.99	39.43
Junc 89	175	0.00	398.99	97.05

Diamond Point – 2044 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 91	180	0.20	337.21	68.12
Junc 92	220	2.40	337.21	50.79
Junc 93	240	1.00	337.21	42.12
Junc 90	175	0.00	337.22	70.29
Junc 94	370	4.30	461.06	39.46
Junc 9	345	1.70	389.99	19.49
Junc 11	175	0.00	266.26	39.54
Junc 50	355	0.00	453.89	42.85
Junc 76	360	0.00	453.80	40.64
Junc 77	360	0.00	453.79	40.64
Junc 95	360	0.00	453.79	40.64
Junc 97	340	0.00	454.18	49.48
Junc 98	340	0.00	453.92	49.36
Junc 99	290	0.00	453.47	70.83
Junc 100	290	0.00	453.20	70.71
Junc 101	360	0.00	453.79	40.64
Junc FH_2	360	0.00	453.80	40.64
Junc FH_1	360	0.00	453.79	40.64
Junc FH_3	360	0.00	455.20	41.25
Junc 103	360	0.00	453.90	40.69
Junc FH_4	360	0.00	453.90	40.69
Junc FH_5	340	0.00	454.18	49.48
Junc FH_7	275	0.00	451.51	76.48
Junc FH_6	290	0.00	453.20	70.71
Junc FH_8	365	0.00	457.93	40.27
Junc FH_9	360	0.00	459.72	43.21
Junc 106	375	0.00	461.07	37.30
Junc 107	370	0.00	461.47	39.63

Diamond Point – 2044 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 108	375	0.00	461.77	37.60
Junc FH_10	370	0.00	461.47	39.63
Junc FH_11	375	0.00	461.77	37.60
Junc 96	286	0.00	286.00	0.00
Junc 102	235	0.00	286.01	22.10
Junc 104	175	1.90	266.44	39.62
Junc 105	175	0.00	337.49	70.41
Junc 109	375	0.00	390.18	6.58
Resvr Well_1	15	0.00	15.00	0.00
Resvr Well_2	8	0.00	8.00	0.00
Tank R1	375	3376.13	375.51	0.22
Tank R2	375	-3440.44	404.00	12.57
Tank R3	235	-50.50	276.90	18.16
Tank 60	175	26.40	337.00	70.19
Tank 110	375	-543.60	467.50	40.08

Diamond Point – 2044 Fire Flow + MDD Scenario

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 3	372	4	120	0.00	0.00	0.00
Pipe 4	373	4	120	0.00	0.00	0.00
Pipe 5	45	4	150	0.00	0.00	0.00
Pipe 6	20	4	150	0.00	0.00	0.00
Pipe 7	80	6	150	0.00	0.00	0.00
Pipe 8	4100	6	150	0.00	0.00	0.00
Pipe 9	100	8	150	-64.30	0.41	0.09
Pipe 10	60	8	150	3376.13	21.55	133.41
Pipe 11	100	8	150	0.00	0.00	0.00
Pipe 12	20	8	120	0.00	0.00	0.00
Pipe 13	20	6	120	543.60	6.17	27.82
Pipe 18	130	6	150	543.60	6.17	18.40
Pipe 19	100	8	150	-3440.44	21.96	138.15
Pipe 22	670	6	150	301.82	3.42	6.19
Pipe 23	190	6	150	254.21	2.88	4.50
Pipe 24	270	8	150	5.20	0.03	0.00
Pipe 25	300	6	150	248.11	2.82	4.31
Pipe 26	160	6	150	90.82	1.03	0.67
Pipe 27	360	4	150	3.50	0.09	0.01
Pipe 28	160	6	150	-14.88	0.17	0.02
Pipe 29	90	2	150	3.50	0.36	0.34
Pipe 31	320	6	150	280.39	3.18	5.40
Pipe 32	460	6	150	18.38	0.21	0.03
Pipe 33	1110	6	150	256.89	2.91	4.59
Pipe 34	420	6	150	252.19	2.86	4.44
Pipe 35	280	6	150	-249.11	2.83	4.34
Pipe 36	640	4	150	45.45	1.16	1.34

Diamond Point – 2044 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 37	370	6	150	255.61	2.90	4.55
Pipe 39	130	6	150	-232.78	2.64	3.83
Pipe 40	310	6	150	-237.48	2.69	3.97
Pipe 41	140	6	150	-237.48	2.69	3.97
Pipe 42	290	6	150	-237.48	2.69	3.97
Pipe 43	610	8	150	-237.48	1.52	0.98
Pipe 44	1630	8	150	64.30	0.41	0.09
Pipe 45	130	6	150	306.12	3.47	6.35
Pipe 16	360	6	150	-232.78	2.64	3.83
Pipe 17	80	8	150	237.48	1.52	0.98
Pipe 20	240	4	150	5.20	0.13	0.02
Pipe 21	300	6	150	250.89	2.85	4.40
Pipe 30	3090	8	150	62.60	0.40	0.08
Pipe 46	10	2	120	62.60	6.39	107.14
Pipe 47	10	2	120	62.60	6.39	107.14
Pipe 49	315	8	150	62.60	0.40	0.08
Pipe 50	105	8	150	56.30	0.36	0.07
Pipe 51	530	6	150	1.80	0.02	0.00
Pipe 52	720	4	150	3.80	0.10	0.01
Pipe 53	250	8	150	52.00	0.33	0.06
Pipe 55	.1	99999	150	50.00	0.00	0.00
Pipe 56	50	4	150	100.50	2.57	5.82
Pipe 57	520	4	150	2.00	0.05	0.00
Pipe 58	200	4	150	100.50	2.57	5.82
Pipe 59	1150	4	150	4.10	0.10	0.02
Pipe 60	365	4	150	1.30	0.03	0.00
Pipe 62	255	4	150	1.40	0.04	0.00
Pipe 63	10	4	150	0.00	0.00	0.00

Diamond Point – 2044 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 64	225	4	150	-8.10	0.21	0.05
Pipe 65	915	4	150	-15.00	0.38	0.17
Pipe 66	1250	4	150	100.50	2.57	5.82
Pipe 67	390	4	150	58.05	1.48	2.11
Pipe 68	490	4	150	39.95	1.02	1.05
Pipe 69	310	4	150	38.05	0.97	0.96
Pipe 70	200	4	150	11.46	0.29	0.10
Pipe 71	490	4	150	1.30	0.03	0.00
Pipe 72	10	4	150	0.00	0.00	0.00
Pipe 73	805	4	150	-4.50	0.11	0.02
Pipe 74	650	4	150	4.10	0.10	0.02
Pipe 75	140	4	150	11.15	0.28	0.10
Pipe 76	280	4	150	1.29	0.03	0.00
Pipe 77	415	4	150	24.89	0.64	0.44
Pipe 78	355	4	150	8.16	0.21	0.06
Pipe 79	355	4	150	6.76	0.17	0.04
Pipe 80	560	4	150	15.61	0.40	0.18
Pipe 81	390	4	150	-8.71	0.22	0.06
Pipe 82	340	4	150	11.05	0.28	0.10
Pipe 83	750	4	150	5.50	0.14	0.03
Pipe 84	270	6	150	31.90	0.36	0.10
Pipe 88	25	6	150	31.90	0.36	0.10
Pipe 89	300	4	150	19.45	0.50	0.28
Pipe 90	150	4	150	5.85	0.15	0.03
Pipe 91	800	4	150	4.15	0.11	0.02
Pipe 92	1010	4	150	0.65	0.02	0.00
Pipe 93	810	4	150	-2.85	0.07	0.01
Pipe 95	150	4	150	-4.55	0.12	0.02

Diamond Point – 2044 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 96	990	4	150	10.75	0.27	0.09
Pipe 97	1220	4	150	2.70	0.07	0.01
Pipe 98	1350	4	150	8.10	0.21	0.05
Pipe 99	120	2	150	1.70	0.17	0.09
Pipe 94	1050	4	150	31.90	0.81	0.69
Pipe 101	10	2	120	30.00	3.06	27.43
Pipe 102	300	4	150	3.60	0.09	0.01
Pipe 103	390	4	150	3.40	0.09	0.01
Pipe 104	420	4	150	1.00	0.03	0.00
Pipe 105	10	2	120	-26.40	2.70	21.65
Pipe 106	490	4	150	4.30	0.11	0.02
Pipe 85	490	2	150	1.70	0.17	0.09
Pipe 86	10	2	120	30.00	3.06	27.44
Pipe 87	180	8	150	170.87	1.09	0.53
Pipe 107	500	8	150	0.00	0.00	0.00
Pipe 108	420	4	150	0.00	0.00	0.00
Pipe 109	10	6	150	-155.99	1.77	1.82
Pipe 111	70	6	150	230.24	2.61	3.75
Pipe 112	40	6	150	230.24	2.61	3.75
Pipe 113	570	8	150	211.86	1.35	0.79
Pipe 114	40	6	150	-43.75	0.50	0.17
Pipe 115	60	6	150	255.61	2.90	4.55
Pipe 116	20	6	150	86.02	0.98	0.61
Pipe 117	10	6	150	0.00	0.00	0.00
Pipe 118	10	8	150	170.87	1.09	0.53
Pipe 119	10	6	150	0.00	0.00	0.00
Pipe 120	10	6	150	0.00	0.00	0.00
Pipe 121	230	6	150	14.88	0.17	0.02

Diamond Point – 2044 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 122	10	6	150	0.00	0.00	0.00
Pipe 123	10	6	150	0.00	0.00	0.00
Pipe 124	10	6	150	0.00	0.00	0.00
Pipe 125	10	6	150	0.00	0.00	0.00
Pipe 126	10	6	150	0.00	0.00	0.00
Pipe 127	10	6	150	0.00	0.00	0.00
Pipe 128	140	6	150	301.82	3.42	6.19
Pipe 129	310	8	150	-237.48	1.52	0.98
Pipe 130	50	8	150	-237.48	1.52	0.98
Pipe 131	10	6	150	0.00	0.00	0.00
Pipe 132	10	6	150	0.00	0.00	0.00
Pipe 133	100	8	150	50.00	0.32	0.05
Pipe 134	290	4	150	30.00	0.77	0.62
Pipe 136	1085	6	150	251.31	2.85	4.41
Pipe 137	50	8	150	3376.13	21.55	133.41
Pipe 138	20	4	150	543.60	13.88	132.62
Pump 1	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 2	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 14	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 15	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump 100	#N/A	#N/A	#N/A	30.00	0.00	-133.00
Valve 38	#N/A	4	#N/A	0.00	0.00	0.00
Valve 48	#N/A	2	#N/A	62.60	6.39	21.77
Valve 54	#N/A	8	#N/A	50.00	0.32	9.10
Valve 61	#N/A	2	#N/A	31.90	3.26	123.47
Valve 110	#N/A	8	#N/A	50.00	0.32	79.81
Valve 135	#N/A	2	#N/A	30.00	3.06	61.50

APPENDIX R
Water Usage Data

Source Meter Data

Cascadia Water: WELL SOURCE READINGS 2020

DIAMOND POINT

	gallons			
MONTH	WELL # 2	CUBIC FEET	WELL # 1	CUBIC FEET
END OF 2019	68255200		49116200	
January	68481900		49380700	
PRODUCTION	226700	30307	264500	35361
February	68858200		49772000	
PRODUCTION	376300	50307	391300	52313
March	69180700		50074800	
PRODUCTION	322500	43115	302800	40481
April	69563500		50449700	
PRODUCTION	382800	51176	374900	50120
May	69985000		50906000	
PRODUCTION	421500	56350	456300	61003
June	70462100		51436000	
PRODUCTION	477100	63783	530000	70856
July	70998200		51938900	
PRODUCTION	536100	71671	502900	67233
August	71595800		52767100	
PRODUCTION	597600	79893	828200	110722
September	72171900		53383000	
PRODUCTION	576100	77019	615900	82340
October	72717400		53820400	
PRODUCTION	545500	72928	437400	58476
November	73060800		54193700	
PRODUCTION	343400	45909	373300	49906
December	73703200		54743800	
PRODUCTION	642400	85882	550100	73543
TOTAL YEARLY PRODUCTION (CF):		728,342.25		752,352.94

Cascadia Water: WELL SOURCE READINGS 2022

	DIAMOND POINT			
	gallons			
MONTH	WELL # 2	CUBIC FEET	WELL # 1	CUBIC FEET
END OF 2021	79799600		61167200	
January	80282800		61653400	
PRODUCTION	483200	64599	486200	65000
February	80671300		62053200	
PRODUCTION	388500	51939	399800	53449
March	81034000		62453400	
PRODUCTION	362700	48489	400200	53503
April	81451500		62852900	
PRODUCTION	417500	55816	399500	53409
May	81934000		63374800	
PRODUCTION	482500	64505	521900	69773
June	82405200		63861800	
PRODUCTION	471200	62995	487000	65107
July	83124000		64581700	
PRODUCTION	718800	96096	719900	96243
August	84011100		65510200	
PRODUCTION	887100	118596	928500	124131
September	84719800		66226400	
PRODUCTION	708700	94746	716200	95749
October	85404000		66925200	
PRODUCTION	684200	91471	698800	93422
November	85835300		67383000	
PRODUCTION	431300	57660	457800	61203
December	86246500		67827800	
PRODUCTION	411200	54973	444800	59465
TOTAL YEARLY PRODUCTION (CF):		861885		890455

2022 - Consumer Consumption Data

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 1 - 499

Account ID	Customer/Service Location	Usage	Average
1	MAXINE SOLOMON 31 BEACH DR	5240	524
5	FISHER, KATHLEEN 61 BEACH DR	3420	342
7	HOFFMAN, JILL 142 DISCOVERY WAY	3030	303
9	HEDRICK, JEAN C. 81 BEACH DR	1640	164
14	CHRISMAN, ED 121 BEACH DR	4050	405
15	CORLISS, JEFFREY 240 NORTH ST	2490	249
16	JOHNSON, DOUGLAS 71 DISCOVERY WAY	3936	393
21	MOGREN, KENNETH W. 151 BEACH DR	1610	161
23	SALMON, DAVID 181 BEACH DR	270	27
24	GAHR, PAUL 733 CRITTER COUNTRY TR	5644	564
26	BACICA, IVAN/SARAH 141 BEACH DR	5170	517
27	BRIDGES, KEN 201 BEACH DR	7440	744
29	RABIAH BINT FRANK 481 CRITTER COUNTRY RD	7280	728
30	PEGGY PETERSEN 280 DIAMOND SHORE LN N	600	60
33	MADDUX, JOSEPH E 220 DIAMOND SHORE LN N	3980	398
35	LANDSTROM, JACK 251 BEACH DR	8790	879
36	JOANNE LABAW 261 BEACH DR	2840	284
40	MARIAN HOLLAND 291 BEACH DR	2420	242
41	DIAMOND POINT LLC 301 BEACH DR	3110	311
42	VALENTINE, KATHY 250 DIAMOND SHORE LN N	1080	108
46	PACHOLSKI, RICK 331 BEACH DR	4380	438
47	HOVIK, STANLEY J. 351 BEACH DR	1820	182
48	SANDY HAYES 361 BEACH DR	650	65
50	POUND, BRUCE 350 DIAMOND SHORE LN N	780	78
52	BUTLER, JOAN L. 381 BEACH DR	3760	376
54	YARUSS, GARY 540 NORTH ST	5440	544
55	CHAMBERLAIN, MICHAEL 401 BEACH DR	40	4
58	KOSEN, GEORGE 240 DIAMOND SHORE LN N	4110	411
62	MILLER, GLORIA 3821 DIAMOND POINT RD	6160	616
63	KING, MICHAEL 451 BEACH DR	720	72
66	DICKIN, PAMELA 3740 DIAMOND POINT RD	5010	501
67	PRAVITZ, KAREN 481 BEACH DR	2540	254
74	DIAMOND PT BEACH CLUB 1000 BEACH DR 2	350	35
76	KASKA, KAREN 281 S DIAMOND SHORE LN	1100	110
78	MCINTYRE, DONALD E. 311 S DIAMOND SHORE LN	2440	244
81	VARBEL, LORI 370 S DIAMOND SHORE LN	2000	200
82	DIAMOND POINT PROPERTIES LLC 390 S DIAMOND SHORE LN	460	46
83	WOOTTEN, CLAUDE 20 EAGLES REST LN	4450	445
88	WARE, ELOISE 441 BEACH DR	9080	908
94	JEANNETTE BRUIL 41 BLUFF LN	640	64

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 1 - 499

Account ID	Customer/Service Location	Usage	Average
101	OLIVER, LUCILLE 3933 DIAMOND POINT RD	0	0
113	ROSHER-WEITENDORF 302 DISCOVERY WAY	3580	358
114	BLACK-PEECHER, MEGAN 160 DIAMOND SHORE LN N	3620	362
123	TERRENCE JEPPERSON 300 DIAMOND SHORE LN N	470	47
130	CHAMPEAUX, MICHAEL G. 23 BEACH DR	12370	1237
140	SCHENK, NANCY 62 DISCOVERY WAY	950	95
143	MITCHELL, DAVID 92 DISCOVERY WAY	4470	447
147	TUFTE LLC 120 DISCOVERY WAY	4960	496
149	BROWN, JACOB 121 DISCOVERY WAY	4110	411
151	HARRISON, FRED 350 NORTH ST	4660	466
152	SPARGO, EUGENE 131 DISCOVERY WAY	2310	231
153	SUNRIVER, APA 151 DISCOVERY WAY	1630	163
156	JONES, ALAN 191 BLUFF LN	2630	263
160	TURVER, DEBRA 0 DISCOVERY WAY	410	41
161	JONES, ALAN 171 BLUFF LN	1180	118
162	HOWARD, JEFF 151 BLUFF LN	0	0
163	VANDERHEUL, HUGH 141 BLUFF LN	6000	600
164	KALINYAK, MARY 123 BLUFF LN	230	23
166	GRUBER, ROBERT 101 BLUFF LN	220	22
186	BECKY TUFTE 210 NORTH ST	1840	184
192	KNUDSON, RICHARD 223 SPRING VIEW PL	630	63
194	PETERSON, BOYD 230 SPRING VIEW PL	1220	122
195	SOLI, DONALD 251 SPRING VIEW PL	1540	154
199	VAZQUEZ, CHARLES 273 SPRING VIEW PL	6080	608
200	VIRGINIA RYAN 283 SPRING VIEW PL	9640	964
207	RICHARDSON, SHARMAN 491 LUPINE DR	3480	348
212	NOEL BORGEN 110 SPRING VIEW PL	2550	255
217	JOHNSON, MARALEE 30 SPRING VIEW PL	870	87
219	HOFFMAN, BEVERLY K. 122 KAUFMAN DR	3090	309
225	BOLTON, ROBERT 40 KAUFMAN DR	40	4
227	LEWIS, NANCY 20 KAUFMAN DR	300	30
228	MOREY, WENDY 3901 DIAMOND POINT RD	5450	545
229	GEORGE EHRLICH 3881 DIAMOND POINT RD	5110	511
230	FORSTER, LISA D. 3871 DIAMOND POINT RD	150	15
239	STULL, DONALD 451 LUPINE DR	830	83
242	SHENAR, JOHN 10 SHIPVIEW LN	5780	578
246	DICUS, MILTON 52 SHIPVIEW LN	2200	220
253	RENEE SOUCY/JOAN BAYER 60 EAGLES REST LN	520	52
254	ZANDER, GORDON 3760 DIAMOND POINT RD	5270	527
260	RANDY UDD 61 SOUTH ST	3220	322

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 1 - 499

Account ID	Customer/Service Location	Usage	Average
265	RICHARD TALBOT 73 SOUTH ST	0	0
272	BARNETT, TOM 231 DISCOVERY WAY	2730	273
273	LUTHER, TERRY 281 DISCOVERY WAY	1280	128
295	LATHAM, ALAN 453 DISCOVERY WAY	2290	229
297	SICKLER, IRVING 457 DISCOVERY WAY	6630	663
305	HANSEN, ERNEST F. 51 S DIAMOND SHORE LN	3890	389
309	AITKENS-MOWREY, PATRICIA C 51 DIAMOND SHORE LN N	9710	971
312	TRASK, ACE F. 90 EAGLES REST LN	2230	223
316	ROBERT PERANTIE 113 NORTH ST	180	18
317	SHANKS, TED 450 NORTH ST	3260	326
318	PALMER, A.J. 381 DISCOVERY WAY	2890	289
321	RHODES, RAY 300 NORTH ST	1040	104
323	NASH, PAUL 21 S DIAMOND SHORE LN	1420	142
324	KIM TURVER 0 DISCOVERY WAY	640	64
325	MASSEY, COLLIS 320 NORTH ST	400	40
326	MCDONALD, PATRICIA 323 CRITTER COUNTRY TR	2990	299
328	LUCY PAUCKERT 71 BLUFF LN	2520	252
329	LUCY PAUCKERT 112 S DIAMOND SHORE LN	4590	459
330	GARRISON, TOM/SHERRI 269 CANYON ESTATES RD	450	45
331	NASH, JOANNA 267 CANYON ESTATES RD	10080	1008
334	PRESTON, ALAN/KIM 193 CANYON ESTATES RD	3320	332
355	WIELBICKI, WALTER W. 63 MADRONA WAY	5310	531
356	CONWAY, CHUCK 50 BLUFF LN	3790	379
359	HARRISON, TIMOTHY 210 DIAMOND SHORE LN N	4480	448
365	SCHLOSSER, TOM 371 BEACH DR	2180	218
372	SLATTERY, KEITH 411 DISCOVERY WAY	2300	230
380	NAHIGIAN, JEFFREY A. 450 LUPINE DR	480	48
388	GERBER, MAX 641 NORTH ST	10	1
394	MELLENTHIN, DAN 80 OCTOBER CT	10980	1098
398	AGAMEMNON LLC 71 SPRING VIEW PL	650	65
399	PUD #1 OF CLALLAM COUNTY 0 CRITTER COUNTRY TR	0	0
412	HERMAN, KAREN L. 601 NORTH ST	8140	814
467	KESSINGER, RANDY LOT 3 CRITTER COUNTRY TR	0	0
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Total(s):		344440	304

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 10000000 - 19999999

Account ID	Customer/Service Location	Usage	Average
10000600	POLANSKA, KATARZYNA LOT 6 DRAGONFLY LN	0	0
10001001	HUGHES, WALTER 556 NORTH ST	3270	327
10001100	BRISCO, MIKE LOT 1 DRAGONFLY LN	0	0
10002100	BRISCO, MIKE LOT 2 DRAGONFLY LN	0	0
10002300	BOEHM, DAYLENE 51 BEACH DR	5490	549
10003200	LLC, PACIFIC FINANCIAL CENTER LOT 3 DRAGONFLY LN	0	0
10004200	RIKER, VAN 651 NORTH ST	5040	504
10005200	LLC, TRIFOUR COMPANY LOT 5 DRAGONFLY LN	0	0
10006300	VANETTEN, TRACIE 71 BEACH DR	3030	303
10009100	RABIAH BINT FRANK 0 CRITTER COUNTRY TR	0	0
10010100	NICKUM, SUSAN 162 DISCOVERY WAY	3880	388
10011200	OLINGER, ELIZABETH 404 CRITTER COUNTRY TR	8420	842
10013100	FOSSE, MORRIS 191 BEACH DR	3620	362
10013200	BEARD, MICHAEL 0 DIAMOND POINT RD	140	14
10017400	WESCOTT, DAVID 131 BEACH DR	6650	665
10019100	POWERS, TRACY 70 KAUFMAN DR	2210	221
10020200	KRUGER, MARK 412 CRITTER COUNTRY TR	6120	612
10022100	JENKINS, JOHN 22 SOUTH ST	1410	141
10027100	NEWKOFF, STAN 44 SPRING VIEW PL	8330	833
10030200	DIKKEN, ELLEN 105 YAKOBI WAY	2570	257
10030300	CAVANAUGH, RICK LOT 3 CRITTER COUNTRY TR	0	0
10031100	CLARK, DAVID Lot 31 S DIAMOND SHORE LN	0	0
10031200	CURTIS, DAVID 180 DIAMOND SHORE LN N	1900	190
10032200	LUKSAN, LARRY 241 BEACH DR	570	57
10033100	LINDA BOND 442 NORTH ST	2830	283
10034300	CULLEN, ELLEN 282 DISCOVERY WAY	6610	661
10037100	OWINGS, AMY 491 BEACH DR	1990	199
10039200	DICKSON, REBECCA RICHARD 271 BEACH DR	8170	817
10040200	LLC, TRIFOUR COMPANY LOT 4 DRAGONFLY LN	0	0
10043100	MICHALSON, MARY 310 DIAMOND SHORE LN N	260	26
10044400	CAVANAUGH, RICK LOT 4 CRITTER COUNTRY TR	0	0
10044600	LLC, TROST INVESTMENTS 340 DIAMOND SHORE LN N	1414	128
10045300	ANDERSON, KURT 321 BEACH DR	360	36
10050100	WATSON, KELLY 160 SPRING VIEW PL	5340	534
10053200	RUSSELL HAMMOND 501 BEACH DR	160	16
10056200	DAY, TRACI 421 BEACH DR	610	61
10057200	WOODVILLE, ANTHONY 572 CRITTER COUNTRY TR	5450	545
10061400	SCOZZARO, BRIAN 732 CRITTER COUNTRY TR	2300	230
10069100	KATHLEEN KEEHN 61 DISCOVERY VIEW DR	4330	433
10069400	BOURGEOIS, MIKE 292 SPRING VIEW PL	0	0

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 10000000 - 19999999

Account ID	Customer/Service Location	Usage	Average
10070200	LENCHO, SARA 82 SHIPVIEW LN	450	45
10073200	MORRIS, LAVON 181 DISCOVERY VIEW DR	7410	741
10075200	KATHRYN KNIGHT 261 S DIAMOND SHORE LN	1030	103
10077200	MACKAY, IAN 291 S DIAMOND SHORE LN	970	97
10078200	VON BURKLEO, CHRISTIAN 150 DIAMOND SHORE LN N	4340	434
10079400	OLIVER-VAUGHN 81 DISCOVERY VIEW DR	2730	273
10080200	DIESEN, LINDA 350 S DIAMOND SHORE LN	3070	307
10084100	HERT, GEORGENE 81 BLUFF LN	0	0
10089200	TANGWALL, RANDY 123 CANYON ESTATES RD	5210	521
10090200	DYE, JASON 10 CANYON ESTATES RD	710	71
10095300	GROSS, GEORGETTE 31 BLUFF LN	1570	157
10096200	CAYS, RICHARD 11 BLUFF LN	3810	381
10099300	PHILLIPS, IVY 203 CRITTER COUNTRY TR	1980	198
10100300	OWINGS, SHARMAN 30 DIAMOND SHORE LN N	7780	778
10101000	COLLIER, CHALON 10 GRETA PL	2580	258
10102400	MINETTI, LANCE 11 DIAMOND SHORE LN N	0	0
10105200	CURRIER, DANIEL 20 CANYON ESTATES RD	5860	586
10106300	DAMMEIER, PATRICK 71 DIAMOND SHORE LN N	8000	800
10108200	DASILVA, CHARLES 90 DIAMOND SHORE LN N	6170	617
10110200	WHICHARD, DAN 110 DIAMOND SHORE LN N	1080	108
10111200	TRUBIANO, JON 120 DIAMOND SHORE LN N	5680	568
10116200	COVEY, JOANNE 0 EAGLES REST LN	0	0
10118601	CRULL, JACEE 11 GRETA PL	12880	1288
10138102	COLE, KENNETH 70 BLUFF LN	6370	637
10142200	ABRAHAMSON, CRAIG 72 DISCOVERY WAY	2480	248
10148405	HINES, TIMBERLY 111 DISCOVERY WAY	3840	384
10150200	BRANTON, KIM 340 NORTH ST	680	68
10168200	WALKER, PETE 11 KAUFMAN DR	3860	386
10169400	MUSARRA, JONATHAN 51 NORTH ST	3110	311
10171200	TANNER BRUCE J. 81 NORTH ST	2330	233
10173300	BOLTON, ROBERT LOT 1 NORTH ST	0	0
10175200	DAVENPORT, JEFF 160 NORTH ST	0	0
10177400	TAUREK, DAVIDA 250 NORTH ST	3870	387
10178200	BRUCE WALES LOT 15 NORTH ST	0	0
10179200	WESTREM, EVELYN 0 NORTH ST LOT 14	0	0
10187200	MINGEE, CHERYL 51 CORMORANT DR	1360	136
10190100	WILLIAMS, LARRY 111 SOUTH ST	3140	314
10190200	CAMPBELL, JIM 190 SPRING VIEW PL	6160	616
10196500	HICKS, AMY 263 SPRING VIEW PL	4490	449
10197200	SKANNES-BERRYMAN 240 SPRING VIEW PL	3880	388

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 10000000 - 19999999

Account ID	Customer/Service Location	Usage	Average
10198200	REYNOLDS, CAROL 280 SPRING VIEW PL	3020	302
10202500	SMITH, CALEB 301 SPRING VIEW PL	2950	295
10203200	KARI DARVILL-COATE 300 SPRING VIEW PL	4600	460
10206200	MAGNUSEN, CHARLIE 170 SPRING VIEW PL	4340	434
10209300	KLEPPER, ALAN 33 GILBERTSON LANE	10150	922
10210200	BRIONES, DANIEL 91 GILBERTSON LANE	7760	776
10213300	ZUMDIECK, JON 100 SPRING VIEW PL	3000	300
10214200	DAVENPORT, JEFF 91 SPRING VIEW PL	1010	101
10215200	BOHAC, HELEN 140 KAUFMAN DR	2050	205
10218300	HOMAN, ANGELA 60 NORTH ST	3370	337
10224200	CARLSON, STEVE 51 KAUFMAN DR	5220	522
10231100	KENNY DINGS 231 BEACH DR	0	0
10234200	CARPENTER, CHRISTIAN 471 LUPINE DR	1050	105
10241200	GARADI, UDAYASHANKAR 11 SHIPVIEW LN	2060	206
10264102	JACKSON, RICH 3690 DIAMOND POINT RD	3930	393
10266200	MCDONNELL, TIM 83 SOUTH ST	160	16
10269200	KIMMEL, LAWRENCE 211 DISCOVERY WAY	190	19
10270200	JONES, PETER 221 DISCOVERY WAY	3810	381
10274300	SIMONS, BRIAN 272 DISCOVERY WAY	8400	840
10277300	CHRIS AIROLA 301 DISCOVERY WAY	1820	182
10281200	ZINGG, PENNY 322 DISCOVERY WAY	2560	256
10282003	BONALLO, WILLIAM 221 BEACH DR	780	78
10283400	JOHNSON, KIM 341 DISCOVERY WAY	2570	257
10284300	NIZIC, MICHAEL 362 DISCOVERY WAY	6380	638
10285300	CERNA, FELISA 382 DISCOVERY WAY	1390	139
10286201	GUENTHER, SHAWN 410 DISCOVERY WAY	1230	123
10290300	PAYNE, KATHRYN 421 DISCOVERY WAY	1420	142
10291100	WELFRINGER, MARK 291 DISCOVERY WAY	690	69
10293200	CHRISTOPHER OKEEFE 191 DISCOVERY VIEW DR	5220	522
10294400	SANDRA WANG 441 DISCOVERY WAY	730	73
10296301	HARDIN, RODGER 455 DISCOVERY WAY	2180	218
10298400	ROSS, BRIDGETTE 141 DISCOVERY VIEW DR	6000	600
10299300	DICKIE, KEITH 123 DISCOVERY VIEW DR	860	86
10300200	GUTTORMSON, STEVEN Lot 11 DISCOVERY VIEW DR	0	0
10304200	BEEBE, BEVERLY 11 DISCOVERY VIEW DR	4390	439
10306300	MORRISON, KELLEY 10 EAGLES REST LN	4080	408
10310200	LONG, RANDY 31 DISCOVERY VIEW DR	5990	599
10311200	JUDY WILSON 40 CORMORANT DR	1930	193
10313300	WOOD, DANIEL 151 DISCOVERY VIEW DR	10510	1051
10315200	MINGEE, CHERYL 203 SPRING VIEW PL	960	96

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 10000000 - 19999999

Account ID	Customer/Service Location	Usage	Average
10319300	WRIGHT, DAVID 190 DIAMOND SHORE LN N	3220	322
10327200	SUZANNE WININGER 252 DISCOVERY WAY	910	91
10333100	TRIEBENBACH, NEIL 0 CANYON ESTATES RD LOT5	0	0
10334301	BAZILE, MARGARET 120 SPRING VIEW PL	2890	289
10335201	SMITHSON, KAITLIN 284 CANYON ESTATES RD	4670	467
10336400	PLISS, RODNEY 286 CANYON ESTATES RD	8620	862
10337301	BRASTER, TUCHERA 32 GRETA PL	5440	544
10341200	VELLA, DAVID 94 CANYON ESTATES RD	4700	470
10342400	MESTRE, STACY 90 GRETA PL	390	39
10343400	REED, CORRINE 31 GRETA PL	12170	1217
10344400	THACHER, AUSTIN 81 GRETA PL	8790	879
10357100	ENGES, ERIC 81 BLUE ICE TER	1070	107
10358301	MCKENZIE, JOHN 51 DISCOVERY VIEW DR	3450	345
10360106	DENENBERG, RISA 60 SHIPVIEW LN	1690	169
10361200	HAO THURMAN 140 DIAMOND SHORE LN N	2440	244
10362200	MCMULLEN, BRAD 362 DIAMOND SHORE LN N	2430	243
10362604	UNTHANK, JOHN 511 BEACH DR	1010	101
10363400	BRUCE/FRANCES LUDWIG 180 SPRING VIEW PL	1960	196
10366400	TRIEBENBACH, NEIL 192 CANYON ESTATES RD	1180	118
10370200	BUTCHER, MARK 34 CANYON ESTATES RD	10850	1085
10371200	GONZALEZ, JAMES 71 KAUFMAN DR	9410	941
10373200	SUNSTROM, CARRIE 11 DISCOVERY WAY	10850	1085
10374200	RAY ANDERSON 11 CORMORANT DR	4890	489
10375200	SILVERMAN, SCOTT 171 DISCOVERY VIEW DR	10370	1037
10377200	DR. THOMAS DAWSON 180 DISCOVERY WAY	1580	158
10379300	SCHNEIDER, GREGORY 70 WEST ST	1880	188
10381200	HAMILTON, DEBRA 90 KAUFMAN DR	8530	853
10384101	MORRIS, PETER 80 BLUFF LN	2660	266
10385200	MARSDEN, JAMES 120 WEST ST	7050	705
10386200	WIDSTEEN, JIM 423 NORTH ST	7860	786
10389300	BARE, PEARLEE 480 LUPINE DR	8770	877
10390100	SCOTT HARRIS 40 DISCOVERY WAY	3470	347
10392201	HIBBARD, JOHN 46 CANYON ESTATES RD	4900	490
10395300	BRECK, CASSIDY 3921 DIAMOND POINT RD	11740	1174
10397300	GILMAN, ANTHONY 22 DISCOVERY WAY	5520	552
10401201	WEEDON, PAM 90 WEST ST	2250	225
10403401	TODD ROBINSON PAINTING, INC. 221 SPRING VIEW PL	2750	275
10405301	STEELE, WAYNE 40 GRETA PL	5830	583
10406300	THOMPSON-WININGER, SUZANNE 42 DISCOVERY WAY	470	47
10407100	FREEMAN, LOWELL 461 LUPINE DR	2880	288

USAGE HISTORY

CASCADIA WATER

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Account ID	Customer/Service Location	Usage	Average
10413200	BELLET, LISBETH 142 WEST ST	3880	388
10414400	BRUCKSCHEN, ROBIN 40 OCTOBER CT	6880	688
10415400	JOHNSON, CHAD 11 OCTOBER CT	5040	504
10416400	BOWMAN, IRENE 83 OCTOBER CT	7850	785
10417300	TURNER, CHRISTINA 71 OCTOBER CT	590	59
10418500	SHAW, JIM 31 OCTOBER CT	4960	496
10419300	RONALD BRIAM 100 WEST ST	6180	618
10420100	WELLS, KIRK 113 CANYON ESTATES RD	1750	175
10421200	P F O A 83 CANYON ESTATES RD	4000	400
10422100	COOPER, JAN 65 CANYON ESTATES RD	6180	618
10423600	BROOKS, ARTHUR 45 CANYON ESTATES RD	4990	499
10424500	LOPEZ, ANTHONY 212 CRITTER COUNTRY TR	2280	207
10425300	SHEARER, ANITA 252 CRITTER COUNTRY TR	9710	971
10426300	BOLTON, KAMIE 20 YAKOBI WAY	6040	604
10427300	HOFMANN, GARY 40 YAKOBI WAY	4060	406
10428300	DALE, RICHARD 62 YAKOBI WAY	810	81
10429200	BRADSHAW, ANDREW 102 YAKOBI WAY	4160	416
10431200	NEELY, PAM 93 YAKOBI WAY	7360	736
10432200	EMILY COLER 33 YAKOBI WAY	4430	443
10433100	VENNETTI, MIKE 21 YAKOBI WAY	0	0
10435100	BAYER, JOAN 0 DIAMOND POINT RD	0	0
10466300	VILLANI, MITCHELL 463 CRITTER COUNTRY TR	5430	543
10468200	KESSLER, ANIKA 363 CRITTER COUNTRY TR	7290	729
10469200	JOE SCHOMMER 430 NORTH ST	8460	846
10477300	DEBORAH CASPER 3671 DIAMOND POINT RD	2770	277
10498100	PARKER, STEVE 301 S DIAMOND SHORE LN	2280	228
10498101	RANKIN, ROBERT 111 S DIAMOND SHORE LN	6170	617
10498102	KIEPKE, RICH 140 SPRING VIEW PL	4940	494
10499300	KATHRYN KNIGHT 263 S DIAMOND SHORE LN	1290	129
10530100	MCCOMB, MICHAEL 530 NORTH ST	5180	518
10533200	PENCZAK, WILLIAM 533 NORTH ST	9700	970
10780300	MCHENRY, PATRICK 21 OCTOBER CT	8660	787
10860200	CODY, DAVID 321 DISCOVERY WAY	5320	532
10889300	KISER, VERENNA 370 NORTH ST	1420	142
10900100	ALEX FOARD Lot 9 DISCOVERY WAY	237	23
10921300	THACKER, AARON 41 GRETA PL	7780	778
11021200	GOODALL, JEFFREY 53 GILBERTSON LANE	7700	770
11639200	LINARES, JOSE 20 GILBERTSON LANE	9020	902
11640200	SUGZDA, ANN MARIE 72 GILBERTSON LANE	5800	580
11641200	BROWN, ARENIA 92 GILBERTSON LANE	7610	761

USAGE HISTORY

CASCADIA WATER

DATE: 05/08/2023 AUTHOR: AQUASJ15

CRITERIA: 01/01/2022 - 12/31/2022 ACCT#: 10000000 - 19999999

Account ID	Customer/Service Location	Usage	Average
11642200	KIRSCHNER, MICHAEL 42 GILBERTSON LANE	5070	460
11644200	AUSTIN, TIFFANY 82 GILBERTSON LANE	6100	610
13906100	HUNT, RAILIN 95 SOUTH ST	1172	117
14041100	BAILEY, MARGARET 31 S DIAMOND SHORE LN	10	1
15585100	PERERSON, MIKE 220 SPRING VIEW PL	0	0
15884100	TETREAULT, SARA 30 EAGLES REST LN	0	0
15918101	KUDRONOWICZ, DESIRAE 303 CRITTER COUNTRY TR	2526	360
19999100	NICHOLS, EVERETT 91 GRETA PL	4410	441
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Total(s):		769149	369

APPENDIX S
Emergency Response Plan

EMERGENCY RESPONSE PLAN

A. PLAN OVERVIEW

This is a general Emergency Response Plan to be implemented by Cascadia Water (hereinafter 'Cascadia') for the water systems they own and operate. This planning document is intended to assist Cascadia and their operators in protecting the health and safety of their customers, staff, and assets. The plan intends to provide general guidance to maintain or restore safe and reliable drinking water. The goals of the Emergency Response Plan are listed in Table 1. Due to the size of the majority of systems owned by Cascadia and most of their infrastructure, the primary vulnerabilities will be related to distribution system pressures, water main repairs, and resulting water quality contamination.

Table 1: Emergency Response Goals

Mission statement for emergency response	In an emergency, the primary objective of Cascadia Water is to protect the health of its customers by being prepared to respond immediately to a variety of events that may result in contamination of the water or disruption to supplying water.
Goal 1	Be able to quickly identify an emergency and initiate timely and effective response action.
Goal 2	Be able to quickly notify local, state, and federal agencies to assist in the response.
Goal 3	Protect public health by being able to quickly determine if the water is safe to drink and being able to immediately notify customers of a potentially unsafe condition and advise them of appropriate protective action.
Goal 4	To be able to quickly respond to and repair damages to minimize system down time.

B. WATER SYSTEM INFORMATION

Table 2 provides a quick reference for general information regarding a water system. Including, locations, primary assets, quantities, and primary contacts.

Table 2: System Information

System Name	Diamond Point
Population:	795 people – 320 connections
Owner Contract Information:	Cascadia Water, LLC PO Box 549 (18181 SR 525) Freeland, WA 98249 Phone: (888) 235-0510 Emergency/After Hours: (833) 591-3336
Operator Contact:	Dale Metzger Phone: (360) 477-9704
System Location:	Pumphouse, Upper Reservoirs 2681 Diamond Point Rd Sequim, WA 98382
Directions	Traveling East/West on WA 101, turn North onto Diamond Point Rd. Travel North approximately 2.0 miles and the system sources are located on the right-hand side of the road. Continuing North on Diamond Point Rd for an additional 0.7 miles and the upper reservoir and pumphouse are located on the left hand side of the road at the address noted (2681 Diamond Point Rd).
Sources	Well 1 – Well Tag: AGP297 – 250 gpm – 393' depth Well 2 – Well Tag: AGP298 – 250 gpm – 392' depth
Reservoirs	Reservoir 1 – 70,500 gallons (20' diameter x 30' height) Reservoir 2 – 106,200 gallons (Elevated Reservoir) Reservoir 3 – 122,200 gallons (20' diameter x 52' height)
Transfer Pumps	(2) Goulds 3656 (7.5 hp) Pump Capacity: 300 gpm (from Reservoir 1 to Reservoir 2)
Booster Pump	(1) Berkeley 15LT2 (1.5 hp) Pressure Settings: 70-/90-psi
Pressure Tanks	(7) Amtrol WX302 (86 gallons)
Distribution Piping	▪ 2" – 220 ft ▪ 4" – 28,255 ft ▪ 6" – 8,010 ft ▪ 8" – 1,860 ft Total: 37,590 ft

C. Emergency Telephone Numbers and Personnel

Response to all emergencies may be initiated by calling 9-1-1.

Clallam County Fire Protection District #3 serves Diamond Point and the other areas located within the approved service areas. The Fire Protection District will respond to chemical spills and physical hazards such as downed trees and power lines, as well as fire emergencies.

General water system inquiries may be made to:

Cascadia Water
Mailing Address:
PO Box 549, Freeland, WA 98249
Physical Address:
18181 SR 525, Freeland, WA 98249
Telephone: 360.578.7044
E-Mail: info@cascadiawater.com

For assistance with emergency procedures, the following additional personnel may be contacted:

Culley Lehman, Manager
Cascadia Water, LLC
Cell: (360) 661.7781

Dale Metzger, Operator
Telephone: (360) 477-9704

The Diamond Point system is equipped with a SCADA (Supervisory Control and Data Acquisition) system which provides monitoring and alarms for the system including system pressures, pump operations, reservoir levels, backwash activation, etc.

D. Notification of Local Authorities

The following agencies shall be notified by Cascadia where required by statute, to request assistance, or to provide information for public inquiries:

Washington State Department of Health	
Andy Anderson, P.E.	
Southwest Regional Office Manager	Phone: (360) 236-3025
DOH After Hours Emergency Hotline	Phone: (877) 481-4901
Clallam County	
Clallam County Public Health	Phone: (360) 417-2274
Clallam County Public Works	Phone: (360) 417-2319
Clallam County Emergency Management Justine Chorley, Program Coordinator	Phone: (360) 417-2525
Clallam County Fire District #3 - Station 31	Phone: (360) 683.4242

Cascadia Water shall be responsible for contacting the above and notifying customers for all emergencies, including coliform monitoring violations.

E. Notification of the Public

For notification of the public during water emergencies such as issuance of an "Acute Health Advisory", Cascadia shall utilize the following methods to notify the public, as they are applicable:

- E-Mail notification
- Portable Signs at primary entry/exit roads
- Door-to-door notification/door hangers
- Website Updates
- News releases

F. Potential Emergency Events

The most likely emergencies will include the following:

- Low system pressure – customer complaint
- Water main break/leak – customer complaint, visual inspection/detection
- Water quality issues – customer complaint or positive test result from routine monitoring

Major and/or widespread system failure may occur from the following:

- Fire at pumphouse
- Earthquake
- Landslide in local area
- Flooding at pumphouse
- Other earth movement (e.g. landslide) causing a major water main break.
- Chemical contamination of sources of supply
- Ice Storm (freezing pipes)
- System Vandalism

G. Emergency Response

Low pressure

Complaints of low pressure should be referred to the system operator, Dale Metzger. Minimum actions include:

- Verify that the source of supply pressure is normal.
    - Reservoir levels are in a normal range
    - Booster pump discharge pressures are in normal range (check pressure gauges on hydropneumatic tanks)

- Establish if low pressure is isolated to the customer making the complaint. This may be done by checking the pressure at the meter of the customer making the complaint (remove meter and install pressure gauge), or by placing a pressure gauge on a neighboring customer's hose bib.
- If low pressure occurs at more than one home, check for closed main valve or leaking water main.
- If pressure is normal at meter, recommend that customer contact plumber/private contractor.

Cascadia Water/Diamond Point WILL NOT undertake work on private property to correct a problem with the customer's plumbing system.

Water main leak or break

Cascadia Water will complete all system repairs where possible. Cascadia has the necessary equipment and parts to complete most repairs required in the system.

Cascadia should maintain the following minimum supply of materials to facilitate emergency repairs:

- Two lengths of 4-, 6- and 8-inch AWWA C-900 Class 150 PVC pipe
- Two 4-, 6- and 8-inch mechanical joint ductile iron sleeves with joint materials
- 20 feet each of ¾-inch and 1-inch HDPE service tubing
- Brass fittings, connectors, etc., for services
- Two each: 4-, 6- and 8-inch x ¾-inch service saddles and corporation stops
- 300 feet of 2.5-inch fire hose with two sets of coupling adapters to connect fire hose to 2-inch IPS fittings

When repairs cannot be accomplished by the system operator, Cascadia maintains a list of locally licensed and bonded general contractors that can provide additional support when necessary.

Whenever possible, leaks in mains and services should be repaired without the shutdown of the water main. A water main break may require that a section of the main be shut down for repair. When isolating the section of broken pipe, leave at least one gate valve slightly open to allow water to flow out of the broken section of pipe until dewatering equipment can remove the water surrounding the broken section of pipe. This is done to prevent groundwater and dirt from entering the broken section of pipe.

In the event of a water main break that shatters a section of pipe or otherwise allows groundwater to enter the main, contamination of the water pipe shall be assumed. As part of the repair procedure, the water system shall be disinfected with a high concentration of chlorine (e.g., 200 mg/L for 2 hours), and then flushed. Following flushing, a bacteriological sample will be collected from the customer at the downstream end of the broken section of water main.

Follow the emergency disinfection procedures outlined in DOH Publication 331-583 Water Main Break Response Protocol for Chlorinated Systems located at the end of this section.

Disinfect repair material with a 5 percent solution of sodium hypochlorite (bleach). Add chlorine to the open trench section as a precautionary measure, working in a wet trench exposes repair parts to groundwater, mud, etc.

If groundwater enters the broken pipe, a full disinfection by the "slug" method may be necessary. The chlorine dose for this method should be at least 500 mg/L.

Following the repair of a main break that requires dewatering of the system, confirm water quality is maintained by collecting investigative bacteriological samples, one upstream and one downstream of the break.

If a long period of time is required for the repair of a water main, it may be necessary to provide temporary water supply to customers by:

- Using garden hoses to connect homes with water to those without, usually through the backyard hose bibs, or
- Using fire hose to run a temporary service main and making connection to each meter setter.

All hoses used to provide temporary service connections should be disinfected.

Complaint about water quality or positive bacteriological result from routine monitoring

With respect to water quality issues, if a complaint indicates system contamination, or the results of water quality analysis show that any maximum contaminant level (MCL) is exceeded, the system operator and manager shall follow the procedures set forth in *WAC 246-290-320 Follow-up Action*.

Notification procedures may include any or all of the following, depending on the nature of the complaint or quality problem:

- Door-to-door or telephone notification of customers
- County and DOH notification
- Public notification per WAC 246-290-330 and the Coliform Monitoring Plan (Appendix M of the Diamond Point – 2025 Water System Plan).

For the emergencies listed above, the impact on the system is likely to include loss of pressure due to line break, potential water quality contamination, loss of power or loss of water service. Main breaks, loss of pressure and water quality contamination are addressed above. Should loss of power or loss of source capacity occur the Water Shortage Response Plan should be implemented.

If a major emergency occurs, it is impossible to predict which portions of the system will be affected. Response procedures will be a variation of those listed above and will need to be tailored to the specific problem at the time of the emergency.

H. BACKFLOW INCIDENT

Whenever the initial evaluation of a water quality complaint indicates that a backflow incident has occurred (potable water supply has been contaminated/polluted), may have occurred, or the reason for the complaint cannot be explained as a "normal" aesthetic problem, a backflow incident investigation should be immediately initiated. It is wise to be conservative when dealing with public health matters.

Within 24 hours of knowledge of any incident of possible contamination of the potable water supply, either in the distribution system and/or in the customer's plumbing system, the state and county personnel listed above should be notified.

A backflow incident investigation is often a team effort. The investigation should be made or (initially) lead by the certified Cascadia.

Cascadia will use the manual Backflow Incident Investigation Procedures, First Edition, 1996, published by the PNWS-AWWA as a supplement to the Backflow Incident Response Plan. The following points are included for initial guidance during a backflow incident:

- As soon as possible, notify customers not to consume or use water. Start the notification with the customers nearest to the assumed source of contamination (usually the customer(s) making the water quality complaint).
- Consider the distribution system as a potential source of the contaminant (e. g., air valve inlet below ground).
- Do not start flushing the distribution system until the source of contamination is identified. Flushing may aggravate the backflow situation and will likely remove the contaminant before a water sample can be collected to fully identify the contaminant.
- Conduct a house-to-house survey to identify the source of contamination and the extent that the contaminant has spread through the distribution system.
- Isolate the portions of the system that are suspected of being contaminated by closing isolation valves; leaving one valve open to ensure that positive water pressure is maintained throughout the isolated system.
- Be sure to notify all affected customers in the isolated area, then the other customers in the system.
- The public health and plumbing authorities should work with all customers who may have consumed the contaminant, or had their plumbing systems contaminated.
- Develop and implement a program for cleaning the contaminated distribution system.

Identification of the source and type of contaminant, and cleaning of a distribution system could take several days.

Most chemical or physical contaminants can be flushed from the water distribution system or customer's plumbing system with adequate flushing velocity. This may not be the case where scale and corrosion deposits (e.g., tuberculation on old cast iron mains) restrict adequate

flushing velocity, or a chemical deposit or bacteriological slime (biofilm) is present on which the chemical contaminant may adhere.

To remove a chemical or physical contaminant, it may be necessary to provide a physical cleaning, using foam swabs (pigs), and/or to alter the form or the chemical contaminant, e.g., through oxidation using chlorination, or addition of detergents.

When adding any chemical (including chlorine) to remove a contaminant, it is essential that the chemistry of the contaminant is fully understood. The wrong chemical reaction could make the contaminant more toxic, more difficult to remove, or both.

Where both a chemical and bacteriological contamination has occurred, disinfection should follow the removal of the chemical contaminant.

Where any bacteriological contamination is suspected, field disinfection should be done. To disinfect water mains using the "slug" or "continuous flow" method, a field unit should be used for chlorine injection, such as a chemical feed - metering or proportioning pump for sodium hypochlorite.

I. Natural Hazard Event

In the event of a natural hazard such as an earthquake, local landslide, flooding, fire, or freezing, Cascadia Water will implement responses per event, along with taking preliminary precautions.

In the event of a natural hazard where immediate help is required, Cascadia is a member of the Washington Water/Wastewater Agency Response Network (WAWARN) and could receive assistance and/or supplies from other utilities registered with WAWARN.

Cascadia's water system components are inspected daily to ensure equipment is at peak performance and that assets are protected in the case of a natural hazard event. All data is stored electronically, and facilities are guarded with proper fencing, and concrete structures to ensure safety of equipment and source water.

J. Contingency Plan

With one well out of service the other well has adequate capacity to support the system.

A short-term well pump failure or loss of a single well should have negligible impact on the system. Customers should be notified that water conservation measures should be implemented if the outage persists for an extended time period and the inoperable well impacts the system capacity or the quality of the delivered water. In the event of a short-term emergency such as source contamination, Cascadia will:

a) Assess the nature and extent of the contamination, its impact on water quality, and whether water treatment will allow continued use of the contaminated well. If not, discontinue use of the well and,
b) Initiate water conservation measures to conserve minimum storage in the system reservoir. The system's reservoirs have a combined useful storage capacity of

approximately 241,000-gallons. Assuming that only a single source is compromised, the reservoir has capacity to provide approximately 730 gallons per connection.

Emergency water sources in order of priority are:

1. Hauled Water
2. Bottled Water
3. Emergency Intertie

If water service interruption is expected to be several days, bottled water may be necessary to meet customer minimum needs until other options are explored.

There are no interties or intertie agreements with other systems at this time. If the water service will be interrupted for longer than a 10-day period, Cascadia may explore the possibility of an emergency intertie with neighboring systems. Existing systems adjacent to the Diamond Point distribution mains would be potential candidates for emergency interties. Should an intertie not be feasible, Cascadia will contract for hauled water to fill the storage tank until service can be restored.

Other emergencies to be addressed:

- Reservoir failure
- Booster Pump Failure
- Treatment Equipment Failure
- Spills around well head

K. GENERAL REFERENCE

For general emergency planning, the following references should be studied before an emergency occurs:

Emergency Planning for Water and Wastewater Utilities (M19), Fifth Edition, 2018, published by the American Water Works Association.

APPENDIX T
Cross-Connection Control Program

Cross-Connection Control Program

- Diamond Point -

1 OVERVIEW

The Diamond Point Water System (Diamond Point) is located in unincorporated Clallam County east of Sequim, Washington. The service area includes portions of Sections 15, 16, 21, and 22 of Township 30 North, Range 2 West of the Willamette Meridian.

Diamond Point is owned and operated by Cascadia Water, LLC (Cascadia) which is a private, investor-owned utility company consisting of multiple water systems throughout the State of Washington. Monterra currently has 320+ connections, all of which are classified as single-family residential connections aside from one recreation connection.

2 REQUIREMENTS FOR PROGRAM

Cascadia Water, hereinafter referred to as the Purveyor, has the responsibility to protect their public water systems from contamination due to cross-connections. A cross-connection may be defined as "Any actual or potential physical connection between a potable water line and any pipe, vessel, or machine that contains or has a probability of containing a non-potable gas or liquid, such that it is possible for a non-potable gas or liquid to enter the potable water system by backflow".

3 PROGRAM OBJECTIVES

The objectives of the cross-connection control program are to:

1 Reasonably reduce the risk of contamination of the public water distribution system; and

2 Reasonably reduce the Purveyor's exposure to legal liability arising from the backflow of any contaminant originating from the customer's plumbing system and then supplied to other customers.

4 PROGRAM ELEMENTS

The following are excerpts from the Washington Administrative Code (WAC) 246-290-490 regarding the required elements of the cross-connection control program.

4.1 Element 1

The purveyor shall adopt a local ordinance, resolution, code, bylaw, or other written legal instrument that:

1. Establishes the purveyor's legal authority to implement a cross-connection control program.
2. Describes the operating policies and technical provisions of the purveyor's cross-connection control program.
3. Describes the corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements.

4.2 Element 2

The purveyor shall develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system and notify the consumer within a reasonable time frame of the hazard evaluation results. At minimum, the program shall meet the following:

1. For new connections made on or after the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted before service is provided.
2. For existing connections made prior to the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted in accordance with a schedule acceptable to the Washington State Department of Health.
3. For all service connections, once an initial evaluation has been conducted, procedures shall ensure that periodic reevaluations are conducted in accordance with a schedule acceptable to the department and whenever there is a change in the use of the premises.

4.3 Element 3

The purveyor shall develop and implement procedures and schedules for ensuring that:

1. Cross-connections are eliminated whenever possible.
2. When cross-connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard; and
3. Approved backflow preventers are installed in accordance with the requirements of WAC 246-290 subsection 6.

4.4 Element 4

The purveyor shall ensure that personnel, including at least one person certified as a cross-connection control specialist (CCS) are provided to develop and implement the cross-connection control program.

4.5 Element 5

The purveyor shall develop and implement procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable) in accordance with WAC 246-290 subsection 7.

4.6 Element 6

The purveyor shall develop and implement a backflow prevention assembly testing quality control assurance program including, but not limited to documentation of tester certification and test kit calibration, test report contents, and time frames for submitting completed test reports.

4.7 Element 7

The purveyor shall develop and implement (when appropriate) procedures for responding to backflow incidents.

4.8 Element 8

The purveyor shall include information on cross-connection control in the purveyor's existing program for educating consumers about water system operations. Such a program may include periodic bill inserts, public service announcements, pamphlet distribution, notification of new consumers and consumer confidence reports.

4.9 Element 9

The purveyor shall develop and maintain cross-connection control records including, but not limited to, the following:

1) A master list of service connections and/or consumer's premises where the purveyor relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow preventer(s).
2) Inventory information on:
    a) Approved air gaps installed in lieu of approved assemblies including exact air gap location, assessed degree of hazard, installation date, history of inspections, inspection results, and person conducting inspections; and
    b) Approved backflow assemblies including exact assembly location, assembly description (type, manufacturer, model, size, and serial number), assessed degree of hazard, installation date, history of inspections, tests and repairs, test results, and person performing tests; and
    c) Approved AVBs used for irrigation system applications including location, description (manufacturer, model, and size), installation date, history of inspections, and person performing inspections.

A copy of the current Washington State Department of Health “Cross-Connection Program Summary Reports” and “Backflow” section WAC 246-290.

4.10 Element 10

Purveyors who distribute and/or have facilities that receive reclaimed water within their water service area shall meet any additional cross-connection control requirements imposed by the department under a permit issued in accordance with chapter 90.46 of the Revised Code of Washington (RCW).

5 PROGRAM OPERATIONS

5.1 Authority

The attached resolution establishes the authority for the program. The attached service contract referred to in the resolution shall be the primary enforcement authority for all new customers.

For customers supplied prior to the adoption of the attached resolution, an implied service contract allows the Purveyor to protect the distribution system from contamination through a Purveyor installed backflow preventer on a customer's service.

The written and implied contract terms are discussed further hereinafter under the section "Policy".

5.2 Program Administration

The responsibility for administration rests with the Purveyor, either as a body or to an individual director or employee, hereinafter referred to as the Director.

The administration of the program shall be periodically audited by a Washington State Department of Health (DOH) certified Cross-Connection Control Specialist (CCCS) employed by the Purveyor. At a minimum, the audit will occur every six years. For systems required to update a water system plan, the audit should be part of water system plan update. When requested, the CCCS shall also advise the Director on cross-connection-control matters.

The current CCCS employed by the Purveyor is:

Culley Lehman (360) 331-7388

5.3 Policy

The following service policy shall apply to all new and existing customers:

Water services to all non-single family or duplex residential customers, hereinafter referred to as "commercial customers", shall be isolated at the meter by a Purveyor approved, double check valve assembly (DCVA) or reduced pressure backflow assembly (RPBA). All customers described in Table 13 of WAC 246-290-490 shall be isolated with a RPBA. All other commercial customers shall be isolated with a DCVA.

Water services to all single family or duplex residential customers, hereafter referred to as "residential customers", shall be isolated at the meter by a Purveyor installed meter check valve (single or dual), except where the customer has special plumbing that increases the risk to the Purveyor's distribution system, such as, but not limited to, the following:

1. Lawn Irrigation System	4. Piping for hobby farming, etc.
2. Solar Heatin System	5. Residential fire sprinkler system
3. Auxiliary Source of supply (e.g. well)	6. Property containing small boat moorage

All residential customers described in Table 13 of WAC 246-290-490 shall be isolated with a RPBA. All other residential customers with special plumbing as described in “2”, above, shall be isolated with a DCVA. For all customers that have a written service contract with the Purveyor, the premises isolation DCVA or RPBA required above shall be:

1. Purchased and install by the customer (at the customer's expense) immediately downstream of the water meter in accordance with the Purveyor's standards described hereinafter;

2. Maintained, repaired, tested, and inspected in accordance with the Purveyor's standards described hereinafter;

For new customers, water shall not be turned on at the meter until the customer complies with the above requirements.

The failure of the customer to comply with the above installation and maintenance requirements shall constitute the customer's breach of contract. The Purveyor may then proceed with corrective action provisions stipulated in the contract.

Customers without a written contract shall be considered to have an implied contract that requires the customer to bear all reasonable costs of service. The Purveyor shall install the required DCVA or RPBA on the service, upstream of the meter, and charge the customer for the cost of the initial installation, and all future maintenance, testing and repair, as set forth in the Purveyor's schedule of rates and charges. The failure of the customer to pay these costs shall constitute the customer's breach of contract, and the Purveyor shall proceed with the established delinquency of payment procedures. As an alternative, the customer may sign a service contract, and install the required backflow preventer downstream of the meter.

The Purveyor has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations, and for prevention of contamination of his plumbing system from sources within his premises. Any action taken by the Purveyor to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation (installation of DCVA or RPBA on service) is solely for the purposes of reducing the risk of contamination of the Purveyor's distribution system.

No action by the Purveyor shall be construed by the customer to provide guidance to the customer on the safety or reliability of the plumbing system. Other than the general public education program discussed hereinafter, the Purveyor will provide no advice to the customer on the design and installation of plumbing.

Except for easements containing the Purveyor's distribution system, the Purveyor will not undertake work on the customer's premises.

5.4 Cross-Connection Surveys

The procedures for evaluating the backflow prevention requirements for new and existing customers are:

1. For all new commercial services, the customer shall submit with the application for water service an evaluation by a purveyor pre-approved, WA Department of Health certified CCS of the hazard posed by the proposed plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA. The Purveyor, at the discretion of the Director, may accept the recommendation or submit the recommendations to a CCCS employed by the Purveyor for peer review and concurrence, before acceptance.
2. For all new residential services, the customer shall submit with the application for water service a completed "Water Use Questionnaire", copy attached hereto. If the customer's reply indicate special plumbing, such as a lawn sprinkler system, the customer shall submit an evaluation by a purveyor pre-approved, DOH CCCS of the hazard posed by the proposed special plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA.

As an alternative to the above requirement for a survey by a CCCS, at the discretion of the Director, the Purveyor may specify the backflow preventer required to be installed as a condition of service.

For all existing commercial services, the customer shall be requested to submit within two years an evaluation by a purveyor pre-approved, DOH certified CCCS of the hazard posed by the proposed plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA. The Purveyor, at the discretion of the Director, may accept the recommendation or submit the recommendations to a CCS employed by the Purveyor for peer review and concurrence, before acceptance.

For all existing residential services, the customer shall be requested to submit within four months a completed "Water Use Questionnaire". If the customer's reply indicates special plumbing, the customer shall submit an evaluation by a purveyor pre-approved, DOH certified CCCS of the hazard posed by the proposed special plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA.

As an alternative to the above requirement for a survey by a CCCS, at the discretion of the Director, the Purveyor may specify the backflow preventer required to be installed as a condition of service. Guidance on the type of backflow preventer shall be provided by the Purveyor's CCCS.

For existing services, should the customer fail to supply the requested information for a hazard assessment, the Director may have the assessment made by a CCCS employed by the Purveyor, require the installation of an RPBA, or take other such actions consistent with the previously stated policies.

For subsequent cross-connection surveys, procedures for evaluating the backflow prevention requirements are:

1. For residential services not required to have a DCVA or RPBA, every two years and/or at the time of a change in ownership of the premises, the customer shall be requested to submit within two months a completed "Water Use Questionnaire". The procedure for evaluating the need to change the hazard assessment, and thus require a DCVA or RPBA shall be the same as the procedure for the initial assessment.
2. For residential services with a DCVA or RPBA, and for all commercial services, the customers shall be required to submit with the annual report on the testing of the DCVA or RPBA, a reevaluation of the hazard assessment. To facilitate the reevaluation, the customer should employ for testing the DCVA or RPBA a Purveyor pre-approved, DOH certified CCCS (dual CCCS and Backflow Assembly Tester (BAT) certification). Alternatively, the customer may employ a CCCS to accompany the BAT.

5.5 Testing of Assemblies

The following requirements apply to all backflow prevention assemblies and air gaps relied upon by the Purveyor to protect its public water system.

The DCVA or RPBA installed on the service for premises isolation shall be inspected and tested by a DOH certified BAT upon installation and at least annually thereafter, after repair, replacement or relocation, and upon the specific request of the Purveyor as a spot quality assurance check. As previously noted, the BAT shall also retain WA DOH certification as a CCCS.

For customer-owned assemblies, the customer shall employ a Purveyor pre-approved BAT to complete the inspection and test within 30 days of date of mailing by the Purveyor of a notification to test the assembly. The test report shall be completed and signed by the BAT, then countersigned and returned by the customer to the Purveyor within 45 days of the date of mailing of the notification to test the assembly. A request for an extension of the completion time for the return of a test report may be made in writing by the customer to the Purveyor. An extension up to 90 days may be granted at the discretion of the Director.

The DCVA, DCDA, RPBA and RPDA, shall be tested in accordance with the test performance criteria outlined in Chapter 8 "Assembly Test Procedures" in the PNWS-AWWA Cross-Connection Control Manual.

The test report form supplied by the Purveyor, copy attached hereto, shall be completed and returned.

5.6 Quality Assurance

The following requirements apply to all backflow prevention assemblies and air gaps relied upon by the Purveyor to protect its public water system.

The test report forms submitted by the customer shall be reviewed upon receipt by the Director, and periodically by a CCCS employed by the Purveyor to audit the cross-connection control program. Test reports should be reviewed by the CCCS at least annually.

To ensure that the equipment used to test assemblies has been checked for calibration within the last year, the Purveyor shall list as pre-approved those BATs listed by another water utility with greater than 1,000 connections that has a quality assurance program. Alternatively, the BAT may submit with a test report a report on the verification of the calibration of his test equipment and current certification status.

5.7 Approved Backflow Assemblies

The Purveyor shall rely upon the Washington Department of Health's published list of "Approved" backflow prevention assemblies. This list shall be obtained from the State of Washington annually.

5.8 Records

The Director shall maintain copies of all records, including but not limited to, correspondence, survey results, and backflow assembly test reports. The record form "Record of Backflow Prevention Assemblies" (Form B-1), included herewith, shall be used to record the location of all backflow prevention assemblies required by the Purveyor.

5.9 List of Certified Testers

The list of local certified BAT and CCS approved by the Purveyor is included herewith. Others may be added to this list upon written request. A list of all certified tester may be obtained from the DOH.

5.10 Coordination with Plumbing Authority

A copy of this cross-connection control program is provided to Clallam County Plumbing Inspector, hereinafter referred to as the local administrative authority, via a copy of the Purveyor's water system plan.

The Director shall provide information to the local administrative authority in a timely manner of:

1. Any requirement imposed on a residential customer for the installation of a DCVA or RPBA on the service, with a description of the cross-connection hazard identified,
2. Any upgrade of the premise’s isolation from a DCVA to a RPBA,
3. Any action taken to discontinue water supply, and
4. Any backflow incident.

The Purveyor's survey of a customer's premises, whether by a representative of the Purveyor or through the evaluation of a questionnaire completed by the customer, is for the sole purpose of establishing the

Purveyor's minimum requirements for the protection of the public water supply system, commensurate with the Purveyor's assessment of the degree of hazard. It shall not be assumed by the customer or any regulatory agencies that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by Purveyor personnel or agent constitutes an approval of the customer's plumbing system, or an assurance to the customer or any regulatory agency, of the absence of cross-connections therein.

5.11 Backflow Incident Response

The Purveyor's emergency procedures (cross-connection control section attached hereto) include a backflow incident response plan. The response plan is supplemented by the most recent version of the PNWS-AWWA Backflow Incident Investigation Procedures.

5.12 Public Education

The public education program for the Purveyor shall consist mainly of the distribution with water bills of information brochures describing the cross-connection hazards in homes and the recommended devices that should be installed by the homeowner to reduce the hazard. The education program emphasizes the responsibility of the customer in preventing the contamination of his water supply. The information brochures may be obtained from Pacific Northwest Section, American Water Works Association, PO Box 19581, Portland, Oregon, 97280, telephone 877-767-2992 (toll free), other backflow prevention associations and other water utilities.

The information brochure on thermal expansion, published by the Spokane Region Cross-connection Control Committee shall be included as part of the education program.

Information brochures shall be periodically distributed to all customers; the period between distributions of a brochure on the topic of cross-connection control shall not exceed three years.

5.13 Installation Standards

All DCVA and RPBA on the customer's service shall be installed in accordance with the recommendations outlined in the most recent version of the PNWS-AWWA Cross- Connection Control Manual.

REFERENCES:

PNWS-AWWA CROSS-CONNECTION CONTROL MANUAL, Sixth Edition, 1995, or latest edition thereof.

PNWS-AWWA BACKFLOW INCIDENT INVESTIGATION PROCEDURES, First Edition, 1996, or latest edition thereof.

WA DOH CROSS-CONNECTION CONTROL GUIDANCE MANUAL FOR SMALL WATER SYSTEMS, 2000, or latest edition thereof.

SCHEDULE FOR PROGRAM
IMPLEMENTATION AND OPERATION

TASK	SCHEDULE
Adoption of policy and administrative authority	March 2020
Assess purveyor's system hazards (e.g., air valves)	May 2020
BPAs installed in water distribution system	August 2020
New customer hazard assessment	Upon application
BPAs installed on new customers	Before service provided
Existing customer hazard assessment: Single family – questionnaire Commercial - survey	 July 2020 September 2020
Notification of assessment: High hazard (table 9) All others	 November 2020 January 2021
BPAs installed on existing customers: High hazard (table 9) Commercial Residential Commercial/residential fire systems	 December 2021 December 2022 December 2023 December 2024
Re-assessment of hazard: Commercial Residential	 Every 2 years Every 2 years
Distribution of education brochures	July each year
Annual BPA testing notification	March each year
CCCS review of program	April each year

Cascadia WATER™

Attachment A:

Cross-Connection Control Resolution

RESOLUTION
CROSS-CONNECTION CONTROL POLICY
(draft)

FINDING OF FACT:

Whereas it is the responsibility of a water purveyor to provide water to the customer that meet State water quality standards;

Whereas it is the water purveyor's responsibility to prevent the contamination of the public water supply system from the source of supply to the customer's connection to the service pipe or meter;

Whereas it is a requirement of the Washington Department of Health for the purveyor to establish a cross-connection control program satisfactory to the Department of Health, and

Whereas cross-connections within the customer's plumbing system pose a potential source for the contamination of the public water supply system;

Now be it resolved that Cascadia Water, hereinafter referred to as the Purveyor, establishes the following service policy to protect the Purveyor owned water supply system from the risk of contamination. For public health and safety, this policy shall apply equally to all new and existing customers.

PREVENTION OF CONTAMINATION:

The customer's plumbing system, starting from the termination of the Purveyor's water service pipe, shall be considered a potential high health hazard requiring the isolation of the customer's premises by a Purveyor approved, customer installed and maintained reduced pressure backflow assembly (RPBA) or detector derivative thereof. The RPBA shall be located at the end of the Purveyor's water service pipe (i.e., immediately downstream of the meter). Water shall only be supplied to the customer through a Purveyor an approved and customer installed and maintained RPBA.

Notwithstanding the aforesaid, the Purveyor, upon an assessment of the risk of contamination posed by the customer's plumbing system and use of water, may allow:

A. A single family or duplex residential customer to connect directly to the water service pipe, i.e., without a Purveyor approved DCVA or RPBA.
B. Any customer other than a single family or duplex residential customer, as a minimum, to be supplied through a Purveyor/WA DOH approved, customer installed and maintained double check valve assembly (DCVA) or double check detector assembly (DCDA).

CONDITIONS FOR PROVIDING SERVICE:

Water service is provided based on the following terms and limitations:

1) The customer agrees to take all measures necessary to prevent the contamination of the plumbing system within his premises and the Purveyor's distribution system that may occur from backflow through a cross-connection. These measures shall include the prevention of backflow under any back pressure or backsiphonage condition, including the disruption of supply from the Purveyor's system that may occur by reason of routine system maintenance or during emergency conditions, such as a water main break.

2) The customer agrees to install, operate and maintain at all times his plumbing system in compliance with the current edition of the Plumbing Code having jurisdiction as it pertains to the prevention of contamination, and protection from thermal expansion due to a closed system that could occur with the present or future installation of backflow preventers on the customer's service and/or at plumbing fixtures.

3) For cross-connection control or other public health related surveys, the customer agrees to provide free access for the employees or agents of the Purveyor to all parts of the premises during reasonable working hours of the day for routine surveys, and at all times during emergencies.

Where agreement for free access for the purveyor's survey is denied, water service may be supplied by the Purveyor, provided premises isolation is provided through a Purveyor/WA DOH approved reduced pressure backflow assembly (RPBA).

4) The customer agrees: (a) to have tested upon installation, annually thereafter or when requested by the Purveyor, after repair and after relocation his RPBA or DCVA installed to protect the Purveyor's distribution system, (b) to have all testing done by a Purveyor approved and State Department of Health currently certified Backflow Assembly Tester (BAT) with certification as a Cross-connection Control Specialist (CCS), (c) to have the RPBA or DCVA tested following the procedures approved by the WA DOH with the recommended additional procedures in the "Cross-connection Control Manual, Accepted Procedures and Practice", Sixth Edition, December 1995, or latest edition thereof, and (d) to submit to the Purveyor the results of the test(s) on the Purveyor supplied test report form within the time period specified by the Purveyor.

The customer agrees to bear all costs for the aforementioned installation, testing, repair, maintenance and replacement of the RPBA or DCVA or derivative thereof installed to protect the Purveyor's distribution system.

5) At the time of application for service, if required by the Purveyor, the customer agrees to submit plumbing plans and/or a cross-connection control survey

of the premises by a Purveyor approved and Washington Department of Health certified CCS.

The survey shall assess the cross-connection hazards and list the backflow prevention provided within the premises. The results of the survey shall be submitted prior to the Purveyor turning on water service to a new customer. The cost of the survey shall be borne by the customer.

6) For classes of customers other than single family residential, when required by the Purveyor, the customer agrees to submit a cross-connection control re-survey of the premises by the persons described above. The Purveyor may require the re-survey to be performed in response to changes in customer's plumbing or performed periodically (annual or less frequent) where the Purveyor considers the customer's plumbing system to be complex or subject to frequent changes in water use. The cost of the re-survey shall be borne by the customer.

7) Within 30 days of a request by the Purveyor, a residential customer shall agree to complete and submit to the Purveyor a "Water Use Questionnaire" for the purpose of surveying the health hazard posed by the customer's plumbing system on the Purveyor's distribution system. Further, the residential customer agrees to provide with 30 days of a request by the Purveyor a cross-connection control survey of the premises by a Purveyor approved and Washington Department of Health certified CCS.

8) The customer agrees to obtain the prior approval from the Purveyor for all changes in water use, and alterations and additions to the plumbing system, and shall comply with any additional requirements imposed by the Purveyor for cross-connection control.

9) The customer agrees to immediately notify the Purveyor and the local public health inspection jurisdiction of any backflow incident occurring within the premises, (i.e., entry into the potable water of any contaminant or pollutant) and shall cooperate fully with the Purveyor to determine the reason for the incident.

10) The customer acknowledges the right of the Purveyor to discontinue water supply within 72 hours of giving notice, or a lesser period of time if required to protect the public health, if the customers fails to cooperate with the Purveyor in the survey of premises, in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies or air gaps required by the Purveyor, or in the Purveyor's effort to contain a contaminant or pollutant that is detected in the customer's system.

Without limiting the generality of the foregoing, in lieu of discontinuing water service the Purveyor may install a reduced pressure backflow assembly (RPBA) on its service pipe to provide premises isolation, and recover all of its costs for the installation and subsequent maintenance and repair of the assembly, appurtenances and enclosure from the customer as fees and charges for water. The failure of the

customer to pay these fees and charges may result in termination of service in accordance with the Purveyor's water billing policies.

11) The customer agrees to indemnify and hold harmless the Purveyor for all contamination of the customer's plumbing system or the Purveyor's distribution system that results from an unprotected or inadequately protected cross-connection within his premises. This indemnification shall pertain to all backflow conditions that may arise from the Purveyor's suspension of water supply or reduction of water pressure, recognizing that the air gap separation otherwise required would require the customer to provide adequate facilities to collect, store and pump water for his premises.

12) The customer agrees that, in the event legal action is required and commenced between the Purveyor and the customer to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.

13) The customer acknowledges that the Purveyor's survey of a customer's premises is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, commensurate with the Purveyor's assessment of the degree of hazard.

It shall not be assumed by the customer or any regulatory agency that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by Purveyor personnel constitutes an approval of the customer's plumbing system, or an assurance to the customer of the absence of cross-connections therein.

14) The customer acknowledges the right of the Purveyor, in keeping with changes to State regulations, industry standards, or the Purveyor's risk management policies, to impose retroactive requirements for additional cross-connection control measures.

The Purveyor shall record the customer's agreement to the above terms for service on an "Application for Water Service", "Application for Change of Water Service" or other such form prepared by the Purveyor and signed by the customer.

The definition of technical terms given in the "Cross-connection Control Manual, Accepted Procedures and Practice", Sixth Edition, December 1995 published by the Pacific Northwest Section, American Water Works Association, or latest edition thereof, shall apply herein.

APPLICATION FOR WATER SERVICE

OWNER'S NAME: _____ TELEPHONE: _____

MAILING ADDRESS: _____

LOCATION ADDRESS: _____

LEGAL DESCRIPTION: _____

The undersigned applicant hereby applies for a water connection to the above described property. The applicant is the owner of the described property or the authorized agent of the owner. By signing this application, the property owner agrees, as a condition of the Cascadia Water, hereinafter referred to as the Purveyor, providing and continuing service to the above described property, to comply with all provisions of the attached Resolution or latest revision thereof, and other such attached rules and regulations now existing or which may be established from time to time governing the Purveyor's water system. The property owner specifically agrees:

a) To install and maintain at all times his plumbing system in compliance with the most current edition of the Island County Plumbing Code as it pertains to the prevention of potable water system contamination, prevention of pressure surges and thermal expansion in his water piping (for thermal expansion, it shall be assumed that a check valve is installed by the Purveyor on the water service pipe);

b) Within 30 days of the Purveyor's request, to install, test, maintain, and repair in accordance with the Purveyor's cross-connection control standards a reduced pressure backflow assembly or double check backflow assembly, or detector derivative thereof, on the customer's service pipe immediately downstream of the Purveyor's meter, or other Purveyor approved location; and to report to the Purveyor within 30 days of obtaining the results of all tests and repairs to aforementioned backflow prevention assemblies, and of making any change to the plumbing system.

c) Not to make a claim against the Purveyor or its agents or employees for damages and/or loss of production, sales or service, in case of water pressure variations, or the disruption of the water supply for water system repair, routine maintenance, power outages, and other conditions normally expected in the operation of a water system.

APPLICATION FOR SERVICE

d) To pay his water billing within thirty (30) days from the date of billing.

After thirty (30) days of the Purveyor mailing a written notice to the property owner of his breach of this agreement, the Purveyor may terminate water service. In the event legal action is required and commenced between the parties to this agreement to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.

_____ _____

Applicant Signature Date

Water rates & charges
Water service connection information
Water Service Policy

PURVEYOR USE ONLY

____ / ____ / _____ Date connection fee received

____ / ____ / _____ Date Water Use Survey questionnaire received

____ / ____ / _____ Date risk assessment completed; by

____ / ____ / _____ Date customer notified of requirement for BPA

____ / ____ / _____ Date BPA installation approved

____ / ____ / _____ Date BPA test report accepted

____ / ____ / _____ Date BPA information entered into database

____ / ____ / _____ Date water service installed

____ / ____ / _____ Date meter installed and water turned on

BACKFLOW INCIDENT RESPONSE PLAN
(supplement to the Emergency Plan)

A. General

This backflow incident response plan is a supplement to the Emergency Plan of Cascadia Water, hereinafter referred to as the Purveyor.

Whenever the initial evaluation of a water quality complaint indicates that a backflow incident has occurred (potable water supply has been contaminated/polluted), may have occurred, or the reason for the complaint can not be explained as a "normal" aesthetic problem, a backflow incident investigation should be immediately initiated. Whenever a water main break or power outage (pumped systems) causes a widespread loss of water pressure (backsiphonage conditions) it is prudent to initiate a check of distribution water quality as a precursor to the need for a backflow incident investigation. It is wise to be conservative when dealing with public health matters.

Within 24 hours of knowledge of any incident of possible contamination of the potable water supply, both in the distribution system and/or in the customer's plumbing system, the state and local county personnel should be notified (see list of emergency telephone numbers at the beginning of the M. & O. Manual).

A backflow incident investigation is often a team effort. The investigation should be made or (initially) lead by the certified Cross-connection Control Specialist employed by the Purveyor. The investigation team should include local health and plumbing inspectors.

General guidance on how to respond to a backflow incident may be obtained from the manual BACKFLOW INCIDENT INVESTIGATION PROCEDURES, First Edition, 1996, published by the Pacific Northwest Section, American Water Works Association, P. O. Box 19581, Portland, Oregon, 97280, telephone (877) 767-2992 (toll free).

B. Short-List of Tasks

The following points are included for initial guidance for dealing with a backflow incident; the above referenced manual BACKFLOW INCIDENT INVESTIGATION PROCEDURES should be consulted as soon as possible.

1) As soon as possible, notify customers not to consume or use water. Start the notification with the customers nearest the assumed source of contamination (usually the customer(s) making the water quality complaint).

The customer should be informed about the reason for the backflow incident investigation, and the Purveyor's efforts to restore water quality as soon as possible. State that the customer will be informed when he may use water, the need to boil water used for consumption until a satisfactory bacteriological test result is obtained from the lab, etc.

Where a customer cannot be contacted immediately, the Purveyor shall place a written notice on the front door handle, and a follow-up visit will be made to confirm that the customer received notice about the break and possible contamination of the water supply.

2) Give consideration to the distribution system as a potential source of the contaminant (e.g., air valve inlet below ground).

3) Do not start flushing the distribution system until the source of contamination is identified. Flushing may aggravate the backflow situation, and will likely remove the contaminant before a water sample can be collected to fully identify the contaminant.

4) Conduct a house-to-house survey to search for the source of contamination and the extent that the contaminant has spread through the distribution system. A check of water meters may show a return of water (meter running backward).

5) Isolate the portions of the system that are suspected of being contaminated by closing isolating valves; leave one valve open to ensure that positive water pressure is maintained throughout the isolated system.

6) Be sure to notify all affected customers in the isolated area, then the other customers in the system.

7) The public health and plumbing authorities should deal with all customers that may have consumed the contaminant, or had their plumbing systems contaminated.

8) Develop and implement a program for cleaning the contaminated distribution system.

9) For the customer where a cross-connection responsible for the system contamination is located, the Purveyor should discontinue water service until the Purveyor ordered corrective action is completed by the customer.

Identification of the source and type of contaminant, and cleaning of a distribution system could take several days.

Most chemical or physical contaminants can be flushed from the water distribution system or customer's plumbing system with adequate flushing velocity. This may not be the case where scale and corrosion deposits (e.g., tuberculation on old cast iron mains) provides a restriction to obtaining adequate flushing velocity, or a chemical deposit or bacteriological slime (biofilm) on which the chemical contaminant may adhere.

To remove a chemical or physical contaminant, it may be necessary to provide a physical cleaning, using foam swabs (pigs), and/or to alter the form or the chemical contaminant, e.g., through oxidation using chlorination, or addition of detergents.

When adding any chemical (including chlorine) to remove a contaminant, it is essential that the chemistry of the contaminant is fully understood. The wrong chemical reaction could make the contaminant more toxic, more difficult to remove, or both.

Where both a chemical and bacteriological contamination has occurred, disinfection should follow the removal of the chemical contaminant.

Where any bacteriological contamination is suspected, field disinfection should be done. To disinfect water mains using the "slug" or "continuous flow" method, a field units should be used for chlorine injection, such as a chemical feed - metering or proportioning pump for sodium hypochlorite.

CROSS-CONNECTION CONTROL
SURVEY REPORT – COMMERCIAL CUSTOMERS

Date of Survey: _____

CUSTOMER INFORMATION

Premises name: _____ Telephone: _____

_____
Address

_____ _____
City, State Zip Code

Contact Person: _____ Title: _____

Customer Type: _____

Description of Water Use: _____

Water Service and Backflow Prevention Assembly (BPA) Size / Type:

	Service Size	Meter Size	BPA Size	BPA Type
Domestic				
Fire line				
Irrigation				
Other				

CROSS-CONNECTION CONTROL SPECIALIST (CCCS) INFORMATION

Name: _____ Telephone: _____

Company Name: _____

_____
Address

_____ _____
City, State Zip Code

WA DOH Certif. #: _____ Year Certified: _____

CROSS-CONNECTION CONTROL
SURVEY REPORT – COMMERCIAL CUSTOMERS

SURVEY RESULTS

Item	Location & Description of Cross-connection	Backflow Prevention Provided/Required

Attach additional sheets if needed

CROSS-CONNECTION CONTROL
SURVEY REPORT – COMMERCIAL CUSTOMERS

SURVEYOR'S COMMENTS

SURVEYOR'S RECOMMENDATIONS

I certify that this survey accurately reflects the overall risk posed to the Purveyor's distribution system by the customer's plumbing system and that the backflow prevention assembly is properly installed. Based on the above survey, I find that (check one):

__ The present _____ (RPBA or DCVA) is commensurate with the degree of hazard.

__ The premises isolation assembly or assemblies should be changed for the reasons stated under "Surveyor's Comments", above.

CCCS Signature Date

This certifies receipt of this completed survey report and its submittal to Cascadia Water.

Customer Signature or Authorized Agent Date

It shall not be assumed by the customer or any regulatory agencies that this requirement by the Purveyor for this survey, or for the installation of a specific backflow prevention assembly on a service pipe constitutes an approval of the customer's plumbing system, compliance with the customer's plumbing system with the plumbing code, or an assurance to the customer of the absence of cross-connections therein.

The completed survey report shall be first signed by the CCS conducting the survey, then counter-signed by the owner of the premises surveyed or his agent.

The survey shall include the inspection of the assembly installed on a service for premises isolation to verify its correct installation and status as a currently listed Approved assembly by the WA DOH.

CROSS-CONNECTION CONTROL
SURVEY REPORT – RESIDENTIAL QUESTIONAIRE

To: _____ Date: _____

_____

_____

The attached brochure describes a "cross-connection" and the potential for contamination of the water system through unprotected cross-connections. The purpose of this questionnaire is to help determine if you have any special plumbing or activities that may pose an increased risk of contamination of the water distribution system. Please respond by checking the appropriate box below:

YES	NO	
☐	☐	Underground lawn sprinkler system
☐	☐	Water treatment system (e.g., water softener)
☐	☐	Solar heating system
☐	☐	Residential fire sprinkler system
☐	☐	Private well, including those not connected to your plumbing
☐	☐	Grey water system or cistern for irrigation water
☐	☐	Piping for livestock watering
☐	☐	Water supply to dock or small boat moorage
☐	☐	Grinder pump and/or off-site septic field

By: _____ Date: _____
Customer Signature

Please return the completed questionnaire to the address on the letterhead.

If you have checked any of the above, we will contact you to request further information. Your cooperation in completing this questionnaire is most appreciated.

If you have any questions, please contact the undersigned.

Cascadia WATER™

Attachment B:

Backflow Prevention Assembly Test Report

Cascadia Water, LLC
PO Box 549
Freeland, WA 98249
Phone: (360) 661-7781

Backflow Prevention Assembly Test Report

TESTER ID: _____ PERMIT NO: _____ ACCOUNT NO: _____

NAME OF PREMISES: _____ COMMERCIAL ☐ RESIDENTIAL ☐

SERVICE ADDRESS: _____ CITY: _____ ZIP CODE: _____

CONTACT PERSON: _____ PHONE: _____ COUNTY: _____

LOCATION OF ASSEMBLY: _____

DOWNSTREAM PROCESS: _____ ASSE NO: _____ DCVA ☐ RPZA ☐ PVBA ☐

NEW INSTALLATION ☐ EXISTING ☐ REPLACEMENT ☐ OLD ASSEMBLY SERIAL NO: _____

MAKE OF ASSEMBLY: _____ MODEL: _____ SERIAL NO: _____

	DCVA / RPBA CHECK VALVE #1	DCVA / RPBA CHECK VALVE #2	RPBA	PVBA/SVBA
INITIAL TEST PASSED ☐ FAILED ☐	CLOSED TIGHT ☐ LEAKED ☐ _____PSID	CLOSED TIGHT ☐ LEAKED ☐ _____PSID	OPENED AT_____PSID #1 CHECK_____PSID AIR GAP OK _____	AIR INET OPENED AT_____PSID DID NOT OPEN ☐
NEW PARTS AND REPAIRS	CLEAN - REPLACE - PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CLEAN - REPLACE - PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CLEAN - REPLACE - PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CHECK VALVE HELD AT _____ PSID LEAKED ☐ CLEANED ☐ REPAIRED ☐
TEST AFTER REPAIRS PASSED ☐ FAILED ☐	LEAKED ☐ _____ PSID	LEAKED ☐ _____ PSID	OPENED AT_____PSID #1 CHECK_____PSID	AIR INLET _____PSID CHECK VALVE _____PSID

AIR GAP INSPECTION: SUPPLY PIPE DIAMETER: _____ SEPARATION: _____ PASS ☐ FAIL ☐

REMARKS: _____ ☐ USC 10TH EDIT LINE PRESSURE: _____ PSI

_____ ☐ CONFINED SPACE

TESTER SIGNATURE: _____ CERT NO: _____ DATE: _____

TESTER NAME (PRINTED) _____ TESTER PHONE: ( ) _____

REPAIRED BY: _____ DATE: _____

FINAL TEST BY: _____ CERT NO: _____ DATE: _____

CALIBRATION DATE: _____ MAKE/MODEL: _____ GAUGE NO: _____

APPENDIX U
Correspondence

DOH Correspondence

This page is a placeholder for future comments and communication with the Washington State Department of Health.

Adjacent System Notification Letters

FACET

June 20, 2024

SUNSHINE ACRES
WASHINGTON WATER SERVICE
ATTN: MATTHEW BROWN, GENERAL MANAGER
PO BOX 336
GIG HARBOR, WA 98335

Re: Cascadia Water – Diamond Point – Water System Plan (WSP) Update

Dear Matthew Brown,

Cascadia Water, which owns the Diamond Point water system, is in the process of updating their Water System Plan (WSP). The Washington State Department of Health requests that adjacent water systems be notified of the update process and be allowed to review and comment on the development of the WSP. A digital copy of the updated WSP can be made available upon request to Facet, Inc. by contacting Robert Bennion, P.E. using the information provided below.

Please let us know if you have any questions, comments, or concerns regarding the WSP update.

Sincerely,

Facet, Inc.

Robert Bennion, P.E.
Civil Engineer
p: (360) 331-4131 x206
e: rbennion@facetnw.com

FACET

June 20, 2024

GARDINER LUD 1
JEFFERSON COUNTY PUD #1
ATTN: DONALD K STREETT, GENERAL MANAGER
310 FOUR CORNERS RD
PORT ANGELES, WA 98368

Re: Cascadia Water – Diamond Point – Water System Plan (WSP) Update

Dear Donald Streett,

Cascadia Water, which owns the Diamond Point water system, is in the process of updating their Water System Plan (WSP). The Washington State Department of Health requests that adjacent water systems be notified of the update process and be allowed to review and comment on the development of the WSP. A digital copy of the updated WSP can be made available upon request to Facet, Inc. by contacting Robert Bennion, P.E. using the information provided below.

Please let us know if you have any questions, comments, or concerns regarding the WSP update.

Sincerely,

Facet, Inc.

Robert Bennion, P.E.
Civil Engineer
p: (360) 331-4131 x206
e: rbennion@facetnw.com

Fire Marshal - Fire Flow Requirements

CLALLAM COUNTY
DEPARTMENT OF COMMUNITY DEVELOPMENT
COUNTY COURTHOUSE
223 E. 4TH ST., SUITE 5
PORT ANGELES, WA 98362-3015
PHONE: (360) 417-2308
FAX: (360) 417-2443

GEORGE.BAILEY@CLALLAMCOUNTYWA.GOV

BRUCE EMERY
DIRECTOR

April 29, 2025

Robert Bennion
Facet NW
1796 East Main St, Suite 105
Freeland, WA 98249

RE: Fire flow requirements

Dear Mr. Bennion:

Clallam County Fire flow requirements do not apply to existing water systems such as Monterra system (ID # 55990Y, Diamond Point system (ID # 192104, and Estates system (ID # 081669) as they were constructed before any applicable county regulations were in effect.

Repairs and maintenance and minor upgrades to such water systems to serve existing buildings are regulated by WAC 246-290. Any proposed expansions to these systems, designed to serve commercial facilities, multifamily buildings, or newly created subdivisions or short subdivisions, large lot subdivisions would be required to meet fire flow provisions per Clallam County Fire Protection Ordinance and Clallam County Land Division Code.

Clallam County requires compliance with the following standards for new water system installations and expansions as noted above. Fire flow for commercial buildings is determined by Table B of the Clallam County Fire Protection Ordinance depending on the size and type of construction. Hydrant specifications and installation and spacing are regulated by Section 21.02.035 subsections (2), and (3) of the Clallam County Fire Protection Ordinance. Residential fire flow is regulated by Clallam County Fire Protection Ordinance Section 21.02.035 subsection (1) (d) @ 500 gpm for 45 minutes for one and two family dwellings (R-3). In rural areas and where substantially open spaces exist between residential structures, a reduction in these requirements may be allowed.

If you have any questions regarding the above information, please feel free to contact me directly by phone @ 360-417-2308 or stop by the Clallam County Courthouse.

Sincerely,

George Bailey
Clallam County Fire Marshal
Plans Examiner
Building Inspector III

George P. Bailey

Local Government Consistency Determination

Local Government Consistency Determination Form

331-568 • 8/10/2023

Water System Name: Diamond Point PWS ID: 19210 4

Planning/Engineering Document Title: Diamond Point – Water System Plan – Part B Plan Date: May 2024

Local Government with Jurisdiction Conducting Review: Clallam County

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

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, the reviewer should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on page 2.

Local Government Consistency Statement	For Use by Water System: Identify page(s) in submittal	For Use by Local Government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Appendix B	yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Section 2.2	yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	n/a	n/a
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Chapter 1	yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	-	–

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

Donella Clark 8-12-24

Signature Date

Donella Clark, Principal Planner, Clallam County

Printed Name, Title, & Jurisdiction

Public Meeting Notes

This page is a placeholder for future minutes from the Consumer Meeting

APPENDIX V
Water System Drawings

Clallam County, WA

VICINITY MAP

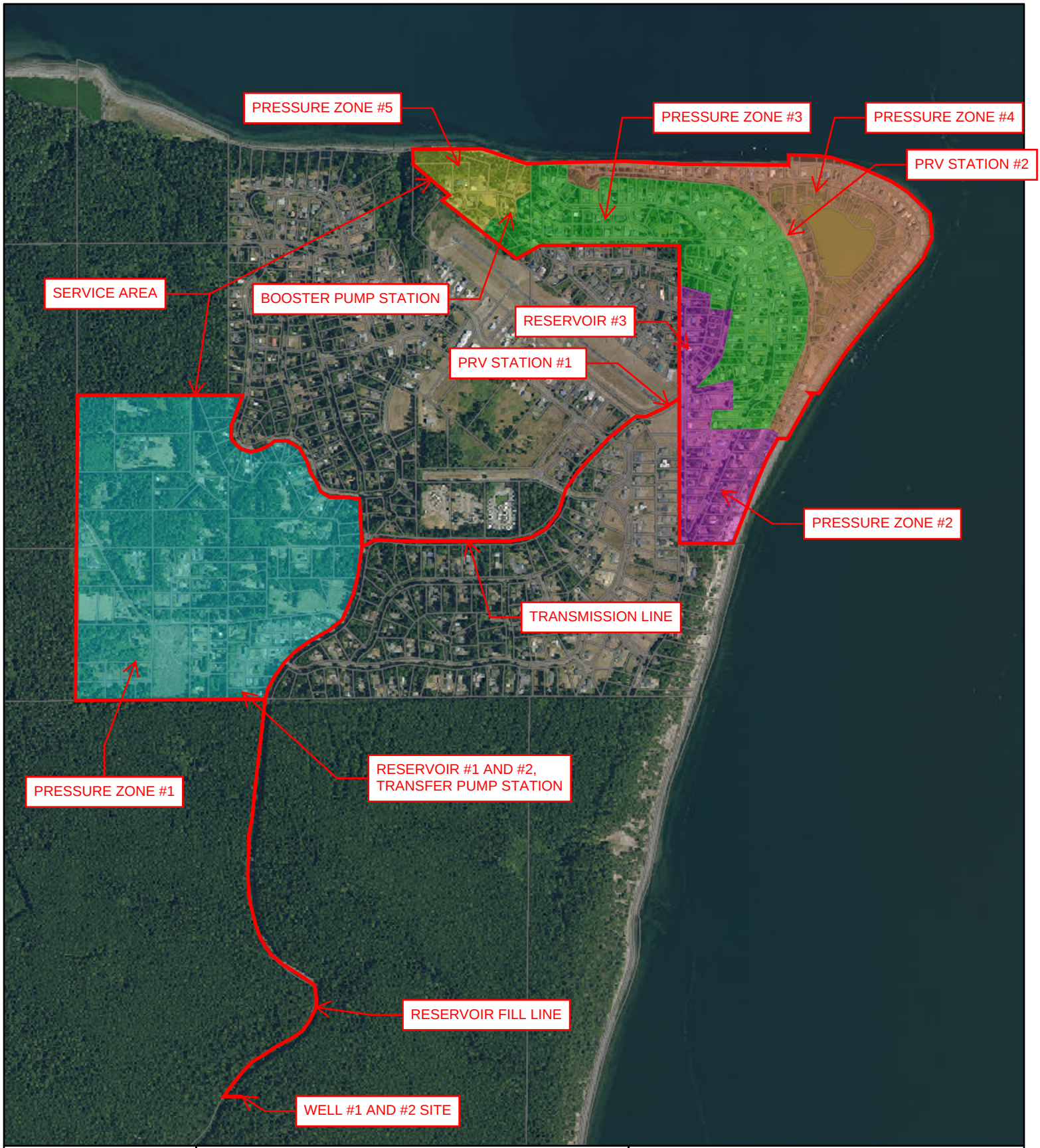
N
W E
S

0 0.9 1.8 mi

8/8/2023 12:50 PM

1:144,448

We are happy to share our maps and hope that you find them helpful. Please be advised, however, that these maps are intended to serve as a guide to the general location of features shown. The accuracy of the individual layers varies and layers may not align with one another. Determination of actual regulatory location of features shown on this map typically requires a field examination by qualified staff. Any person or entity that relies on any information contained herein does so at their own risk. Clallam County makes no warranty of the accuracy or usefulness of this data.



Clallam County, WA

SERVICE AREA MAP

0 700 1,400 ft

N
W E
S

8/8/2023 2:34 PM

1:20,000

We are happy to share our maps and hope that you find them helpful. Please be advised, however, that these maps are intended to serve as a guide to the general location of features shown. The accuracy of the individual layers varies and layers may not align with one another. Determination of actual regulatory location of features shown on this map typically requires a field examination by qualified staff. Any person or entity that relies on any information contained herein does so at their own risk. Clallam County makes no warranty of the accuracy or usefulness of this data.

Canyon Estates Dr.

Critter Country Trail

Yakobi Way

Dragonfly Lane

Greta's Place

Gilbertson Lane

October Ct

Diamond Point Road

20' Esmt.

2-2" P.E.

4"PVC

6"PVC

8"PVC

Booster Pump Station (Built 2011)

Tank #1: Elevated Steel 57,000gal. (Built 1988)

Tank #2: Concrete Standpipe 70,500gal. (Built 2011)

FROM WELLS

Legend

- Service Area
- Easement
- Water Main
- Gate Valve
- Hydrant
- 2" Standpipe
- Air Release Valve

Scale: 1" = 130'

0 130 260 390

GREGORY G. ROAF
STATE OF WASHINGTON
23376
REGISTERED PROFESSIONAL ENGINEER
6/28/23
EXPIRES 12/29/23

Aquarius Utilities, LLC

Distribution System Map: SW Area Diamond Point Water System

WSID# 192104

SECTION 15/21, TOWNSHIP 30N., RANGE 2W., W.M., CLALLAM COUNTY, WA

DC SURVEYING
office@dcsurveyors.com
P.O. BOX 1090
POULSBO, WA 98370
PHONE: 360-779-6633
B.I. PHONE: 206-842-6123

DRAWN: JAB	CHECKED: GGR	SCALE: 1"=130'	JOB NO.:21-8606
DESIGN: GGR	DATE: JUNE 2023	SHEET 1 OF 2	FB ____

Strait of Juan de Fuca

Diamond Point Airstrip

Discovery Bay

North St.

4"PVC

Protection Pt. Booster Pump Sta. (Built 2004)

N Diamond Shore Ln.

2"PVC

4"AC

Spring View Pl.

Cormorant Dr.

Kaufman Dr.

Beach Dr.

4" Plastic

Lagoon

PRV#2

8" AC

S. Diamond Shore Ln.

Lupine Dr.

West Street

Diamond Point Road

Altitude Valve

Normally Closed

Tank#3 Conc. Standpipe 125,000gal. (Built 1980)

6" PVC

South Street

8" PVC

PRV#1

Discovery View Dr

4" AC

Discovery Way

D.P. Beach Club

Legend

- Service Area
- Easement
- Water Main
- Gate Valve
- Hydrant
- 2" Standpipe
- Air Release Valve

Scale: 1" = 170'

0 170 340 510

GREGORY G. ROAF STATE OF WASHINGTON 21614 REGISTERED PROFESSIONAL ENGINEER

EXPIRES 12/23

6/28/23

Aquarius Utilities, LLC

Distribution System Map: NE Area Diamond Point Water System

WSID# 192104

SECTION 16, TOWNSHIP 30N., RANGE 2W., W.M., CLALLAM COUNTY, WA

DC SURVEYING
office@dcsurveyors.com
P.O. BOX 1090
POULSBO, WA 98370
PHONE: 360-779-8633
B.I. PHONE: 206-842-8123

DRAWN: JAB	CHECKED: GGR	SCALE: 1"=170'	JOB NO.:21-8606
DESIGN: GGR	DATE: JUNE 2023	SHEET 2 OF 2	FB ____