CASCADIA WATER ™
WASHINGTON STATE – SOUTHWEST REGION
WATER SYSTEM PLAN
PART B – DISCOVERY BAY VILLAGE

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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
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 Discovery Bay Village (hereafter "Water System") ownership and management, system background, inventory of existing facilities, related plans, existing service area characteristics, future service area, service area 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: Discovery Bay Village
Water System ID No: 19430 W

1.1.2 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).

1.1.3 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

1.1.4 Discovery Bay Village Staff

Table 1-1 Water 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	WDM 2
Amy Lehman	Office Manager	-
Stephani Long	Office Administrator	-

1.1.5 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: JTasoff@facetnw.com or QClements@facetnw.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 water system standards and future system needs.

1.1.6 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

Discovery Bay Village is located within unincorporated Jefferson County, Washington, encompassed within Section 13 of Township 29 North, Range 2 West, of the Willamette Meridian. The Water System serves residentials homes, a 52-unit condominium resort known as "WorldMark Discovery Bay" (WorldMark), and a Washington State Department of Transportation (WSDOT) maintenance facility. Discovery Bay Village is classified as a Group A water system. Figure 1-1 shows the location of Discovery Bay Village and its associated service area boundary.

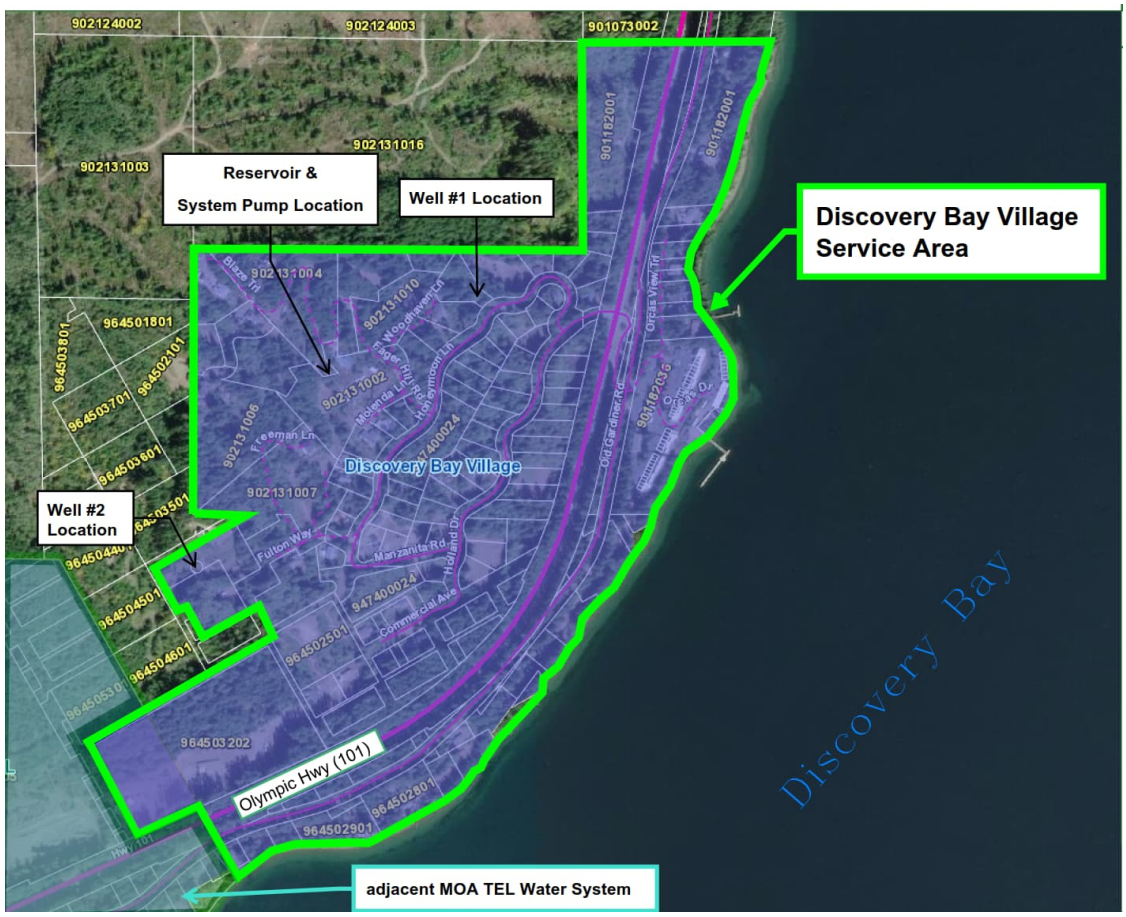

Figure 1-1 Discovery Bay Village Service Area Boundaries

Discovery Bay Village originated in 1969, when the first well (Well #1) was drilled on the north end of the system to a total depth of 305 feet with a 6-inch casing. Currently, this well has a design capacity of 26-gpm. The second well (Well #2) was drilled in the southwest portion of the system in 1978 to 330 feet with a 6-inch casing and currently has a design capacity of 49-gpm. Each well is equipped with 7.5-hp multi-stage submersible pumps. Discovery Bay contains only one concrete reservoir that was built in the mid-1980s that has a total capacity of 57,000 gallons. According to the 2021 Department of Health (DOH) Sanitary Survey Report, this reservoir is in relatively good condition with only some minor moss growth on the top of the tank. Today, the system has an inventory of 2 wells, 1 reservoir, 1 booster pump, and 5 pressure tanks, with a total of 134 DOH approved connections, but only 66 active physical water service connections. Plans for the System's concrete storage reservoir, booster pump house, pressure tank building, and Well 2 enclosure structure are included in Appendix V. A copy of the system's Water Facility Inventory form is included in Appendix A.

As for the water quality of the system, the only concern is high manganese levels within well #1. When looking at the growth rate of the system, the DOH 2021 Sanitary Survey Report states that over the course of 2019-2021 the average annual growth rate of the system was 26.1%. According to the DOH, 100% of the connections are metered.

1.2.1 Type of Ownership and Management

Discovery Bay Village 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.

1.2.2 Geography and Topography

The community served by Discovery Bay Village is in the northeast portion of Jefferson County on the northeastern corner of the Olympic Peninsula, between the Miller and Quimper peninsulas, and along the western coast of Discovery Bay (waterbody), about 7 miles southeast of Gardiner. The geography throughout the area, along the Olympic Highway (US Route 101), consists of other plats with single-family residences, designated forest land, and along coastal properties on coastal bluffs. The system is located on the western shoreline of Discovery Bay (waterbody) that creates the water system's natural eastern boundary, and the inland properties on the hillside west of Olympic Highway. The service area for the system ranges from the generally flat parcels along the shoreline, to the moderately sloped parcels west of the Olympic Highway, to the steeply sloped western-most parcels on the hillside, where the upland roads meander through the topography. The water system has ground surface elevations that range from sea-level to 555-feet above sea level.

1.2.3 Climate

The climate within Jefferson County includes mild weather year-round with an average temperature of 70 degrees Fahrenheit in the hottest months of the summer and 35 in the coldest months of the winter. Rainfall in these counties is on the high end with around 79 inches of rain per year.

1.2.4 Neighboring/Adjacent Water Systems

The current service area map for the system is included in Appendix B. Discovery Bay Village is adjacent to only one water system, a Group A community water system: MOA TEL, Water System ID: 07816U, which has 26 active connections. There is also a Group B water system named "17th Street" (PWS ID: AB693), which is within the MOA TEL water system boundary (not shown on the map). The respective service areas are shown in Figure 1-2.

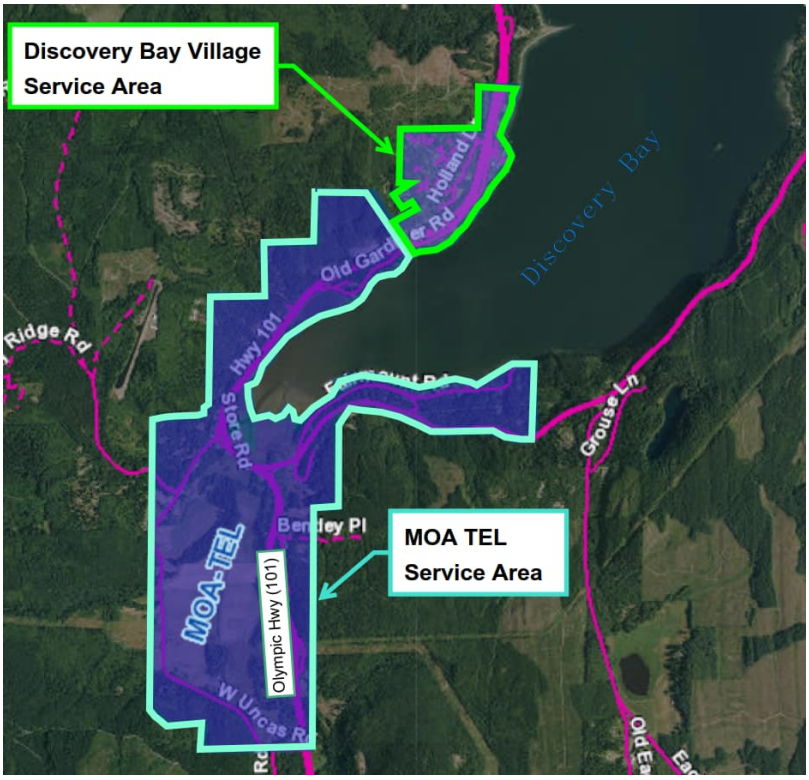

Figure 1-2 Neighboring Water Systems

1.3 Inventory of Existing Facilities

A detailed system inventory 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

Discovery Bay Village is located on the northeastern corner of the Olympic Peninsula, between the Miller and Quimper peninsulas, and along the western coast of Discovery Bay (waterbody). The service area spans roughly 165 acres, and includes 103 residential parcels, a 52-unit condominium resort known as "WorldMark Discovery Bay" (WorldMark), and a WSDOT maintenance facility. Out of the 103 current residential parcels within the Discovery Bay Village water system, only 57 parcels have an active service connection and receive a water bill, leaving 46 remaining undeveloped single-family parcels in the water system service area. The service area is made up of three (3) pressure zones.

The service area boundaries are shown on the map in Figure 1-2 and is included in Appendix B. The service area encompasses several short plats including Discovery Bay Village Short Plat, Discovery Bay Associates Restaurant Short Plat, Nelson Short Plat, Tim Fagen Short Plat, Howard Fager Short Plat, and a portion of the Junction City Short Plat.

1.4.2 Existing Zoning and Land Use

The service area of the water system is zoned as "Rural Residential" (RR-5) according to Jefferson County's terminology. The zoning category is defined by the Jefferson County Code Chapter 18.15, to have the following characteristics:

- The purpose of this district is to allow for continued residential development in areas of Jefferson County consisting of relatively high-density pre-existing patterns of development, along the county's coastal areas, and within areas within or adjacent to rural centers and rural crossroads. In addition, this district seeks to support and foster Jefferson County's existing rural residential landscape and character by restricting new land divisions to a base density of one unit per five acres.
- RR-5 is to provide areas having low density rural setting free from commercial, industrial, and moderate density residential developments.
- Development densities are limited to one dwelling unit per 5 acres.
- The minimum lot size for new parcels shall be 5 acres in the RR-5 zone.
- Accessory dwellings units are allowed.

1.5 Service Area Boundary

Currently there is no documentation for a Service Area Agreement for Discovery Bay Village with Jefferson County. Cascadia Water is pursuing measures to locate, coordinate, and finalize Service Area Agreements with Jefferson County over the next few years. The Franchise Agreement for Discovery Bay Village with Jefferson County has expired and Cascadia Water is in the process of renewing with the County. Any service area changes will comply with Jefferson County and DOH requirements. The System is located in Township 29 north, Range 02 west, within Section 13.

1.6 Consistency from Local Planning

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

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 66 active water service connections for Discovery Bay Village's distribution system, including 57 current residential connections, 8 connections that serve the 52 condos and their management office (WorldMark), and one commercial connection (WSDOT facility). There are a total of 9 non-residential physical water service connections.

This plan evaluates 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 2043 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

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

2.1.1 Current Population

Discovery Bay Village currently serves 56 full-time single-family residences and 9 non-residential connections. The system is estimated to serve approximately 120 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. Eight (8) of the non-residential connections are associated with the, WorldMark condominiums which estimates 1,872 visitors per month.

Residential Connections
Given an active number of full-time residential service connections of 57, and the population of 102 full-time residents, the average population served per residential connection is approximately 1.8 people. This is less than the state's population average of 2.5 people per home.

WorldMark Condos
In addition to the single-family parcels, the 52 WorldMark resort condos operate as hotel rooms, and therefore users represent transient non-residential users. Information provided by WorldMark indicates that the units are generally occupied each day of the year. It is assumed that an average of 2 people occupy each unit on each day of the year, for a total estimated daily transient population of 104 people.

It is notable that although Discovery Bay Village serves a sizable "transient" population at the WorldMark, WorldMark staff indicated that the units are generally consistently occupied each day of the year, therefore even the transient population can be considered relatively consistent throughout the year, as opposed to seasonal.

WSDOT Facility
The WSDOT maintenance facility is estimated to have three (3) daily non-residential users.

It is notable that the full-time residential population of the single-family parcels (102 people) is almost equivalent in scale to the transient non-residential population of the Worldmark condos and WSDOT facility (107 total people).

2.1.2 Water Usage History

Demands and consumption for the water system were analyzed based on available data from 2021 and 2022, to determine current design values for Discovery Bay Village. Source production numbers for 2021

and portions of 2022 were unreliable until source meters could be replaced once Cascadia took ownership of the system. The available consumption data for these periods is provided in Appendix R. The following sections summarize the system production, water loss, service connections, and consumer demands.

2.1.2.1 Water Production

Water usage data from 2021 and 2022 was analyzed to determine current design values for the distribution system. The capacity calculation provided in Appendix P provides a detailed summary of the demands based on water use data. The data is summarized in Table 2-1.

Table 2-1 Water Production and Usage

Year	Annual Production (gallons)	Annual Usage (gallons)	Annual Residential Usage (gallons)	Annual ADD (gpd/ERU)	Residential Max. Month (gallons)	MMADD (gpd/ERU)	MDD (gpd/ERU)
2021	Data unavailable	5,469,167	2,469,320	128	380,365	232	382
2022	Data unavailable	5,482,728	2,662,334	128	629,449	263	434

There is a seasonal demand which occurs during the summer months as irrigation increases. Variations in consumption rates reflect change in weather conditions, community activities, and habits of the population. Analysis of seasonal demand can assist in identifying trends and differences within the summer and winter months. Knowledge of seasonal variations in water demand can help planning personnel better serve customers and properly maintain the distribution system. Monthly usage data shows the highest seasonal use for all customers is during the summer months of July and August. This is typical for residential communities as irrigation requirements significantly increase due to warmer temperatures, and many summer homes are in use.

2.1.3 *Distribution System Leakage*

Table 2-2 below summarizes the usage data reported in the DOH Water Use Efficiency (WUE) annual reports. Both sources and all of the water service connections to the system are metered. The 2020 WUE report notes multiple watermain breaks occurred that year, which corresponds to the apparent jump in the 2020 DSL. The 2021 WUE report notes "Cascadia Water is in progress of changing out all master meters and service meters." There was a dramatic drop in Distribution System Leakage (DSL) that occurred between the 2021 and 2022 reporting periods, which is likely due to the replacement of the meters. This leads to the conclusion that the majority of the prior DSL was attributed to inaccurate meters, which gave a false impression of artificially high DSL. The 2022 DSL value (6.6%) is therefore assumed to represent the current DSL of the system more accurately, and this value was used for the calculation of equivalent non-residential ERUs within this report.

Table 2-2 Historical Water Consumption and Loss

Year	Annual Production (gallons)	Annual Withdrawal (acre-feet)	Authorized Consumption	Leakage (gallons)	DSL
2019	7,897,008	24.2	5,613,979	2,283,029	28.9%
2020	8,341,523	25.6	5,541,102	2,800,421	33.6%
2021	7,547,698	23.2	5,945,066	1,602,632	21.2%
2022	5,011,315	15.4	4,679,562	331,753	6.6%

2.1.4 Equivalent Residential Units

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 single-family residence (WAC 246-290-010). Many water systems serve a mixture of single and multifamily dwellings, commercial and industrial customers, and other users. The ERU is a tool to translate non-single-family demand into an equivalent value of demand on the system's infrastructure.

The Discovery Bay Village system is primarily made up of full-time single-family residences and condominiums (WorldMark), with one commercial connection (WSDOT facility). The ERUs associated with single-family residences are relatively straight-forward, in that each single-family residence that has an active service connection and receives a water bill is considered one ERU. These are referred to as "Residential" ERUs.

The remaining non-single-family connections are translated into Equivalent Residential Units (ERUs), by dividing their total annual usage by the ADD associated with the single-family residences, resulting in an equivalent value of demand, or an ERU for each non-single-family connection. To properly assess the number of ERUs associated with the non-residential connections, as well as with Distribution System Loss (DSL), consumption data from the last three years was analyzed. The calculations are provided in Appendix P and are summarized in Table 2-3.

Table 2-3 Current Equivalent Residential Unit Calculations

Type	Number of Connections	Annual Avg. Usage (gpd/conn.)	Annual ADD (gpd)	Annual ADD[1] (gpd/ERU)	ERUs
Residential	56	2,662,334	7,294	150	56
WorldMark	8 (serving 52 Condos)	2,958,265	8,105	*150*	54
WSDOT	1	67,313	184	*150*	2
DSL	-	331,753	909	*150*	6
				Total:	119

[1] ADD value determined based on single-family "Residential" water usage. The Residential ADD is then used as a means to determine the equivalent non-residential ERUs.

There are a total of 103 total buildable single-family parcels in the water service area. There are 56 equivalent non-residential ERUs (WorldMark plus WSDOT). If a zero value for ERUs associated with DSL is assumed, then there is a total of 159 potential ERUs within the service area of the water system. This total future potential of 159 ERUs will be referred to within this report as "full build-out". The proposed number of ERUs ("design ERUs") used for design purposes of the water system is 200 ERUs, which is the limiting factor resulting from the capacity analysis, as noted in Section 3.4.7. This design scenario therefore

includes a buffer for potential future additional ERUs, such as accessory dwelling units (ADUs), etc. The various ERU values used within this report are summarized in Table 2-4 for comparison and clarity.

Table 2-4 Summary of ERU Values

Scenario	ERUs
Current ERUs (including DSL)	119
Current ERUs (no DSL)*	113
Full Build-out*	159
Design Scenario*	180

* This scenario assumes a zero value of ERUs assigned to DSL.

2.1.5 Average Day Demand

Average day demand (ADD) is defined as the average daily usage by an ERU in the system. For the system it is calculated by the total volume of water consumed by full-time residential consumers in a calendar year, divided by the number of days in the year and the number of ERUs in the distribution system. Available water usage from 2021 and 2022 was analyzed to determine current design values for the system. The water use data for these periods is provided in Appendix R. Due to the relative confidence in the available data a safety factor of 1.15 was assigned to the calculated values. The calculated ADD for system is outlined below:

$$ERU_{ADD} = \frac{(2{,}662{,}334\ gal)}{(365 days)(57\ ERUs)}(1.15) = 150 \text{ gpd/ERU}$$

Since an ERU is defined by the amount of water consumed by the typical full-time single-family residence, and the single-family residences in the water service area are primarily full-time residences, then the ADD value is representative of the full year. The design value used for Discovery Bay Village's annual ADD is 150 gallons per day per ERU (gpd/ERU).

2.1.6 Maximum Day Demand

Maximum day demand (MDD) is ideally determined by meter readings and is the largest single-day usage of water based upon production. MDD could not be determined from actual water use data due to lack of daily source meter readings. Therefore, a multiplier of 1.65 is used to estimate MDD from maximum monthly average day demand (MMADD) per Section 3.4.1 of DOH Water System Design Manual, 2019 edition (Design Manual). Water usage data from customer accounts was analyzed for the years 2021 and 2022. The water use data for these periods is provided in Appendix R and is summarized in Table 2-1. As shown in Table 2-1, the design MMADD is 14,987 gpd (263 gpd/ERU) which equates to an overall system MDD value of 24, 730 gpd (434 gpd/ERU). Due to the relative confidence in the available data a factor of safety of 1.15 was assigned to the calculated values in accordance with Section 3.11 of the Design Manual. The ERU_{MDD} design value for Discovery Bay Village is 500 gallons per day per ERU (gpd/ERU).

2.1.7 Peak Hour Demand

Peak Hour Demand (PHD) was calculated in accordance with Section 3.4.2 of the 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.

Equation 2-1

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

$$PHD = \frac{500}{1440}[(2)(180) + 75] + 18 = 169\ gpm$$

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

The coefficients used in the above formula are dependent upon the number of connections served as described in Table 2-5 .

Table 2-5 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

Equation 2-1 and the values provided in Table 2-5 were used to calculate the PHD for each hydraulically connected pressure zone, for each scenario including the current ERUs, the current approved number of ERUs, and the system limiting number of connections (design ERUs). As described in Section 2.1.4, and Figure 3-1, the Water System consists of 3 pressure zones. The number of ERUs in each pressure zone was assumed to be the number of parcels in each pressure zone as analyzed from Jefferson County mapping, which represents the full build-out ERUs for each zone. A map consisting of the parcels in each pressure zone can be found in Appendix B. Table 2-6 summarizes the number of parcels in each pressure zone.

Table 2-6 Total Parcels in each Pressure Zone

Pressure Zone	Number of Parcels
Pressure Zone 1	26
Pressure Zone 2	68
Pressure Zone 3	9
Total Parcels	103

The design MDD of 450 gpd/ERU, Equation 2-1 and the values provided in Table 2-3 were used to calculate the PHD for each scenario for the full water system area: current 2023 ERUs, projected years 2029 and 2043 and the design ERUs. For the purposes of the future projections DSL is removed from the total ERUs. The maximum number of ERUs noted in the table is the proposed system's capacity limitation, as discussed in Section 3.4. The calculated PHD values for each scenario described in this section are summarized in Table 2-7.

Table 2-7 Group A Peak Hour Demand (PHD) Based on MDD

Scenario and Zone	N (ERUs)	ERU_{MDD} (gpd/ERU)	C	F	PHD (gpm)
Full Water System - 2023 Current ERUs	119	500	2	75	127
Full Water System - 2029 projected ERUs	120	500	2	75	127
Full Water System - 2043 projected ERUs	138	500	2	75	140
Full Water System - Approved ERUs	134	500	2	75	137
Full Water System - Design ERUs	180	500	2	75	169
Pressure Zone 1 - Full Build-out	26	500	3	0	45
Pressure Zone 2 - Full Build-out	68	500	2.5	25	86
Pressure Zone 3 - Full Build-out	9	500	3	0	27

For the purpose of design in the distribution system, the PHD design value is based on the design ERUs (180 ERUs). The PHD design value is 169 gallons per minute (gpm).

2.2 Projected Land Use, Future Population, and Demand Forecasting

The projected land use, future population, and water demand forecasting for Discovery Bay Village 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 "Rural Residential" (RR-5) per Jefferson County Code. RR-5 land is limited in the allowable land uses, such as single-family dwellings, accessory dwellings units, small bed and breakfasts, and duplex units. Large commercial development is prohibited in RR-5 zoning. The potential for any major business or larger multifamily structures being located within the majority of the water system area (within the single-family parcels) is minimal due to zoning restrictions. 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 B.

2.2.2 Projected Connections

The estimated number of connections for 2029 and 2043 were determined by using a 1.0% population growth rate to establish the number of future residents served, and 2.5 residents per residential connection as recommended by DOH. Equation 2-1 and the values provided in Table 2-5 were used to calculate the PHD for 2023, 2029, 2043, the current number of DOH approved connections, and the maximum system physical capacity.

2.2.3 Projected Demand

Projected demands are based on ERU projections and trends in the annual production of ADD. The project source withdrawal for annual production is summarized in Table 2-8 based on the number of projected ERUs discussed in Section 2.1.6.

Table 2-8 Projected Annual Demand Based on ADD

Year	N (ERUs)	ADD (gpd/ERU)	Annual Production (gallons)	Annual Production (ac-ft)
2023	113	150	6,186,750	18.99
2029	120	150	6,570,000	20.16
2043	138	150	7,555,500	23.19

Projections are based on the increase in the proposed ERUs at a rate of 1.0% and trends in Annual Production and the ADD. The ADD is assumed to be level as the increase in consumer demand can be offset by the steps currently underway and those that will be implemented to reduce the DSL.

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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 required 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 and Analysis

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 provides the system with a water quality monitoring schedule (WQMS) that summarizes the specific testing requirements for that system. A copy of the current WQMS is included in Appendix K. See Table 3.1 below for additional information.

Currently the water system is not chlorinating but chlorination is proposed to be added for preventative disinfection. If chlorination is used, then these testing requirements may need to be implemented for additional water quality analytes such as Trihalomethanes.

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 Well #1 (ABR271)	Schedule/Frequency Well #2 (ABR017)
Asbestos	One sample from the routine coliform sampling sites that contains asbestos concrete pipe.	Waiver 1 sample every 9 years.	Waiver 1 sample every 9 years
Bacteriological	From representative points throughout distribution system.	1 sampler per month.	1 sampler per month.
Complete Inorganic Chemicals (IOCs) & Physical	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	Waiver 1 sample every 9 years	Waiver 1 sample every 9 years
Lead/Copper	From the distribution system at targeted sample tap locations.	5 samples every 3 years	5 samples every 3 years
Nitrate	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	1 sample annually.	1 sample annually.
Arsenic	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	n/a	1 sample every 3 years.
Manganese	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	1 sample every 3 years.	n/a
Radionuclides	From the source.	1 sample every 6 years.	1 sample every 6 years.
Volatile Organic Chemicals (VOCs)	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	Waiver 1 sample every 6 years.	Waiver 1 sample every 6 years.
Synthetic Organic Chemicals (SOCs) - Herbicides	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	Waiver 1 sample every 9 years.	Waiver 1 sample every 9 years.
Synthetic Organic Chemicals (SOCs) - Pesticides	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	Complete Waiver Granted	Complete Waiver Granted
Synthetic Organic Chemicals (SOCs including EDB and other soil contaminants, Dioxin, Endothall, Diquat, Glyphosate, Insecticides)	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	Complete Waiver Granted	Complete Waiver Granted
Pre-and Polyfluoroalkyl Substances (PFAS)	From a point representative of the source, after treatment (if any), and prior to entry to the distribution system.	1 sample every 3 years.	1 sample every 3 years.

3.2.1 Water Testing

The latest water quality testing results are provided for the Water 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 tests 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 the distribution system. When any samples with a coliform presence are collected during the previous month, the purveyor must take 5 repeat samples. If those samples do not contain any presence of coliform bacteria, the sampling may revert to the statutory number of samples per month. If coliform bacteria are detected, four follow-up samples are required the same month, then five routine samples the following month if the four follow-up tests are negative; otherwise, DOH will specify follow-up requirements. The Coliform Monitoring Plan, provided in Appendix M, provides the sampling points that will be used within the system.

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) and latest source test results for inorganic chemicals (IOCs) are summarized in Table 3-2.

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

PRIMARY INORGANIC CHEMICALS				
Substance	MCLs (mg/L)	State Reporting Limits (mg/L)	IOC Results [A] Well #1 (S01) (mg/L)	IOC Results [A] Well #2 (S02) (mg/L)
Antimony (Sb)	0.0060	0.0030	LT	0.0030
Arsenic (As)	0.010	0.0010	0.0036	0.0059
Asbestos	7 million fibers/liter (longer than 10 microns)	-	No data	No data
Barium (Ba)	2.0000	0.1000	LT	LT
Beryllium (Be)	0.0040	0.0003	LT	LT
Cadmium (Cd)	0.005	0.0010	LT	LT
Chromium (Cr)	0.1	0.0070	LT	0.0130
Copper (Cu)	*	0.0200	LT	0.0500
Cyanide (HCN)	0.2	0.0500	No data	No data
Lead (Pb)	*	0.0010	LT	LT
Mercury (Hg)	0.002	0.0002	LT	LT
Nickel (Ni)	0.1	0.0050	LT	LT
Nitrate (as N)	10.0	0.5000	LT	2.0900
Nitrite (as N)	1.0	0.1000	LT	1.7300
Selenium (Se)	0.05	0.0020	LT	0.0030
Sodium (Na)	*	5.00	11.3000	9.2800
Thallium (Tl)	0.002	0.0010	LT	LT
SECONDARY INORGANIC CHEMICALS				
Chloride (Cl)	250.0	20.00	13.50	7.7100
Fluoride (F)	2.0	0.2000	LT 0.5000	LT 0.5000
Iron (Fe)	0.3	0.1000	0.1310	LT
Manganese (Mn)	0.05	0.0100	0.0600	LT
Silver (Ag)	0.1	0.1000	LT	LT
Sulfate (SO_4)	250.0	50.00	LT	LT
Zinc (Zn)	5.0	0.2000	LT	LT

[A] Testing results less than the state reporting limit are entered as "LT". If the reported value is greater than the state reporting limit (but less than the MCL), then the value in the table is entered at LT [value], meaning the quantity was less than the value noted.

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 [A] Well #1 (S01)	Physical characteristics Results [A] Well #2 (S02)
Color	15 Color Units	LT	LT
Specific Conductivity	700 umhos/cm	512	423
Total Dissolved Solids (TDS)	500 mg/L	No data	No data

[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 latest hardness concentration was measured at 256 mg/L for Well #1 and 212 mg/L for Well #2, both of which are considered very hard water.

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)*

The system does not currently utilize chlorination and therefore does not test for DBPs. The following information on DBPs is presented here since DBPs will need to be considered in the future as chlorination is proposed to be utilized for preventative disinfection.

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.

3.2.6 *Radionuclides*

The State considers radionuclides primary contaminants. The MCLs for radionuclides and the latest source test results are summarized in Table 3-6. There was no data available for combined Radium 226 and Radium 228, so those analytes are entered into the table individually.

Table 3-5 Radionuclides MCLs

Substance	MCL (pCi/L)	State Reporting Limit (pCi/L)	Radionuclides Results [A] Well #1 (S01) (pCi/L)	Radionuclides Results [A] Well #2 (S02) (pCi/L)
Radium-226	3.0	-	No data	No data
Radium-228	5.0	1.00	LT	LT
Gross alpha particle activity (excluding uranium)	15.0	3.0	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 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 and latest system test results are summarized in Table 3-6.

Table 3-6 Volatile Organic Chemicals (VOCs) MCLs

Contaminant	MCL (µg/L)	State Reporting Limits (µg/L)	VOC Results Well #1 (S01) (µg/L)	VOC Results Well #2 (S02) (µg/L)
Vinyl chloride	2.0	All VOC State Reporting Limits are 0.5 ug/L	All VOC Results Less Than State Reporting Limit	All VOC Results Less Than State Reporting Limit
Benzene	5.0			
Carbon tetrachloride	5.0			
1,2-Dichloroethane	5.0			
Trichloroethylene	5.0			
para-Dichlorobenzene	-			
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 (mg/L)	State Reporting Limits (µg/L)	SOC Results [A] Well #1 (S01) (µg/L)	SOC Results [A] Well #2 (S02) (µg/L)
ENDRIN	2.0000	0.0100	LT 0.0500	LT 0.0500
LINDANE (BHC - GAMMA)	0.2000	0.0200	LT 0.0400	LT 0.0400
METHOXYCHLOR	40.0000	0.1000	LT 10.0000	LT 10.0000
TOXAPHENE	3.0000	1.0000	LT 2.0000	LT 2.0000
Alachlor	2.0000	0.2000	LT 0.4000	LT 0.4000
ALDRIN	0.0000	0.1000	LT 0.1000	LT 0.1000
ATRAZINE	3.0000	0.1000	LT 0.5000	LT 0.5000
BENZO (A) PYRENE	0.2000	0.0200	LT 0.0400	LT 0.0400
BUTACHLOR	0.0000	0.1000	LT 0.4000	LT 0.4000
CHLORDANE (TOTAL)	2.0000	0.2000	LT 0.4000	LT 0.4000
DIELDRIN	0.0000	0.1000	LT 0.1000	LT 0.1000
DI (ETHYLHEXYL) ADIPATE	400.0000	0.6000	LT 1.3000	LT 1.3000
DI (ETHYLHEXYL) PHTHALATE	6.0000	0.6000	LT 1.3000	LT 1.3000
HEPTACHLOR	0.4000	0.0400	LT 0.0900	LT 0.0900
HEPTACHLOR EPOXIDE	0.2000	0.0200	LT 0.1000	LT 0.1000
HEXACHLOROBENZENE	1.0000	0.1000	LT 0.5000	LT 0.5000
HEXACHLOROCYCLO PENTADIENE	50.0000	0.1000	LT 0.5000	LT 0.5000
METOLACHLOR	0.0000	0.1000	LT 1.0000	LT 1.0000
METRIBUZIN	0.0000	0.1000	LT 0.2000	LT 0.2000
PROPACHLOR	0.0000	0.1000	LT 0.1000	LT 0.1000
SIMAZINE	4.0000	0.0700	LT 0.1500	LT 0.1500
PENTACHLOROPHENOL	1.0000	0.0400	LT 0.2000	LT 0.2000
PCB (AS TOTAL AROCHLORS)	0.5000	0.5000	LT 0.5000	LT 0.5000
AROCHLOR 1221	0.0000	20.0000	LT 100.0000	LT 100.0000
AROCHLOR 1232	0.0000	0.5000	LT 2.5000	LT 2.5000
AROCHLOR 1242	0.0000	0.3000	LT 1.5000	LT 1.5000
AROCHLOR 1248	0.0000	0.1000	LT 0.5000	LT 0.5000
AROCHLOR 1254	0.0000	0.1000	LT 0.5000	LT 0.5000
AROCHLOR 1260	0.0000	0.2000	LT 1.0000	LT 1.0000
BROMACIL	0.0000	0.1000	LT 0.2000	LT 0.2000
AROCHLOR 1016	0.0000	0.0800	LT 0.4000	LT 0.4000
FLUORENE	0.0000	0.2000	LT 0.2000	LT 0.2000

* The DOH has granted complete waivers for dioxin, endothall, glyphosate, and diquat.

** The DOH has granted complete waivers for these insecticides but latest test results are included.

[A] Testing results are entered as LT [value], meaning the quantity was less than the value noted.

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. 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. Discovery Bay Village's groundwater wells are located approximately ¼ mile away from nearest shoreline. The most recent Chloride values from Well 1 (S01) and Well 2 (S02) were measured at concentrations of 13.50 mg/L (2023) and 7.71 mg/L (2016), respectively. It is recommended that Discovery Bay Village continue testing its wells for chloride to check for any long-term trends in the aquifer.

The DOH Design Manual identifies wells are at risk for intrusion if the well is located within ½ mile of the shoreline and pumps water from a depth below sea level, and within ½ mile of a groundwater source with chloride concentrations over 100 mg/L. Both Discovery Bay Village wells are located within ½ mile of the shoreline and pump water from a depth below sea level, so they are considered "at risk for intrusion" per the DOH Design Manual criteria.

Jefferson County Code Section 18.22.310 (3) (b) defines "high risk" Seawater intrusion protection zones as groundwater sources with a history of chloride analyses above 200 mg/L, or areas within 1,000 feet of a groundwater source with a history of chloride analyses above 200 mg/L. Neither of the source wells meets either of those criteria, so neither well is considered "high risk".

Jefferson County Code Section 18.22.310 (3) (c) defines "at risk" Seawater intrusion protection zones as areas within 1,000 feet of a groundwater source with a history of chloride analyses above 100 mg/L. Neither of the source wells meet those criteria, so neither well is considered "at risk".

3.2.10 Source Water Quality

A wellhead protection plan was developed to help identify items and situations that could possibly pose a threat to the water quality of the system. A copy of the Wellhead Protection Plan is included in Appendix I. The primary contaminant of concern for the water system is a slight elevation in manganese, which is a naturally occurring contaminant common in groundwater sources.

3.2.11 Finished Water Quality

Water quality samples from the distribution system for lead and copper show concentrations less than EPA action levels (0.015 mg/L for lead and 1.3 mg/L for copper). Lead concentrations were measured at less than 0.001 mg/L. Copper concentrations were measured at 0.170 mg/L. Total coliform concentrations are measured monthly, with the most recent results indicating that coliform is absent. Coliform was last found present in the distribution system in 2021.

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.

3.3.1 Existing System Configurations

The system is currently supplied by two wells sited in two different locations. Well 1 (S01) is located off Honeymoon Lane in the northern center portion of the service area on Jefferson County parcel 947400072. Well 2 (S02) is located off Fulton Way in the southwest corner of the service area on county parcel 964502307. The wells alternate in operation and are triggered by the float switches in the storage reservoir. Both wells pump into the distribution system piping in Pressure Zone 2 which is hydraulically connected to the system's storage reservoir. The retail service area consists of three (3) pressure zones

with distinct hydraulic grade lines (HGL). A schematic of the system configuration is provided in Figure 3-1.

The system's storage reservoir is centrally located within the retail service area on county parcel 902131004. The reservoir is 20-foot diameter with a height of 25-feet for a total volume of approximately 58,000-gallons, and is connected to the same distribution system piping that both wells pump into within Pressure Zone 2. The reservoir supplies storage volumes for the entire distribution system. The details of each pressure zone are as follows:

Pressure Zone 3
A pump house is located next to the reservoir at an elevation of 355-feet. The pump house contains a single booster pump (5 hp Ebara EVMU(A)) as well as a small 10-gallon pressure tank that provides protection for the booster pump from water hammer. The booster pump is operated off a pressure switch which has a 150-psi pump on / 130-psi off pump setting. The pump pressurizes the distribution system for Pressure Zone 3 which supplies the residential services at the highest elevation within the distribution system. Pump protection is provided by four (4) 86-gallon pressure tanks located within a small structure on county parcel 902131012 at an elevation of 540-feet. Pressure Zone 3 operates at a HGL of 770-feet for the 5 ERUs (5 single-family residences) located off of that portion of the distribution system.

Pressure Zone 2
The residences located in Pressure Zone 2 are pressurized by gravity fed from to the 58,000 gallon reservoir. The elevation of the water in the storage reservoir creates an HGL of 375-feet. Most of the single-family residences are located within Pressure Zone 2 as well as both groundwater sources serving the system. Pressure Zone 2 currently serves 45 ERUs which consists of 45 single-family residential connections. This pressure zone is separated from Pressure Zone 3 by a pressure reducing valve (PRV) located northwest of the intersection of Holland Drive and Honeymoon Lane.

Pressure Zone 1
Pressure Zone 1 is the portion of the distribution system located at the lowest elevation and is separated from Pressure Zone 2 by a PRV. The PRV is in a cinderblock vault just northeast of the intersection of Honeymoon Lane and Holland Drive at an elevation of 145-feet. The PRV is set to reduce pressure to 35-psi creating a HGL in Pressure Zone 1 of 225-feet. Pressure Zone 1 serves currently serves 62 ERUs, all on the east side of State Route 101, which consists of 6 single-family residential connections, the WSDOT facility, the WorldMark resort, and the WSDOT facility.

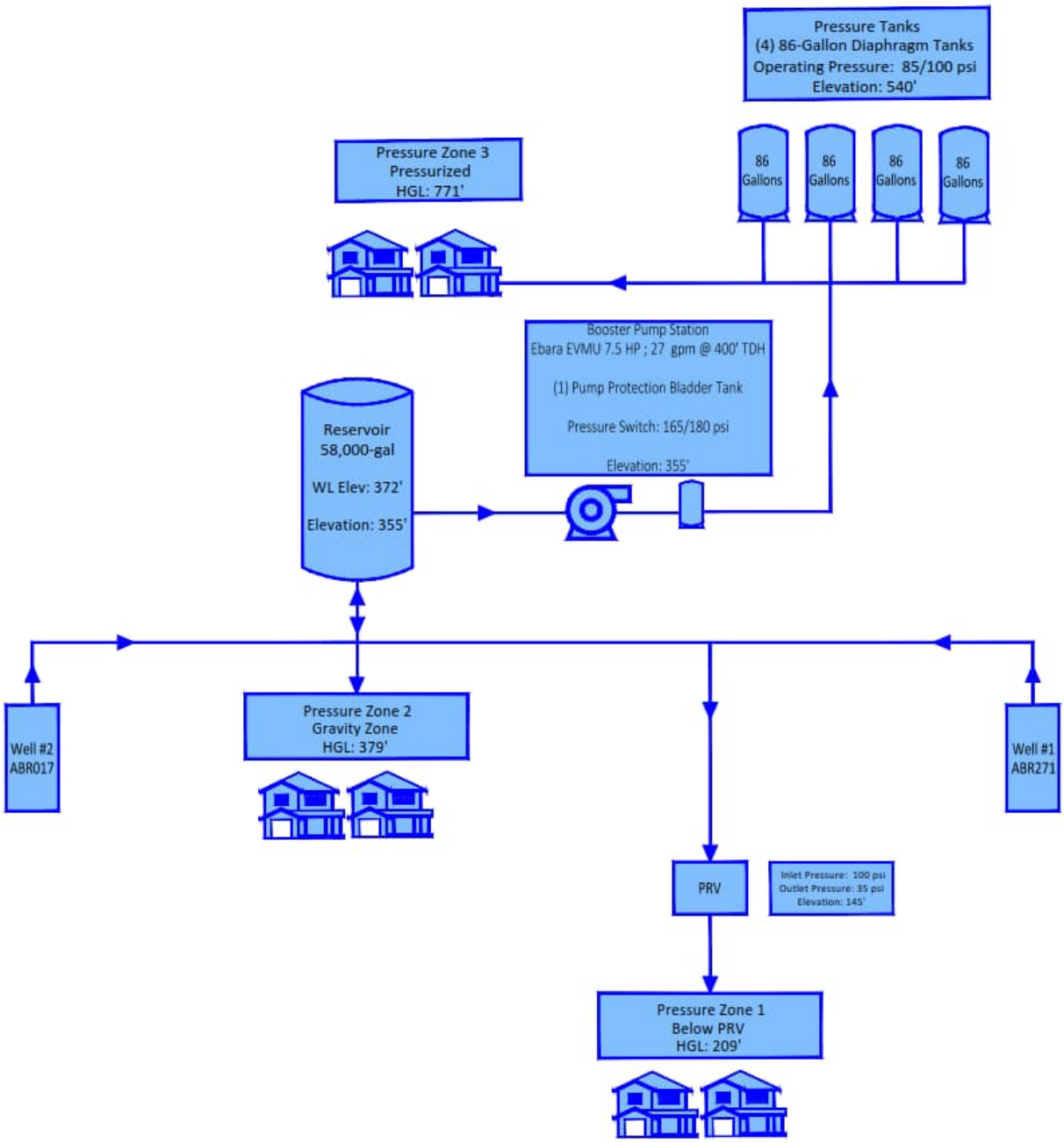

Figure 3-1 Discovery Bay Village Water System Schematic

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3.3.2 Water Rights

The Washington State Department of Ecology (DOE) issued Ground Water Certificate G2-26449 (Priority Date December 9, 1983) to Discovery Bay Village Water Co, Inc. This water right supersedes prior water rights for the water system and authorizes an instantaneous withdrawal of 100-gpm and a maximum annual withdrawal of 48.5 acre-feet for the water system. A copy of the water right is provided in Appendix E. A water right self-assessment for Discovery Bay Village is provided in Appendix F.

3.3.3 Source

Discovery Bay Village is served by two groundwater wells that are located on two separate Jefferson County parcels, noted in table below. The wells are located on parcels owned by Cascadia Water LLC. Well 1 (S01) is located off Honeymoon Lane in the northern center portion of the service area. Well 1, the source meter, and the electrical controls are housed in a small structure located on the same parcel as the well. Well 2 (S02) is located off Fulton Way in the southwest corner of the service area. Well 2 is housed in a concrete manhole structure. The Well 2 controls are housed in a nearby electrical enclosure, and the Well 2 source meter is in a nearby water meter box. The wells alternate in operation and are triggered by the float switches in the storage reservoir. Both wells pump into the distribution system piping in Pressure Zone 2.

Well 1 was drilled in 1969 to serve as a primary source. Well 2 was drilled in 1978 to serve as a supplemental primary source. Well logs for each well are in Appendix G. Detailed information regarding each source is summarized in Table 3-8.

Table 3-8 Group A - Source Type, Location, and Use Information

Discovery Bay Village	Well 1	Well 2
Well Name	Lot 72 “Village”	Nelson Short Plat
Source Type	Well (Non GWI)	Well (Non GWI)
DOE Tag	ABR271	ABR017
Source Location	Sec 13 T29N R02W	Sec 13 T29N R02W
Parcel #	947400072	964502307
Purpose of Use	Domestic Water Supply – Primary	Domestic Water Supply – Primary
Place of Use	Service Area	Service Area
Year of Installation	1969	1978
Approx. Capacity (gpm)	26	49
Ex. Capacity (gpm)	26	49
Pump Size (hp)	7.5 hp	7.5 hp
Casing Size	6”	6”
Ground Elev. (ft)	240	275
Bottom Well Depth (ft)	304	330
Static Water Depth (ft)	216	250
Top of Perforations (ft)	294	319
Bottom of Perforations (ft)	304	324
Drawdown (ft)	10	10

DOH requirements for ground water 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, except 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. Bacteriological, chemical, and physical water quality requirements are discussed in Section 3.2.

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. Cascadia is clarifying the existence of restrictive covenants for both sources with Jefferson County.

3.3.3.2 Current Facility Age and Estimate of Future Life Expectancy

The groundwater wells that serve the system are 54- and 45-years old respectively. Both sources should be evaluated on a yearly basis with measurements for static and dynamic water levels. This information should be monitored annually to evaluate the condition of the wells and their associated pumps.

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.

3.3.3.3 *Condition and Capacity of Transmission Mains*

The water from both Well 1 and Well 2 is conveyed through separate 2-inch galvanized steel pipes that connect into the distribution system piping at the two well locations. Site observations indicate that the piping is in good condition.

3.3.4 Storage

Water storage is necessary for multiple reasons, including 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 an approximately 58,000-gallon reservoir located within an easement on Jefferson County parcel 902131004. The reservoir is accessed through an access easement from Fager Hill Road. The reservoir is 20 feet in diameter and is 25-feet tall. The reservoir has a base elevation of 355 feet above sea-level. The reservoir was constructed circa 1981 as a circular concrete structure.

The system reservoir provides 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*

Circular reinforced concrete storage reservoirs typically have a 60- to 80-year anticipated service life. The concrete reservoir serving the system is approximately 42 years old. 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.

3.3.5 Booster Pumps and Pressure Tanks

The five (5) connections in Pressure Zone 3 are pressurized by the single booster pump fed from the 58,000-gallon reservoir. System pressures are maintained, and pump protection is provided by four (4) vertically orientated hydropneumatic tanks with a volume of 85-gallons each. The booster pump is operated by a 130/150-psi pressure switch. Data regarding the booster pump is summarized in Table 3-9. The pump curve associated with the booster pump is included in Appendix O.

Table 3-9 Pump Capacity

Make	Model	Motor	Flowrate (gpm)	THD (feet)
Ebara	EVMU(A) 5 12	Leeson 5 hp (3500 RPM)	27	415

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

The useful lifespan of the existing booster pump and pressure tank should surpass the planning periods of this Water System Plan. Additional information regarding pump capacity and pump protection are detailed in Section 3.4.5 and Section 3.4.6.

3.3.6 Distribution Water Mains

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 the system inventory provided in Appendix N. A summary of the pipe within the system is provided in Table 3-10.

Table 3-10 Distribution System Piping

Diameter (in)	Length (ft)
2	7,215
4	3,665
6	1,805
8	4,475
Total:	17,160

All the piping in the distribution system is polyvinyl chloride (PVC). According to system records all PVC piping is either Class 160 or Class 200. There are no documented water main replacements, so all pipe is assumed to be the age of the original construction, believed to be 1981. All distribution pipes are PVC which has an expected 70- to 100-year anticipated useful life. As of 2024, the lines are 43 years old and should surpass the planning periods of this Water System Plan. Watermains should continue to be

monitored, and if leaking or cracking is present, replaced. A comprehensive inventory of the system, including distribution system piping, is provided in Appendix N.

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 2044 in accordance with Section 6.1.4 of the Design Manual. All models simulate full build-out of the service area.

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. 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 the reservoir is filled to the top of operational storage and the booster pump pressure settings are set at the "off" pressure.

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 the reservoir is depleted and the booster pump pressure settings are set at the "on" pressure.

Fire Flow & MDD Scenario:

The water system is required to provide the MDD with fire flow demands at a hydrant while maintaining a required minimum pressure of 20-psi at all service connections. In this scenario, equalizing and fire suppression storage in the reservoir is depleted (See Section 3.4.6.5).

Site specific fire flow requirements for individual development projects are determined by Jefferson County through its development review process. Jefferson County Code doesn't specify fire flow requirements, so Washington State requirements were assumed to apply in lieu of Jefferson County Code fire flow requirements. WAC 246-293-640 lists the fire flow requirements for residential areas as requiring 500 gpm for thirty (30) minutes, which is assumed to be applicable to any/all fire hydrants within the whole water system area, other than the WorldMark condominium extents. Additionally, per WAC 246-293-640, the fire flow requirements for '*commercial and multifamily structures greater than 4,000 square*

feet' is 750 gpm for sixty (60) minutes, which is assumed to be applicable to areas with fire hydrants within the WorldMark condominium extents, and this was used in the model.

This modeling scenario has been included despite fire flow requirements not being applicable to the Discovery Bay system. A letter from the Jefferson 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, the reservoir level is set at the top of operational storage (See Section 3.4.6.1). The booster pump settings are at the "off" pressure of 70 psi. The model indicates that in this scenario, service pressures in the distribution system will range between 34- and 150-psi. Pressures at all service connections exceed 30-psi. The highest pressures that occur in the distribution system where service connections exist is the lowest elevations of Pressure Zone 2, at the location of the WSDOT service facility. The pressure extremes within the distribution system occur in Pressure Zone 3 just downstream of the booster pumps, however no houses connect for service within this high pressure area.

3.3.7.2 Existing Distribution System – PHD Scenario

In this PHD model, the reservoir level is set at the bottom of equalizing storage (See Section 3.4.6.2). The booster pump settings are at the "on" pressure of 50 psi. The model indicates that in this scenario, System pressures will range between 31- and 130-psi. Pressures at all service connections exceed 30-psi. The highest pressures that occur in the distribution system where service connections exist is the lowest elevations of Pressure Zone 2, at the location of the WSDOT service facility. The pressure extremes within the distribution system occur in Pressure Zone 3 just downstream of the booster pumps, however no houses connect for service within this high pressure area. The maximum velocity in the distribution system watermains is 0.22 fps.

3.3.7.3 Existing Distribution System – Fire Flow & MDD Scenario

In this Fire Flow & MDD model, the reservoir level is set with the equalizing and fire suppression storage in the reservoir depleted (See Section 3.4.6.5). Fire flow demand was placed at the lowest elevation fire hydrant within the WorldMark, which is within Pressure Zone 1 because this results in the worst-case distribution system pressure. The model indicates that in this scenario, System pressures will range between 19- and 130-psi. The highest pressures that occur in the distribution system where service connections exist is the lowest elevations of Pressure Zone 2, at the location of the WSDOT service facility. The pressure extremes within the distribution system occur in Pressure Zone 3 just downstream of the booster pumps, however no houses connect for service within this high pressure area. The maximum velocity in the distribution system watermains is 5.0 fps. The distribution system has adequate capacity to support the full build-out of the service area.

Minimum pressure requirements (20 psi) are not met at all service connections. Two connections accessed from Woodhaven Lane don't meet pressure requirements in this scenario. A proposed solution to this potential pressure issue is presented in Section 3.5.5.

Currently, the reservoir can provide fire flow requirements to the system, based on the fire flow parameters noted above, but it requires the entirety of the fire suppression storage (FSS) volume (45,000 gallons), and effectively will drain the tank to do so. Given this, it is recommended that future reservoir replacement projects confirm the applicable fire flow requirements and consider the consumer's expectations in regard to the need for additional (FSS) volume. Section 3.5.3 further discusses future capital improvements to address these system deficiencies.

3.3.7.4 Future Distribution System – Static Scenario

Within all of the future scenario models, the Capital Improvement Projects specified in Sectoin 3.5 are included in the model. The significant changes in the hydraulic model include:

- A new reservoir with double the volume of the existing reservoir.
- Looping of the water pipe network serving the WorldMark, by the addition of a new 8 inch pipe to be connected to the existing downstream terminus of the watermain, along with the inclusion of a PRV on the uphill end of this new 8 inch main.
- Extension of the Pressure Zone 3 pressurized water pipe to serve parcels 902131009 and 902131010.
- The addition of a redundant booster pump (which is not activated in the model to represent the scenario of one pump out of service).

In this static model, the reservoir level is set at the top of operational storage (See Section 3.4.6.1). The booster pump is set at the "off" pressure of 70-psi. The model indicates that in this scenario, service pressures in the distribution system will range between 34- and 189-psi. The highest pressures occur in the new proposed pipes that are intended to bring the two parcels accessed from Woodhaven Lane into Pressure Zone 3, demonstrating that individual PRVs will be needed for each of these water services, in conjunction with this proposed distribution piping to keep the newly increased pressures within maximum recommended operating pressures.

3.3.7.5 Future Distribution System – PHD Scenario

In this PHD model, the reservoir level is set at the bottom of equalizing storage (See Section 3.4.6.2). The booster pump is set at the "on" pressure of 50-psi. The model indicates that in this scenario, System pressures will range between 32- and 163-psi. Pressures at all service connections exceed 30-psi. Again, demonstrating that individual PRVs will be needed for each of these water services at high pressures. The lowest pressures occur in Pressure Zone 2 at the parcel served from Freeman Lane. The maximum velocity in the distribution system watermains is 2.6 fps.

3.3.7.6 Future Distribution System – Fire Flow & MDD Scenario

In the Fire Flow & MDD model, the reservoir level is set with the equalizing and fire suppression storage in the reservoir depleted (See Section 3.4.6.5). Fire flow demand was placed at the lowest elevation fire hydrant within the WorldMark, which is within Pressure Zone 1 because this results in the worst-case distribution system pressure. The model indicates that in this scenario, System pressures will range between 17- and 164-psi. Minimum pressure requirements (20 psi) are met at all service connections. The highest pressures that occur in the distribution system in the proposed Pressure Zone 3 expansion to include the two parcels accessed from Woodhaven Lane, following the implementation of the proposed solution presented in Section 3.5.5.

The maximum velocity in the distribution system watermains is 5.9 fps. Therefore, the distribution system has adequate capacity to support the full build-out of the service area. With the proposed improvements including the larger reservoir to support fire flow volumes, the system would be able to provide fire flow requirements to the distribution system. The proposed larger reservoir volume provides for the fire flow requirements (750 gpm for 60 minutes) and maintains remaining standby storage in the reservoir.

3.3.8 Pressure Reducing Station – Pressure Zone 1

As noted in Section 3.3.1, pressure into Pressure Zone 1 is controlled by a Pressure Reducing Station located northwest of the intersection of Holland Drive and Honeymoon Lane. The station consists of a 2

pressure reducing valves (PRVs) in a shallow hole with brick walls and an earth floor. A picture of the existing PRV station is provided as Figure 3-2.

Figure 3-2 Existing PRV Station

The smaller 2-inch PRV is set to 30-psi and can handle flows up to 100 gpm. The larger 4-inch PRV is set at approximately 20-psi and can handle approximately 900 gpm. The majority of flow will be modulated by the smaller PRV which will operate within its suggested flow range. In scenarios of high demand, such as fire or flushing, the system pressure would drop and the larger PRV would assist in modulating downstream pressures.

There are significant concerns with the condition of the RPV station. The station is located adjacent to a roadway and is only covered by degrading plywood. The depth is below the recommended level for protection from freezing, and all parts of the facility are showing wear due to exposure to the elements.:

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 Table 2-7 and Table 2-8 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 ADD and MDD expressed in terms of gallons per day per ERU, were used throughout the system capacity calculations. Currently Discovery Bay Village serves 113 of its 134 currently approved connections (assuming DSL is reduced to zero ERUs). A diagram

of the system is provided in Figure 3-1. The analysis shows that Discovery Bay Village has the physical and legal capacity to serve 180 ERUs, limited by source capacity. Calculations for the capacity analysis are included in Appendix P.

3.4.1 Water Right Capacity Based on Annual Volume

The water right for the system allows for an annual withdrawal of 48.5 acre-feet per year (15,802,697 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:

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

$$N = \frac{48.5\ acre \cdot \frac{\text{ft}}{\text{yr}} \cdot \frac{43{,}560\ \text{ft}^2}{\text{acre}} \cdot 7.48 \frac{\text{gal}}{\text{ft}^3}}{365\ days/yr \cdot 150 \frac{gpd}{ERU}} = 289\ ERUs$$

Where,

N = ERUs Supported
Q_a = Annual Volume (gallons/year)
ERU_{ADD} = ADD value per ERU (gpd/ERU)

ADD was determined to be 150 gpd/ERU (See Section 2.1.4) and the established water right annual withdrawal volume of 48.5 ac-ft/yr as the annual volume (Q_a), then the number of total ERUs that may be served calculates to 289 ERUs based on ADD and the allowed annual withdrawal volume.

3.4.2 Water Right Capacity Based on Instantaneous Flow

The water right for the system allows for an instantaneous pumping rate of 100 gallons-per-minute (gpm). Equation 4-4a in the WSDOH Design Manual was used to determine the number of ERUs based upon Maximum Daily Demand (MDD) and water right:

Equation 4-4a:

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

$$N = \frac{100\ gpm\ \cdot\ 1{,}440\ minutes/day}{500\ gpd/ERU} = 288\ ERUs$$

Where,

N = ERUs Supported
V_d = Total Volume of Water Available for Maximum Day's Demand (gpd)
Q_i = Instantaneous Maximum Water Right Flow Rate (gpm)
T_d = Time that source operates per day (minutes/day)
ERU_{MDD} = MDD value per ERU (gpd/ERU)

MDD was determined to be 500 gpd/ERU (Section 2.1.5) and the current water right instantaneous pumping rate of 100 gallons per minute as the annual volume (V_d), then the number of total ERUs that may be served calculates to 288 ERUs based on MDD and the allowed instantaneous pumping rate.

3.4.3 Source Capacity Based on Maximum Day Demand

The Design Manual Section 4.4.2.7 outlines the evaluation procedure of the number of ERUs that can be supported based upon source capacity and MDD. The WSDOH Design Manual provides Equation 4-3 to for the evaluation.

Equation 4-3:

$$N = \frac{V_t}{ERU_{MDD}} = \frac{(Q_i * t_i)}{ERU_{MDD}}$$

$$N = \frac{75\ gpm\ \cdot\ 1{,}200\ minutes/day}{500\ gpd/ERU} = 180\ ERUs$$

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 (gpd/ERU)

Section 3.10.4 of the WSDOH 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. Therefore, the number of ERUs that can be supported by the Water System's sources is 180 ERUs.

3.4.4 System Capacity Based on Treatment

Currently, Discovery Bay Village does not have a treatment system installed. Therefore, treatment capacity was not analyzed.

3.4.5 System Capacity Based on Booster Pump Capacity

Pressure Zone 3 is pressurized to provide water service to the uphill residences, using a singular system booster pump located in the reservoir pumphouse from an outlet of the reservoir. Zone 3 elevations range from 355- to 550-feet above sea level, with the reservoir site elevation being 355-feet above sea level. Pressurized systems are required to meet the system PHD in the distribution system while maintaining 30 psi with the largest pump out of service. Rearranging equation 3-1, the number of ERUs available based on the booster pump can be calculated. Table 3-9 outlines the parameters of the booster pump.

Fire flow is not provided for Zone 3 and the booster pump does not meet requirements for fire flow.

Equation 3-1:

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

$$N = \frac{\left[\frac{1440(36 - 18)}{500 - 0}\right]}{3.0} = 17\ ERUs$$

Where,

N = Number of ERUs supported
PHD = Peak Hour Demand, (gallons/minute) (Booster Pump Capacity)
MDD = Maximum Daily Demand per ERU (gpd/ERU)
F = PHD Coefficient from Table 2-5 .
Table 2-5
C = PHD Coefficient from Table 2-5 .
Table 2-5

MDD is 500 gpd/ERU and the booster pump capacity is 36 gpm. Currently, the system only has one booster pump installed in the reservoir pump house. The number of ERUs calculated is 19 ERUs for the booster pump capacity. Therefore, the current maximum ERUs served in Pressure Zone 3 is 19, which is greater than the number of parcels in Pressure Zone 3.

3.4.5.1 Pressure Tanks

There is a small structure located at the upper portion of Pressure Zone 3 that houses four (4) Well-Xtrol WX-302 vertical bladder pressure tanks with a volume of 86 gallons each, and an outer diameter of 26 inches which provide pump protection for the booster pump. Additionally, there is one (1) Wessel Company FXA-25 10-gallon pressure tank adjacent to the booster pump in the pumphouse beside the reservoir, that provides pump protection on startup. Equation 9-1 from the DOH Design Manual was used to determine the minimum pressure tank volume needed for the system.

Design Manual Equation 9-1: Bladder Tanks

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

Where,

T_S = The number of bladder tanks of gross volume V_B
R = $\frac{15(P1 + 14.7)(P2 + 14.7)}{(P1 - P2)(P2 + 9.7)}$
P_1 is pump off pressure setting (psi),
P_2 is pump on pressure setting (psi),
Q_p is the pump delivery capacity (gpm) at the midpoint of on pump curve between P_1 and P_2,
N_c is the max number of pump motor starts per hour recommended by the manufacturer.

V_B is the gross volume of an individual bladder tank in gallons

Assuming 12 cycles per hour, the total volume of usable storage that will need to be provided as pump protection via hydropneumatic bladder tanks is 113-gallons. The four (4) WX-302 tanks each have an acceptance factor of 0.54 according to the manufacturer. Therefor the tanks installed in Pressure Zone 3 provide a total usable volume of 186 gallons which meets the Design Manual recommendations.

3.4.6 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 of water for potential firefighting needs.

The capacity for the distribution system was analyzed to determine the necessary storage volumes associated with the reservoir. A complete set of calculations are included in Appendix P. The following storage components were analyzed and reported:

- 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

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

3.4.6.1 Operational Storage

Operational storage (OS) is the volume of the reservoir devoted to supplying the water system while, under normal operating conditions, the sources of supply are off, and the well pumps are off. This prevents the excess cycling of well pumps. It is assumed that two feet of elevation difference exists between the well pump on and off signals. The OS for the system is 4,700 gallons.

$$OS = 2\ feet \cdot (2{,}350)\ \frac{gallons}{foot} = 4{,}700\ gallons$$

3.4.6.2 Equalizing Storage

Equalizing Storage (ES) is defined as the volume of storage needed to supplement the sources when the peak hourly demand exceeds the total source pumping capacity. Since the PHD exceeds the combined well pumping capacity for the system ES is required to meet the peak demand period for the water system. ES is calculated from Equation 7-1 of the Design Manuel:

$$ES\ (gallons) = (PHD - Qs) \cdot 150\ minutes$$

Where:

PHD = peak hour demand (gpm) (Section 2.1.7 above);
Qs = well pump capacity(gpm)

$$ES = (169 - 75)\ gpm \cdot 150\ minutes = 14{,}106\ gallons$$

$14{,}106\ gallons\ /(2{,}350)\ \frac{gallons}{foot}$ = 6.0 feet

Based on the system PHD and source capacities, 14,106 gallons, or an equalizing storage height of 6.0 feet is required.

3.4.6.3 Dead Storage

Dead Storage (DS) is the unusable volume at the top and bottom of the tank. Approximately 0.6' is provided at the top for the overflow pipe (freeboard) and an additional 0.5' at the bottom of the tank. Therefore, a total of 1.1' of dead storage is provided.

$$DS = 1.1\ foot \cdot (2{,}350)\ \frac{gallons}{foot} = 2{,}585\ gallons$$

3.4.6.4 Standby Storage

Standby Storage (SB) volume is intended 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, the degree to which SB is incorporated into reservoir design "is a direct reflection of the consumers' expectations of water service during abnormal operating conditions" (Design Manual Section 7.1.1.3).

The Design Manual recommends SB volume to be greater than MDD in most systems. However, for water systems with multiple sources, such as Discovery Bay, SB may be reduced if a source is considered to be continuously available and provides redundancy and resilience for the water system. To satisfy the requirements of WAC 246-290-420 the DOH recommends a minimum SB of 200 gallons per day per ERU (Design Manual Section 4.4.3.2). Therefore, the minimum SB volume for Discovery Bay is calculated as shown:

$$SB_{min} = (\mathrm{SB}_i)(N)\ (t_d) = (200)(180)(1) = 36{,}000\ gallons$$

Where:
SB_{min} = minimum recommended standby storage (gallons);
SB_i = Selected volume of standby storage per consumer expectations (gpd/ERU);
N = Number of system ERUs;
t_d = Number of days selected to meet consumer expectations (days),

The minimum standby storage volume for the system to be able to support 180 ERUs at the end of the 20-year planning period would be 36,000 gallons. For 180 ERUs the storage reservoir would exceed this recommendation with 37,357 gallons available. Equation 4-7 of the Design Manual is provided to calculate ERUs based on SB.

Design Manual Equation 4-7:

$$N = \frac{SB}{(SB_i)(t_d)} = \frac{37{,}357\ gal}{(200\ gpd/ERU)(1\ day)} = 186\ ERUs$$

Where:
N = Number of system ERUs based on ERU_{MDD} value;
SB = Total volume of available standby storage (gallons);
SB_i = Selected volume of standby storage per consumer expectations (gpd/ERU);
t_d = Number of days selected to meet consumer expectations (days),

The minimum recommended volumes are appropriate for Discovery Bay since it has redundant sources that have backup power supply. Both available sources meet the DOH definition for continuously available sources per Section 7.1.3 of the Design Manual. The available SB of 37,357 gallons for the system can support 186 ERUs.

3.4.6.5 Fire Suppression Storage

Fire Suppression Storage (FSS) level depends on the maximum flow rate and duration determined by the applicable fire flow requirements, as noted in Section 3.3.7. 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.

The larger of the two applicable fire flow requirements requires the following FSS volume:

$$FSS = 750 \text{ gpm} \cdot 60 \text{ minutes} = 45{,}000 \; gallons$$

The currently available SB volume is insufficient to meet the existing county fire flow requirements to the system, based on the fire flow parameters noted in Section 3.3.7. In the design scenario (180 ERUs), the volume available for FSS is insufficient to provide for the fire flow requirements. Given this, it is recommended that a future reservoir replacement project should plan for additional (FSS) volume when replacing the reservoir. See Section 3.5.3 of this plan.

3.4.6.6 Storage Summary

The provided storage volumes associated with 180 ERUs are summarized in Table 3-11.

Table 3-11 Storage Components

Storage Component	Volume (gal)
Operational Storage (OS)	4,700
Equalizing Storage (ES)	14,106
Standby Storage (SB)	37,357
Fire Suppression Storage (FSS)	45,000
Dead Storage (DS)	2,585
Totals:	58,748

3.4.6.7 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 annual average day demand 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.

$$Water\ Age = \frac{Storage\ Volume}{ADD_{min} \cdot ERU} = \frac{52{,}638 \; gallons}{150 \text{ gpm/ERU} \cdot 200 \text{ ERU}} = 1.75 \; days$$

It is recommended that the complete turnover of water should occur at least every three to five days. Currently, the water age for the system is 1.75 days, which is below the minimum three day recommendation.

3.4.6.8 Storage Capacity

As noted in the previous subsection, storage capacity in the reservoir correlates to system operations. To place an actual numerical value to the storage capacity of the reservoir, 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 the system reservoir would be the available ES and SB for each reservoir. It is calculated as follows:

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

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

The available ES and SB for the reservoir is 51,463 gallons (See Table 3-11). The number ERUs that can be supported by the reservoir is 193.

3.4.7 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 3-12.

Table 3-12 Connection Limiting Factors

Components	Limiting Factor	Potential Connections
Annual Water Right (V_a)	V_a & ADD	289
Instantaneous Water Right (Q_i)	Q_i & MDD	288
Instantaneous Source Production	Q_s & MDD	180
Booster Pump	Q_B & MDD	19 (for Zone 3 only)
System Storage	SB & ES Volume	193

The water system was analyzed to estimate the maximum number of connections that can be served by each component, and to determine which components limit the system's capacity to serve more ERUs as summarized in Table 3-13. The limiting factor currently for the system is the source capacity. The system was determined to have a maximum capacity of 180 ERUs. 180 ERUs is sufficient to support the anticipated full build-out of the existing retail service area. The 19 currently supported ERU capacity, related to the booster pump for Zone 3, is more than sufficient to provide for the full build-out of the lots in Zone 3.

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 3-13.

Table 3-13 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 3-13 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 3-13 and are summarized in Chapter 8.

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 60- 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. 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.

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 at the required total dynamic head to pass into the top of the reservoir

Currently the wells pump directly into the distribution piping as means of conveyance to the water reservoir, which likely leads to less than ideal water turn-over and circulation/distribution of source water within the distribution pipes. Dedicated reservoir fill lines from the wells would improve the water system circulation. The new well lines would route from the two well locations to a centralized location such as the reservoir. Should there be a future project to replace either of the watermain distribution pipes from

either of the two sources all the way to the reservoir, then the existing water distribution pipes could be repurposed as dedicated reservoir fill lines, if new distribution piping is to be installed in parallel.

3.5.2 Treatment Needs

Currently the system does not have treatment installed. From the Inorganic compounds (IOC-short) report for Well 1 dated 3/24/22, manganese concentration for was measured at 0.06 mg/L, which is over the MCL of 0.05 mg/L. However, the IOC report for Well 2 dated 6/21/16, manganese concentration for was measured at 0.01 mg/L, which is well below the MCL. Given the relative manganese concentrations of the two wells, blending the source water would bring the concentration below the secondary MCL, so it should be verified that the source water is achieving proper blending to achieve acceptable water quality standards for manganese. If it isn't, a remedy should be investigated, such as potential pipe routing and/or operational changes so that the source water is properly blended.

Chlorination is proposed to be added for preventative disinfection and to provide a disinfection residual in the distribution system. The potential to form disinfection byproducts will also be evaluated prior to implementing chlorination. Chlorination would need to be implemented at either source well. At the Well #1 site, chlorination could be installed in existing pumphouse building. At the Well #2 site, chlorination would require the construction of a pumphouse building to house the chlorination equipment.

Adding chlorination to a system can change the oxidation-reduction potential of the water and increase its corrosivity (Design Manal). This can affect a system's ability to maintain compliance with the EPA's Lead and Copper Rule (LCR), depending on what materials were used in construction of the water system and household plumbing (i.e., lead service lines, lead based solder, copper plumbing, bronze and brass fittings, etc.).

The distribution piping is comprised of PVC as shown in the system drawings provided in Appendix V. Since this material does not contain lead or copper, adding chlorination is expected to have minimal impact on lead and copper release in the distribution system and its effects on compliance with the LCR.

No information on the material used for service connection piping on the System side of the meter is available. Household plumbing and service connection piping on the customer side of the meter are owned and maintained by the customer; Cascadia does not have control over these items and the material used is often unknown. Adding chlorination could have an impact on the corrosion of these items depending on what material is present.

After chlorination is installed, the system will monitor for compliance with the LCR. This will be discussed in greater detail when a specific chlorination design project report is submitted to the DOH.

3.5.3 Storage Needs

As noted in Section 3.4.6.5 the reservoir storage is inadequate to meet the fire suppression storage requirements of Jefferson County. Additional storage should be provided to meet current and projected future demands including the appropriate fire suppression storage. A likely option would be to provide a second, hydraulically equivalent, reservoir adjacent to the existing facilities.

Water turnover and water age within the reservoir would improve with reconfiguration/optimization of the reservoir inlet/outlet pipes such as a dedicated inlet pipe to discharge water into the top of the reservoir, which has the added benefit of improving source water blending and water turn-over. Alternatively, another water mixing mechanism for turning over water in the reservoir could be implemented, such as a mixer.

3.5.4 *Booster Pump & Pressure Tank Needs*

A requirement for pressurized water systems is to provide 30 psi during PHD, with the largest booster pump out of service. Currently Zone 3 operates utilizing a singular booster pump. The system should install an additional redundant booster pump to meet requirements. The additional booster pump will also ensure the current pressure tanks provide adequate pump protection within Pressure Zone #3.

3.5.5 *Distribution Needs*

Cascadia is in the process of testing remote read meters to replace/upgrade the existing meters for Discovery Bay Village. 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. Service and source meters will also be placed on a routine replacement schedule to ensure accuracy of well production data.

EPA-Net modeling results demonstrate that in order to provide the required 20 psi pressure at each service connection during a fire flow scenario, the services associated with parcels 902131009 and 902131010, both accessed from Woodhaven Lane, should be switched to the Pressure Zone 3 distribution system. Parcel 902131009 does not currently contain a residence. Parcel 902131010 does currently contain a residence and is currently served from the 2 inch PVC gravity pipe in Woodhaven Lane, within Pressure Zone 2. Switching these parcels to be within Pressure Zone 3 results in high pressures for these parcels given their elevation, so this proposed change would require pressure reducing valves on each individual service connection to keep the resulting water pressure within reasonable values.

The pressure reducing valve (PRV) is located near the intersection of Holland Drive and Honeymoon Lane and manages pressures between Pressure Zone #2 and Pressure Zone #1. The PRV is in a brick walled hole with a dirt bottom and is covered by a few pieces of plywood. These valves are a critical point of infrastructure along the water main serving the WorldMark condos. New PRVs should be installed along the dedicated water main on Holland Drive. The new valves should be installed within a concrete vault with a traffic rated lid to protect infrastructure from tampering and traffic accidents.

Currently Pressure Zone #1 is only served by the water main crossing State Route 101 along Holland Drive and Orcas Drive. The distribution system would benefit from being looped down to Pressure Zone #1 from an additional location. This loop could potentially be installed further south along Holland Drive crossing State Route 20 to Old Gardiner Road. In association with this new looped connection, an additional PRV will need to be included, as the proposed loop will create a second link between Pressure Zone #1 and Pressure Zone #2.

Fire Hydrants should be evaluated for operability and fire department connection compatibility and replaced/upgraded as needed. An analysis of where the water system would benefit from additional fire hydrants would be beneficial as well.

Any customer experiencing high water pressure (over 100 psi) from their water service, should install a pressure reducing valve (PRV) on the downstream side of the water meter serving their parcel.

There are two items that need further investigation, which are being included in this report as future projects. They are as follows:

1. Investigate the 2-inch PVC pipe that supplies the WSDOT Maintenance Facility and the houses within the southeast portion of the water service area, potentially via potholing, etc., to verify the existing pipe size and verify it is properly sized to supply this portion of the service area, based on current and future demand.

2. Investigate reported leakage from pipes related to irrigation pipes on the "Logging Yard" to determine the leakage source, and fix the leak, as required. The best available knowledge regarding this issue, is that there is a landowner in the northern portion of the water service area in the vicinity of Old Gardiner Road that impounds water from a spring and conveys this water in small diameter polyethylene pipes (1" to 2"), mostly along the ground surface, to other properties along Old Gardiner Road for the purpose of irrigation. The leakage complaints are often received by the water system operator, who does not have any affiliation with these irrigation pipes. This investigation could potentially involve locating and documenting these irrigation pipes, so that future complaints can be diagnosed easier and relayed to the irrigation pipe owner. Possible investigation techniques might include locating and tracking the pipe route, tracing a leak, and/or water quality testing, etc. Investigating this irrigation network to confirm there is no cross-contamination risk with the water system distribution piping would be prudent.

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 and controlled 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.

The Water System would benefit from installing ultrasonic water level measurement equipment in both wells for automated water level data collection. These water level measurements are required twice a year by the provisions within the water right permit, however these measurements are recommended to be taken at least on a monthly basis, if not more frequently. There are many uses for this data, including diagnosing issues with the well. Automated water level measurement data collection equipment can be configured to collect and log measurements on any frequency, and also will log the pumping water levels in addition to the static water levels.

3.5.7 *Non-Facility Needs*

Cascadia is planning to add a backup generator(s) to provide backup power to both well pumps, as well as to the booster pumps and treatment. Cascadia is also 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.

It would be prudent to track-down and gather all the legal documentation associated with the water system, including: Utility and Access Easements to facilities (wells, storage reservoir, pumphouses), Covenants (Sanitary Control Area for wells), the Franchise Agreement, and the Retail Service Area Agreement. Some of these tasks are in progress, but the remaining items could be investigated by a representative of the water system, or a consultant such as a surveyor and/or a lawyer, etc.

Cascadia is in the process of installing remote read meters to replace/upgrade their existing meters and will be implemented for the system. The remote reading 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

Table 3-14 Prioritized System Improvement Needs

#	Prioritization	Component	Component Description	Cost
1	Immediate Term (2024)	Distribution	Water Meter Replacement - Replace all source meters and water service meters.	$40,000
2	Immediate Term (2024)	Controls/ Telemetry	Add a SCADA so that the system that could be monitored and controlled from a central location.	$25,000
3	Immediate Term (2024)	Controls/ Telemetry	Backup Generators – A generator will be sized and installed to allow for functioning of the source well pumps, booster pumps, and potential treatment system, during power outages.	$50,000
4	Immediate Term (2024)	Distribution/ Investigative	Leakage has been reported at the "Logging Yard", which could be related to water distribution piping. Investigate the reported leakage to determine the source, and fix leak. Potentially potholing or excavating pipes, tracing, water quality testing, etc.	$10,000
5	Immediate Term (2024)	Legal/ Investigative	Investigate and track down all legal documents: Utility and Access Easements to facilities, Covenants (Sanitary Control Area for wells), Franchise Agreement, Retail Service Area Agreement	$5,000
6	Near Term (2025)	Controls/ Telemetry	Security fencing will be installed around the system reservoirs and wells. Security alarms will be added to reservoir hatches, and pumphouse doors.	$40,000
7	Near Term (2026)	Distribution	Booster Pump Station – A redundant booster pump for the system will need to be installed so the system can meet DOH requirements for a redundant booster pump, to meet PHD and 30 psi with the largest pump out of service. It is anticipated that due to the condition and size of the building located adjacent to the concrete reservoir, this will necessitate a new building being constructed.	$175,000
8	Near Term (2026)	Distribution	The existing pressure reducing vault is in disrepair and needs replacement. Replace Pressure Reducing Vault (PRV) between Pressure Zones 1 and 2.	$125,000
9	Near Term (2026)	Treatment	Implement chlorination at each well location. It is anticipated that a building will need to be installed at both well locations to house the chlorination equipment.	$200,000

10	Near Term/ Medium Range (2025/2027)	Distribution	Extend Zone 3 pressurized water services to include parcels 902131009 and 902131010. Two parcels are served from Pressure Zone 2 that would not maintain 20 psi during fire flow.	$100,000 $200/foot
11	Medium Range/ Long Range (2028/2030)	Storage	Additional Reservoir Storage Capacity: Reservoir Replacement or additional reservoir. The reservoir does not provide the recommended standby storage (SB) volume, and the volume available for fire suppression storage (FSS) is insufficient.	$500,000
12	Long Range (2030-2040)	Distribution	Add watermain loop from Holland Drive to WorldMark condos. Include pressure reducing vault. The WorldMark condos are served by only one watermain, and do not have any redundancy (looping).	$500,000
13	Long Range (2030-2040)	Distribution	Fire Hydrant Evaluation and Replacement - replace and add fire hydrants where warranted. The existing fire hydrant configuration/compatibility is questionable. Some hydrants may be non-functional.	$60,000

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 Jefferson County, near to Port Townsend. Port Townsend has an average annual rainfall of 18.7 inches, per the Western Regional Climate Center. The rainfall amount is relatively low; it's about half of the average annual precipitation of Washington State of 38.2 inches.

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.
- Reduce distribution system water loss to 10 percent or less, if determined to be over 10 percent.

4.1.1 System Water Loss Summary and Action Plan

As discussed in Section 2.1.3, Distribution System Leakage (DSL) has historically been relatively high, ranging from approximately 21% to 29% from 2021 going back to 2019, as reported on the Water Use Efficiency (WUE) annual reports. The 2021 WUE report notes "Cascadia Water is in the process of changing out all master meters and service meters." There was a dramatic drop in Distribution System Leakage (DSL) that occurred between the 2021 and 2022 reporting periods, which is likely due to the replacement of the meters. This leads to the conclusion that the majority of the prior DSL was attributed to inaccurate meters, which gave a false impression of artificially high DSL. The 2022 DSL value (6.6%) is therefore assumed to represent the current DSL of the system more accurately, and this value was used for the calculation of equivalent non-residential ERUs within this report.

4.1.1.1 Goals

Discovery Bay has established a goal as part of their conservation program to reduce the growth adjusted maximum day demand by a minimum of 1.5% within six years. Reductions in the MDD can be accomplished through the proper tracking of DSL, updated rate structure, and 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 the Water System to demonstrate serious consideration of all options prior to issuing a new or expanded water right. The purpose of a source of supply analysis is to evaluate opportunities to obtain or optimize the use of existing developed sources and evaluate other innovative methods to meet water needs.

The Water System has an adequate water right at this time and is not projected to require additional rights, even at full build-out of the water system service area.

4.2.1 Enhanced Conservation Measures

As discussed in Section 4.1, Cascadia has or will implement water use efficiency measures with the goal of reducing MDD and DSL system wide for Discovery Bay Village.

4.2.2 Water Rights Changes

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

4.2.3 Interties

Currently there are no additional water systems intertied with Discovery Bay Village. One nearby water system, known as MOA TEL, has a service area boundary that is adjacent to Discovery Bay Village. The location of the MOA TEL distribution system is unknown, but it is assumed that a long watermain extension would be required for an intertie to be feasible. Additionally, pumps would be required to service Discovery Bay Village from the MOA TEL distribution system. These items limit the practicality of an inter-tie. 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 emergencies such as line breaks or source production issues, but further evaluation would be needed to accurately determine the cost-effectiveness. 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.

4.3 Water Right Evaluation

The following sections summarize the Water System's water right evaluation.

4.3.1 Existing Water Rights

The Washington State Department of Ecology (DOE) issued Ground Water Certificate G2-26449 (Priority Date December 9th, 1983) to Discovery Bay Village. The water right allows the system a maximum instantaneous withdrawal (Q_i) of 100 gpm and a maximum volume (Q_a) of 48.5 acre-feet per year (ac-ft/yr). Well #1 point of withdrawal is 1,250 feet south and 500 feet west of the northeast corner of Section

13. Well #2 point of withdrawal is 2,700 feet south and 700 feet east of the northeast corner of Section 13. A copy of the water rights are included in Appendix E.

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. Per the water quality monitoring schedule (WQMS), the Water System is scheduled to perform PFAS sampling in 2024. The two groundwater sources are completed in relatively deep aquifers. It is unknown if the aquifers are protected by glacial till or clay confining layers, that might slow the transport of potential contaminates and allow for their natural degradation.

The purpose of this source protection program is to provide the System with a proactive program for preventing groundwater contamination. Source protection programs in Washington must include:

- A delineated Sanitary Control Area (SCA) around each source.
- An inventory of potential contamination sources in the wellhead protection area that could threaten the aquifer used by the well.
- Documentation showing the water system sent delineation and inventory findings to the required entities.
- Contingency plans for providing alternate drinking water sources if contamination does occur.
- Coordination with local emergency responders for appropriate spill or incident response measures.

5.2 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 two 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 of the Water System Plan is intended to be the Discovery Bay Village Operation and Maintenance Program Manual (O&M Manual), and it can be used as a standalone document. A copy of the O&M Manual shall be maintained onsite at the system, as well as Cascadia offices. The O&M Manual includes pertinent contact information, worksheets, and operational procedures. The O&M Manual also includes the Water Shortage Plan, 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 that maintain Discovery Bay Village. Staff should continually maintain certifications through continuing education as required by each 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 at minimum include the tasks outlined in Table 6-2.

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

Daily
Source Well Locations
▪ Record production and source meter readings
▪ Record pump hours, calculate daily run times for booster and well pumps
▪ Visual premises check – correct or report any problems
▪ Visual inspection of well heads – correct or report problems
Reservoir
▪ Record reservoir levels
▪ Visual premises check – correct or report any problems

Weekly
Pump Houses
▪ Operate all pumps manually
▪ Pump facilities should be visually checked
Generator
▪ Generator – Check fuel levels (fill as needed)
▪ Generator – Check and record hours
▪ Generator – Verify auto test is operating properly
Reservoir
▪ Perimeter check – correct or report problems
Monthly
General System O&M
▪ Wells: Measure static water level (SWL) and pumping water level (PWL)
▪ Wells: Perform Flow/production calculations
▪ Bacteria Testing: 1 sample required per month. See Coliform Monitoring Plan
▪ Collect temperature and pH samples from individual wells and reservoir
▪ Pressure Tanks: Check water or air leakage of tanks associated pipes and fittings
▪ Pressure Tanks: Monitor Pressure level, fluctuation during a cycle (cut-in and cut-out pressures), and number of cycles per hour
Every Two Months
▪ 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.
▪ Booster Pumps: Check the integrity of the pump's foundation and check the hold down bolts for tightness.
▪ Booster Pumps: Conduct a motor inspection: Clean? Grease free of dirt? Blockage? Ohmmeter periodically to see if winding insulation is OK.
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
▪ Pressure Tanks: Tanks should be checked to ensure the pre-charge pressure is properly maintained.

Annually
General System O&M
▪ Cross-connection control – Verify high/medium risk customers have submitted test reports for backflow devices
▪ Pressure Tanks: Check whether there is sediment in the tanks
▪ Water Use Efficiency data reporting (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
▪ Backflow prevention device inspection
▪ Line valve inspection and exercising
Every 3 Years
▪ Reservoir inspection and cleaning
▪ Air valve inspections (air release, air/vacuum, and combination air valves)
▪ Electrical review of system by licensed electrician
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
At Specific Times
▪ By January 31st of each year: submit the year's chloride and conductivity chemical analysis results to DOE [per Water Right Provisions]

▪ By January 31st of each year: submit the year's depth to static water level measurements to DOE [per Water Right Provisions]
▪ April: chloride and conductivity chemical analysis from Well S01 (ABR271) [per Water Right Provisions]
▪ April: static water level measurements from Well S01 (ABR271) [per Water Right Provisions]
▪ September: chloride and conductivity chemical analysis from Well S01 (ABR271) [per Water Right Provisions]
▪ September: static water level measurements from Well S01 (ABR271) [per Water Right Provisions]

The DOH also requires bacteriological samples to be taken and that chemical analyses of Discovery Bay Village's supply sources be made often enough to assure compliance. Water quality requirements are listed in detail in Section 3-2. It's good practice to have 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. The DOH provides a water quality monitoring schedule (WQMs) that summarizes the specific testing requirements for that system. The WQMS is included in Appendix K. Table 3-1 provides a description of the other required samples and frequency.

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

6.4.1 Bacteriological Detection Procedures

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 notifications required of the Water System vary depending on the type of violation that occurs. Table 6-3 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 hours with a boil water advisory. The DOH must be notified, and certification forms submitted within 10 days.

6.4.2 Organic and Inorganic 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 are listed below. Nitrates and nitrites are subject to a separate process by the WSDOH as noted in Section 6.4.3. Currently the Water System has varied waivers for testing parameters as 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 a quarterly interval.
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 publication on radio 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/Nitrite Compound 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. 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 operator 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 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 the system 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 the 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 Discovery Bay Village 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 Discovery Bay Village 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
Environmental Public Health Jefferson County	360-385-9444
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

Discovery Bay Village has 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.

The system'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. The plan for Discovery Bay Village is outlined below. The rules and regulations provided in the tariff for Cascadia are included in the Appendix of the Cascadia Water – Water System Plan Part A. In general, the tariff outlines requirements for cross-connection control. Cascadia Water 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 system.

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 the 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 Cascadia 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 the Discovery Bay Village distribution system. These potential uses can include, but are not 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, the system 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.

The Discovery Bay Village 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.

At a minimum, the system shall require 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's distribution system. Cascadia policy requires that the owner of a property or any person residing thereon receiving water service from Discovery Bay Village shall not connect, directly or indirectly, the water service line, or any part of the plumbing of such structure receiving water service from Discovery Bay Village.

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. Discovery Bay Village 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.

The system will promptly notify property owners with known potential cross-connections. The system 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

Cascadia Water 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.

Cascadia requires 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's distribution system, the water system operator shall notify Cascadia Water and the local DOH 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.
- Occurred within the premises of a customer served by Discovery Bay Village.

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 officers, and general management as needed.

6.9 Summary of O&M Deficiencies

Cascadia continually strives to improve O&M procedures for the Water System.

If an ATEC Manganese Filtration System is added to the system, the Operations & Maintenance Manual for the ATEC treatment equipment should be incorporated into this O&M Manual and kept on file at the pumphouse and retained at the offices of Cascadia Water.

If other treatment such as chlorination is added to the system, the Operations & Maintenance considerations for those procedures and equipment should be incorporated into this O&M Manual and kept on file at the pumphouse and retained at the offices of Cascadia Water.

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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 the 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 the Water System. Population and water demand forecast and existing system analysis, discussed in previous chapters, were used to formulate the following Capital Improvement Plan. The Water System's design criteria were included in the formation of the plan.

The following sections summarize Discovery Bay Village's Improvement Program which is organized in two basic elements: 1) Prioritizing Improvement Projects, and 2) Improvement Schedule.

Planning Phase 1 (6 years; 2023 - 2029)
It is anticipated the system will serve approximately 120 ERUs by the end of 2029. Based on the capacity analysis detailed in Section 0, the Water System's current infrastructure appears adequate to meet the anticipated growth as the limiting factor of the system is the instantaneous source production and MDD for a maximum of 180 ERUs. The existing system deficiencies have been identified to support the anticipated growth and future development of the system. The next limiting factor of the system is the instantaneous withdrawal water right limit at 288 ERUs.

The 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, providing treatment, and fire flow needs. 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; 2029 - 2043)
It is anticipated that the Water System will serve approximately 138 connections by the end of 2043. The anticipated number of connections will be less than the number of ERUs that can be legally and physically supported by the system based on the analysis provided in Section 3.4. In Phase 2, following the projects in the immediate term, the system will prioritize looping portions of their distribution system and providing additional system storage.

Planning Phase 3 (20+ years, 2043 and beyond)
As indicated above, build-out for many of the water system's components will be completed by the end of Phase 2. As the system continues 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 Discovery Bay Village 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 3-14. 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. Potential improvement projects addressing the needs in each of the system functional groups were also noted in Section 3.5 and Table 3-14.

8.2.1 Source

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, the system should incorporate annual monitoring of the system sources into their standard operations and maintenance. Wells should be analyzed to determine their efficacy compared to when the well was originally installed and tested. If a well's performance is diminishing, then rehabilitation or replacement will be considered. This analysis should include a yearly test to determine static and dynamic water levels. Further information is included in the operations and maintenance program outlined in Chapter 6. When the well pumps are replaced, the installation of new well pumps should include the sounding tubes and a pressure transducer to remotely monitor the well's water levels and operation.

8.2.2 Treatment

Chlorination is proposed to be added for preventative disinfection and to provide a disinfection residual in the distribution system. It is anticipated that chlorination will be implemented at the source wells. At Well #1, chlorination could be installed in the existing pumphouse building. At Well #2, chlorination would require the construction of a building to house the chlorination equipment.

8.2.3 Storage

With the deficiencies identified in Section 3.4.6, the system will install additional storage in the medium range. The new reservoir should be sized to meet current and future demands including fire suppression storage. It is anticipated that the additional storage could be accomplished with a second reservoir located adjacent to the existing concrete storage reservoir. The new reservoir should be hydraulically equivalent to the existing reservoir to optimize system operations and existing infrastructure. The available land and corresponding topography will need to be assessed to properly locate a new reservoir.

8.2.4 Distribution

The water system has portions of the distribution system piping that are aging and will need replacing. The distribution system projects prioritize replacement of aging infrastructure and the installation of additions to the distribution system to improve reliability and water turnover on dead end portions of the distribution system. The following projects have been identified:

- *PRV Vault Replacement – Holland Drive – Short Term/Medium Range*

  The pressure reducing valves (PRV) located near the intersection of Holland Drive and Honeymoon Lane manage pressures between Pressure Zone #2 and Pressure Zone #1. The PRVs are currently in a brick walled hole with a dirt bottom and are covered by a few pieces of plywood. These valves are a critical point of infrastructure along the water main serving the WorldMark condos. New PRVs should be installed along the dedicated water main on Holland Drive. The new valves should be installed within a concrete vault with a traffic rated lid to protect infrastructure from tampering and traffic accidents.

- *Holland Drive to Old Gardiner Road Loop – Current Planning Period*

  Currently Pressure Zone #1 is only served by the water main crossing State Route 101 along Holland Drive and Orcas Drive. The distribution system would benefit from being looped down to Pressure Zone #1 from an additional location. This loop could potentially be installed further south along Holland Drive crossing State Route 20 to Old Gardiner Road. In association with this new looped connection, an additional PRV will need to be included, as the proposed loop will create a second link between Pressure Zone #1 and Pressure Zone #2.

8.2.5 Non-Facility Improvements

Potential non-facility improvements include continued promotion of conservation policies, and updates to the system procedures and policies to ensure that the integrity of the water distribution system are maintained. The following item has been identified for the WSP planning periods:

Service & Source Meter Replacement – Current Planning Period

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 water 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 the 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

The improvement projects shown in Table 3-14 were developed based on the above factors and the prioritization system presented in Section 3.5.

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

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

- MOA TEL water system

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 Discovery Bay Village serves less than 1,000 connections. Therefore, the documentation has not been included with the Plan.

10.3 Agreements

Currently there is no documentation for a Service Area Agreement for Discovery Bay Village with Jefferson County. Cascadia Water is pursuing measures to locate, coordinate, and finalize Service Area Agreements with Jefferson County over the next few years.

The Franchise Agreement for Discovery Bay Village with Jefferson County has expired and Cascadia Water is in the process of renewing with the County.

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APPENDIX A
Water Facility 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.

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

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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

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

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

Charmayne Elias
Residing @ SeQuim
Commission Expires April 7, 2007

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

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.

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

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.

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

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.

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

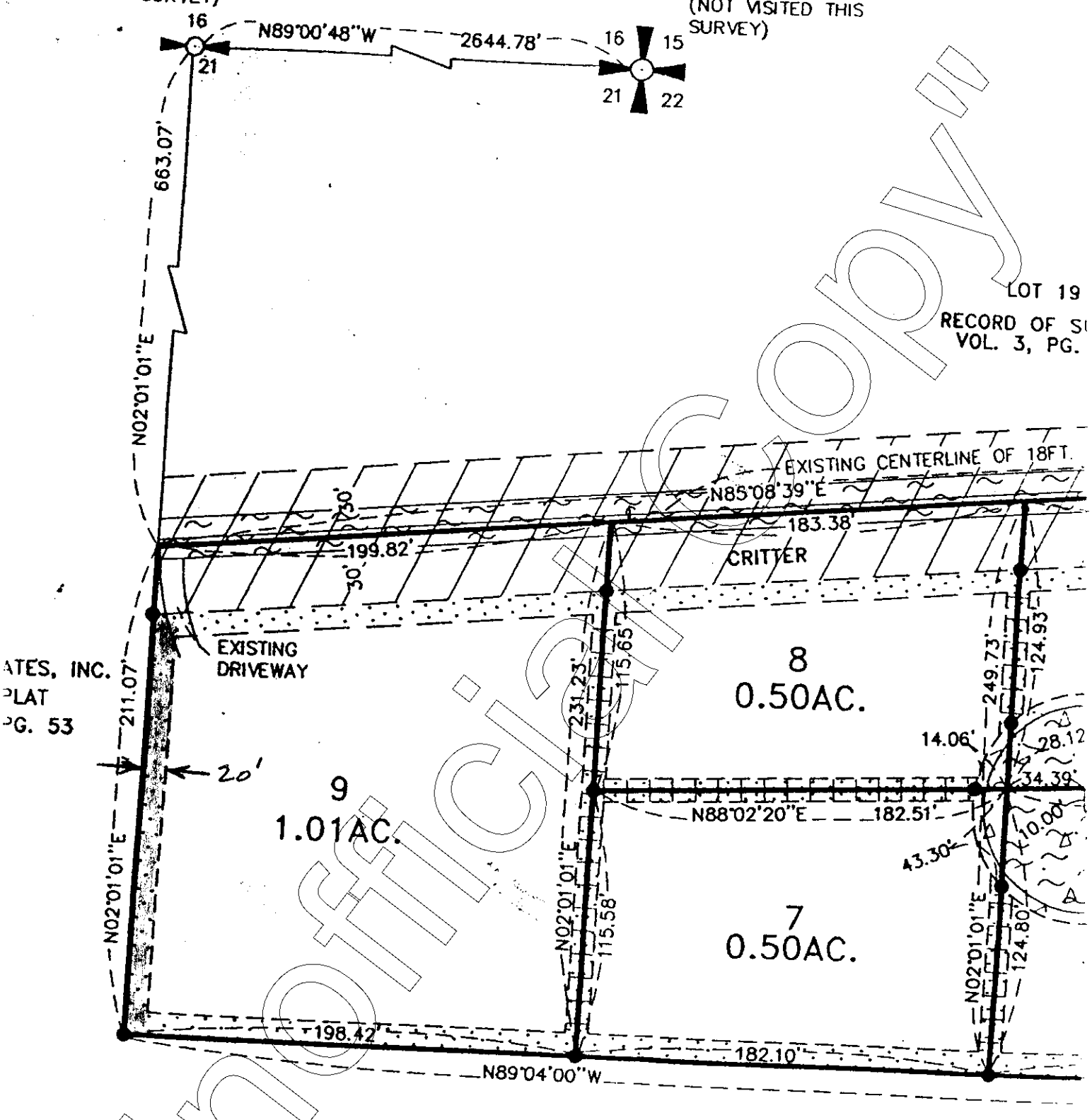
Notary Public in and for the State of Washington, residing at Clallam

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

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.

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

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

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

[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

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.

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,

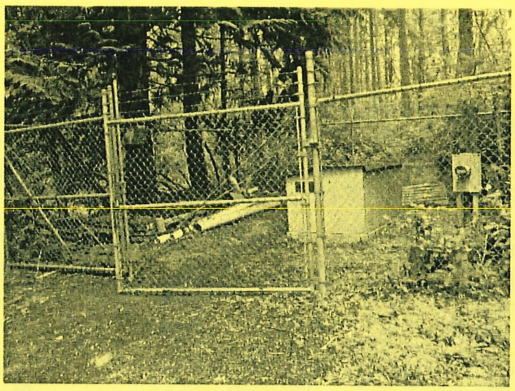
Jocelyne Gray

Jocelyne Gray, PE
Office of Drinking Water, Regional Engineer

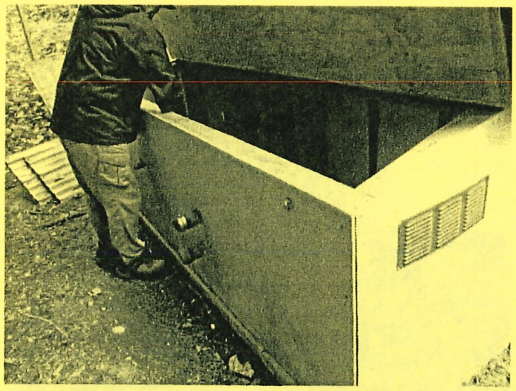
Enclosures

cc: Sue Waldrip, Clallam County Health and Human Services
Denise Miles, ODW
Mark Mazeski, ODW

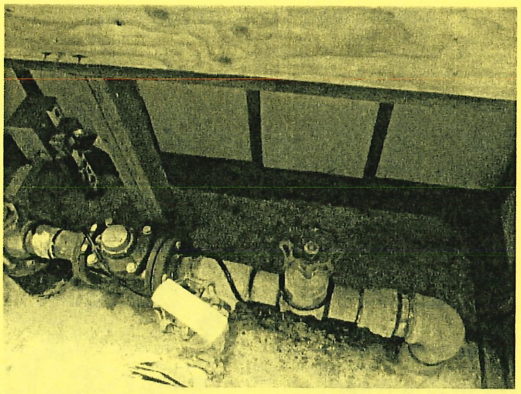
Well Site



Well 1



Well 1 enclosure



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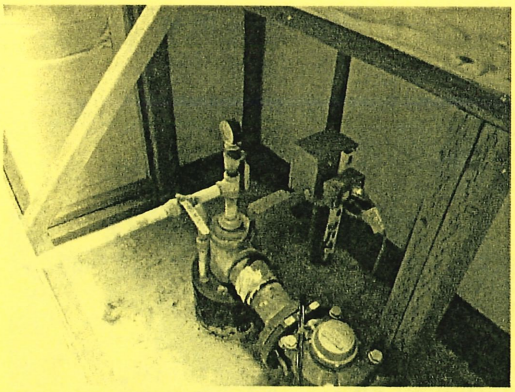
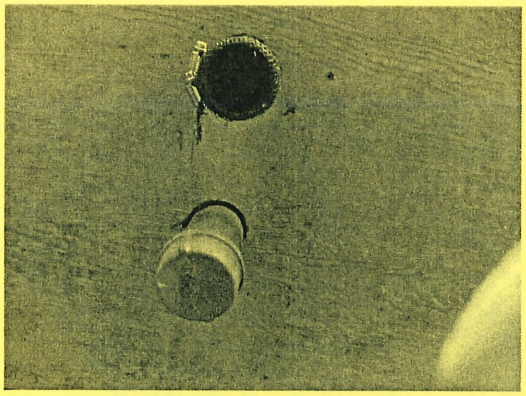
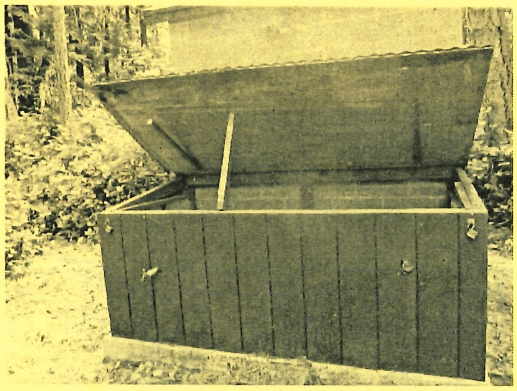


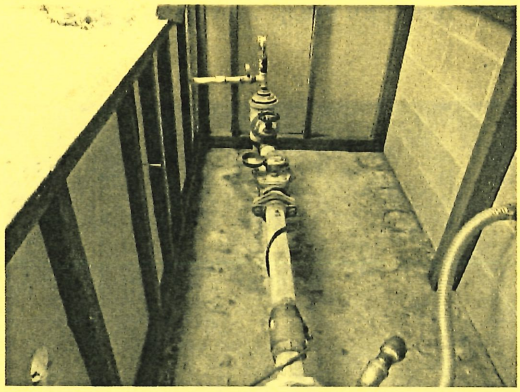
Well 1



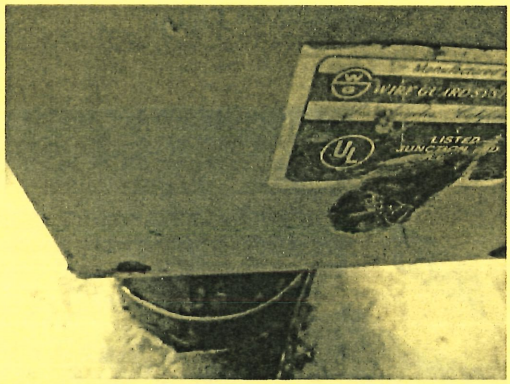
Well 1 enclosure drain and vent



Well 2 enclosure

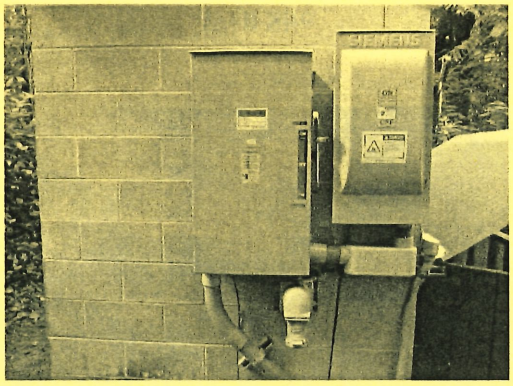


Well 2



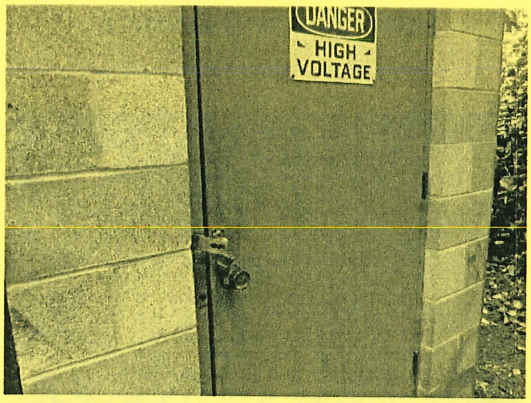
Openings in electrical box at Well 2

Opening in Well 2 enclosure

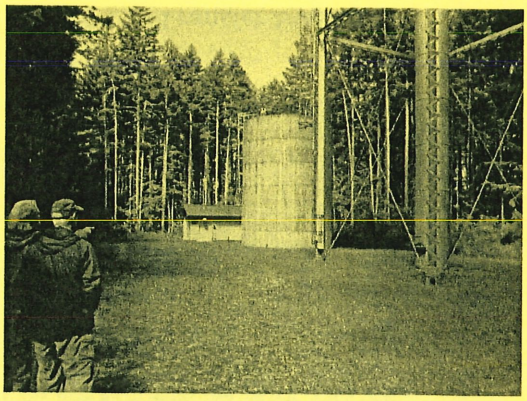


Portable generator connection & controls

Electrical controls for both wells

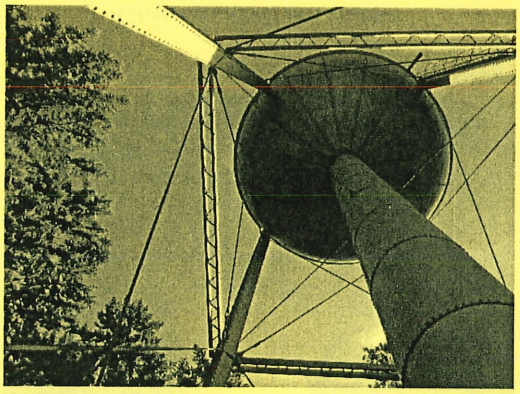


Well Control House

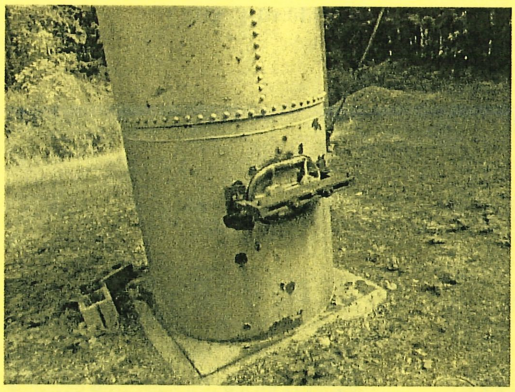


Diamond Point Rd Tank Site – Tank 3

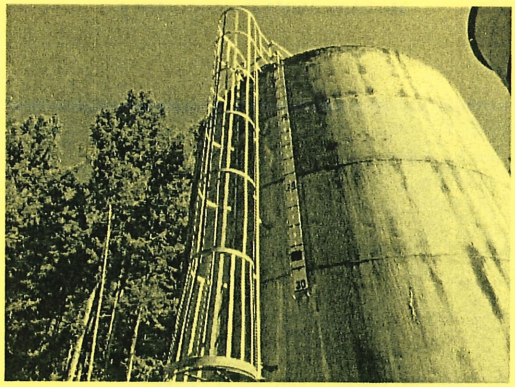
Diamond Point Rd – Tank 2



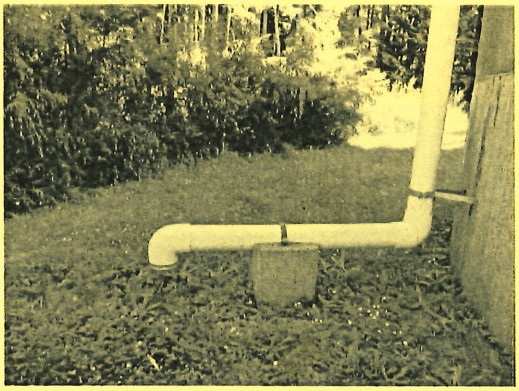
Tank 2



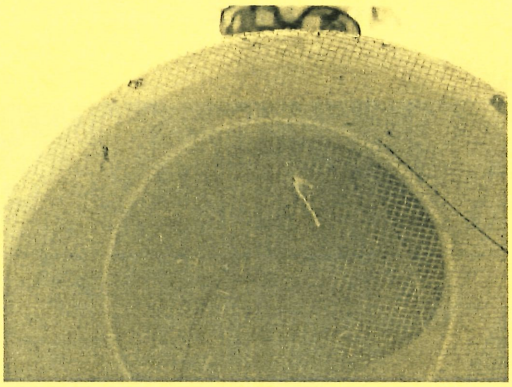
Tank 2 base



Tank 3

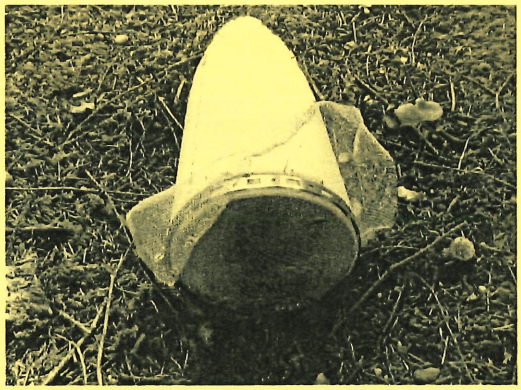


Tank 3 overflow



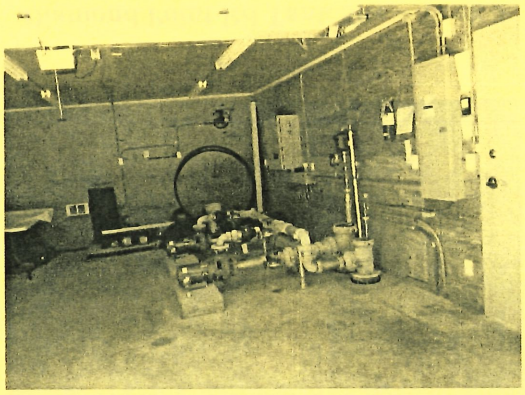
Tank 3 overflow screen

Combined drain for Tanks 2 & 3

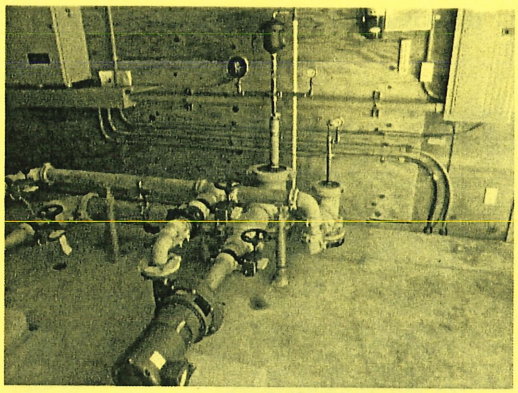


Combined drain outlet

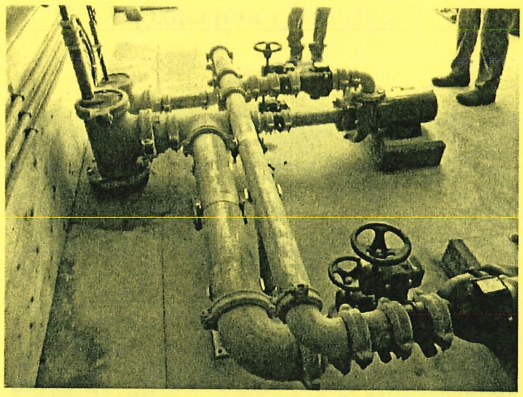
Tank site from drain outlet



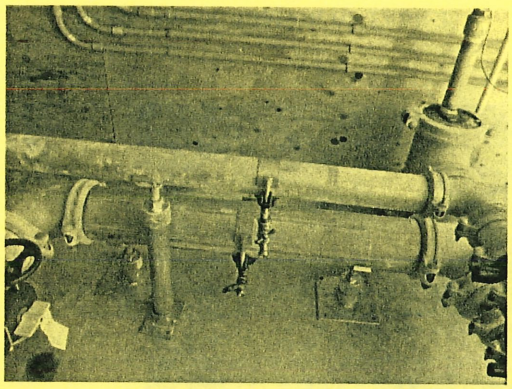
Transfer Station



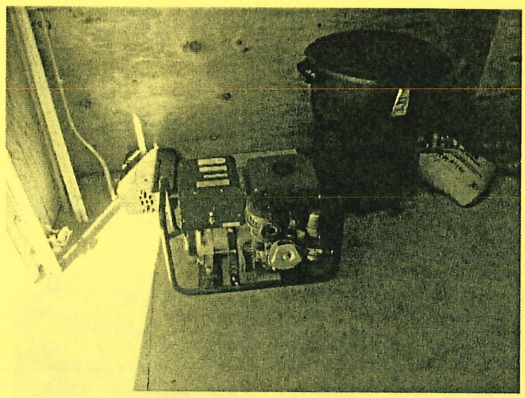
Transfer Station Pump 1



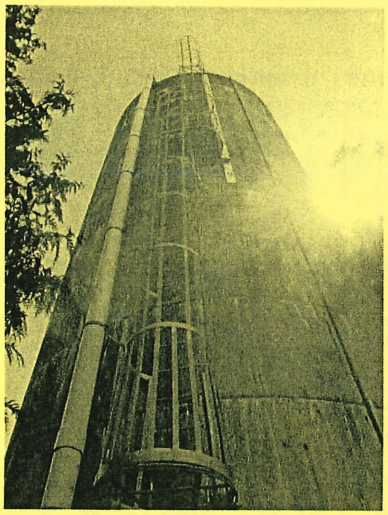
Transfer Station piping & pumps



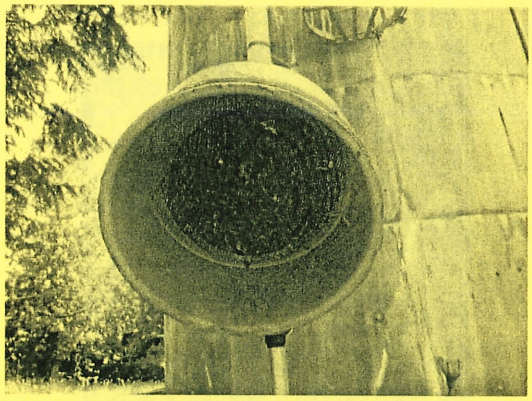
Transfer Station – pumps' sample taps



Generator for Transfer Station



Tank 1 at North Street

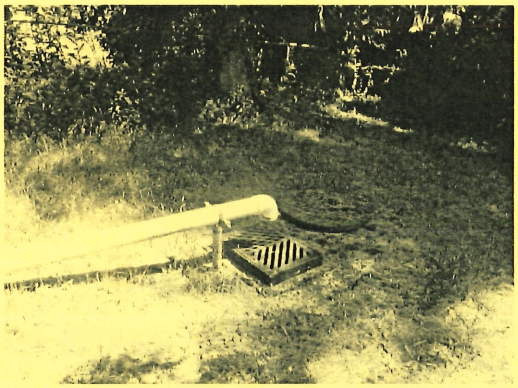


Tank 1 overflow screen

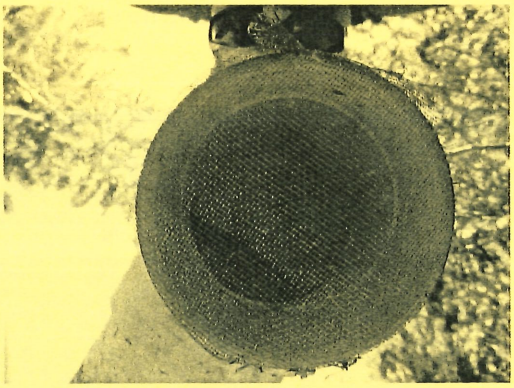
Vegetation on west side of Tank 1

Vegetation on east side of Tank 1

Moss on foundation of Tank 1

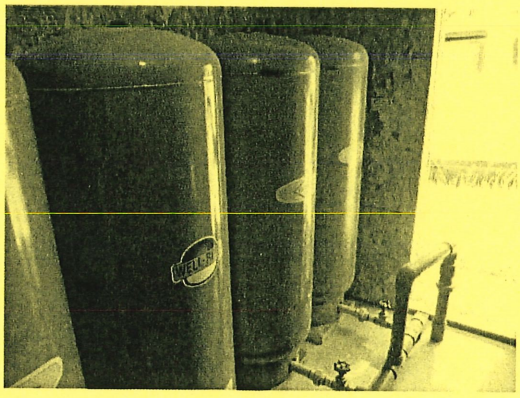


Tank 1 emergency overflow

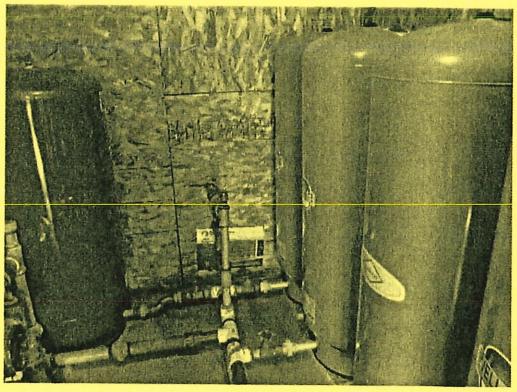


Tank 1 emergency overflow screen

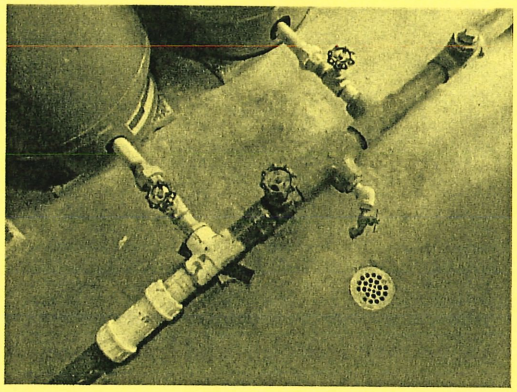
Protection Point BPS



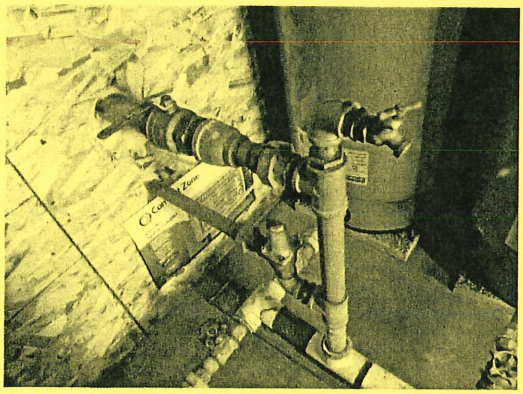
Bladder Tanks (r-l) 1-3
Bladder Tank 1 waterlogged & off



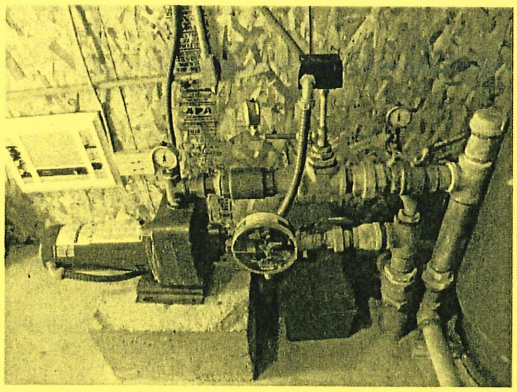
Bladder Tanks (r-l) 4-7
Bladder Tank 7 waterlogged & off



Bladder tank system connections



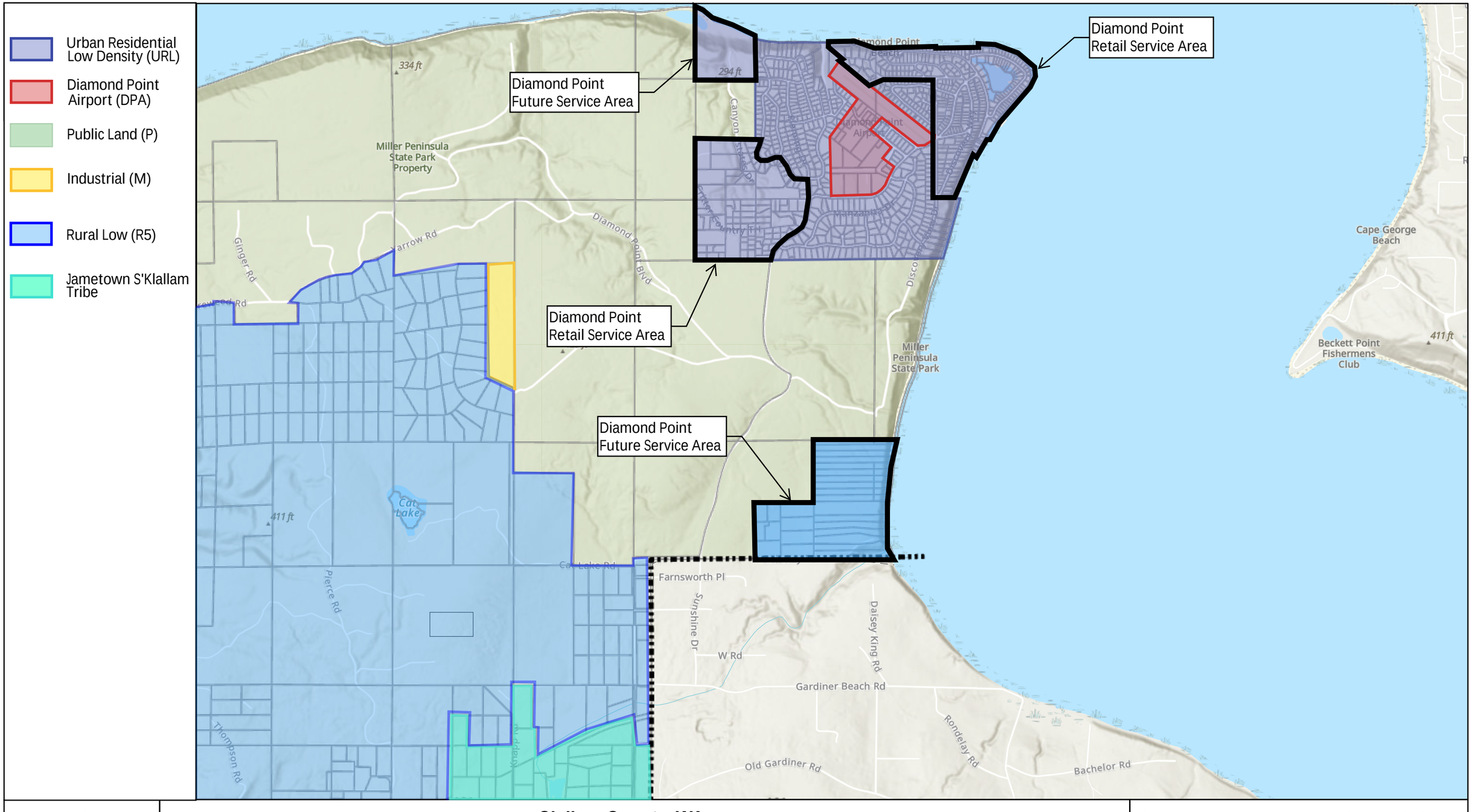
PRV for bladder tanks and booster pump



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

ENGINEERING DATA
OK UKB

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 21Q

(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
Baller 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, 19 75 Completed 6-2, 19 75

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] Hugh D. Burt
(Well Driller)
License No. 223-02-6084 Date July 18, 19 75

S. F. No. 7356—OS—(Rev. 4-71). (USE ADDITIONAL SHEETS IF NECESSARY) 223909

OK RJ 7/25/75

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

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

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.

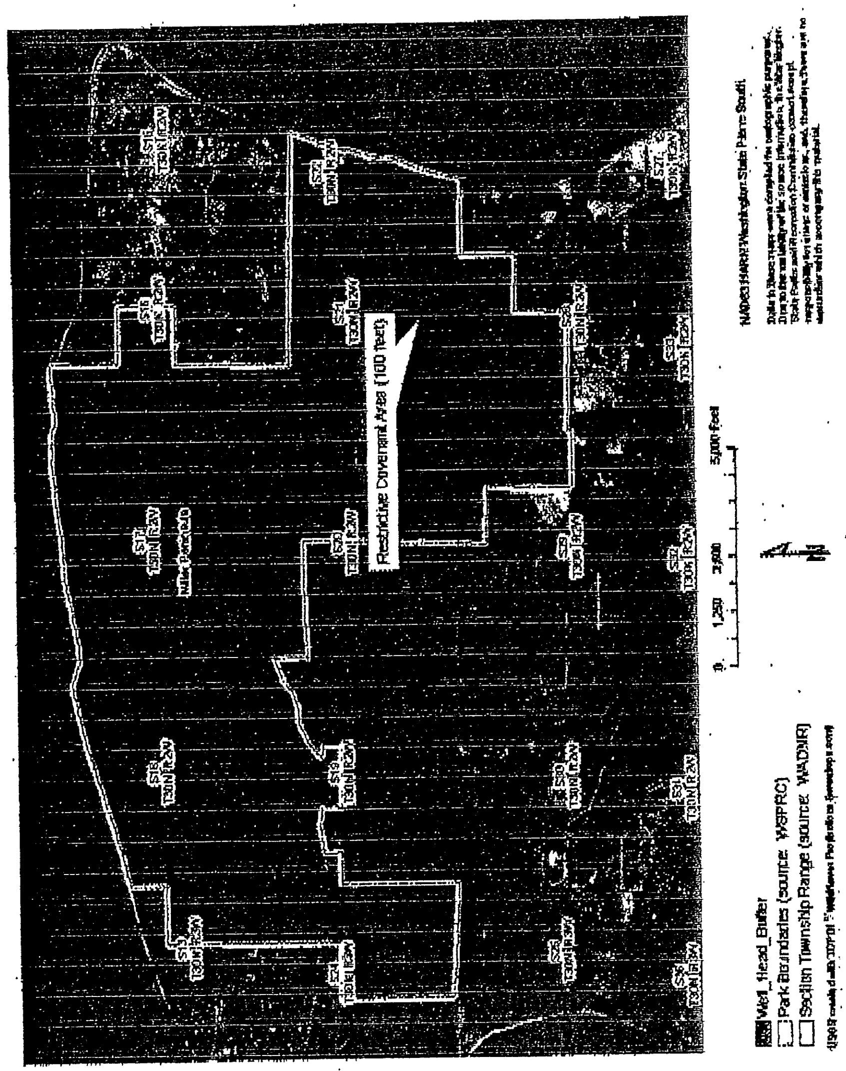
WITNESS my hand and official seal this _____day of _
_____, 2008.

_____
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 Protect 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.

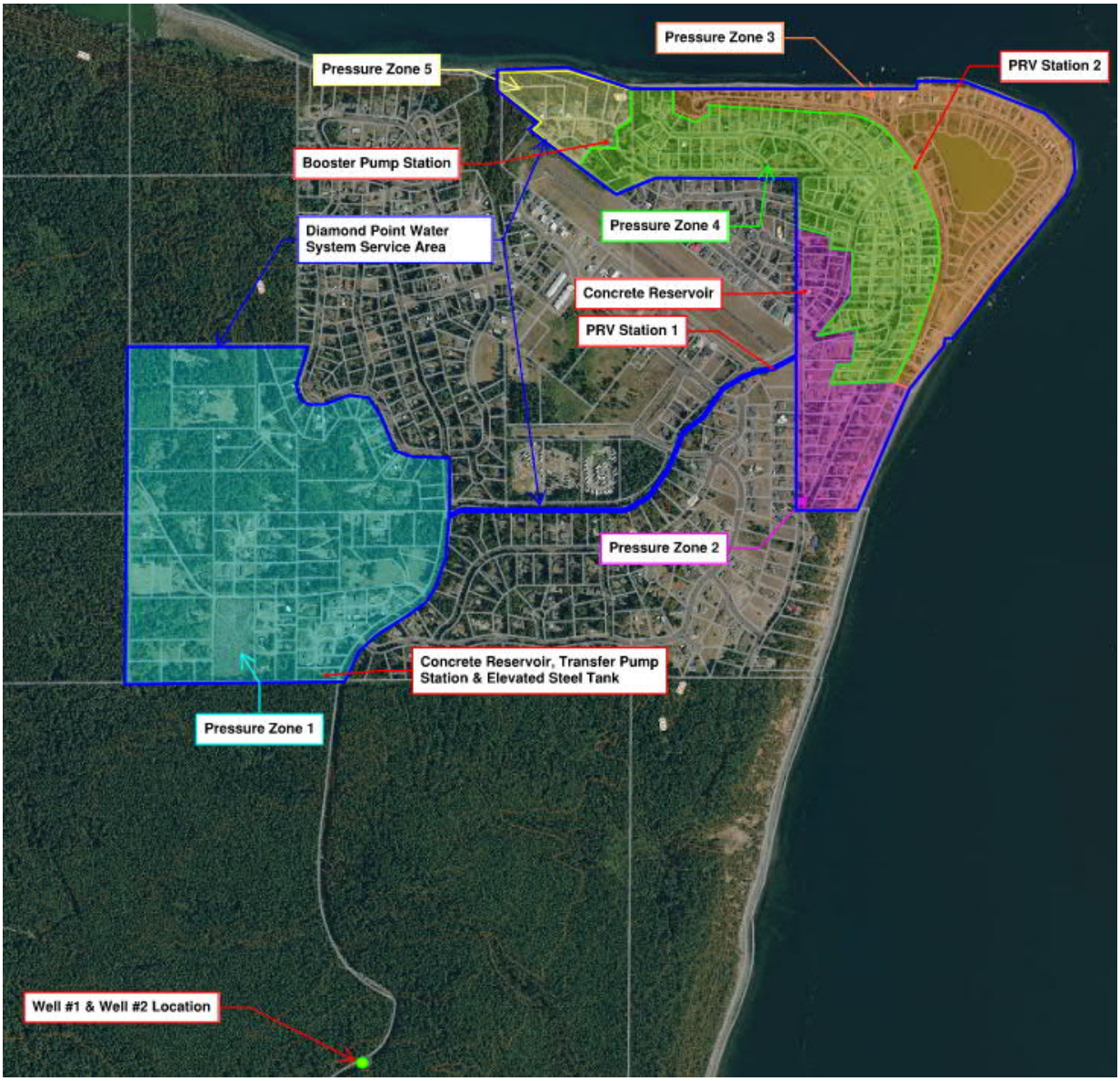
1.1.2 Seawater Intrusion

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)

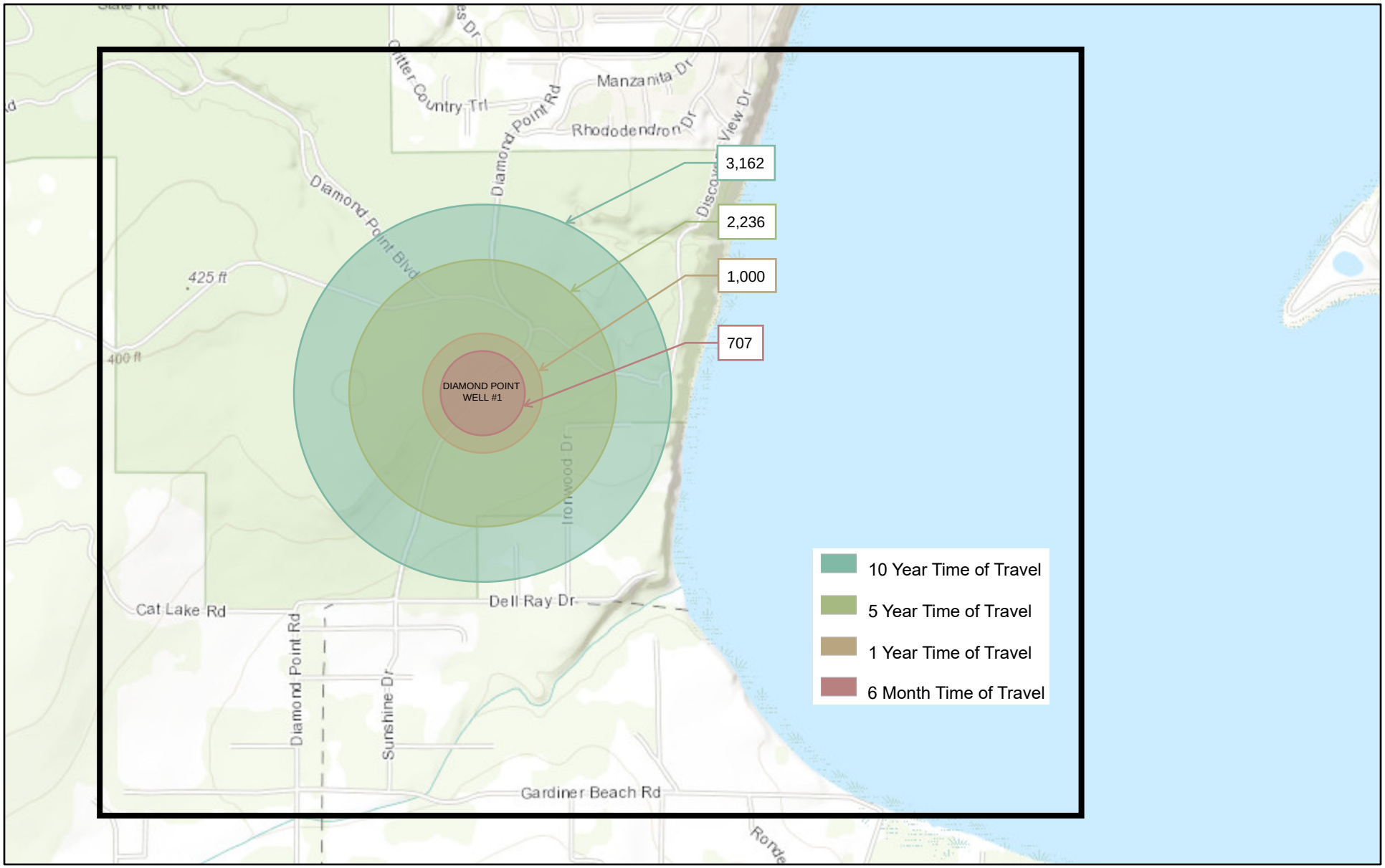
Source: Well #1

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

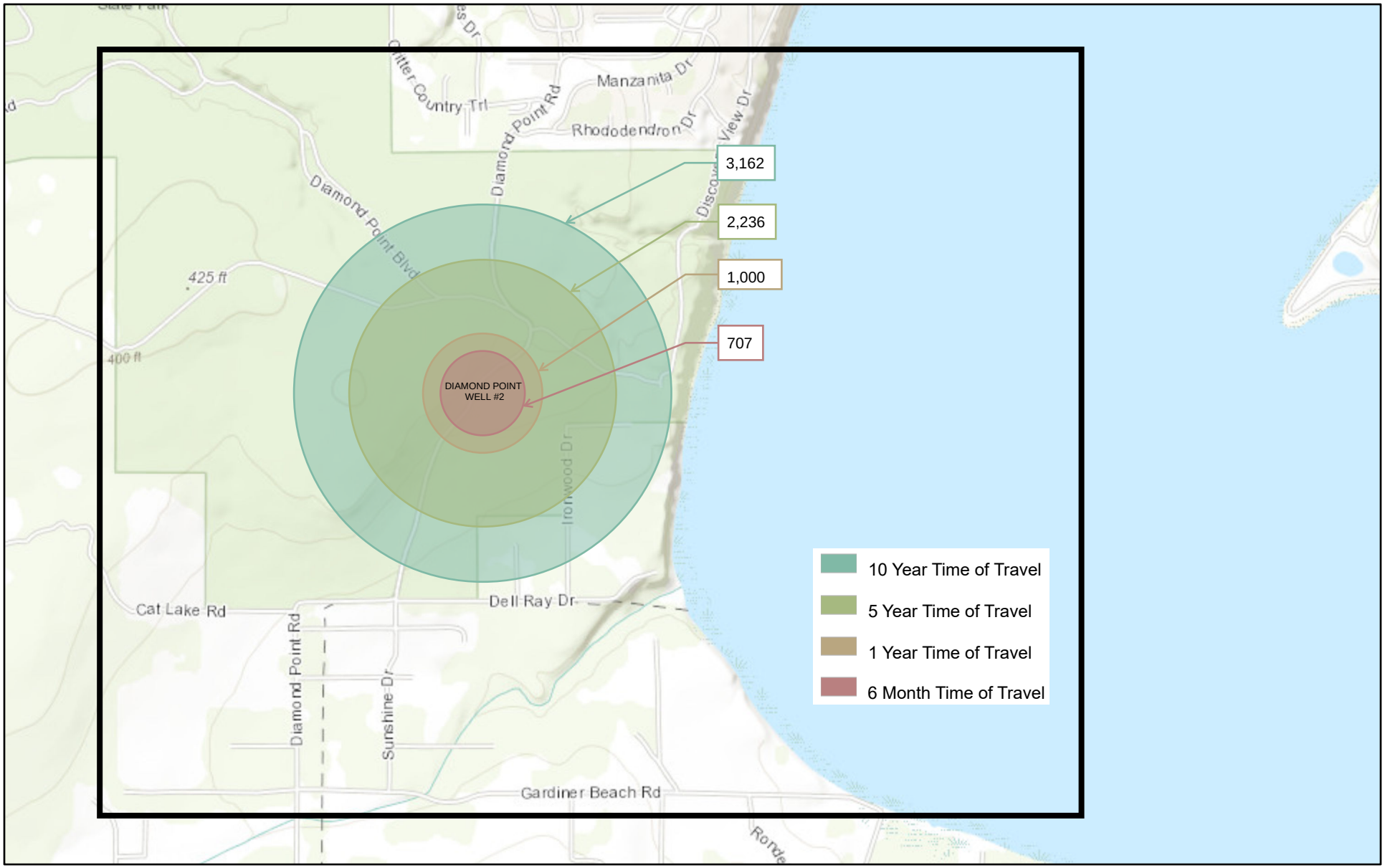
1:36,112

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

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

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

NAME
ADDRESS
CITY, STATE, ZIP COD

NAME
ADDRESS
CITY, STATE, ZIP COD

NAME
ADDRESS
CITY, STATE, ZIP COD

NAME
ADDRESS
CITY, STATE, ZIP CODE

Date: 7/22/2025

Re: Estates Inc – Wellhead Protection Program

Dear Property Owner,

To protect the drinking water supply for the customers of Estates Inc, 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

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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
Water 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

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

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	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

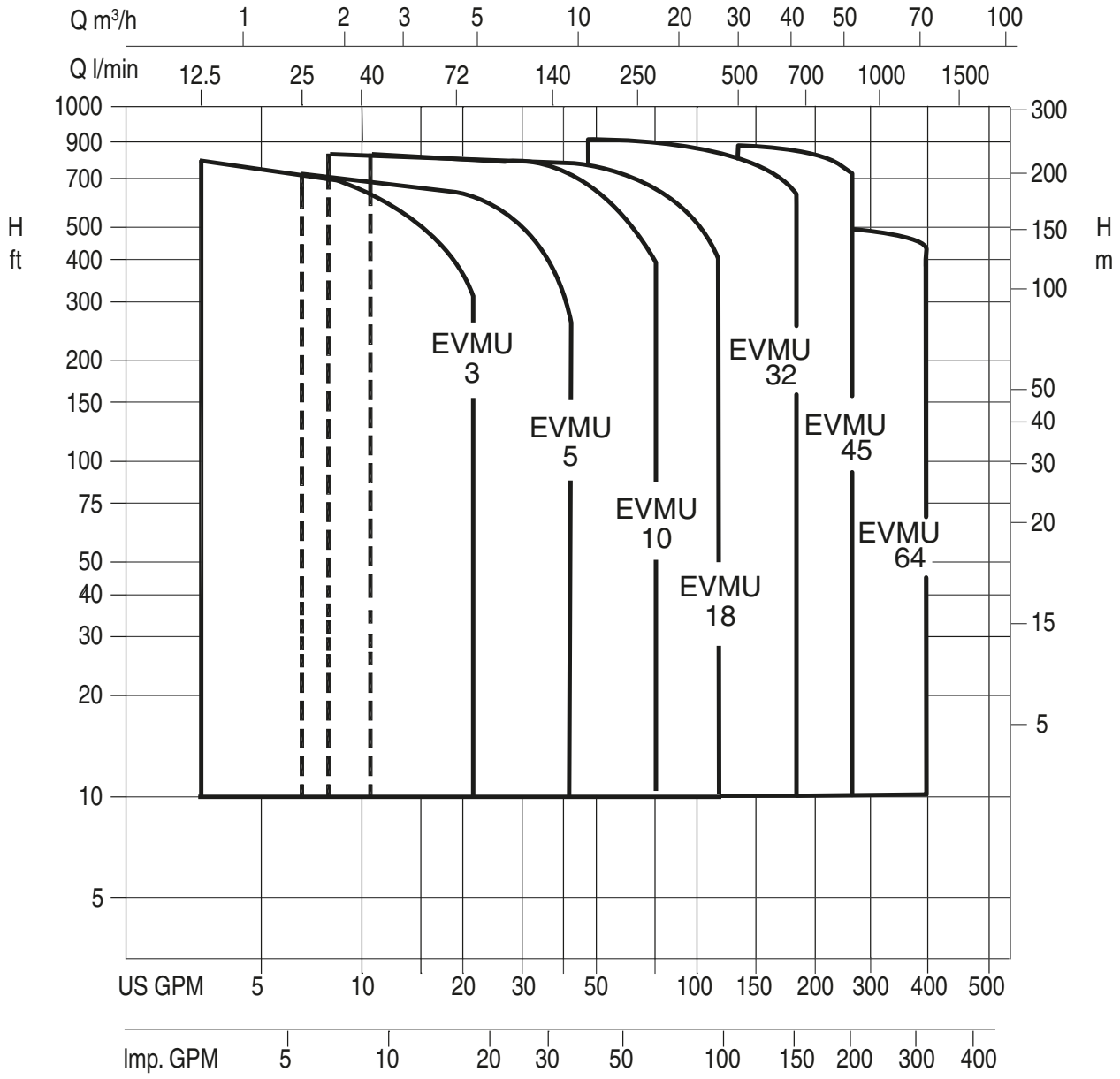
APPENDIX O
System Equipment Specifications

Booster Pump - Pump Curve

Model EVMU / EVMUG / EVMUL **EBARA Stainless Steel Vertical Multistage**

Selection chart

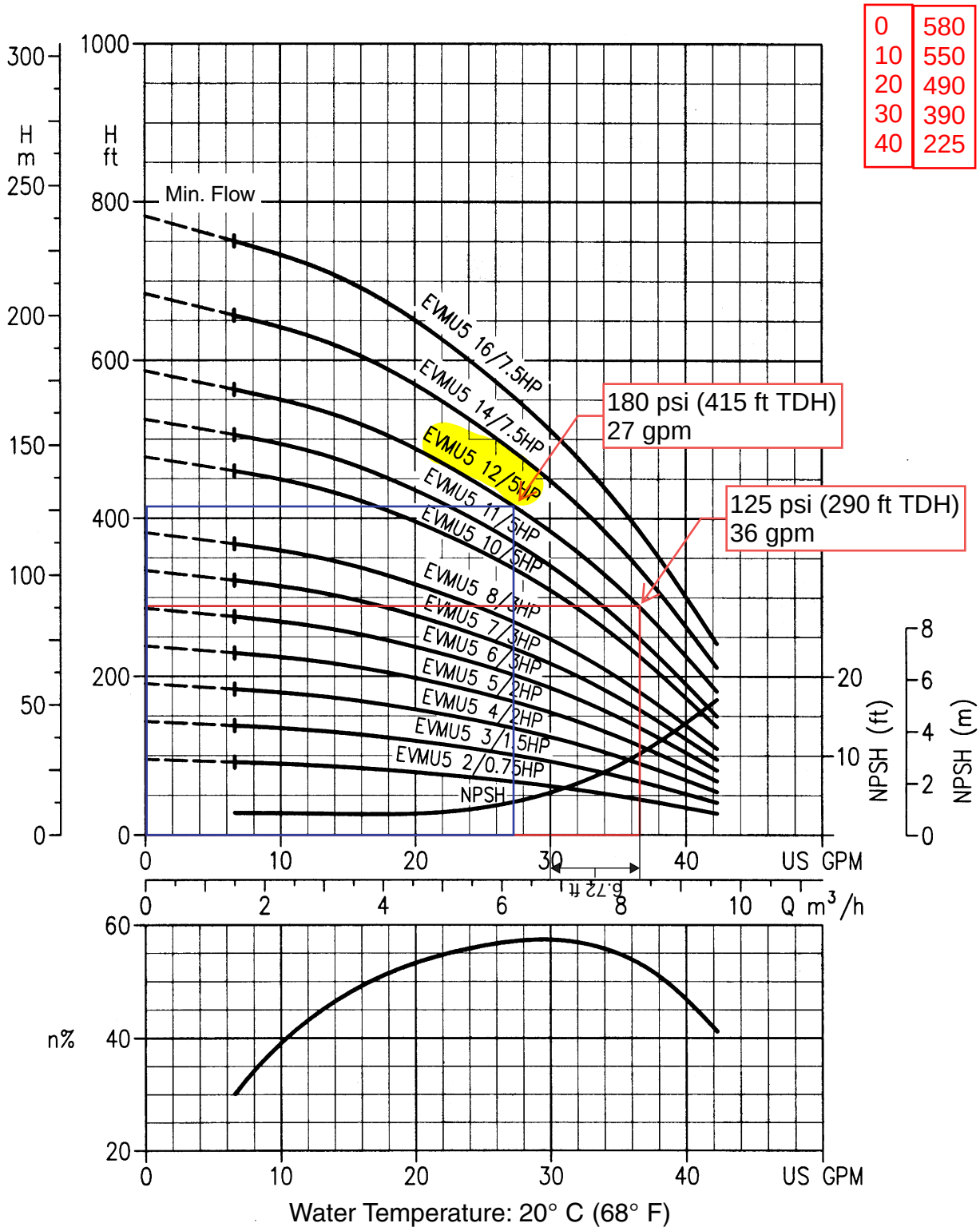
60 Hz, Synchronous Speed 3450 RPM



Model EVMU / EVMUL — **EBARA Stainless Steel Vertical Multistage**

Performance Curves — **EVMU5 ¾ HP - 7½ HP**

EVMU5 2 - EVMU5 16 — **Synchronous Speed: 3450 RPM** — **250# ANSI 1¼" 4-Bolt**

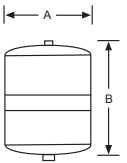


Pressure Tanks

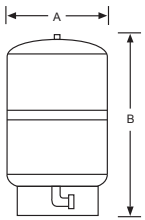
AMTROL

WELLXTROL

Next Generation Well Tanks Featuring Antimicrobial Protection



WX-101 through WX-200



WX-201 through WX-350

Specifications

Model Number	Tank Volume (Gallons)	Max. Acceptance Factor	Dimensions		System Conn. (Inches)	Drawdown (Gallons)			Shipping Weight (lbs.)
			A Diameter (Inches)	B Height (Inches)		30/50 (psig)	40/60 (psig)	50/70 (psig)	
WX-101	2.0	0.45	8	13	¾ NPTM	0.6	0.6	0.5	5
WX-102	4.4	0.55	11	15	¾ NPTM	1.4	1.2	1.0	9
WX-103	7.4	0.43	11	22	¾ NPTM	2.4	2.0	1.8	15
WX-104	10.3	1.00	15	18	1 NPTM	3.2	2.8	2.4	20
WX-200	14.0	0.81	15	22	1 NPTM	4.3	3.8	3.3	22
WX-201	14.0	0.81	15	25	1 NPTF	4.3	3.8	3.3	25
WX-202	20.0	0.57	15	32	1 NPTF	6.2	5.4	4.7	32
WX-202XL	26.0	0.44	15	39	1 NPTF	8.0	7.0	6.1	39
WX-203	32.0	0.35	15	47	1 NPTF	9.9	8.6	7.6	47
WX-205	34.0	1.00	22	30	1 ¼ NPTF	10.5	9.1	8.0	57
WX-250	44.0	0.77	22	36	1 ¼ NPTF	13.6	11.8	10.4	65
WX-251	62.0	0.55	22	47	1 ¼ NPTF	19.2	16.6	14.6	87
WX-255	81.0	0.41	22	57	1 ¼ NPTF	25.0	21.7	19.1	109
WX-252	86.0	0.39	22	62	1 ¼ NPTF	26.6	23.0	20.3	107
WX-302	86.0	0.54	26	47	1 ¼ NPTF	26.6	23.0	20.3	106
WX-350	119.0	0.39	26	62	1 ¼ NPTF	36.8	31.9	28.1	146

Stainless Steel System Connection.
Maximum Working Pressure: All models except WX-252: 150 psig. WX-252: 100 psig. Factory Precharge: 38 psig.
Drawdown can be affected by various ambient and system conditions, including temperature and pressure.

APPENDIX P
System Capacity Calculations

FACET

WATER SYSTEM INFORMATION

System:	Discovery Bay Village
PWS ID:	19430 W
Location:	Port Townsend, WA
Owner:	Cascadia Water, LLC c/o Culley Lehman
Operator:	Dale Metzger

Operating Permit	
Issue Date	9/1/2022
Color	Green

Water Facilities Inventory (WFI) Form	
Date Printed	4/7/2023
Active Residential Connections	55
Active Residential Population	102
Active Non-Residential Connections	4
Average Non-Residential Population	1,872
Approved Connections	134

FACET

CONNECTIONS

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

Year	Active Connections (Residential)	Active Connections (Condominiums)	Active Connections (Commercial)	Active Connections Metered	Active Connections Unmetered	Ready to Serve	Committed Connections
2021	53	8	1	62	0	62	62
2022	57	8	1	66	0	66	66

Approved ERUs per WFI	134

FACET

WATER RIGHTS SUMMARY

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

Certificate #	Name	Priority Date	Source Name	Primary or Supplemental	Q_i (gpm) Additive	Q_i (gpm) Non-Additive	Q_a (acre-ft) Additive	Q_a (acre-ft) Non-Additive
Record #: G2-26449	Lot 72 Village well & Nelson Short Plat well	30659	Groundwater	Primary	100		48.5	
				Total	100		48.5	
				max flow per day (gal)	72,000		2,112,660	
				max flow per year (gal)	26,280,000		15,802,697	
							43,295	

Q_i = Maximum Instantaneous Flow Rate
V_a = Maximum Annual Withdrawal

Conversion Factors	
square feet per acre	43,560
gallons per CF	7.48
days per year	365
hours per day	24

Pump	
pump cycles per hour	6
pump run per hour (min)	30
pump run per day (min)	720

FACET

SOURCE INFORMATION

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

Source		
Well Name	Well #1 - Village	Well #2 - Short Plat
Source ID	S01	S02
DOE Well Tag	ABR271	ABR017
Treatment	None	None
Capacity (gpm)	26	49
Casing (in)	6	6
Screen Diameter (in)	5	5
Top of Screen (ft bgs) (Depth to first open interval)	299	319
Bottom of Screen (ft bgs)	304	324
Location		
Parcel Number		
1/4, 1/4	NE NE	NW SE
Section	13	13
Township	29N	29N
Range	02W	02W
Elevations		
Accuracy of Elevation	GIS Contours	GIS Contours
Vertical Datum	NAVDD88	NAVDD88
Top of Casing (NAVDD88)	241	276
Measure up (ft)	1	1
Ground Surface Elevation (NAVDD88)	240	275
Top of Screen (NAVDD88)	-59	-44
Bottom of Screen (NAVDD88)	-64	-49
Water Levels (Well Log)		
Initial Static Water Level (ft below TOC)	216	250
Initial Static Water Level Elevation (NAVDD88)	25.0	26.0
Water Levels (Pump Test)		
Static Water Level (ft below TOC)	242.0	260.5
Static Water Level Elevation (NAVDD88)	-1.0	15.5
Static Water Level Elevation (MSL)	-5.1	11.4
Drawdown (ft)	10.0	16.5
Pumping Water Level (ft below TOC)	252.0	277.0
Pumping Water Level (NAVDD88)	-11.0	-1.0

FACET

RESIDENTIAL DEMAND BASED ON WATER USE DATA

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

Year	Metered Connections	Annual Residential Usage (gal)	Annual ADD (gpd)	Annual ADD (gpd/ERU)	Maximum Month Residential Usage (gal)	Maximum Month ADD (gpd)	MMADD (gpd/ERU)	MDD** (gpd/ERU)
2021	53	2,469,320	6,765	128	380,365	12,270	232	382
2022	57	2,662,334	7,294	128	629,449	14,987	263	434
	Average	2,565,827	7,030	128	504,907	13,628	247	408
	Minimum	2,469,320	6,765	128	380,365	12,270	232	382
	Maximum	2,662,334	7,294	128	629,449	14,987	263	434

** Per Section 3.4.1:
MDD=1.65(MMADD) for system serving fewer than 1,000 people

	Proposed Value
ADD	150
MDD	500

FACET

Equivalent Non-Residential ERUs

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

WorldMark

Year	Total Annual Usage (gal)	Annual ADD (gpd)	Residential ADD (gpd)	Equivalent # ERUs (ADD)	Assigned ERUs
2021	2,958,265	8,105	150	54	**54.0**
2022	2,753,081	7,543	150	50	

WSDOT Maintenance Center

Year	Total Annual Usage (gal)	Annual ADD (gpd)	Residential ADD (gpd)	Equivalent # ERUs (ADD)	
2021	41,581	114	150	0.8	
2022	67,313	184	150	1.2	**2.0**

Total Equivalent Non-Residential ERUs (rounded up)	**56.0**

DSL

Year*	Total Annual Usage (gal)	Annual ADD (gpd)	Residential ADD (gpd)	Equivalent # ERUs (ADD)	Assigned ERUs
2022	331,753	909	150	**6**	**6.0**

* only using 2022 data, since this data more accurately represents DSL, after Meter replacement

FACET

SOURCE-BASED PHYSICAL CAPACITY

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

WATER RIGHT CALCULATIONS

Based on Annual Volume & Average Day Demand (Section 4.4.2.7 - Equation 4-4b):

$N = Q_a/(ERU_{ADD}*365)$

Where: N = Number of Service Connections, ERUs
Q_a = Annual Volume of Water Available from All Sources, as limited by Water Right (gallons/year)
ERU_{ADD} = Average Daily Demand per ERU (gpd/ERU)

	V_a (gal/year)	ADD (gpd/ERU)	N (ERUs)
Potential Connections	15,802,697	150	289

Based on Instantaneous Flow & Maximum Day Demand (Section 4.4.2.7 - Equation 4-4a):

$N = Q_i/(ERU_{MDD}/1440)$

Where: N = Number of Service Connections, ERUs
V_d = Total Volume of Water Available for Maximum Day's Demand (gpd)
ERU_{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	100	60	1440	500	288

SOURCE CALCULATIONS

Individual Source Capacity (Section 4.4.2.7 - Equation 4-1):

$V_j = Q_j*t_j$

Where: V_j = Total volume for source "j" over a specified period of time (gal/specified time period)
Q_j = Delivery rate of source (gal/unit time)
t_j = Time that flow (Qj) was delivered from source "j"

Total Source Capacity (Section 4.4.2.7 - Equation 4-2):

$V_T=\Sigma(Q_j*T_j)=\Sigma V_j$

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 ID	S01	S02			
Q_j Delivery Rate (gpm)	26	49			
Max Pump Time (min/day) *	1200	1200			
Max Days Pumped (days/yr)	365	365			
V_j Source Capacity (gal/yr)	11,388,000	21,462,000			

Q_s = 75 gpm

V_T = 32,850,000 gal/yr

* Per Section 4.5.2.7: The DOH recommends assessing daily source capacity based on 20 hours of pumping per day.

Based on Source Production & Maximum Day Demand (Section 4.4.2.7 - Equation 4-3):

$N = V_T/ERU_{MDD} = (Q_s*t_d)/MDD$

Where: N = Number of Service Connections, ERUs
V_T = Total Volume of Water Available for Maximum Day's Demand (gpd)
ERU_{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)

FACET

SOURCE-BASED PHYSICAL CAPACITY

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

	Q_s (gpm)	Minutes Pumped/Hr	t_d (min/day)	MDD (gpd/ERU)	N (ERUs)
Potential Connections	75	50	1200	500	180

BOOSTER PUMP CALCULATIONS

Based on Booster Pump Production & Maximum Day Demand (Derived from Equation 3-1):

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

Where: N = Number of Service Connections, ERUs
PHD = Q_B = Peak Hour Demand (gallons/minute) (Booster Pump Capacity)
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	36	3.0	0.0	500.00	17

identify # of connections in uppe

* Capacity of the combined booster pumps (with the largest out of service) minus the flow associated with fire flow.
** MDD Value should be modified to PHD if the system does not provide fire flow.

pump curve Qb is flowrate when

SUMMARY

ERUs	Condition	Limiting Factor
289	Water Right	V_a & ADD
288	Water Right	Q_i & MDD
180	Source	Q_s & MDD
17	Booster Pump (Pressurized Zone)	Q_B & MDD

System Capacity: 180 ERUs

Limited by: Qs & MDD Source
Proposed connections: 180 ERUs

FACET

PEAK HOUR DEMAND (PHD) CALCULATION

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, 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 Service Connections, ERUs
F = Factor Associated with Ranges of ERUs
MDD = Maximum Day Demand, (gpd/ERU)

Table 3-1:

Range of N (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

MDD (gpd/ERU)	N (ERUs)	C	F	PHD (gpm)	
500	119	2	75	127	2024 ERUs
500	120	2	75	127	2029 ERUs
500	138	2	75	140	2043 ERUs
500	134	2	75	137	Approved Connections
500	113	2	75	123	Current ERUs, (no DSL)
500	159	2	75	154	Full Build-out: NO DSL
500	165	2	75	159	Full Build-out: WITH DSL
500	180	2	75	169	System Capacity (limitation)
500	26	3	0	45	Pressure Zone 1 - Full Build-out
500	68	2.5	25	86	Pressure Zone 2 - Full Build-out
500	9	3	0	27	Pressure Zone 3 - Full Build-out

FACET

STORAGE CAPACITY CALCULATIONS

System: Discovery Bay Village
ID No.: 19430 W
Location: Port Townsend, WA

Demands	
N (ERUs)	134
ADD (gpd/ERU)	150
MDD (gpd/ERU)	500
PHD (gpm)	137

Sources		
Source ID	Delivery Rate (gpm)	
S01	26	
S02	49	
Q_s =	75	
Q_s =	100	water right limited
Q_L =	49	largest source

Existing Reservoir						
Reservoir ID	Diameter (ft)	Area (ft^2)	Height (ft)	Base Elevation (ft)	Volume (gal)	VF (gal/ft)
Reservoir (Circular, concrete)	20	314.2	25	355	58,748	2,350
				Total	58,748	2,350

Top Dead Storage (TDS)	
Depth (ft)	Volume (gal)
0.6	1,410

Operational Storage (OS)	
Depth (ft)	Volume (gal)
2.0	4,700

Required Equalizing Storage (ES)			
PHD (gpm)	Q_s (gpm)	Volume (gal)	Depth (ft)
137	75	9,315	4.0

ES = (PHD-Q_s)*150 or Zero

Standby Storage (SB)*						
	N (ERU)	Sbi (gal/day/ERU)	Q_S (gpm)	Q_L (gpm)	SB Volume (gallons)	Depth (ft)
Recommended **	134	500	n/a	n/a	67,000	28.5
Minimum ***	134	200	n/a	n/a	26,800	11.4
Optional Reduction ****	134	500	75.0	49.0	35,800	15.2
				Recommended SB	35,800	28.5

* (Section 7.1.1.3 Equation 7-2) SB = (N)(SB_i)(T_d)
** (Section 4.4.3.2) Sbi=ERU_{MDD} and T_d=1 day
*** (Section 4.4.3.2) Sbi=200 gpd/ERU and T_d=1 day
**** Optional Reduction (Section 7.1.1.3) SB = (N)(ERU_{MDD})-[1200(Q_S-Q_L)]

FACET

STORAGE CAPACITY CALCULATIONS

System: Discovery Bay Village
ID No.: 19430 W
Location: Port Townsend, WA

Available Standby Storage (SB)			
Volume (gallons)	Depth (ft)	N (ERUs)	SB_i (gal/ERU)
42,148	17.9	134	315

SB = Total Storage Volume -TDS-OS -ES-BDS

Fire Suppression Storage (FSS)		
Fire Flow (gpm)	t_m (min)	Volume (gal)
750	60	45,000

$FSS = FF * t_m$

Where: 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	1,410	0.6
OS	4,700	2.0
ES	9,315	4.0
SB/FSS	42,148	17.9
BDS	1,175	0.5
Total	58,748	25.0

Is the available SB/FSS...	
greater than recommended SB?	greater than required FSS?
yes	no

FACET

STORAGE CAPACITY CALCULATIONS

System: Discovery Bay Village
ID No.: 19430 W
Location: Port Townsend, WA

Demands	
N (ERUs)	159
ADD (gpd/ERU)	150
MDD (gpd/ERU)	500
PHD (gpm)	154

Sources		
Source ID	Delivery Rate (gpm)	
S01	26	
S02	49	
Q_S =	75	
Q_S =	100	water right limited
Q_L =	49	largest source

Existing Reservoir						
Reservoir ID	Diameter (ft)	Area (ft^2)	Height (ft)	Base Elevation (ft)	Volume (gal)	VF (gal/ft)
Reservoir (Circular, concrete)	30	706.9	25	355	132,183	5,287
				Total	132,183	5,287

Top Dead Storage (TDS)	
Depth (ft)	Volume (gal)
1.0	5,287

Operational Storage (OS)	
Depth (ft)	Volume (gal)
1.0	5,287

Required Equalizing Storage (ES)			
PHD (gpm)	Q_S (gpm)	Volume (gal)	Depth (ft)
154	75	11,922	2.3

ES = (PHD-Q_S)*150 or Zero

Standby Storage (SB)*						
	N (ERU)	Sbi (gal/day/ERU)	Q_S (gpm)	Q_L (gpm)	SB Volume (gallons)	Depth (ft)
Recommended **	159	500	n/a	n/a	79,516	15.0
Minimum ***	159	200	n/a	n/a	31,806	6.0
Optional Reduction ****	159	500	75.0	49.0	48,316	9.1
				Recommended SB	79,516	15.0

* (Section 7.1.1.3 Equation 7-2) SB = (N)(SB_i)(T_d)
** (Section 4.4.3.2) Sbi=ERU $_{MDD}$ and T_d =1 day
*** (Section 4.4.3.2) Sbi=200 gpd/ERU and T_d =1 day
**** Optional Reduction (Section 7.1.1.3) SB = (N)(ERU $_{MDD}$)-[1200(Q_S-Q_L)]

FACET

STORAGE CAPACITY CALCULATIONS

System: Discovery Bay Village
ID No.: 19430 W
Location: Port Townsend, WA

Available Standby Storage (SB)			
Volume (gallons)	Depth (ft)	N (ERUs)	SB_i (gal/ERU)
99,111	18.7	159	623

SB = Total Storage Volume -TDS-OS -ES-BDS

Fire Suppression Storage (FSS)		
Fire Flow (gpm)	t_m (min)	Volume (gal)
750	60	45,000

$FSS = FF * t_m$

Where: FF = Required fire flow rate (gpm)
t_m = Duration of FF rate (minutes)

Bottom Dead Storage (BDS)	
Depth (ft)	Volume (gal)
2.0	10,575

Available Storage Summary		
Component	Volume (gal)	Depth of Storage Component (ft)
TDS	5,287	1.0
OS	5,287	1.0
ES	11,922	2.3
FSS	45,000	8.5
SB/FSS	99,111	18.7
BDS	10,575	2.0
Total	132,183	25.0

Is the available SB/FSS...	
greater than recommended SB?	greater than required FSS?
yes	yes

FACET

PRESSURE TANK SIZING CALCULATION

System: Discovery Bay Village
PWS ID: 19430 W
Location: Port Townsend, WA

From DOH Water System Design Manual (Section 9.1.3)

Equation 9-3:

$$V_t = \frac{P_1 - 14.7}{P_1 - P_2} x \frac{15 Q_P (MF)}{N_C} + 0.0204 D^2$$

Where:
V_T = Total Tank Volume (gallons)
P_1 = Pump off pressure (psi)
P_2 = Pump on pressure (psi)
N_C = Pump operating cycles per hour
Q_P = Pump delivery capacity at midpoint between P_1 and P_2
MF = Multiplication Factor (See Table 9-3)

Table 3-1:

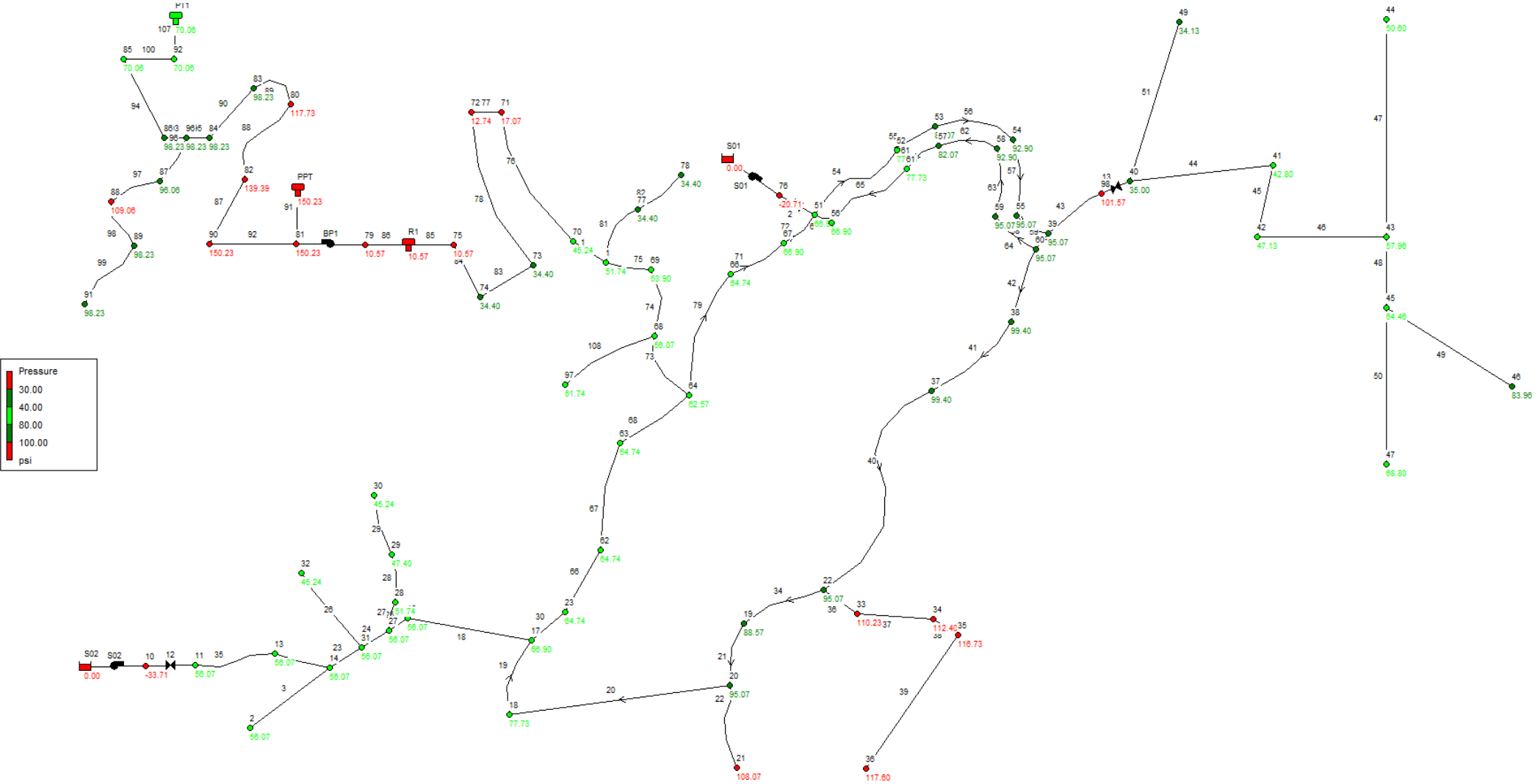
Tank Diameter (inches)	MF
12	2.00
16	1.52
20	1.34
24	1.24
30	1.17
36	1.12
48	1.08
54	1.06
60	1.05
72	1.04
84	1.03
96	1.03
120	1.02

Diameter:	26	inches
P_1:	70	psi
P_2:	50	psi
Q_1:	27	gpm
Q_2:	30	gpm
Q_P:	29	gpm
MF:	1.00	
N_C:	12	cycles/hour
V_{Total}:	186	gallons
V_t:	112.3	gallons

Vtotal>Vt: Yes

APPENDIX Q
Hydraulic Models

Discovery Bay – 2024 Static Scenario (High System Pressure)



Discovery Bay – 2024 Static Scenario (High System Pressure)

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 15	200	4	140	0.00	0.00	0.00
Pipe 18	150	4	140	0.00	0.00	0.00
Pipe 19	128	6	140	-0.01	0.00	0.00
Pipe 20	555	6	140	-0.01	0.00	0.00
Pipe 21	175	6	140	-0.01	0.00	0.00
Pipe 22	325	2	140	0.00	0.00	0.00
Pipe 23	175	4	140	0.00	0.00	0.00
Pipe 24	115	4	140	0.00	0.00	0.00
Pipe 25	25	4	140	0.00	0.00	0.00
Pipe 26	335	2	140	0.00	0.00	0.00
Pipe 27	90	2	140	0.00	0.00	0.00
Pipe 28	150	2	140	0.00	0.00	0.00
Pipe 29	150	2	140	0.00	0.00	0.00
Pipe 30	101	6	140	0.00	0.00	0.00
Pipe 34	190	6	140	-0.01	0.00	0.00
Pipe 35	200	4	140	0.00	0.00	0.00
Pipe 36	170	2	140	0.00	0.00	0.00
Pipe 37	170	2	140	0.00	0.00	0.00
Pipe 38	80	2	140	0.00	0.00	0.00
Pipe 39	2275	2	140	0.00	0.00	0.00
Pipe 40	425	4	140	-0.01	0.00	0.00
Pipe 41	280	4	140	-0.01	0.00	0.00
Pipe 42	205	4	140	-0.01	0.00	0.00
Pipe 43	210	8	140	0.00	0.00	0.00
Pipe 44	225	8	140	0.00	0.00	0.00
Pipe 45	215	8	140	0.00	0.00	0.00
Pipe 46	155	8	140	0.00	0.00	0.00

Discovery Bay – 2024 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 47	1020	4	140	0.00	0.00	0.00
Pipe 48	150	8	140	0.00	0.00	0.00
Pipe 49	355	8	140	0.00	0.00	0.00
Pipe 50	375	8	140	0.00	0.00	0.00
Pipe 51	430	2	140	0.00	0.00	0.00
Pipe 54	190	8	140	0.02	0.00	0.00
Pipe 55	115	8	140	0.02	0.00	0.00
Pipe 56	160	8	140	0.02	0.00	0.00
Pipe 57	200	8	140	0.02	0.00	0.00
Pipe 58	90	8	140	0.02	0.00	0.00
Pipe 59	85	4	140	-0.02	0.00	0.00
Pipe 60	20	4	140	-0.01	0.00	0.00
Pipe 61	110	4	140	-0.01	0.00	0.00
Pipe 62	145	4	140	-0.01	0.00	0.00
Pipe 63	190	4	140	-0.01	0.00	0.00
Pipe 64	120	4	140	-0.01	0.00	0.00
Pipe 65	200	4	140	0.01	0.00	0.00
Pipe 66	350	6	140	0.00	0.00	0.00
Pipe 67	155	6	140	0.00	0.00	0.00
Pipe 68	150	6	140	0.00	0.00	0.00
Pipe 71	200	8	140	0.01	0.00	0.00
Pipe 72	130	8	140	0.01	0.00	0.00
Pipe 73	110	8	140	0.00	0.00	0.00
Pipe 74	110	8	140	0.00	0.00	0.00
Pipe 75	70	8	140	0.00	0.00	0.00
Pipe 76	245	8	140	0.00	0.00	0.00
Pipe 77	50	8	140	0.00	0.00	0.00
Pipe 78	315	8	140	0.00	0.00	0.00

Discovery Bay – 2024 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 79	290	8	140	0.01	0.00	0.00
Pipe 81	165	2	140	0.00	0.00	0.00
Pipe 82	165	2	140	0.00	0.00	0.00
Pipe 83	175	8	140	0.00	0.00	0.00
Pipe 84	190	8	140	0.00	0.00	0.00
Pipe 85	25	8	140	0.00	0.00	0.00
Pipe 86	25	2	140	0.00	0.00	0.00
Pipe 87	200	2	140	0.00	0.00	0.00
Pipe 88	270	2	140	0.00	0.00	0.00
Pipe 89	165	2	140	0.00	0.00	0.00
Pipe 90	240	2	140	0.00	0.00	0.00
Pipe 91	25	2	140	0.00	0.00	0.00
Pipe 92	25	2	140	0.00	0.00	0.00
Pipe 93	25	2	140	0.00	0.00	0.00
Pipe 94	400	2	140	0.00	0.00	0.00
Pipe 95	25	2	140	0.00	0.00	0.00
Pipe 96	160	2	140	0.00	0.00	0.00
Pipe 97	130	2	140	0.00	0.00	0.00
Pipe 98	130	2	140	0.00	0.00	0.00
Pipe 99	165	2	140	0.00	0.00	0.00
Pipe 100	25	2	140	0.00	0.00	0.00
Pipe 107	25	2	140	0.00	0.00	0.00
Pipe 108	275	2	140	0.00	0.00	0.00
Pipe 1	125	8	140	0.00	0.00	0.00
Pipe 3	250	2	140	0.00	0.00	0.00
Pump S02	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump S01	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP1	#N/A	#N/A	#N/A	0.00	0.00	0.00

Discovery Bay – 2024 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Valve 12	#N/A	4	#N/A	0.00	0.00	0.00
Valve 13	#N/A	8	#N/A	0.00	0.00	170.62
Valve 2	#N/A	4	#N/A	0.00	0.00	0.00

Discovery Bay – 2024 Static Scenario (High System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 10	275	0.00	197.20	-33.71
Junc 11	250	0.00	379.40	56.07
Junc 13	250	0.00	379.40	56.07
Junc 14	250	0.00	379.40	56.07
Junc 16	250	0.00	379.40	56.07
Junc 17	225	0.00	379.40	66.90
Junc 18	200	0.00	379.40	77.73
Junc 19	175	0.00	379.40	88.57
Junc 20	160	0.00	379.40	95.07
Junc 21	130	0.00	379.40	108.07
Junc 22	160	0.00	379.40	95.07
Junc 23	230	0.00	379.40	64.74
Junc 27	250	0.00	379.40	56.07
Junc 28	260	0.00	379.40	51.74
Junc 29	270	0.00	379.40	47.40
Junc 30	275	0.00	379.40	45.24
Junc 31	250	0.00	379.40	56.07
Junc 32	275	0.00	379.40	45.24
Junc 33	125	0.00	379.40	110.23
Junc 34	120	0.00	379.40	112.40
Junc 35	110	0.00	379.40	116.73
Junc 36	108	0.00	379.40	117.60
Junc 37	150	0.00	379.40	99.40
Junc 38	150	0.00	379.40	99.40
Junc 39	160	0.00	379.40	95.07
Junc 40	128	0.00	208.78	35.00
Junc 41	110	0.00	208.78	42.80

Discovery Bay – 2024 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 42	100	0.00	208.78	47.13
Junc 43	75	0.00	208.78	57.96
Junc 44	92	0.00	208.78	50.60
Junc 45	60	0.00	208.78	64.46
Junc 46	15	0.00	208.78	83.96
Junc 47	50	0.00	208.78	68.80
Junc 49	130	0.00	208.78	34.13
Junc 51	225	0.00	379.40	66.90
Junc 52	200	0.00	379.40	77.73
Junc 53	190	0.00	379.40	82.07
Junc 54	165	0.00	379.40	92.90
Junc 55	160	0.00	379.40	95.07
Junc 56	225	0.00	379.40	66.90
Junc 57	190	0.00	379.40	82.07
Junc 58	165	0.00	379.40	92.90
Junc 59	160	0.00	379.40	95.07
Junc 60	160	0.00	379.40	95.07
Junc 61	200	0.00	379.40	77.73
Junc 62	230	0.00	379.40	64.74
Junc 63	230	0.00	379.40	64.74
Junc 64	235	0.00	379.40	62.57
Junc 66	230	0.00	379.40	64.74
Junc 67	225	0.00	379.40	66.90
Junc 68	250	0.00	379.40	56.07
Junc 69	255	0.00	379.40	53.90
Junc 70	275	0.00	379.40	45.24
Junc 71	340	0.00	379.40	17.07
Junc 72	350	0.00	379.40	12.74

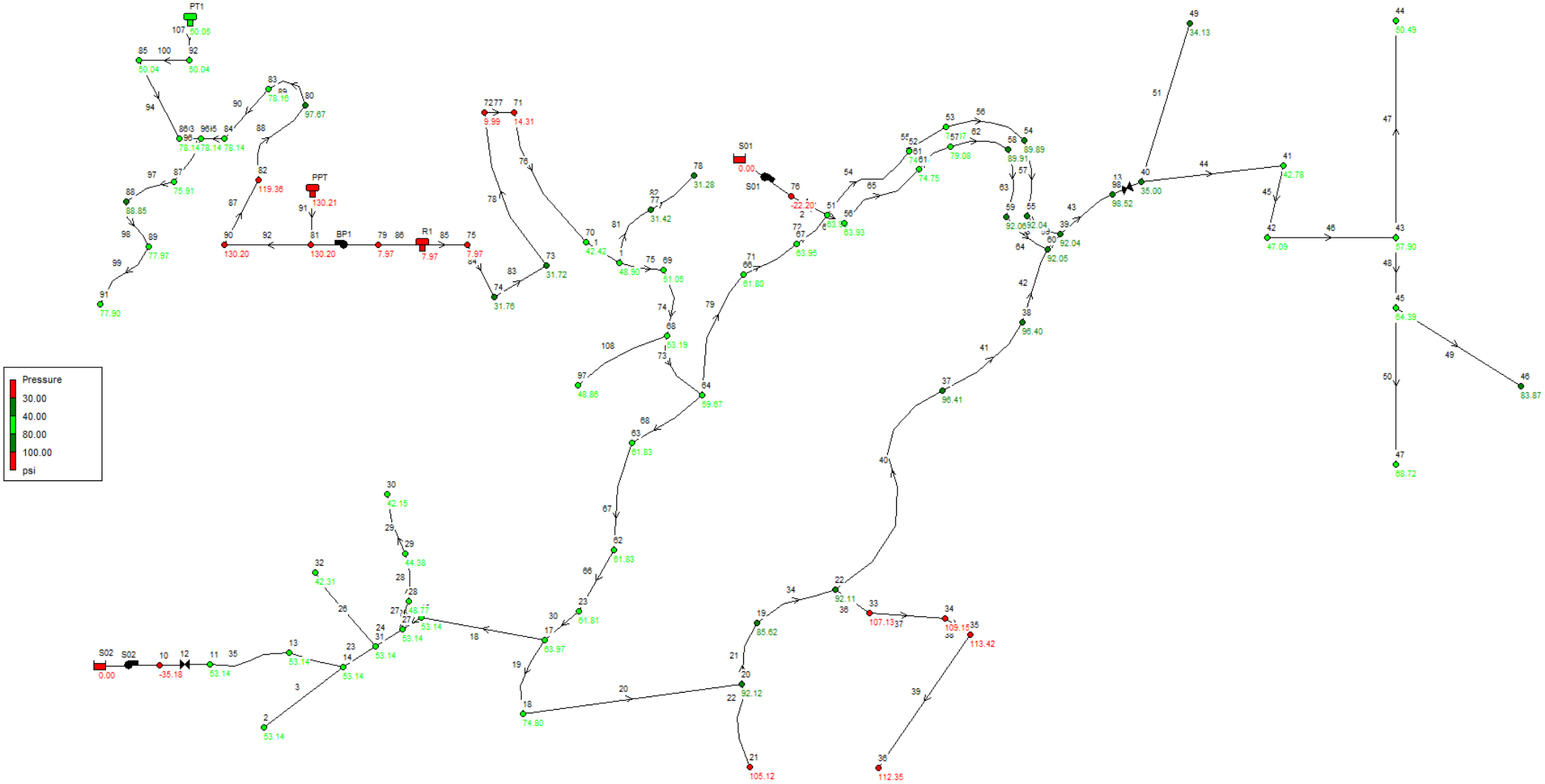
Discovery Bay – 2024 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 73	300	0.00	379.40	34.40
Junc 74	300	0.00	379.40	34.40
Junc 75	355	0.00	379.40	10.57
Junc 76	245	0.00	197.20	-20.71
Junc 77	300	0.00	379.40	34.40
Junc 78	300	0.00	379.40	34.40
Junc 79	355	0.00	379.40	10.57
Junc 80	430	0.00	701.70	117.73
Junc 81	355	0.00	701.70	150.23
Junc 82	380	0.00	701.70	139.39
Junc 83	475	0.00	701.70	98.23
Junc 84	475	0.00	701.70	98.23
Junc 85	540	0.00	701.70	70.06
Junc 86	475	0.00	701.70	98.23
Junc 87	480	0.00	701.70	96.06
Junc 88	450	0.00	701.70	109.06
Junc 89	475	0.00	701.70	98.23
Junc 90	355	0.00	701.70	150.23
Junc 91	475	0.00	701.70	98.23
Junc 92	540	0.00	701.70	70.06
Junc 96	475	0.00	701.70	98.23
Junc 97	260	0.00	379.40	51.74
Junc 98	145	0.00	379.40	101.57
Junc 1	260	0.00	379.40	51.74
Junc 2	250	0.00	379.40	56.07
Resvr S02	15	0.00	15.00	0.00
Resvr S01	15	0.00	15.00	0.00
Tank R1	355	0.00	379.40	10.57

Discovery Bay – 2024 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Tank PPT	355	0.00	701.70	150.23
Tank PT1	540	0.00	701.70	70.06

Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)



Discovery Bay – 2024 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 15	200	4	140	0.00	0.00	0.00
Pipe 18	150	4	140	-5.63	0.14	0.03
Pipe 19	128	6	140	22.71	0.26	0.06
Pipe 20	555	6	140	22.71	0.26	0.06
Pipe 21	175	6	140	22.71	0.26	0.06
Pipe 22	325	2	140	0.00	0.00	0.00
Pipe 23	175	4	140	0.00	0.00	0.00
Pipe 24	115	4	140	0.00	0.00	0.00
Pipe 25	25	4	140	-5.63	0.14	0.03
Pipe 26	335	2	140	0.00	0.00	0.00
Pipe 27	90	2	140	5.63	0.57	0.93
Pipe 28	150	2	140	5.63	0.57	0.93
Pipe 29	150	2	140	5.63	0.57	0.93
Pipe 30	101	6	140	-28.33	0.32	0.09
Pipe 34	190	6	140	22.71	0.26	0.06
Pipe 35	200	4	140	0.00	0.00	0.00
Pipe 36	170	2	140	8.44	0.86	1.97
Pipe 37	170	2	140	8.44	0.86	1.97
Pipe 38	80	2	140	8.44	0.86	1.97
Pipe 39	2275	2	140	8.44	0.86	1.97
Pipe 40	425	4	140	14.27	0.36	0.18
Pipe 41	280	4	140	11.46	0.29	0.12
Pipe 42	205	4	140	11.46	0.29	0.12
Pipe 43	210	8	140	102.74	0.66	0.24
Pipe 44	225	8	140	102.74	0.66	0.24
Pipe 45	215	8	140	102.74	0.66	0.24
Pipe 46	155	8	140	102.74	0.66	0.24

Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 47	1020	4	140	-11.25	0.29	0.11
Pipe 48	150	8	140	91.49	0.58	0.19
Pipe 49	355	8	140	76.03	0.49	0.13
Pipe 50	375	8	140	5.63	0.04	0.00
Pipe 51	430	2	140	0.00	0.00	0.00
Pipe 54	190	8	140	93.27	0.60	0.20
Pipe 55	115	8	140	93.27	0.60	0.20
Pipe 56	160	8	140	93.27	0.60	0.20
Pipe 57	200	8	140	86.24	0.55	0.17
Pipe 58	90	8	140	86.24	0.55	0.17
Pipe 59	85	4	140	23.54	0.60	0.45
Pipe 60	20	4	140	12.08	0.31	0.13
Pipe 61	110	4	140	12.08	0.31	0.13
Pipe 62	145	4	140	12.08	0.31	0.13
Pipe 63	190	4	140	12.08	0.31	0.13
Pipe 64	120	4	140	12.08	0.31	0.13
Pipe 65	200	4	140	-12.08	0.31	0.13
Pipe 66	350	6	140	-28.33	0.32	0.09
Pipe 67	155	6	140	-28.33	0.32	0.09
Pipe 68	150	6	140	-32.55	0.37	0.11
Pipe 71	200	8	140	105.35	0.67	0.25
Pipe 72	130	8	140	105.35	0.67	0.25
Pipe 73	110	8	140	-144.94	0.93	0.45
Pipe 74	110	8	140	-144.93	0.93	0.45
Pipe 75	70	8	140	-144.93	0.93	0.45
Pipe 76	245	8	140	-153.37	0.98	0.49
Pipe 77	50	8	140	-153.37	0.98	0.49
Pipe 78	315	8	140	-153.37	0.98	0.49

Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 79	290	8	140	112.38	0.72	0.28
Pipe 81	165	2	140	8.44	0.86	1.97
Pipe 82	165	2	140	8.44	0.86	1.97
Pipe 83	175	8	140	-153.37	0.98	0.49
Pipe 84	190	8	140	-153.37	0.98	0.49
Pipe 85	25	8	140	-153.37	0.98	0.49
Pipe 86	25	2	140	0.00	0.00	0.00
Pipe 87	200	2	140	-2.30	0.23	0.18
Pipe 88	270	2	140	-2.30	0.23	0.18
Pipe 89	165	2	140	-2.30	0.23	0.18
Pipe 90	240	2	140	-2.30	0.23	0.18
Pipe 91	25	2	140	-2.30	0.23	0.18
Pipe 92	25	2	140	-2.30	0.23	0.18
Pipe 93	25	2	140	-3.33	0.34	0.35
Pipe 94	400	2	140	3.33	0.34	0.35
Pipe 95	25	2	140	2.30	0.23	0.18
Pipe 96	160	2	140	5.63	0.57	0.93
Pipe 97	130	2	140	5.63	0.57	0.93
Pipe 98	130	2	140	5.63	0.57	0.93
Pipe 99	165	2	140	5.63	0.57	0.93
Pipe 100	25	2	140	3.33	0.34	0.35
Pipe 107	25	2	140	3.33	0.34	0.35
Pipe 108	275	2	140	0.00	0.00	0.00
Pipe 1	125	8	140	-153.37	0.98	0.49
Pipe 3	250	2	140	0.00	0.00	0.00
Pump S02	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump S01	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP1	#N/A	#N/A	#N/A	0.00	0.00	0.00

Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Valve 12	#N/A	4	#N/A	0.00	0.00	0.00
Valve 13	#N/A	8	#N/A	102.74	0.66	163.59
Valve 2	#N/A	4	#N/A	0.00	0.00	0.00

Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 10	275	0.00	193.82	-35.18
Junc 11	250	0.00	372.64	53.14
Junc 13	250	0.00	372.64	53.14
Junc 14	250	0.00	372.64	53.14
Junc 16	250	0.00	372.64	53.14
Junc 17	225	0.00	372.64	63.97
Junc 18	200	0.00	372.64	74.80
Junc 19	175	0.00	372.59	85.62
Junc 20	160	0.00	372.60	92.12
Junc 21	130	0.00	372.60	105.12
Junc 22	160	0.00	372.58	92.11
Junc 23	230	0.00	372.65	61.81
Junc 27	250	0.00	372.64	53.14
Junc 28	260	0.00	372.56	48.77
Junc 29	270	0.00	372.42	44.38
Junc 30	275	5.63	372.28	42.15
Junc 31	250	0.00	372.64	53.14
Junc 32	275	0.00	372.64	42.31
Junc 33	125	0.00	372.25	107.13
Junc 34	120	0.00	371.91	109.15
Junc 35	110	0.00	371.76	113.42
Junc 36	108	8.44	367.28	112.35
Junc 37	150	2.81	372.51	96.41
Junc 38	150	0.00	372.47	96.40
Junc 39	160	7.03	372.41	92.04
Junc 40	128	0.00	208.78	35.00
Junc 41	110	0.00	208.72	42.78

Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 42	100	0.00	208.67	47.09
Junc 43	75	0.00	208.64	57.90
Junc 44	92	11.25	208.52	50.49
Junc 45	60	9.84	208.61	64.39
Junc 46	15	76.03	208.56	83.87
Junc 47	50	5.63	208.61	68.72
Junc 49	130	0.00	208.78	34.13
Junc 51	225	0.00	372.55	63.93
Junc 52	200	0.00	372.52	74.75
Junc 53	190	0.00	372.49	79.07
Junc 54	165	7.03	372.46	89.89
Junc 55	160	0.00	372.43	92.04
Junc 56	225	0.00	372.55	63.93
Junc 57	190	0.00	372.51	79.08
Junc 58	165	0.00	372.49	89.91
Junc 59	160	0.00	372.47	92.06
Junc 60	160	0.00	372.45	92.05
Junc 61	200	0.00	372.52	74.75
Junc 62	230	0.00	372.68	61.83
Junc 63	230	4.22	372.70	61.83
Junc 64	235	0.00	372.71	59.67
Junc 66	230	7.03	372.63	61.80
Junc 67	225	0.00	372.58	63.95
Junc 68	250	0.00	372.76	53.19
Junc 69	255	0.00	372.81	51.05
Junc 70	275	0.00	372.91	42.42
Junc 71	340	0.00	373.03	14.31
Junc 72	350	0.00	373.05	9.99

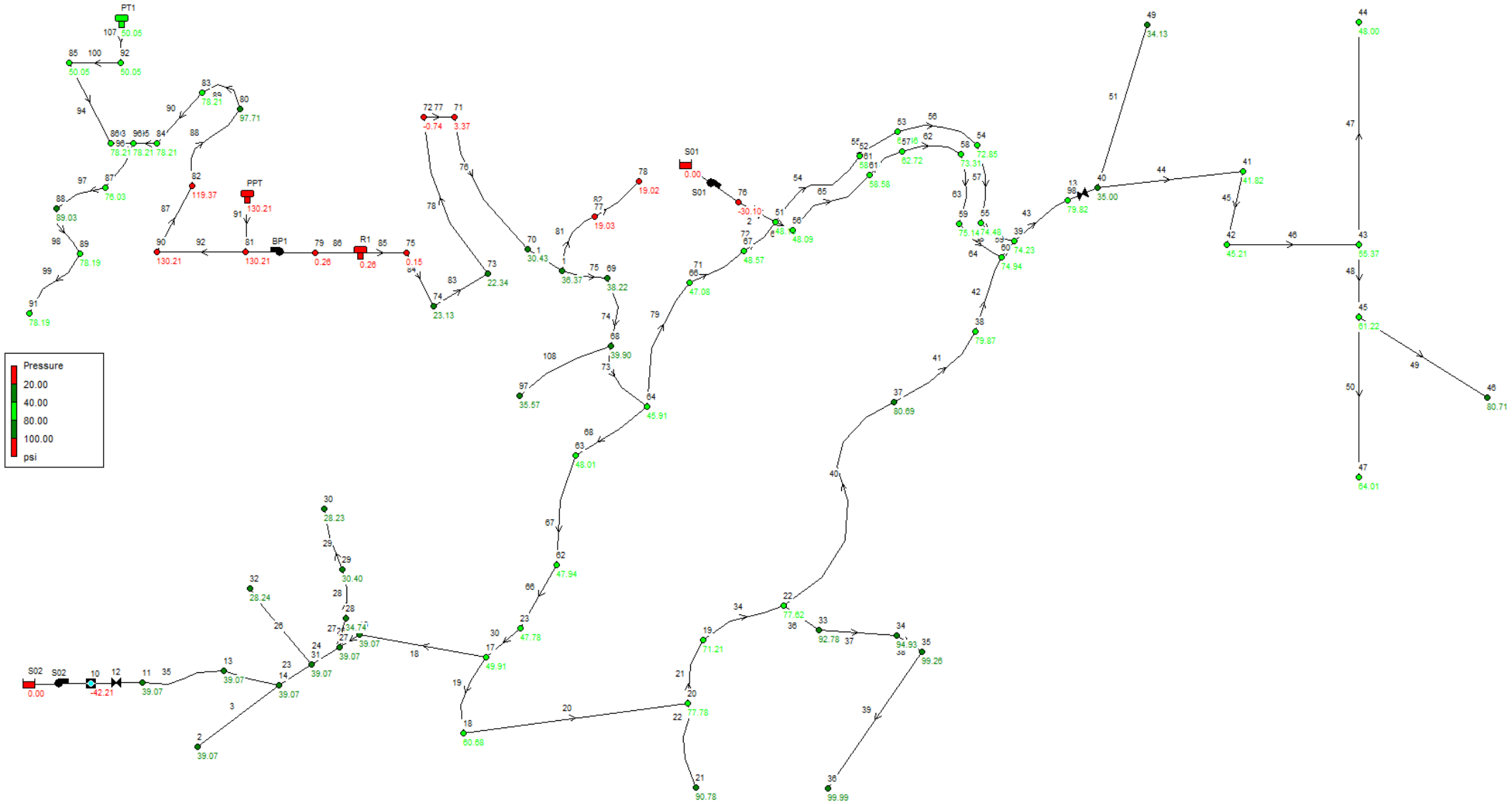
Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 73	300	0.00	373.21	31.72
Junc 74	300	0.00	373.29	31.76
Junc 75	355	0.00	373.39	7.97
Junc 76	245	0.00	193.78	-22.20
Junc 77	300	0.00	372.52	31.42
Junc 78	300	8.44	372.19	31.28
Junc 79	355	0.00	373.40	7.97
Junc 80	430	0.00	655.41	97.67
Junc 81	355	0.00	655.50	130.20
Junc 82	380	0.00	655.46	119.36
Junc 83	475	0.00	655.38	78.16
Junc 84	475	0.00	655.34	78.14
Junc 85	540	0.00	655.48	50.04
Junc 86	475	0.00	655.34	78.14
Junc 87	480	0.00	655.18	75.91
Junc 88	450	0.00	655.06	88.85
Junc 89	475	0.00	654.94	77.97
Junc 90	355	0.00	655.49	130.20
Junc 91	475	5.63	654.79	77.90
Junc 92	540	0.00	655.49	50.04
Junc 96	475	0.00	655.33	78.14
Junc 97	260	0.00	372.76	48.86
Junc 98	145	0.00	372.36	98.52
Junc 1	260	0.00	372.84	48.90
Junc 2	250	0.00	372.64	53.14
Resvr S02	15	0.00	15.00	0.00
Resvr S01	15	0.00	15.00	0.00
Tank R1	355	-153.37	373.40	7.97

Discovery Bay – 2024 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Tank PPT	355	-2.30	655.50	130.21
Tank PT1	540	-3.33	655.50	50.05

Discovery Bay – 2024 Fire Flow + MDD Scenario



Discovery Bay – 2024 Fire Flow + MDD Scenario

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 15	200	4	140	0.00	0.00	0.00
Pipe 18	150	4	140	-1.36	0.03	0.00
Pipe 19	128	6	140	104.53	1.19	0.99
Pipe 20	555	6	140	104.53	1.19	0.99
Pipe 21	175	6	140	104.53	1.19	0.99
Pipe 22	325	2	140	0.00	0.00	0.00
Pipe 23	175	4	140	0.00	0.00	0.00
Pipe 24	115	4	140	0.00	0.00	0.00
Pipe 25	25	4	140	-1.36	0.03	0.00
Pipe 26	335	2	140	0.00	0.00	0.00
Pipe 27	90	2	140	1.36	0.14	0.07
Pipe 28	150	2	140	1.36	0.14	0.07
Pipe 29	150	2	140	1.36	0.14	0.07
Pipe 30	101	6	140	-105.89	1.20	1.01
Pipe 34	190	6	140	104.53	1.19	0.99
Pipe 35	200	4	140	0.00	0.00	0.00
Pipe 36	170	2	140	2.04	0.21	0.14
Pipe 37	170	2	140	2.04	0.21	0.14
Pipe 38	80	2	140	2.04	0.21	0.14
Pipe 39	2275	2	140	2.04	0.21	0.14
Pipe 40	425	4	140	102.49	2.62	6.86
Pipe 41	280	4	140	101.81	2.60	6.77
Pipe 42	205	4	140	101.81	2.60	6.77
Pipe 43	210	8	140	780.90	4.98	10.07
Pipe 44	225	8	140	780.90	4.98	10.07
Pipe 45	215	8	140	780.90	4.98	10.07
Pipe 46	155	8	140	780.90	4.98	10.07

Discovery Bay – 2024 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 47	1020	4	140	-2.72	0.07	0.01
Pipe 48	150	8	140	778.19	4.97	10.01
Pipe 49	355	8	140	20.18	0.13	0.01
Pipe 50	375	8	140	755.63	4.82	9.48
Pipe 51	430	2	140	0.00	0.00	0.00
Pipe 54	190	8	140	606.10	3.87	6.30
Pipe 55	115	8	140	606.10	3.87	6.30
Pipe 56	160	8	140	606.10	3.87	6.30
Pipe 57	200	8	140	604.40	3.86	6.27
Pipe 58	90	8	140	604.40	3.86	6.27
Pipe 59	85	4	140	178.20	4.55	19.10
Pipe 60	20	4	140	76.39	1.95	3.98
Pipe 61	110	4	140	76.39	1.95	3.98
Pipe 62	145	4	140	76.39	1.95	3.98
Pipe 63	190	4	140	76.39	1.95	3.98
Pipe 64	120	4	140	76.39	1.95	3.98
Pipe 65	200	4	140	-76.39	1.95	3.98
Pipe 66	350	6	140	-105.89	1.20	1.01
Pipe 67	155	6	140	-105.89	1.20	1.01
Pipe 68	150	6	140	-106.91	1.21	1.03
Pipe 71	200	8	140	682.49	4.36	7.85
Pipe 72	130	8	140	682.49	4.36	7.85
Pipe 73	110	8	140	-791.10	5.05	10.32
Pipe 74	110	8	140	-791.10	5.05	10.32
Pipe 75	70	8	140	-791.10	5.05	10.32
Pipe 76	245	8	140	-793.14	5.06	10.37
Pipe 77	50	8	140	-793.14	5.06	10.37
Pipe 78	315	8	140	-793.14	5.06	10.37

Discovery Bay – 2024 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 79	290	8	140	684.19	4.37	7.88
Pipe 81	165	2	140	2.04	0.21	0.14
Pipe 82	165	2	140	2.04	0.21	0.14
Pipe 83	175	8	140	-793.14	5.06	10.37
Pipe 84	190	8	140	-793.14	5.06	10.37
Pipe 85	25	8	140	-793.14	5.06	10.37
Pipe 86	25	2	140	0.00	0.00	0.00
Pipe 87	200	2	140	-0.35	0.04	0.01
Pipe 88	270	2	140	-0.35	0.04	0.01
Pipe 89	165	2	140	-0.35	0.04	0.01
Pipe 90	240	2	140	-0.35	0.04	0.01
Pipe 91	25	2	140	-0.35	0.04	0.01
Pipe 92	25	2	140	-0.35	0.04	0.01
Pipe 93	25	2	140	-1.01	0.10	0.02
Pipe 94	400	2	140	1.01	0.10	0.03
Pipe 95	25	2	140	0.35	0.04	0.01
Pipe 96	160	2	140	1.36	0.14	0.07
Pipe 97	130	2	140	1.36	0.14	0.07
Pipe 98	130	2	140	1.36	0.14	0.07
Pipe 99	165	2	140	1.36	0.14	0.07
Pipe 100	25	2	140	1.01	0.10	0.02
Pipe 107	25	2	140	1.01	0.10	0.03
Pipe 108	275	2	140	0.00	0.00	0.00
Pipe 1	125	8	140	-793.14	5.06	10.37
Pipe 3	250	2	140	0.00	0.00	0.00
Pump S02	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump S01	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP1	#N/A	#N/A	#N/A	0.00	0.00	0.00

Discovery Bay – 2024 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Valve 12	#N/A	4	#N/A	0.00	0.00	0.00
Valve 13	#N/A	8	#N/A	780.90	4.98	120.43
Valve 2	#N/A	4	#N/A	0.00	0.00	0.00

Discovery Bay – 2024 Fire Flow + MDD Scenario

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 10	275	0.00	177.59	-42.21
Junc 11	250	0.00	340.18	39.07
Junc 13	250	0.00	340.18	39.07
Junc 14	250	0.00	340.18	39.07
Junc 16	250	0.00	340.18	39.07
Junc 17	225	0.00	340.18	49.91
Junc 18	200	0.00	340.05	60.68
Junc 19	175	0.00	339.33	71.21
Junc 20	160	0.00	339.50	77.78
Junc 21	130	0.00	339.50	90.78
Junc 22	160	0.00	339.14	77.62
Junc 23	230	0.00	340.28	47.78
Junc 27	250	0.00	340.18	39.07
Junc 28	260	0.00	340.17	34.74
Junc 29	270	0.00	340.16	30.40
Junc 30	275	1.36	340.15	28.23
Junc 31	250	0.00	340.18	39.07
Junc 32	275	0.00	340.18	28.24
Junc 33	125	0.00	339.12	92.78
Junc 34	120	0.00	339.10	94.93
Junc 35	110	0.00	339.09	99.26
Junc 36	108	2.04	338.76	99.99
Junc 37	150	0.68	336.23	80.69
Junc 38	150	0.00	334.33	79.87
Junc 39	160	1.70	331.32	74.23
Junc 40	128	0.00	208.78	35.00
Junc 41	110	0.00	206.51	41.82

Discovery Bay – 2024 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 42	100	0.00	204.34	45.21
Junc 43	75	0.00	202.78	55.37
Junc 44	92	2.72	202.77	48.00
Junc 45	60	2.38	201.28	61.22
Junc 46	15	20.18	201.28	80.71
Junc 47	50	755.63	197.73	64.01
Junc 49	130	0.00	208.78	34.13
Junc 51	225	0.00	336.07	48.13
Junc 52	200	0.00	334.87	58.44
Junc 53	190	0.00	334.15	62.46
Junc 54	165	1.70	333.14	72.85
Junc 55	160	0.00	331.89	74.48
Junc 56	225	0.00	335.99	48.09
Junc 57	190	0.00	334.76	62.72
Junc 58	165	0.00	334.18	73.31
Junc 59	160	0.00	333.42	75.14
Junc 60	160	0.00	332.95	74.94
Junc 61	200	0.00	335.19	58.58
Junc 62	230	0.00	340.63	47.94
Junc 63	230	1.02	340.79	48.01
Junc 64	235	0.00	340.95	45.91
Junc 66	230	1.70	338.66	47.08
Junc 67	225	0.00	337.09	48.57
Junc 68	250	0.00	342.08	39.90
Junc 69	255	0.00	343.22	38.22
Junc 70	275	0.00	345.23	30.43
Junc 71	340	0.00	347.77	3.37
Junc 72	350	0.00	348.29	-0.74

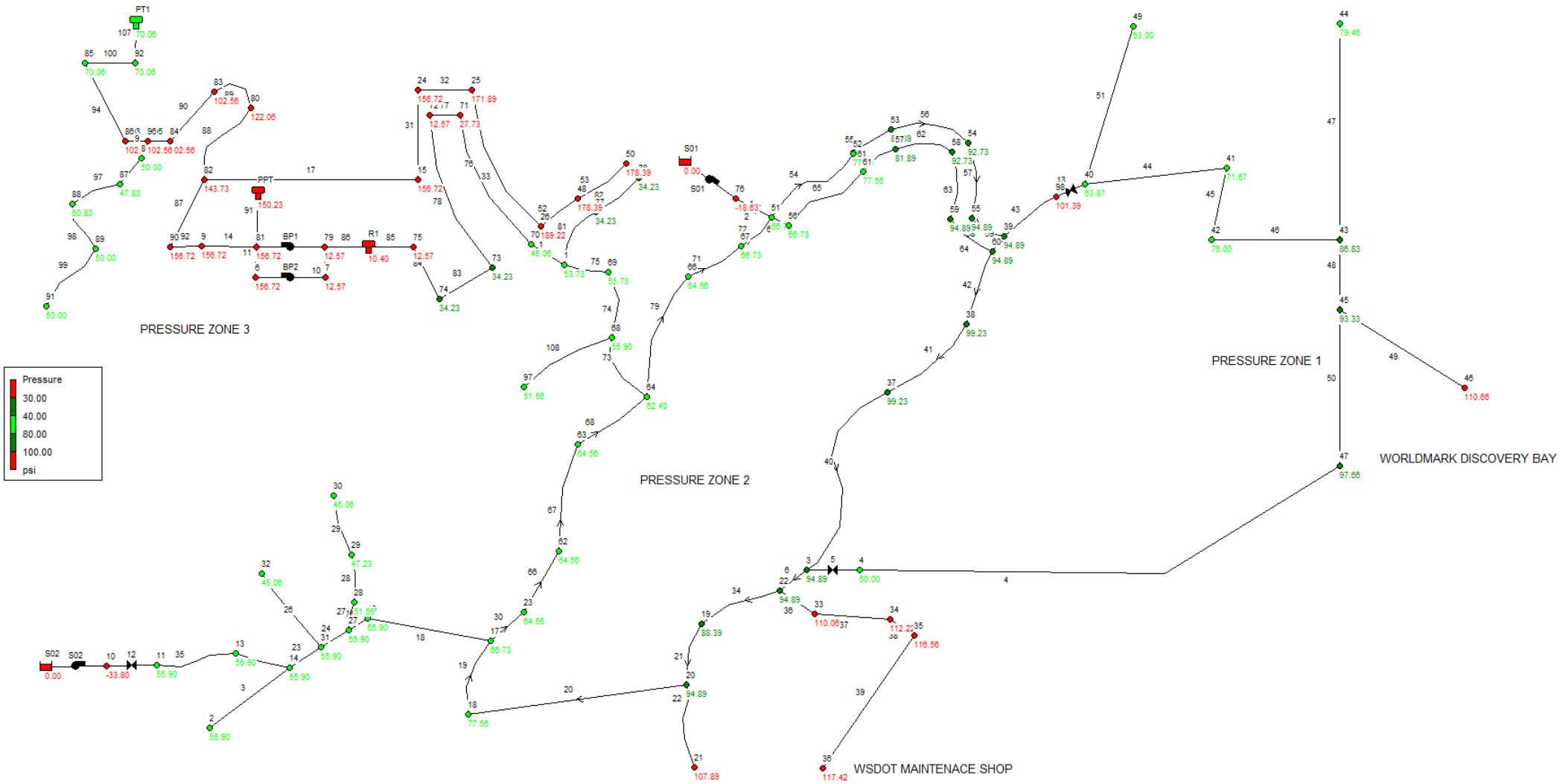
Discovery Bay – 2024 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 73	300	0.00	351.56	22.34
Junc 74	300	0.00	353.37	23.13
Junc 75	355	0.00	355.34	0.15
Junc 76	245	0.00	175.53	-30.10
Junc 77	300	0.00	343.91	19.03
Junc 78	300	2.04	343.89	19.02
Junc 79	355	0.00	355.60	0.26
Junc 80	430	0.00	655.49	97.71
Junc 81	355	0.00	655.50	130.21
Junc 82	380	0.00	655.50	119.37
Junc 83	475	0.00	655.49	78.21
Junc 84	475	0.00	655.49	78.21
Junc 85	540	0.00	655.50	50.05
Junc 86	475	0.00	655.49	78.21
Junc 87	480	0.00	655.48	76.03
Junc 88	450	0.00	655.47	89.03
Junc 89	475	0.00	655.46	78.19
Junc 90	355	0.00	655.50	130.21
Junc 91	475	1.36	655.45	78.19
Junc 92	540	0.00	655.50	50.05
Junc 96	475	0.00	655.49	78.21
Junc 97	260	0.00	342.08	35.57
Junc 98	145	0.00	329.21	79.82
Junc 1	260	0.00	343.94	36.37
Junc 2	250	0.00	340.18	39.07
Resvr S02	15	0.00	15.00	0.00
Resvr S01	15	0.00	15.00	0.00
Tank R1	355	-793.14	355.60	0.26

Discovery Bay – 2024 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Tank PPT	355	-0.35	655.50	130.21
Tank PT1	540	-1.01	655.50	50.05

Discovery Bay – 2044 Static Scenario (High System Pressure)



Discovery Bay – 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 15	200	4	140	0.00	0.00	0.00
Pipe 18	150	4	140	0.00	0.00	0.00
Pipe 19	128	6	140	-0.01	0.00	0.00
Pipe 20	555	6	140	-0.01	0.00	0.00
Pipe 21	175	6	140	-0.01	0.00	0.00
Pipe 22	325	2	140	0.00	0.00	0.00
Pipe 23	175	4	140	0.00	0.00	0.00
Pipe 24	115	4	140	0.00	0.00	0.00
Pipe 25	25	4	140	0.00	0.00	0.00
Pipe 26	335	2	140	0.00	0.00	0.00
Pipe 27	90	2	140	0.00	0.00	0.00
Pipe 28	150	2	140	0.00	0.00	0.00
Pipe 29	150	2	140	0.00	0.00	0.00
Pipe 30	101	6	140	0.01	0.00	0.00
Pipe 34	190	6	140	-0.01	0.00	0.00
Pipe 35	200	4	140	0.00	0.00	0.00
Pipe 36	170	2	140	0.00	0.00	0.00
Pipe 37	170	2	140	0.00	0.00	0.00
Pipe 38	80	2	140	0.00	0.00	0.00
Pipe 39	2275	2	140	0.00	0.00	0.00
Pipe 40	425	4	140	-0.01	0.00	0.00
Pipe 41	280	4	140	-0.01	0.00	0.00
Pipe 42	205	4	140	-0.01	0.00	0.00
Pipe 43	210	8	140	0.00	0.00	0.00
Pipe 44	225	8	140	0.00	0.00	0.00
Pipe 45	215	8	140	0.00	0.00	0.00
Pipe 46	155	8	140	0.00	0.00	0.00

Discovery Bay – 2044 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 47	1020	4	140	0.00	0.00	0.00
Pipe 48	150	8	140	0.00	0.00	0.00
Pipe 49	355	8	140	0.00	0.00	0.00
Pipe 50	375	8	140	0.00	0.00	0.00
Pipe 51	430	2	140	0.00	0.00	0.00
Pipe 54	190	8	140	0.01	0.00	0.00
Pipe 55	115	8	140	0.01	0.00	0.00
Pipe 56	160	8	140	0.01	0.00	0.00
Pipe 57	200	8	140	0.01	0.00	0.00
Pipe 58	90	8	140	0.01	0.00	0.00
Pipe 59	85	4	140	-0.01	0.00	0.00
Pipe 60	20	4	140	0.00	0.00	0.00
Pipe 61	110	4	140	0.00	0.00	0.00
Pipe 62	145	4	140	0.00	0.00	0.00
Pipe 63	190	4	140	0.00	0.00	0.00
Pipe 64	120	4	140	0.00	0.00	0.00
Pipe 65	200	4	140	0.00	0.00	0.00
Pipe 66	350	6	140	0.01	0.00	0.00
Pipe 67	155	6	140	0.01	0.00	0.00
Pipe 68	150	6	140	0.01	0.00	0.00
Pipe 71	200	8	140	0.01	0.00	0.00
Pipe 72	130	8	140	0.01	0.00	0.00
Pipe 73	110	8	140	0.00	0.00	0.00
Pipe 74	110	8	140	0.00	0.00	0.00
Pipe 75	70	8	140	0.00	0.00	0.00
Pipe 76	245	8	140	0.00	0.00	0.00
Pipe 77	50	8	140	0.00	0.00	0.00
Pipe 78	315	8	140	0.00	0.00	0.00

Discovery Bay – 2044 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 79	290	8	140	0.01	0.00	0.00
Pipe 81	165	2	140	0.00	0.00	0.00
Pipe 82	165	2	140	0.00	0.00	0.00
Pipe 83	175	8	140	0.00	0.00	0.00
Pipe 84	190	8	140	0.00	0.00	0.00
Pipe 85	25	8	140	0.00	0.00	0.00
Pipe 86	25	2	140	0.00	0.00	0.00
Pipe 87	200	2	140	0.00	0.00	0.00
Pipe 88	270	2	140	0.00	0.00	0.00
Pipe 89	165	2	140	0.00	0.00	0.00
Pipe 90	240	2	140	0.00	0.00	0.00
Pipe 91	25	2	140	0.00	0.00	0.00
Pipe 92	25	2	140	0.00	0.00	0.00
Pipe 93	25	2	140	0.00	0.00	0.00
Pipe 94	400	2	140	0.00	0.00	0.00
Pipe 95	25	2	140	0.00	0.00	0.00
Pipe 96	160	2	140	0.00	0.00	0.00
Pipe 97	130	2	140	0.00	0.00	0.00
Pipe 98	130	2	140	0.00	0.00	0.00
Pipe 99	165	2	140	0.00	0.00	0.00
Pipe 100	25	2	140	0.00	0.00	0.00
Pipe 107	25	2	140	0.00	0.00	0.00
Pipe 108	275	2	140	0.00	0.00	0.00
Pipe 1	125	8	140	0.00	0.00	0.00
Pipe 3	250	2	140	0.00	0.00	0.00
Pipe 4	1000	8	140	0.00	0.00	0.00
Pipe 6	25	4	140	0.01	0.00	0.00
Pipe 10	25	2	140	0.00	0.00	0.00

Discovery Bay – 2044 Static Scenario (High System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 11	25	2	140	0.00	0.00	0.00
Pipe 14	25	2	140	0.00	0.00	0.00
Pipe 17	85	4	140	0.00	0.00	0.00
Pipe 31	160	4	140	0.00	0.00	0.00
Pipe 32	120	4	140	0.00	0.00	0.00
Pipe 33	350	4	140	0.00	0.00	0.00
Pipe 52	115	2	140	0.00	0.00	0.00
Pipe 53	200	2	140	0.00	0.00	0.00
Pump S02	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump S01	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP1	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP2	#N/A	#N/A	#N/A	0.00	0.00	0.00
Valve 12	#N/A	4	#N/A	0.00	0.00	0.00
Valve 13	#N/A	8	#N/A	0.00	0.00	0.00
Valve 2	#N/A	4	#N/A	0.00	0.00	0.00
Valve 5	#N/A	8	#N/A	0.00	0.00	103.61
Valve 9	#N/A	2	#N/A	0.00	0.00	121.31

Discovery Bay – 2044 Static Scenario (High System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 10	275	0.00	197.00	-33.80
Junc 11	250	0.00	379.00	55.90
Junc 13	250	0.00	379.00	55.90
Junc 14	250	0.00	379.00	55.90
Junc 16	250	0.00	379.00	55.90
Junc 17	225	0.00	379.00	66.73
Junc 18	200	0.00	379.00	77.56
Junc 19	175	0.00	379.00	88.39
Junc 20	160	0.00	379.00	94.89
Junc 21	130	0.00	379.00	107.89
Junc 22	160	0.00	379.00	94.89
Junc 23	230	0.00	379.00	64.56
Junc 27	250	0.00	379.00	55.90
Junc 28	260	0.00	379.00	51.56
Junc 29	270	0.00	379.00	47.23
Junc 30	275	0.00	379.00	45.06
Junc 31	250	0.00	379.00	55.90
Junc 32	275	0.00	379.00	45.06
Junc 33	125	0.00	379.00	110.06
Junc 34	120	0.00	379.00	112.22
Junc 35	110	0.00	379.00	116.56
Junc 36	108	0.00	379.00	117.42
Junc 37	150	0.00	379.00	99.23
Junc 38	150	0.00	379.00	99.23
Junc 39	160	0.00	379.00	94.89
Junc 40	128	0.00	275.39	63.87
Junc 41	110	0.00	275.39	71.67

Discovery Bay – 2044 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 42	100	0.00	275.39	76.00
Junc 43	75	0.00	275.39	86.83
Junc 44	92	0.00	275.39	79.46
Junc 45	60	0.00	275.39	93.33
Junc 46	20	0.00	275.39	110.66
Junc 47	50	0.00	275.39	97.66
Junc 49	130	0.00	275.39	63.00
Junc 51	225	0.00	379.00	66.73
Junc 52	200	0.00	379.00	77.56
Junc 53	190	0.00	379.00	81.89
Junc 54	165	0.00	379.00	92.73
Junc 55	160	0.00	379.00	94.89
Junc 56	225	0.00	379.00	66.73
Junc 57	190	0.00	379.00	81.89
Junc 58	165	0.00	379.00	92.73
Junc 59	160	0.00	379.00	94.89
Junc 60	160	0.00	379.00	94.89
Junc 61	200	0.00	379.00	77.56
Junc 62	230	0.00	379.00	64.56
Junc 63	230	0.00	379.00	64.56
Junc 64	235	0.00	379.00	62.40
Junc 66	230	0.00	379.00	64.56
Junc 67	225	0.00	379.00	66.73
Junc 68	250	0.00	379.00	55.90
Junc 69	255	0.00	379.00	53.73
Junc 70	275	0.00	379.00	45.06
Junc 71	315	0.00	379.00	27.73
Junc 72	350	0.00	379.00	12.57

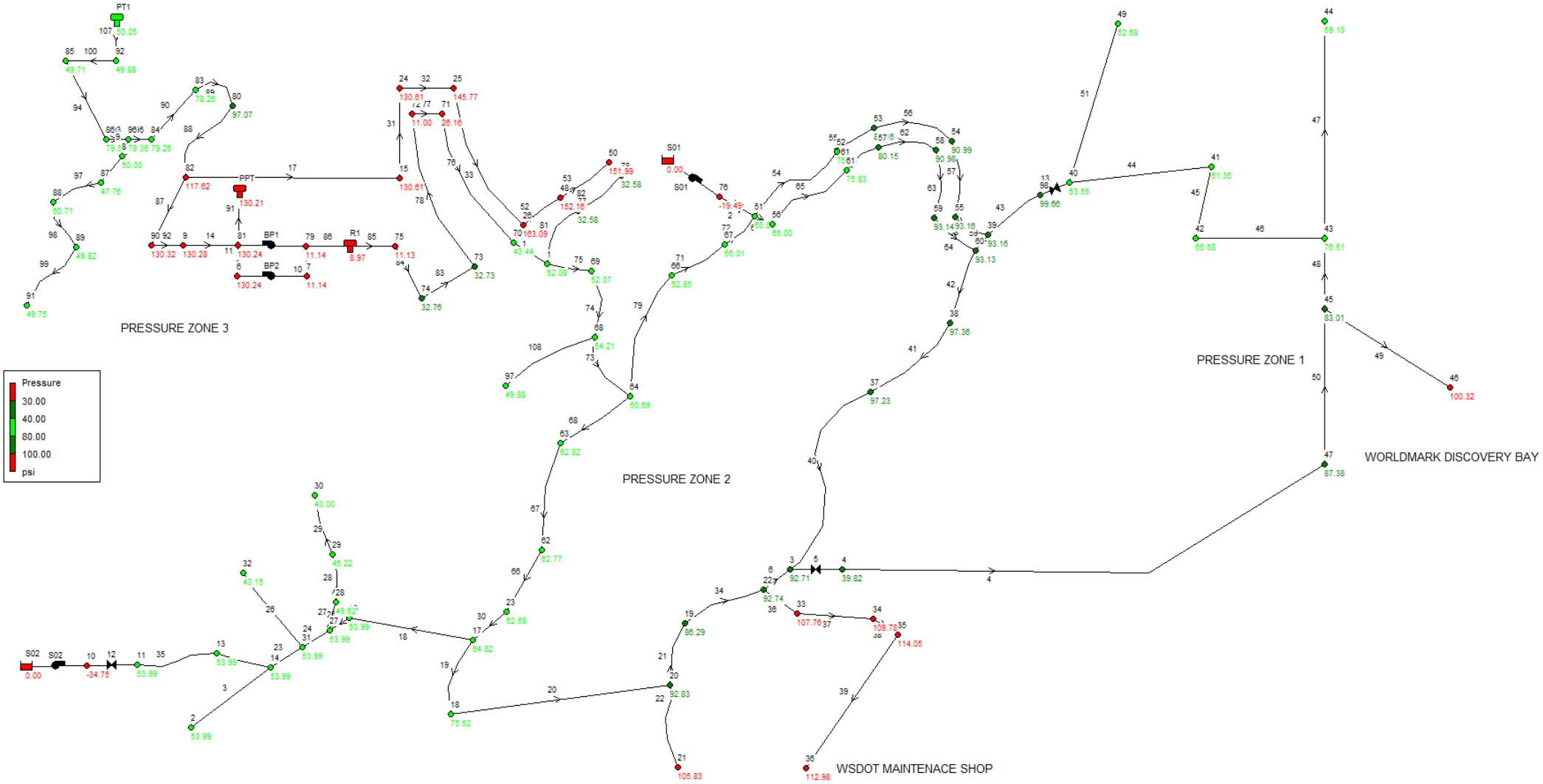
Discovery Bay – 2044 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 73	300	0.00	379.00	34.23
Junc 74	300	0.00	379.00	34.23
Junc 75	350	0.00	379.00	12.57
Junc 76	240	0.00	197.00	-18.63
Junc 77	300	0.00	379.00	34.23
Junc 78	300	0.00	379.00	34.23
Junc 79	350	0.00	379.00	12.57
Junc 80	430	0.00	711.70	122.06
Junc 81	350	0.00	711.70	156.72
Junc 82	380	0.00	711.70	143.73
Junc 83	475	0.00	711.70	102.56
Junc 84	475	0.00	711.70	102.56
Junc 85	550	0.00	711.70	70.06
Junc 86	475	0.00	711.70	102.56
Junc 87	480	0.00	590.39	47.83
Junc 88	450	0.00	590.39	60.83
Junc 89	475	0.00	590.39	50.00
Junc 90	350	0.00	711.70	156.72
Junc 91	475	0.00	590.39	50.00
Junc 92	550	0.00	711.70	70.06
Junc 96	475	0.00	711.70	102.56
Junc 97	260	0.00	379.00	51.56
Junc 98	145	0.00	379.00	101.39
Junc 1	255	0.00	379.00	53.73
Junc 2	250	0.00	379.00	55.90
Junc 3	160	0.00	379.00	94.89
Junc 4	160	0.00	275.39	50.00
Junc 6	350	0.00	711.70	156.72

Discovery Bay – 2044 Static Scenario (High System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 7	350	0.00	379.00	12.57
Junc 8	475	0.00	590.39	50.00
Junc 9	350	0.00	711.70	156.72
Junc 15	350	0.00	711.70	156.72
Junc 24	350	0.00	711.70	156.72
Junc 25	315	0.00	711.70	171.89
Junc 26	275	0.00	711.70	189.22
Junc 48	300	0.00	711.70	178.39
Junc 50	300	0.00	711.70	178.39
Resvr S02	15	0.00	15.00	0.00
Resvr S01	15	0.00	15.00	0.00
Tank R1	355	0.00	379.00	10.40
Tank PPT	350	0.00	696.70	150.23
Tank PT1	550	0.00	711.70	70.06

Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)



Discovery Bay – 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 15	200	4	140	0.00	0.00	0.00
Pipe 18	150	4	140	-5.63	0.14	0.03
Pipe 19	128	6	140	75.06	0.85	0.53
Pipe 20	555	6	140	75.06	0.85	0.53
Pipe 21	175	6	140	75.06	0.85	0.53
Pipe 22	325	2	140	0.00	0.00	0.00
Pipe 23	175	4	140	0.00	0.00	0.00
Pipe 24	115	4	140	0.00	0.00	0.00
Pipe 25	25	4	140	-5.63	0.14	0.03
Pipe 26	335	2	140	0.00	0.00	0.00
Pipe 27	90	2	140	5.63	0.57	0.93
Pipe 28	150	2	140	5.63	0.57	0.93
Pipe 29	150	2	140	5.63	0.57	0.93
Pipe 30	101	6	140	-80.69	0.92	0.61
Pipe 34	190	6	140	75.06	0.85	0.53
Pipe 35	200	4	140	0.00	0.00	0.00
Pipe 36	170	2	140	8.44	0.86	1.97
Pipe 37	170	2	140	8.44	0.86	1.97
Pipe 38	80	2	140	8.44	0.86	1.97
Pipe 39	2275	2	140	8.44	0.86	1.97
Pipe 40	425	4	140	-36.13	0.92	0.99
Pipe 41	280	4	140	-38.94	0.99	1.14
Pipe 42	205	4	140	-38.94	0.99	1.14
Pipe 43	210	8	140	0.00	0.00	0.00
Pipe 44	225	8	140	0.00	0.00	0.00
Pipe 45	215	8	140	0.00	0.00	0.00
Pipe 46	155	8	140	0.00	0.00	0.00

Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 47	1020	4	140	-11.25	0.29	0.11
Pipe 48	150	8	140	-11.25	0.07	0.00
Pipe 49	355	8	140	76.03	0.49	0.13
Pipe 50	375	8	140	-97.12	0.62	0.21
Pipe 51	430	2	140	0.00	0.00	0.00
Pipe 54	190	8	140	42.19	0.27	0.05
Pipe 55	115	8	140	42.19	0.27	0.05
Pipe 56	160	8	140	42.19	0.27	0.05
Pipe 57	200	8	140	35.16	0.22	0.03
Pipe 58	90	8	140	35.16	0.22	0.03
Pipe 59	85	4	140	-28.13	0.72	0.63
Pipe 60	20	4	140	10.81	0.28	0.11
Pipe 61	110	4	140	10.81	0.28	0.11
Pipe 62	145	4	140	10.81	0.28	0.11
Pipe 63	190	4	140	10.81	0.28	0.11
Pipe 64	120	4	140	10.81	0.28	0.11
Pipe 65	200	4	140	-10.81	0.28	0.11
Pipe 66	350	6	140	-80.69	0.92	0.61
Pipe 67	155	6	140	-80.69	0.92	0.61
Pipe 68	150	6	140	-84.91	0.96	0.67
Pipe 71	200	8	140	53.00	0.34	0.07
Pipe 72	130	8	140	53.00	0.34	0.07
Pipe 73	110	8	140	-144.94	0.93	0.45
Pipe 74	110	8	140	-144.94	0.93	0.45
Pipe 75	70	8	140	-144.94	0.93	0.45
Pipe 76	245	8	140	-144.94	0.93	0.45
Pipe 77	50	8	140	-144.94	0.93	0.44
Pipe 78	315	8	140	-144.94	0.93	0.45

Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 79	290	8	140	60.03	0.38	0.09
Pipe 81	165	2	140	0.00	0.00	0.00
Pipe 82	165	2	140	0.00	0.00	0.00
Pipe 83	175	8	140	-144.94	0.93	0.45
Pipe 84	190	8	140	-144.94	0.93	0.45
Pipe 85	25	8	140	-144.94	0.93	0.45
Pipe 86	25	2	140	0.00	0.00	0.00
Pipe 87	200	2	140	11.40	1.16	3.44
Pipe 88	270	2	140	19.84	2.03	9.59
Pipe 89	165	2	140	19.84	2.03	9.59
Pipe 90	240	2	140	19.84	2.03	9.59
Pipe 91	25	2	140	11.40	1.16	3.44
Pipe 92	25	2	140	11.40	1.16	3.44
Pipe 93	25	2	140	-25.67	2.62	15.45
Pipe 94	400	2	140	25.67	2.62	15.45
Pipe 95	25	2	140	-19.84	2.03	9.59
Pipe 96	160	2	140	5.83	0.60	0.99
Pipe 97	130	2	140	5.83	0.60	0.99
Pipe 98	130	2	140	5.83	0.60	0.99
Pipe 99	165	2	140	5.83	0.60	0.99
Pipe 100	25	2	140	25.67	2.62	15.45
Pipe 107	25	2	140	25.67	2.62	15.45
Pipe 108	275	2	140	0.00	0.00	0.00
Pipe 1	125	8	140	-144.94	0.93	0.45
Pipe 3	250	2	140	0.00	0.00	0.00
Pipe 4	1000	8	140	102.75	0.66	0.24
Pipe 6	25	4	140	-66.62	1.70	3.09
Pipe 10	25	2	140	0.00	0.00	0.00

Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 11	25	2	140	0.00	0.00	0.00
Pipe 14	25	2	140	11.40	1.16	3.44
Pipe 17	85	4	140	8.44	0.22	0.07
Pipe 31	160	4	140	8.44	0.22	0.07
Pipe 32	120	4	140	8.44	0.22	0.07
Pipe 33	350	4	140	8.44	0.22	0.07
Pipe 52	115	2	140	8.44	0.86	1.97
Pipe 53	200	2	140	8.44	0.86	1.97
Pump S02	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump S01	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP1	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP2	#N/A	#N/A	#N/A	0.00	0.00	0.00
Valve 12	#N/A	4	#N/A	0.00	0.00	0.00
Valve 13	#N/A	8	#N/A	0.00	0.00	0.00
Valve 2	#N/A	4	#N/A	0.00	0.00	0.00
Valve 5	#N/A	8	#N/A	102.75	0.66	122.06
Valve 9	#N/A	2	#N/A	5.83	0.60	67.77

Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 10	275	0.00	194.80	-34.75
Junc 11	250	0.00	374.59	53.99
Junc 13	250	0.00	374.59	53.99
Junc 14	250	0.00	374.59	53.99
Junc 16	250	0.00	374.59	53.99
Junc 17	225	0.00	374.60	64.82
Junc 18	200	0.00	374.53	75.62
Junc 19	175	0.00	374.14	86.29
Junc 20	160	0.00	374.23	92.83
Junc 21	130	0.00	374.23	105.83
Junc 22	160	0.00	374.04	92.74
Junc 23	230	0.00	374.66	62.68
Junc 27	250	0.00	374.59	53.99
Junc 28	260	0.00	374.51	49.62
Junc 29	270	0.00	374.37	45.22
Junc 30	275	5.63	374.23	43.00
Junc 31	250	0.00	374.59	53.99
Junc 32	275	0.00	374.59	43.15
Junc 33	125	0.00	373.70	107.76
Junc 34	120	0.00	373.37	109.78
Junc 35	110	0.00	373.21	114.05
Junc 36	108	8.44	368.73	112.98
Junc 37	150	2.81	374.38	97.23
Junc 38	150	0.00	374.70	97.36
Junc 39	160	7.03	374.99	93.16
Junc 40	128	0.00	251.58	53.55
Junc 41	110	0.00	251.58	61.35

Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 42	100	0.00	251.58	65.68
Junc 43	75	0.00	251.58	76.51
Junc 44	92	11.25	251.47	69.10
Junc 45	60	9.84	251.58	83.01
Junc 46	20	76.03	251.54	100.32
Junc 47	50	5.63	251.66	87.38
Junc 49	130	0.00	251.58	52.68
Junc 51	225	0.00	375.02	65.00
Junc 52	200	0.00	375.01	75.83
Junc 53	190	0.00	375.01	80.16
Junc 54	165	7.03	375.00	90.99
Junc 55	160	0.00	374.99	93.16
Junc 56	225	0.00	375.02	65.00
Junc 57	190	0.00	374.99	80.15
Junc 58	165	0.00	374.97	90.98
Junc 59	160	0.00	374.95	93.14
Junc 60	160	0.00	374.94	93.13
Junc 61	200	0.00	375.00	75.83
Junc 62	230	0.00	374.87	62.77
Junc 63	230	4.22	374.97	62.82
Junc 64	235	0.00	375.07	60.69
Junc 66	230	7.03	375.04	62.85
Junc 67	225	0.00	375.03	65.01
Junc 68	250	0.00	375.12	54.21
Junc 69	255	0.00	375.17	52.07
Junc 70	275	0.00	375.25	43.44
Junc 71	315	0.00	375.36	26.16
Junc 72	350	0.00	375.39	11.00

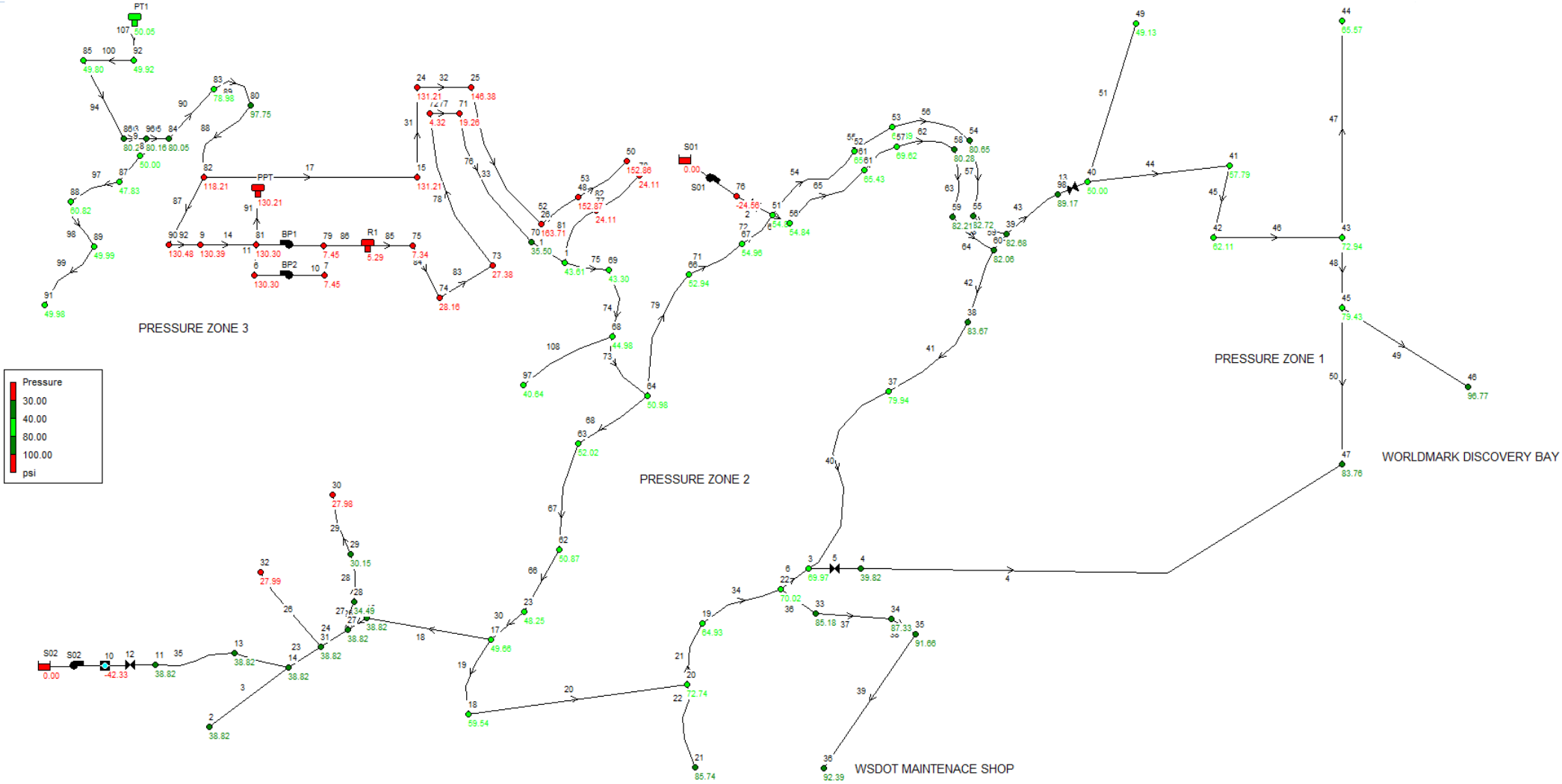
Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 73	300	0.00	375.53	32.73
Junc 74	300	0.00	375.60	32.76
Junc 75	350	0.00	375.69	11.13
Junc 76	240	0.00	195.01	-19.49
Junc 77	300	0.00	375.20	32.58
Junc 78	300	0.00	375.20	32.58
Junc 79	350	0.00	375.70	11.14
Junc 80	430	0.00	654.04	97.07
Junc 81	350	0.00	650.59	130.24
Junc 82	380	0.00	651.45	117.62
Junc 83	475	0.00	655.62	78.26
Junc 84	475	0.00	657.92	79.26
Junc 85	550	0.00	664.73	49.71
Junc 86	475	0.00	658.55	79.53
Junc 87	480	0.00	590.23	47.76
Junc 88	450	0.00	590.11	60.71
Junc 89	475	0.00	589.98	49.82
Junc 90	350	0.00	650.76	130.32
Junc 91	475	5.83	589.81	49.75
Junc 92	550	0.00	665.11	49.88
Junc 96	475	0.00	658.16	79.36
Junc 97	260	0.00	375.12	49.88
Junc 98	145	0.00	374.99	99.66
Junc 1	255	0.00	375.20	52.08
Junc 2	250	0.00	374.59	53.99
Junc 3	160	0.00	373.96	92.71
Junc 4	160	0.00	251.90	39.82
Junc 6	350	0.00	650.59	130.24

Discovery Bay – 2044 Peak Hour Demand Scenario (Low System Pressure)

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 7	350	0.00	375.70	11.14
Junc 8	475	0.00	590.39	50.00
Junc 9	350	0.00	650.67	130.28
Junc 15	350	0.00	651.44	130.61
Junc 24	350	0.00	651.43	130.61
Junc 25	315	0.00	651.42	145.77
Junc 26	275	0.00	651.40	163.09
Junc 48	300	0.00	651.17	152.16
Junc 50	300	8.44	650.78	151.99
Resvr S02	15	0.00	15.00	0.00
Resvr S01	15	0.00	15.00	0.00
Tank R1	355	-144.94	375.70	8.97
Tank PPT	350	11.40	650.50	130.21
Tank PT1	550	-25.67	665.50	50.05

Discovery Bay – 2044 Fire Flow + MDD Scenario



Discovery Bay – 2044 Fire Flow + MDD Scenario

Network Table - Links

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 15	200	4	140	0.00	0.00	0.00
Pipe 18	150	4	140	-1.36	0.03	0.00
Pipe 19	128	6	140	488.88	5.55	17.18
Pipe 20	555	6	140	488.88	5.55	17.18
Pipe 21	175	6	140	488.88	5.55	17.18
Pipe 22	325	2	140	0.00	0.00	0.00
Pipe 23	175	4	140	0.00	0.00	0.00
Pipe 24	115	4	140	0.00	0.00	0.00
Pipe 25	25	4	140	-1.36	0.03	0.00
Pipe 26	335	2	140	0.00	0.00	0.00
Pipe 27	90	2	140	1.36	0.14	0.07
Pipe 28	150	2	140	1.36	0.14	0.07
Pipe 29	150	2	140	1.36	0.14	0.07
Pipe 30	101	6	140	-490.24	5.56	17.27
Pipe 34	190	6	140	488.88	5.55	17.18
Pipe 35	200	4	140	0.00	0.00	0.00
Pipe 36	170	2	140	2.04	0.21	0.14
Pipe 37	170	2	140	2.04	0.21	0.14
Pipe 38	80	2	140	2.04	0.21	0.14
Pipe 39	2275	2	140	2.04	0.21	0.14
Pipe 40	425	4	140	-229.70	5.86	30.57
Pipe 41	280	4	140	-230.38	5.88	30.73
Pipe 42	205	4	140	-230.38	5.88	30.73
Pipe 43	210	8	140	62.44	0.40	0.09
Pipe 44	225	8	140	62.44	0.40	0.09
Pipe 45	215	8	140	62.44	0.40	0.09
Pipe 46	155	8	140	62.44	0.40	0.09

Discovery Bay – 2044 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 47	1020	4	140	-2.72	0.07	0.01
Pipe 48	150	8	140	59.72	0.38	0.09
Pipe 49	355	8	140	18.37	0.12	0.01
Pipe 50	375	8	140	38.97	0.25	0.04
Pipe 51	430	2	140	0.00	0.00	0.00
Pipe 54	190	8	140	232.45	1.48	1.07
Pipe 55	115	8	140	232.45	1.48	1.07
Pipe 56	160	8	140	232.45	1.48	1.07
Pipe 57	200	8	140	230.75	1.47	1.05
Pipe 58	90	8	140	230.75	1.47	1.05
Pipe 59	85	4	140	-166.61	4.25	16.86
Pipe 60	20	4	140	63.77	1.63	2.85
Pipe 61	110	4	140	63.77	1.63	2.85
Pipe 62	145	4	140	63.77	1.63	2.85
Pipe 63	190	4	140	63.77	1.63	2.85
Pipe 64	120	4	140	63.77	1.63	2.85
Pipe 65	200	4	140	-63.77	1.63	2.85
Pipe 66	350	6	140	-490.24	5.56	17.27
Pipe 67	155	6	140	-490.24	5.56	17.27
Pipe 68	150	6	140	-491.26	5.57	17.34
Pipe 71	200	8	140	296.22	1.89	1.67
Pipe 72	130	8	140	296.22	1.89	1.67
Pipe 73	110	8	140	-789.18	5.04	10.27
Pipe 74	110	8	140	-789.18	5.04	10.27
Pipe 75	70	8	140	-789.18	5.04	10.27
Pipe 76	245	8	140	-789.18	5.04	10.27
Pipe 77	50	8	140	-789.18	5.04	10.27
Pipe 78	315	8	140	-789.18	5.04	10.27

Discovery Bay – 2044 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 79	290	8	140	297.92	1.90	1.69
Pipe 81	165	2	140	0.00	0.00	0.00
Pipe 82	165	2	140	0.00	0.00	0.00
Pipe 83	175	8	140	-789.18	5.04	10.27
Pipe 84	190	8	140	-789.18	5.04	10.27
Pipe 85	25	8	140	-789.18	5.04	10.27
Pipe 86	25	2	140	0.00	0.00	0.00
Pipe 87	200	2	140	18.53	1.89	8.45
Pipe 88	270	2	140	20.57	2.10	10.25
Pipe 89	165	2	140	20.57	2.10	10.25
Pipe 90	240	2	140	20.57	2.10	10.25
Pipe 91	25	2	140	18.53	1.89	8.44
Pipe 92	25	2	140	18.53	1.89	8.45
Pipe 93	25	2	140	-21.98	2.24	11.58
Pipe 94	400	2	140	21.98	2.24	11.59
Pipe 95	25	2	140	-20.57	2.10	10.25
Pipe 96	160	2	140	1.41	0.14	0.07
Pipe 97	130	2	140	1.41	0.14	0.07
Pipe 98	130	2	140	1.41	0.14	0.07
Pipe 99	165	2	140	1.41	0.14	0.07
Pipe 100	25	2	140	21.98	2.24	11.58
Pipe 107	25	2	140	21.98	2.24	11.59
Pipe 108	275	2	140	0.00	0.00	0.00
Pipe 1	125	8	140	-789.18	5.04	10.27
Pipe 3	250	2	140	0.00	0.00	0.00
Pipe 4	1000	8	140	716.55	4.57	8.59
Pipe 6	25	8	140	-486.84	3.11	4.20
Pipe 10	25	2	140	0.00	0.00	0.00

Discovery Bay – 2044 Fire Flow + MDD Scenario

Link ID	Length ft	Diameter in	Roughness	Flow GPM	Velocity fps	Unit Headloss ft/Kft
Pipe 11	25	2	140	0.00	0.00	0.00
Pipe 14	25	2	140	18.53	1.89	8.44
Pipe 17	85	4	140	2.04	0.05	0.01
Pipe 31	160	4	140	2.04	0.05	0.00
Pipe 32	120	4	140	2.04	0.05	0.00
Pipe 33	350	4	140	2.04	0.05	0.00
Pipe 52	115	2	140	2.04	0.21	0.14
Pipe 53	200	2	140	2.04	0.21	0.14
Pump S02	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump S01	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP1	#N/A	#N/A	#N/A	0.00	0.00	0.00
Pump BP2	#N/A	#N/A	#N/A	0.00	0.00	0.00
Valve 12	#N/A	4	#N/A	0.00	0.00	0.00
Valve 13	#N/A	8	#N/A	62.44	0.40	107.41
Valve 2	#N/A	4	#N/A	0.00	0.00	0.00
Valve 5	#N/A	8	#N/A	716.55	4.57	69.59
Valve 9	#N/A	2	#N/A	1.41	0.14	69.60

Discovery Bay – 2044 Fire Flow + MDD Scenario

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 10	275	0.00	177.30	-42.33
Junc 11	250	0.00	339.60	38.82
Junc 13	250	0.00	339.60	38.82
Junc 14	250	0.00	339.60	38.82
Junc 16	250	0.00	339.60	38.82
Junc 17	225	0.00	339.60	49.66
Junc 18	200	0.00	337.40	59.54
Junc 19	175	0.00	324.86	64.93
Junc 20	160	0.00	327.87	72.74
Junc 21	130	0.00	327.87	85.74
Junc 22	160	0.00	321.60	70.02
Junc 23	230	0.00	341.35	48.25
Junc 27	250	0.00	339.60	38.82
Junc 28	260	0.00	339.60	34.49
Junc 29	270	0.00	339.59	30.15
Junc 30	275	1.36	339.58	27.98
Junc 31	250	0.00	339.60	38.82
Junc 32	275	0.00	339.60	27.99
Junc 33	125	0.00	321.57	85.18
Junc 34	120	0.00	321.55	87.33
Junc 35	110	0.00	321.54	91.66
Junc 36	108	2.04	321.22	92.39
Junc 37	150	0.68	334.48	79.94
Junc 38	150	0.00	343.09	83.67
Junc 39	160	1.70	350.82	82.68
Junc 40	128	0.00	243.39	50.00
Junc 41	110	0.00	243.37	57.79

Discovery Bay – 2044 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 42	100	0.00	243.35	62.11
Junc 43	75	0.00	243.34	72.94
Junc 44	92	2.72	243.33	65.57
Junc 45	60	2.38	243.32	79.43
Junc 46	20	18.37	243.32	96.77
Junc 47	50	755.52	243.31	83.76
Junc 49	130	0.00	243.39	49.13
Junc 51	225	0.00	351.62	54.87
Junc 52	200	0.00	351.42	65.61
Junc 53	190	0.00	351.30	69.89
Junc 54	165	1.70	351.13	80.65
Junc 55	160	0.00	350.92	82.72
Junc 56	225	0.00	351.57	54.84
Junc 57	190	0.00	350.68	69.62
Junc 58	165	0.00	350.27	80.28
Junc 59	160	0.00	349.73	82.21
Junc 60	160	0.00	349.39	82.06
Junc 61	200	0.00	351.00	65.43
Junc 62	230	0.00	347.39	50.87
Junc 63	230	1.02	350.07	52.02
Junc 64	235	0.00	352.67	50.98
Junc 66	230	1.70	352.18	52.94
Junc 67	225	0.00	351.84	54.96
Junc 68	250	0.00	353.80	44.98
Junc 69	255	0.00	354.93	43.30
Junc 70	275	0.00	356.93	35.50
Junc 71	315	0.00	359.45	19.26
Junc 72	350	0.00	359.96	4.32

Discovery Bay – 2044 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 73	300	0.00	363.19	27.38
Junc 74	300	0.00	364.99	28.16
Junc 75	350	0.00	366.94	7.34
Junc 76	240	0.00	183.31	-24.56
Junc 77	300	0.00	355.65	24.11
Junc 78	300	0.00	355.65	24.11
Junc 79	350	0.00	367.20	7.45
Junc 80	430	0.00	655.59	97.75
Junc 81	350	0.00	650.71	130.30
Junc 82	380	0.00	652.82	118.21
Junc 83	475	0.00	657.28	78.98
Junc 84	475	0.00	659.74	80.05
Junc 85	550	0.00	664.92	49.80
Junc 86	475	0.00	660.29	80.28
Junc 87	480	0.00	590.38	47.83
Junc 88	450	0.00	590.37	60.82
Junc 89	475	0.00	590.36	49.99
Junc 90	350	0.00	651.13	130.48
Junc 91	475	1.41	590.35	49.98
Junc 92	550	0.00	665.21	49.92
Junc 96	475	0.00	660.00	80.16
Junc 97	260	0.00	353.80	40.64
Junc 98	145	0.00	350.80	89.17
Junc 1	255	0.00	355.65	43.61
Junc 2	250	0.00	339.60	38.82
Junc 3	160	0.00	321.49	69.97
Junc 4	160	0.00	251.90	39.82
Junc 6	350	0.00	650.71	130.30

Discovery Bay – 2044 Fire Flow + MDD Scenario

Node ID	Elevation ft	Demand GPM	Head ft	Pressure psi
Junc 7	350	0.00	367.20	7.45
Junc 8	475	0.00	590.39	50.00
Junc 9	350	0.00	650.92	130.39
Junc 15	350	0.00	652.82	131.21
Junc 24	350	0.00	652.82	131.21
Junc 25	315	0.00	652.82	146.38
Junc 26	275	0.00	652.82	163.71
Junc 48	300	0.00	652.80	152.87
Junc 50	300	2.04	652.77	152.86
Resvr S02	15	0.00	15.00	0.00
Resvr S01	15	0.00	15.00	0.00
Tank R1	355	-789.18	367.20	5.29
Tank PPT	350	18.53	650.50	130.21
Tank PT1	550	-21.98	665.50	50.05

APPENDIX R
Water Use Data

CASCADIA WATER
Average Usage

Grouped by: Account No
From 1/1/2021 Through 12/31/2021

Limited to : Route No 15 - DB-Discovery Bay

Service Account No	Units No of Bills	Total Usage	Average
WATER (WTR)	**Cubic Ft**		
000000005001	3	6,385.0000	2,128.3333
000000005002	3	9,669.0000	3,223.0000
000000005003	3	6,934.0000	2,311.3333
000000005004	3	22,908.0000	7,636.0000
000000005005	2	0.0000	0.0000
000000005006	3	3,857.0000	1,285.6667
000000005007	3	3,404.0000	1,134.6667
000000005010	3	3,129.0000	1,043.0000
000000005011	3	1,466.0000	488.6667
000000005012	3	2,465.0000	821.6667
000000005014	3	4,417.0000	1,472.3333
000000005015	3	6,011.0000	2,003.6667
000000005016	3	15,250.0000	5,083.3333
000000005018	3	4,897.0000	1,632.3333
000000005021	3	4,622.0000	1,540.6667
000000005022	3	554.0000	184.6667
000000005023	3	7,874.0000	2,624.6667
000000005024	3	6,013.0000	2,004.3333
000000005029	3	9,044.0000	3,014.6667
000000005030	3	2,396.0000	798.6667
000000005031	3	7,348.0000	2,449.3333
000000005032	3	1,117.0000	372.3333
000000005034	2	6,584.0000	3,292.0000
000000005035	3	2,539.0000	846.3333
000000005036	3	4,718.0000	1,572.6667
000000005038	3	6,304.0000	2,101.3333
000000005040	3	9,807.0000	3,269.0000
000000005041	3	18,798.0000	6,266.0000
000000005042	3	8,334.0000	2,778.0000
000000005043	3	6,396.0000	2,132.0000
000000005044	3	2,776.0000	925.3333
000000005045	3	7,161.0000	2,387.0000
000000005046	3	7,747.0000	2,582.3333
000000005047	3	5,559.0000	1,853.0000

Service Account No	Units No of Bills	Total Usage	Average
000000005048	3	16,299.0000	5,433.0000
000000005049	3	4,424.0000	1,474.6667
000000005050	3	3,670.0000	1,223.3333
000000005051	3	1,834.0000	611.3333
000000005052	3	9,479.0000	3,159.6667
000000005053	3	6,584.0000	2,194.6667
000000005054	3	11,040.0000	3,680.0000
000000005055	3	5,204.0000	1,734.6667
000000005056	3	3,145.0000	1,048.3333
000000005057	3	2,498.0000	832.6667
000000005058	3	3,232.0000	1,077.3333
000000005059	3	2,028.0000	676.0000
000000005060	3	3,649.0000	1,216.3333
000000005061	3	2,002.0000	667.3333
000000005062	3	6,298.0000	2,099.3333
000000005063	3	6,026.0000	2,008.6667
000000005064	3	3,715.0000	1,238.3333
000000005065	3	3,378.0000	1,126.0000
000000005066	3	7,276.0000	2,425.3333
000000005101	3	44,984.0000	14,994.6667
000000005102	3	44,232.0000	14,744.0000
000000005103	3	54,640.0000	18,213.3333
000000005104	3	34,245.0000	11,415.0000
000000005105	3	65,685.0000	21,895.0000
000000005106	3	72,279.0000	24,093.0000
000000005107	3	40,081.0000	13,360.3333
000000005108	3	43,229.0000	14,409.6667
000005009.01	3	5,448.0000	1,816.0000
000005013.01	3	11,970.0000	3,990.0000
Grand Total for WATER - Cubic Ft	**187**	**735,057.0000**	**3,930.7861**

CASCADIA WATER
Average Usage

Grouped by: Account No
From 1/1/2022 Through 12/31/2022

Limited to : Route No 15 - DB-Discovery Bay

Service Account No	Units No of Bills	Total Usage	Average
WATER (WTR)	**Cubic Ft**		
000000005001	7	5,484.0000	783.4286
000000005002	7	11,258.0000	1,608.2857
000000005003	7	7,983.0000	1,140.4286
000000005004	7	28,819.0000	4,117.0000
000000005005	7	643.0000	91.8571
000000005006	7	3,447.0000	492.4286
000000005007	7	3,049.0000	435.5714
000000005009	4	1,950.0000	487.5000
000000005010	7	1,841.0000	263.0000
000000005011	7	1,787.0000	255.2857
000000005012	7	2,669.0000	381.2857
000000005013	6	3,414.0000	569.0000
000000005014	7	4,550.0000	650.0000
000000005015	7	7,329.0000	1,047.0000
000000005016	7	16,832.0000	2,404.5714
000000005018	7	4,592.0000	656.0000
000000005021	7	5,157.0000	736.7143
000000005022	7	678.0000	96.8571
000000005023	7	9,374.0000	1,339.1429
000000005024	7	5,413.0000	773.2857
000000005029	7	10,223.0000	1,460.4286
000000005030	7	15,115.0000	2,159.2857
000000005031	7	5,939.0000	848.4286
000000005032	7	859.0000	122.7143
000000005034	7	14,960.0000	2,137.1429
000000005035	7	2,916.0000	416.5714
000000005036	7	6,451.0000	921.5714
000000005038	7	5,735.0000	819.2857
000000005040	7	9,162.0000	1,308.8571
000000005041	7	14,244.0000	2,034.8571
000000005042	7	10,842.0000	1,548.8571
000000005043	7	6,926.0000	989.4286
000000005044	7	6,578.0000	939.7143
000000005045	7	10,021.0000	1,431.5714

Service Account No	Units No of Bills	Total Usage	Average
000000005046	7	6,940.0000	991.4286
000000005047	7	8,999.0000	1,285.5714
000000005048	7	15,464.0000	2,209.1429
000000005049	7	4,291.0000	613.0000
000000005050	7	2,905.0000	415.0000
000000005051	7	2,195.0000	313.5714
000000005052	7	9,739.0000	1,391.2857
000000005053	7	7,103.0000	1,014.7143
000000005054	7	10,321.0000	1,474.4286
000000005055	7	6,874.0000	982.0000
000000005056	7	3,579.0000	511.2857
000000005057	7	2,737.0000	391.0000
000000005058	7	3,131.0000	447.2857
000000005059	7	2,177.0000	311.0000
000000005060	7	2,605.0000	372.1429
000000005061	7	2,498.0000	356.8571
000000005062	7	5,196.0000	742.2857
000000005063	7	6,129.0000	875.5714
000000005064	7	5,846.0000	835.1429
000000005065	7	1,677.0000	239.5714
000000005066	7	4,285.0000	612.1429
000000005067	2	404.0000	202.0000
000000005101	7	39,025.0000	5,575.0000
000000005102	7	102,077.0000	14,582.4286
000000005103	7	40,965.0000	5,852.1429
000000005104	7	33,734.0000	4,819.1429
000000005105	7	35,541.0000	5,077.2857
000000005106	7	42,995.0000	6,142.1429
000000005107	7	29,636.0000	4,233.7143
000000005108	7	44,086.0000	6,298.0000
000005009.01	4	3,271.0000	817.7500
000005013.01	1	320.0000	320.0000
Grand Total for WATER - Cubic Ft	**444**	**732,985.0000**	**1,650.8671**

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	Discovery Bay Village
Population:	120 people – 65 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, Reservoir & Pumphouse 203 Fager Hill Road Port Townsend, WA 98368
Directions	Traveling West on WA 101, approximately 0.6 miles past milemarker 281 turn left on Holland Dr, after 300 feet turn right onto Honeymoon Ln, continue 0.3 miles and turn right onto Fager Hill Rd (unmarked/gravel). Tavel Northwest on Frager Hill Rd for 600 feet and turn left into the driveway for 203 Fager Hill Road. Continue on the gravel driveway past two outbuildings and take a right up a dirt access road to the system reservoir and pumphouse.
Sources	Well 1 – Well Tag: ABR271 – 30 gpm – 304’ depth (102 Honeymoon Ln) Well 2 – Well Tag: ABR017 – 50 gpm – 330’ depth (115 Freeman Ln)
Reservoirs	58,000 gallons (20’ diameter x 25’ height)
Booster Pumps	(1) Ebara EVMU(A) 5 12 (5 hp) Pressure Settings: 130-/150-psi
Pressure Tanks	(4) Amtrol WX302 (86 gallons)
Distribution Piping	▪ 2” – 7,215 ft ▪ 4” – 3,655 ft ▪ 6” – 1,805 ft ▪ 8” – 4,475 ft Total: 17,160 ft

C. Emergency Telephone Numbers and Personnel

Response to all emergencies may be initiated by calling 9-1-1.

Jefferson County Fire Protection District #5 (Discovery Bay Volunteer Fire & Rescue) serves Discovery Bay Village 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 Discovery Bay Village 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
Jefferson County	
Jefferson County Public Health	Phone: (360) 385-9400
Jefferson County Public Works	Phone: (360) 385-9160
Clallam County Emergency Management	Phone: (360) 385-9376

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/Discovery Bay Village 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 Discovery Bay Village 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 has a storage capacity of 58,000-gallons. Assuming that

only a single source is compromised, the reservoir has capacity to provide approximately 850 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 Discovery Bay Village 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

- Discovery Bay Village -

1 OVERVIEW

The Discovery Bay Village Water System (Discovery Bay) is located within unincorporated Jefferson County west of Sequim, Washington. The service area includes portions of Section 13 of Township 29 North, Range 2 West of the Willamette Meridian.

Discovery Bay Village 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. Discovery Bay currently has approximately 65 connections which consist of mostly single-family residential connections but also 9 commercial connections to the Department of Transportation and the “WorldMark Discovery Bay” condominium resort.

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

APPENDIX A
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

MOA TEL WATER SYSTEM
WALTER A MOA, MANAGER
154 STATE ROUTE 20
PORT ANGELES, WA 98368

Re: Cascadia Water – Discovery Bay Village - Water System Plan (WSP) Update

Dear Mr. Moa,

Cascadia Water, which owns the Discovery Bay Village. 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

Local Government Consistency Determination

Local Government Consistency Determination Form

331-568 • 8/10/2023

Water System Name: Discovery Bay Village PWS ID: 19430 W

Planning/Engineering Document Title: Discovery Bay Village – Water System Plan – Part B Plan Date: May 2024

Local Government with Jurisdiction Conducting Review: Jefferson 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	Not Applicable
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.	-	Yes

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.

Joel M Peterson
Signature

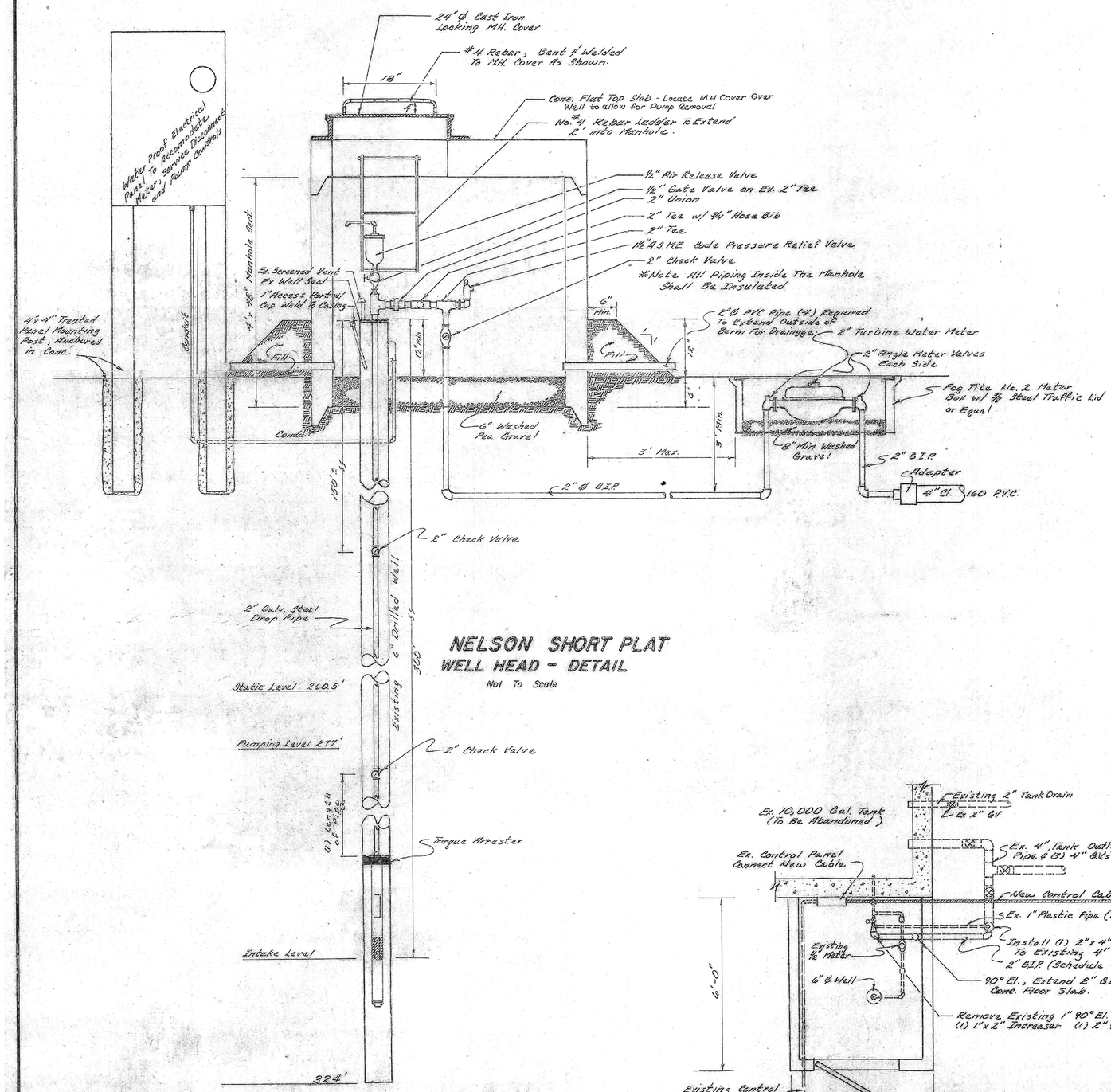
1/30/2025
Date

Joel M. Peterson, Associate Planner, Jefferson County
Printed Name, Title, & Jurisdiction

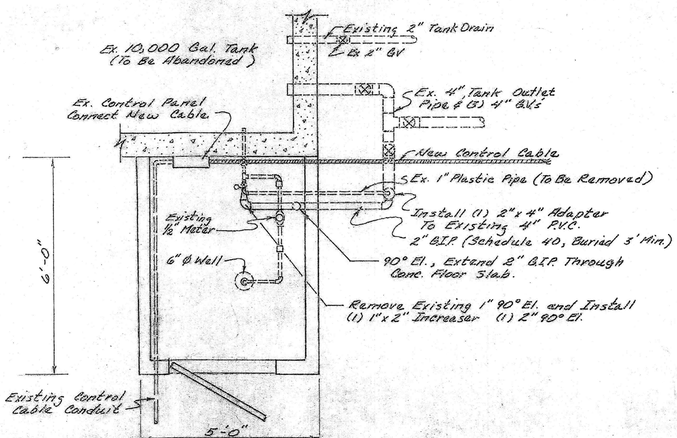
APPENDIX V
Water System Drawings

Detail Sta. 7+50
8"x4" Tee
4" Cl. 160 P.V.C.
Cut Ex 4" Line & Install
(1) 4" Tee
(2) 4" G.V.
From Well
8" Cl. 160
Ex 4" Cl. 160 P.V.C.
Sta. 12+80 Pressure Tank House (See Detail Sht. 3)
SERVICE AREA BOUNDARY
TRACT 1
TRACT 2
TRACT 3
TRACT 4
TRACT 5
TRACT 6
FREEMAN - NELSON 5 ACRE TRACTS
Sta. 8+40 = 0+00 SW (1) 2" Tee (1) 2" G.V.
Sta. 0+00 (2") Booster Pump House (See Detail Sht. 2)
Sta. 27+50 Conc. Reservoir (See Detail Sht. 2)
Sta. 5+50 (1) A.R.V. & B.O. Combination
Access Road To Be Constructed By Others
Sta. 25+75 (1) 90° Bend (1) B.O.
Sta. 21+00 (1) 90° Bend (1) ARV
Sta. 20+50 (1) 90° Bend
Sta. 24+25 (1) 90° Bend
Sta. 14+75 (1) 8"x4" Tee (1) 4"x2" Reducer (1) 2" 45° Bend (1) 2" G.V.
Sta. 2+75 (2") (1) ARV & B.O. Combination
Sta. 3+50 (2") (1) ARV & B.O. Combination
Sta. 11+25 (1) B.O.
Sta. 16+50 (1) 8"x4" Tee (1) 4x2 Reducer (1) 2" 45° Ell. (1) 2" G.V.
Protected Area Around Well
Ex. Well, Pump House & Reservoir (See Detail Sht. 3)
Sta. 7+50 (See Detail Above)
100' R.
Sta. 3+10 (2") (1) A.R.V. & B.O. Combination
Sta. 5+25 (1) B.O.
Existing 4" Cl. 160 P.V.C.
Install Fire Hydrant
Ex. 8" Cl. 200 P.V.C.
Sta. 0+00 (8") Connect To Ex. 8" Stub (1) 8" G.V.
Sta. 7+90 BK. Install (1) B.O.
Sta. 4+00 (2") (1) B.O.
20' Esmt.
2" Cl. 160 PVC
Connect To Ex. 4" Stub (1) 4x2 Reducer Ex. 4" G.V.
WATERFRONT LOTS
D.B.A. Water System Main Line
Ex. 4"
HONEYMOON LANE
8" Cl. 160 P.V.C.
PLAT OF DISCOVERY BAY VILLAGE
Sta. 13+75 (8") ~ 18+50 (6") (1) 8" Tee (1) 8" G.V.'s (1) 8"x6" Reducer (1) 6" G.V.
Sta. 17+90 (1) ARV
D.B.A. TENNIS COURT COMPLEX
DRIVE Existing 4" Cl. 160 P.V.C.
Sta. 3+60 BK. Install (1) ARV
Sta. 1+90 BK. Install (1) B.O.
HOLLAND
Existing B.O.
33 Sta 0+00 (AHD & BK) Connect To Ex. 4" P.V.C. Pipe
Ex. 2" G.V.
Ex. 2" Ø P.V.C.
State HWY 101
Old Olympic HWY
C.M. St. P. & P. Railroad
DISCOVERY BAY ASSOCIATES DEVELOPMENTS
PORT DISCOVERY
HONEYMOON
6" Cl. 160 P.V.C.
Sta. 12+00 (1) B.O.
Sta. 1+50 (1) 4"x2" Tee (1) 2" G.V.
Sta. 10+20 = 0+00 NW (1) 6x4" Tee (1) 4" G.V. (2) 6" G.V.
MANZANITA ROAD
Sta. 6+00 (1) B.O.
Sta. 9+00 (1) 90° Bend
Sta. 3+50 = Sta 0+00, So. (1) 6" Tee (1) 6"x2" Reducer (1) 2" G.V.
Sta. 3+10 (1) B.O.
To State Maint. Shed
D.B.A. BOAT STORAGE
Protected Area Around Well
Sta. 8+50 Existing 6" Ø Well
Sta. 7+30 (1) ARV.
Sta. 2+75 (1) 4"x2" Tee (1) 2" G.V.
4" Cl. 160 P.V.C.
ENTERPRISE AVE.
Sta. 4+35 (1) 4"x2" Tee (1) 2" G.V.
Sta. 2+50 (2") (1) B.O.
2" Cl. 160 P.V.C.
NELSON SHORT PLAT
SCALE 1" = 100'
DATUM
M.L.L.W.
Legend
Meter Box (Single Service)
Meter Box (Double Service)
Air Relief Valve Assembly
Blow Off Valve Assembly
Gate Valve
Existing Gate Valve
Water Line
Extra Depth Water / Power Line
29 Non Building Sites
Fire Hydrant
REV'D 2-83 6" MAIN
REV'D 3-82 NAME CHG.
To Gardiner
DISCOVERY BAY
101
HWY 20
Anderson Rd.
Project Site
Discovery Bay Village
Disc. Bay Lodge
Old Oly. HWY
VICINITY MAP
NOT TO SCALE
HERBERT A. ARMSTRONG
Sec. 13, T. 29 N, R. 2 W, W.M.
DISCOVERY BAY VILLAGE
WATER SYSTEM PLAN
Jefferson County
Washington.
PREPARED BY:
ROATS ENGINEERING
P.O. BOX 995
POULSBO, WASHINGTON
DRAWN: G.R.S.
CHECKED: M.R.A.
SCALE: As Shown
DRAWING NUMBER 12B-1
F.B.:
DATE: 1981
SHEET 1 OF 3

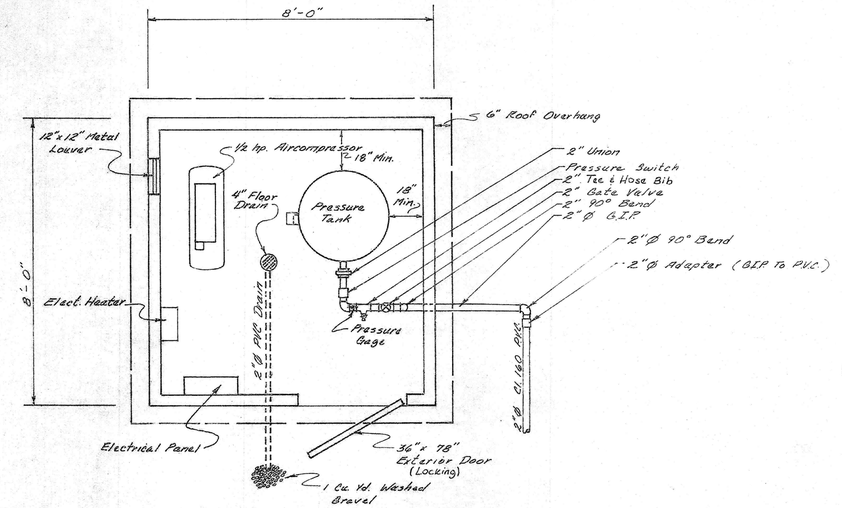
Water System Design Drawings



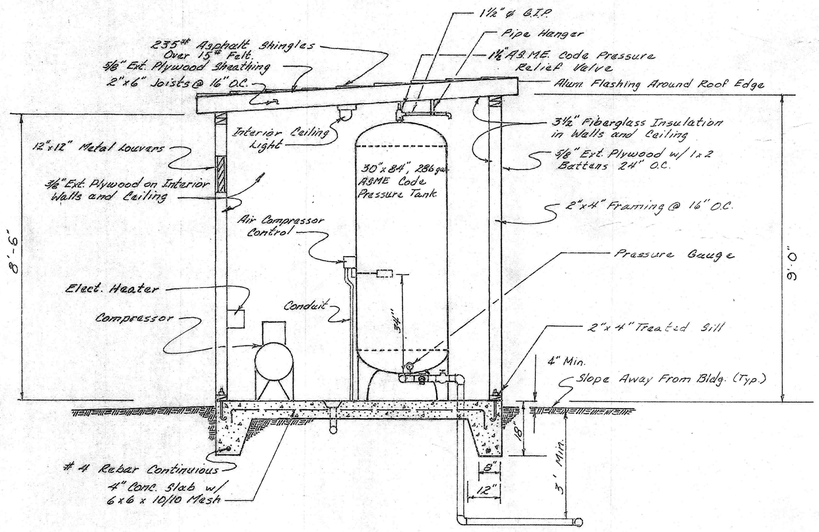
NELSON SHORT PLAT
WELL HEAD - DETAIL
Not To Scale



Lot 72 Discovery Bay Village
EXISTING PUMP HOUSE MODIFICATION
DETAIL ..... Not To Scale



PLAN



ELEVATION

PRESSURE TANK and BUILDING DETAIL
N.T.S.

HERBERT A. ARMSTRONG
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR

Herbert A. Armstrong

REVD 3-82 NAME CHG.

Sec. 13, T. 29 N., R. 2 W., W.M.

DISCOVERY BAY VILLAGE WATER SYSTEM DETAILS

Jefferson County Washington

PREPARED BY:

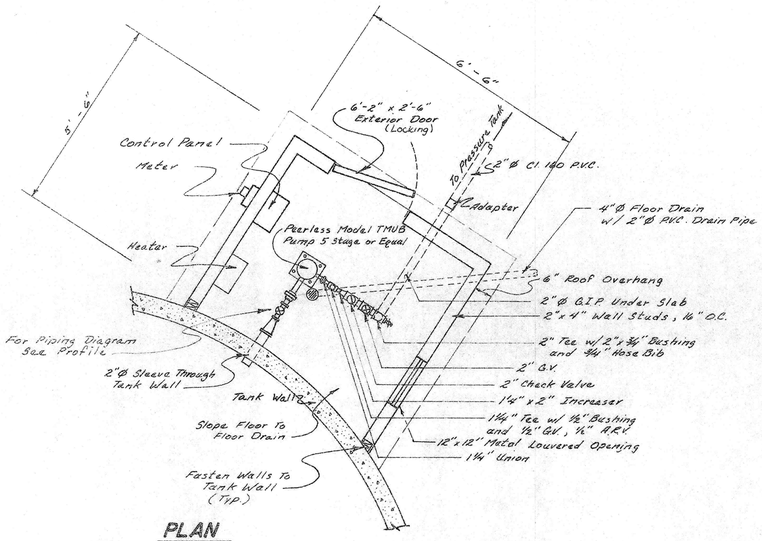
ROATS ENGINEERING

P.O. BOX 995 POULSBO, WASHINGTON

DRAWN: G.R.S.	CHECKED: M.R.A.	SCALE: As Shown	DRAWING NUMBER
F. B.:	DATE: 1981	SHEET 3 OF 3	12B-3

Water System Design Drawings

Discovery Bay Village
Water System
(Sht 002 of 3)



PLAN

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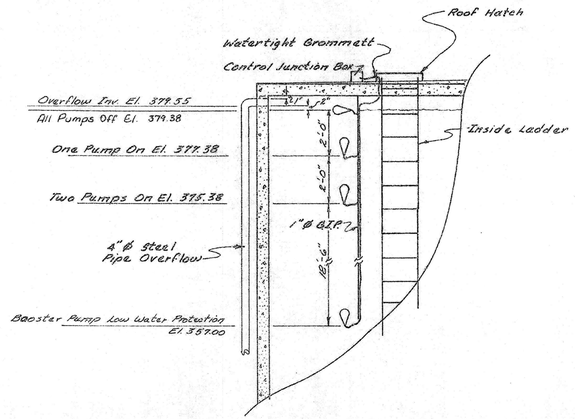

LEVEL CONTROL DETAIL

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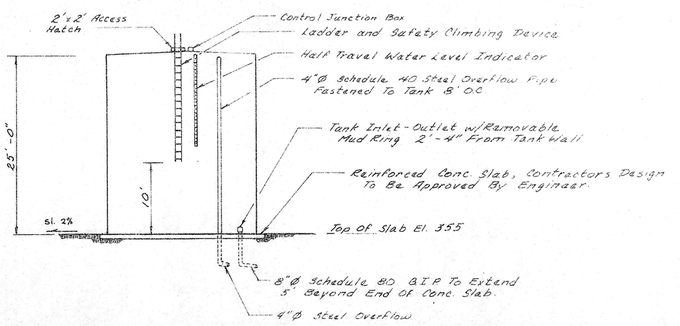
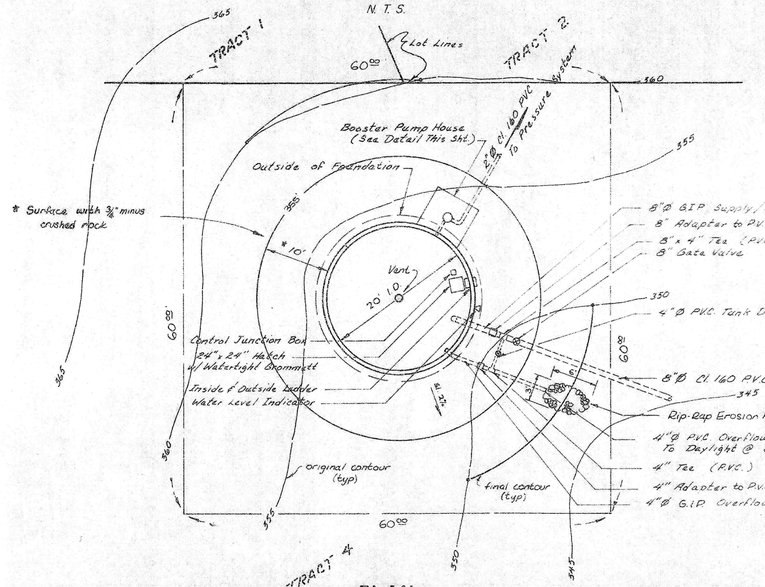


PROFILE

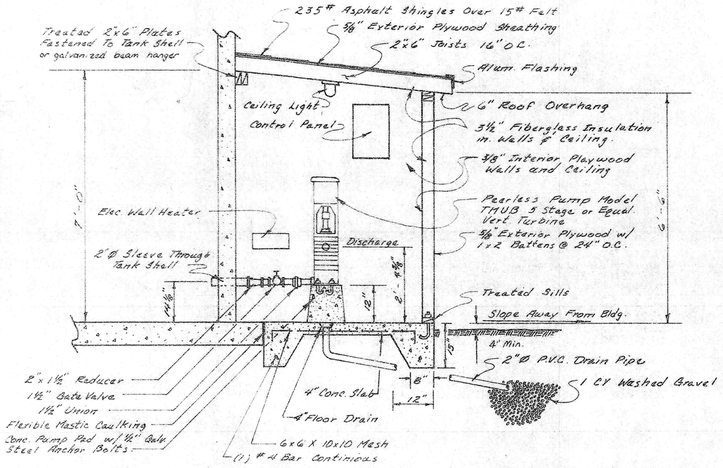
N.T.S.



PLAN

CONCRETE STORAGE RESEVOIR DETAIL and GRADING PLAN

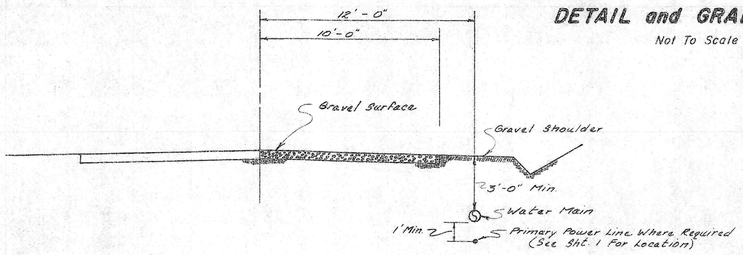
Not To Scale



PROFILE

BOOSTER PUMP HOUSE DETAIL

Not To Scale



TYPICAL ROAD SECTION

N.T.S.

Herbert A. Armstrong

Sec. 13, T. 29 N., R. 2 W., W.M.

DISCOVERY BAY VILLAGE WATER SYSTEM DETAILS

Jefferson County — Washington

PREPARED BY:

ROATS ENGINEERING

P.O. BOX 995 — POULSBO, WASHINGTON

DRAWN: G.R.S.	CHECKED: M.R.A.	SCALE: As Shown	DRAWING NUMBER
F.B.:	DATE: 1981	SHEET 2 OF 3	12B-2